TIGER CONSERVATION PLAN
(2023/24 to 2033/34)

SIMILIPAL

SIMILIPAL TIGER RESERVE

Forest, Environment and Climate Change Department
Government of Odisha

Prepared by

Dr. Prakash Chand Gogineni, IFS
Field Director, Similipal Tiger Reserve-cum-
Regional Chief Conservator of Forests, Baripada

Late Bimal Kumar Jena
FOREST GUARD
(01.07.1982-22.05.2023)

Late Mathy Hansdah
FOREST RANGE OFFICER
(09.07.1982- 17.06.2023)

This Plan is dedicated to Late Bimal Kumar Jena, Forest Guard, Similipal North WL Division and Late Mathy Hansdah, Forest Range Officer, Similipal South WL Division, who made supreme sacrifice and laid down their life on Govt, duty while protecting Similipal Tiger Reserve.

ONLINE DIARY
NO. 4387/CWLW
Dt. 09/07/2024

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Government of India
Ministry of Environment, Forest & Climate Change
National Tiger Conservation Authority

F. No. 1-8/2012-NTCA (E-31569) **Dated: 05th July, 2024**

To,

The Chief Wildlife Warden,
Government of Odisha
Bhubaneswar

Sub: Approval of Tiger Conservation Plan (TCP) for the Similipal Tiger Reserve Odisha – reg.

Sir,

The draft Tiger Conservation Plan (TCP) prepared by the State of Odisha for Similipal Tiger Reserve ***under sub-section (3) of Section 38V of Wildlife (Protection) Act 1972,*** was submitted to this Authority requesting for approval under section 38O (1) (a) of the said Act.

2. After examination of the said TCP by the Technical Committee of the NTCA constituted for the purpose, observation of NTCA/ Experts were communicated to the Chief Wildlife Warden, Odisha & Field Director, Similipal Tiger Reserves, for their incorporation in TCP.

3. In this context, I am directed to say that further to the compliance furnished by the State Government and based on the recommendation of the technical committee, ***approval of the NTCA is hereby granted for the TCP of Similipal Tiger Reserve for the period from 2023-24 to 2033-2034 under section 38O (1) (a) of the Wildlife (Protection) Act 1972***, subject to following condition:

a. No deviation shall be made from the prescriptions of the TCP, read with conditions stipulated here-in, without prior approval of the NTCA u/s 38O (1) (a) of the Wildlife (Protection) Act 1972.
b. The approved TCP shall have a provision for mid-term review corresponding to the proposed period the plan for appropriate mid-course alteration, if any, as required.
c. The State Government shall comply with the guidelines and advisories issued by the NTCA/ Project Tiger from time to time and the commitments made in the tripartite Memorandum of Understanding (MoU).
d. Since the core/critical tiger habitat has the status of a National Park/Wildlife Sanctuary, all provision under Chapter IV of Wildlife (Protection) Act, 1972 would be applicable to such areas, in addition to section 51 (1C), (1D) and 55 (ab), (ac).
e. At no stage of implementation of various prescription of the TCP relating to the tiger reserve, shall overrule the provision of:

i. The Wildlife (Protection) Act, 1972
ii. The Indian Forest Act, 1927
iii. The Biological Diversity Act, 2002
iv. The Environment (Protection) Act, 1986

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v. The Forest (Conservation) Act, 1980
vi. The National Forest Policy, 1988
vii. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
viii. Directives issued from time to time by Hon'ble Supreme Court of India.

f. Deviations, if any with respect to the provisions under section 38 0 (1) (b) & (g) of the Wildlife (Protection) Act, 1972 observed/ cognized at any point of time should be brought forward for necessary evaluation and assessment of such cases/ instances by the National Tiger Conservation Authority and State Government joint team for strict compliance as well as to decide upon the future course of action under the provisions of the said Act.
g. The following need to be ensured while executing forestry operations in the buffer are of the Tiger Reserve:

i. To ensure minimum 'patch disturbance' and minimum human-wildlife conflicts, forestry operations should be restricted only in those coupes which are due for the current year.
ii. Compliance of section 38V (2) of the Wildlife (Protection) Act, 1972 should be strictly ensured.
iii. No working or camping should be permitted in the area after sunset.
iv. Daily monitoring of the tiger movement, water points and cattle kill should be done and recorded.

h. The Tourism activities should be strictly managed/regulated as per the comprehensive guidelines issued by the NTCA under section 38O (I) (C) of the Wildlife (Protection) Act, 1972 vide letter dated 15.10.2012, and under no circumstance should night tourism, monsoon tourism and tourism in village rehabilitated sites be carried out.
i. The necessary copies of the TCP will be provide to the concerned Department/ Agencies for coordinated implementation of the provisions concerned.
j. The NTCA reserves right to review modify and withdraw this approval at any time i.e. various maps indicative etc., if any of the conditions of approval are violated.
k. Final TCP should have all necessary annexure viz maps etc. duly signed by competent authority.

Yours sincerely,

Signed by
Ramesh Kumar Pandey
Date: 05-07-2024 16:34:17

(Ramesh K Pandey)
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Copy to:

1. The Principal Secretary of Forests, Government of Odisha
2. PCCF (Wildlife) and CWLW Odisha
3. AIGF (NTCA), Regional Office, Nagpur, Maharashtra
4. The Field Director, Simlipal Tiger Reserve, Odisha with a request to submit copies

PREFACE

Similipal Tiger Reserve, covering an area of 2750 sq km of forest lying on the South Eastern corner of the Deccan Peninsula in the Mayurbhanj District of Odisha, is one of the largest tracts of contiguous forest with immeasurable ecosystem service values. It forms the largest watershed of northern Odisha. The rich diversity of habitats and mosaic of landscapes also supports a fascinating floral and faunal composition. The Government has dedicated such a vast forest, to fulfil the commitment of protecting and conserving biodiversity and wildlife. Once an exclusive hunting preserve of the Maharajas of Mayurbhanj, Similipal today is the beacon of conservation. Similipal is among India's first 9 tiger reserves declared in 1973 under Project Tiger. After the amendment of the Wildlife Protection Act, 1972, in 2006, it is a statutory requirement under Section 38V to have a Tiger Conservation Plan for the area as per guidelines issued by the National Tiger Conservation Authority.

The previous Tiger Conservation Plan for Similipal Tiger Reserve was written by Dr. Anup Kumar Nayak, IFS, Field Director, Similipal Tiger Reserve-cum-Regional Chief Conservator of Forests, Baripada, for the period from 2013-14 to 2022-23. The present plan have been prepared for a period of 10 years from 2023-24 to 2032-33.

The format and write-up of this plan have been based on the Guide to Planning Wildlife Management in Protected Areas and Managed Landscapes by V.B. Sawarkar as well as the "Guidelines for Preparation of TCP" (Technical Document NTCA/01/07) issued by National Tiger Conservation Authority, MoEF, Government of India. The plan has incorporated following important interventions as per the NTCA guidelines.

- Appropriateness and adequacy of critical tiger habitat
- Protection strategies
- Monitoring Tiger, its co-predators, prey and their habitat

ACKNOWLEDGEMENT

The author is sincerely thankful to National Tiger Conservation Authority for their technical guidance and financial support for writing the Plan.

I am thankful to Sh. Debidutta Biswal, IFS, Principal Chief Conservator of Forests, Odisha and Sh. Susanta Nanda, IFS, Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden, Odisha, for their constant guidance and very useful inputs provided by them at every stage for writing this Plan. I am also thankful to Dr. Manoj V. Nair, IFS, CCF, O/o PCCF WL & CWLW, for his technical inputs and valuable suggestions for the preparation of this plan.

My thanks are also due to Dr. Samrat Gowda DS, IFS, Deputy Director, Similipal South WL Division and Shri Sai Kiran D N.,IFS, Deputy Director, Similipal North WL Division, Jashipur, without their support and suggestions the plan would never have been completed. Both Deputy Directors played a pivotal role in giving shape to the whole plan apart from contributing a lot in writing the plan for Similipal Tiger Reserve. Shri Samaresh Kumar Biswal,OFS-I(JB) Asst. Conservator of Forests, Similipal South WL Division, Shri Bidya Sagar,OFS-I(JB), Asst. Conservator of Forests, Similipal South WL Division and Shri Nikesh Mahapatra,OFS-I(JB), Asst. Conservator of Forests, Similipal North WL Division, Jashipur and Shri Pradeep Kumar Dey,OFS-I (JB), Asst. Conservator of Forests, Similipal North WL Divison, Jashipur, Dr. Harshvardhan Singh Rathore, Dr. Piyush Ranjan Soren, VAS has contributed a lot in collecting tons of data for writing the plan for the Core area and buffer area, and Ms Nibedita Nayak,OFS-I(JB), Asst. Conservator of Forests, O/o the Field Director, Similipal Tiger Reserve-cum-Regional Chief Conservator of Forests, Baripada for coordination between two Division to complete the plan and submit at the earliest to NTCA.

I am thankful to stakeholders like EDC members, revenue and police officials, other line department officials, PRI members, and NGOs for providing valuable suggestions during various meetings held with them from time to time. I am extremely thankful to the field staff of Similipal Tiger Reserve who provided all the field data for the plan.

I am very much thankful to the staff of my office for providing available data and information required for writing this plan. Thanks are also due to Range Officer of this office for arranging all the logistics during the entire period of plan preparation till the plan getting the final shape.

I am also thankful to Sri Dharani Dhara Mohakud, GUIDE, Saifuddin Mallik, GIS Analyst, Shri Sanjib Kumar Behera, DEO, Shri Pankaj Kumar Das, DEO who have taken pain in tirelessly typing, correcting, and completing the Plan in time.

Last, but not least, I am sincerely thankful to all, whose names have not been specifically mentioned but are of any kind of help and are associated, directly or indirectly, in completing the Tiger Conservation Plan.

(Dr. Prakash Chand Gogineni)
Field Director, Similipal Tiger Reserve cum
Regional Chief Conservator of Forests, Baripada

EXECUTIVE SUMMARY

Historically, wildlife managers took a restricted view of wildlife and focused primarily on game species of interest to hunters because revenue from hunting products and services provided the main funding source for program development and land acquisition. In the past several decades, ecosystem management has come to the forefront as the paradigm for modern land management. Wildlife management in an ecosystem management context is the management of rare and common habitats and animal populations for multiple uses at multiple scales to achieve ecosystem integrity and sustainable use of available resources. Management in this approach must embrace human use and employ methods to preserve, conserve, enhance, restore, and manage species and habitats. As such, the historic and current definitions of wildlife management are integrated with ecosystem management to meet the needs of society. Drastic landscape level alterations have substantially changed the potential carrying capacity for many species from historic times. Current problems including habitat loss and degradation, fragmentation of habitats, the spread of exotic floral and faunal species, pollution, and human disturbance among others, are all contributing to loss of species diversity and abundance. Wildlife management plans are essential for properly managing wildlife habitats, population, and associated recreational activities. **A management plan is a description of the short-term objectives and long-term goals that will be met by manipulation of habitat, wildlife populations, and people and how these objectives and goals will be reached.** Historically, management plans have focused primarily on increasing the abundance of game species and maximizing recreational opportunities associated with these species. Currently, management plans address threatened and endangered species and habitats, species that are not classified as rare, overall biodiversity, and quality and abundance of game species populations. Management objectives are targeted towards restoring native habitats; removing invasive, exotic species; protecting habitats for rare species; conserving and providing habitat for birds, small mammals, and herpetofauna; increasing the abundance of other species; and providing public recreational opportunities. These plans should be biologically feasible and should result in the maintenance and enhancement of wildlife populations and habitats.

The plan shall have to address a range of issues holistically including protection of the tiger reserve; provision of site-specific habitat inputs for a viable population of the tigers, co-predators and prey animals without distorting the natural prey-predator ecological cycle in the habitat; delineation of dispersal pathways and corridors and ensuring that adjoining forest divisions have forestry operations compatible to tiger conservation. In addition, the plan shall also ensure the agricultural, livelihood, developmental, and other interests of the people living in tiger-bearing forests or tiger reserves.

As per provisions under Section 38V of the Wildlife (Protection) Act, 1972, each Tiger Reserve should have a Tiger Conservation Plan. The National Tiger Conservation Authority has also issued technical guidelines for the preparation of the Tiger Conservation Plan. Thus, an attempt is made in this conservation plan to summarise the existing situation, analyze the potentials and challenges, and suggest steps that should be adopted for the long-term survival of the forest ecosystem in the Similipal landscape.

Similipal Tiger Reserve, covering an area of 2750 sq km of forest lying on the South Eastern corner of the Deccan Peninsula in the Mayurbhanj District of Odisha, is one of the largest tracts of contiguous forest with immeasurable ecosystem service values. It forms the largest watershed of northern Odisha. The rich diversity of habitats and mosaic of landscapes also supports a fascinating floral and faunal composition.

The vast terrain of Similipal with wide altitudinal, climatic, and topographic variations, crisscrossed by large number of perennial streams, harbors a unique blend of Western Ghats, Eastern Ghats, and Sub-Himalayan plant species. The floristic composition indicates a connecting link between South Indian and North Eastern Sub-Himalayan Species. The landscape supports more than 1352 plant species with 94 species of orchids of which three species are endemic. It is also the home of some endemic cultivars and aquatic grass species. *It houses 7 % of the flowering plants and 8% orchids of India.* Similipal comes under Deccan Peninsular Bio-geographic Zone, Chhotanagpur Province and Mahanadian Region. Forest is predominantly moist mixed deciduous forest with tropical semi-evergreen forest in areas with suitable microclimatic conditions and sporadic patches of dry deciduous forests and grasslands. Some patches of old plantations

of Tropical Pines and *Eucalyptus* are also present. The rich diversity of habitats and mosaic of landscapes with wide altitudinal and climatic variation of Similipal supports a fascinating faunal composition. There are 55 species of mammals, 361 species of birds, 62 species of reptiles, 21 species of amphibians, and many species of insects and microfauna. Similipal Tiger Reserve has the largest source population of wild tigers. It is also the only home of the unique melanistic tigers. Similipal Tiger Reserve also has a rich history of conservation. It is also famous for Padmashree Late Saroj Raj Chowdhury, its founder Director, and the tigress "Khairi", his foster daughter. Similipal has come under the Global Network of Biospheres since 2009.

Protection of this vast and unique habitat is the major challenge in front of the Park Managers. The major threat to Similipal is the vastness of the area and high anthropogenic pressure coming from 68 villages situated within the park and about 1200 villages in the surroundings. The area is dominated by tribal who are born hunters. They have a unique tradition of mass hunting called *Akhand Shikar* which poses a serious threat to the animal population of the park. The situation is aggravated by the intrusion of poachers from the adjoining Jharkhand state who instigate local tribal for elephant poaching.

While the tiger reserve is under the control of the Field Director, he is assisted by two Deputy Directors of Similipal South & North WL Divisions who look after the Similipal Wildlife Sanctuary and three territorial DFOs having jurisdiction over the buffer area of Tiger Reserve beyond the limits of Similipal Wildlife Sanctuary. Coordination between core and buffer staff is an important aspect of strengthening the protection mechanism of the park.

In March & April 2009 the park witnessed unprecedented devastation due to a series of Naxalite attacks followed by rampant poaching, tree felling, and damage to infrastructures by opportunistic neighbouring villagers. All the protection camps remained vacant after the attack for about a year and the park was open to all types of ravages. This resulted in a drastic reduction in prey base of large carnivores and also depletion in vegetation with selective felling of *Bija*, Sal, and *Sissoo* trees. The morale of the staff was at its lowest. The efforts on the part of the park authorities to overcoming the above threats resulted in the gradual restoration of normalcy and strengthened protection of the park with visible impact.

The conservation and management of Tiger Reserves is a complex task with limited financial and organizational capacity. It is important to invest the efforts in the most critical areas to ensure that the available resources are applied to their maximum effectiveness. During the previous plan period, there has been significant improvement in infrastructure for the protection of wildlife. Due to the plugging of loopholes, the tiger population in the tiger is on the path of recovery. The number of unique tigers captured in the tiger reserve has improved from 05 (five) in AITE, 2014, to 16 (sixteen) in AITE, 2022. Due to efficient management of resources, Similipal TR, scored 90.15 % in the 5th Cycle of Management Effectiveness Evaluation, 2022, and has been placed at rank 11 amongst the 12 tiger reserves that are put under Excellent Category.

The protection efforts faced setbacks again in the year 2023 when two officials were murdered by armed poachers inside the core area of the tiger reserve in the line of duty. The forest administration took immediate steps to re-organize the protection efforts and restore normalcy in Similipal TR. Modern arms with adequate training have been provided to the frontline staff. Massive use of technology to detect intrusion, collection of intelligence, and enforcement activities have been revamped. The welfare of frontline staff of the tiger reserve and their families is also actively being taken care of.

The previous Management Plan for Similipal Tiger Reserve was written by Dr. Anup Kumar Nayak, IFS, for the period from 2013-14 to 2023-24. The present plan has been prepared for 10 years from 2023-24 to 2032-33.

Objective of the Tiger Conservation Plan

The objective of this plan is the protection of the Similipal Tiger Reserve by providing site-specific habitat inputs based on sound principles of natural resource management and developing a framework for compatible land use in the adjoining area.

The Planning Process

The process of preparation of this plan is:

1. Assessment of the existing situation of the area including its importance for tiger conservation, the effectiveness of the current protection and management strategies, the risks or threat perception, the number of competing interests, the level of stakeholders' involvement, and the issues arising from outside the Tiger Reserve.
2. Setting up realistic management goals and objectives for the Tiger Reserve based on the baseline information and problem analysis for achieving the objectives.
3. Evolving strategies for achieving the objectives based on sound planning principles.
4. Prescribing monitoring and evaluation mechanisms for measuring performance and taking corrective actions necessary to achieve planned results.

While preparing the plan the essentials of the suggested inputs have been developed based on:

- Past management plans written for the area, the history of management based on those plans, and their implications.
- Various research documents of the experts and scientists of the studies conducted in the park on various subjects of conservation and general literature available on the related subjects.
- Reports of NTCA, WII, FSI, and other national organizations.
- Best practices of wildlife management followed in other Protected Areas of the country and outside.
- Views emerged during consultation with various stakeholders regarding protection and other issues relating to Similipal.

Components of the Tiger Conservation Plan

The Tiger Conservation Plan has three major components to address three different areas: core, buffer, and indicative plan for corridors and connectivity. The different components and sub-components are described briefly below.

The entire Critical Tiger Habitat over 1194.75 km² has been brought under the Core Area Plan. The core area lies under the administrative jurisdiction of Similipal South (841.57 km²) and Similipal North WL Divisions (841.57 km²). The Buffer Area is 1555.25 km² and is distributed in five Divisions namely Similipal South WL Division (406.01 km²), Similipal North WL Division (705.85 km²), Baripada (70.01 km²), Rairangpur (181.28 km²) and Karanjia Division (192.01 km²).

Tigers need inviolate space to breed and flourish. The villages located in the core area of Similipal TR have been voluntarily relocated and rehabilitated to provide inviolate space for wildlife. In the previous plan period, a total of 82 families of 4 villages/hamlets from the core area of the tiger have been relocated as per Relocation and rehabilitation guidelines issued by the NTCA, and Govt. of Odisha, from time to time. Further, efforts will be made to voluntarily relocate the Bakua Village, which is the only village now located in the core area. Further, voluntary relocation from the buffer area of the TR to the outside will also be carried out if applications are received from the villagers.

The objective of managing the core area is to keep the area completely inviolate with minimal intervention. Accordingly, the area has been divided into three zones, i.e., 1. Fully inviolate Zone, 2. Restoration Zone (revenue villages after relocation to be developed as meadows) and 3. Eco-tourism Zone.

Similarly, the buffer area has been divided into 4 zones namely, 1. Traditional Use Zone, 2. Eco-tourism Zone, 3. Eco-development Zone, 4. Biodiversity Conservation Zone.

A Security Plan as a theme plan of protection has been elaborately prepared for the entire Tiger Reserve. The highlights are:

1. Extensive patrolling on foot has been given importance in the plan
2. Revisiting of the location of anti poaching camps and proposal for relocating the camps to the periphery for keeping the core undisturbed.
3. Special strategies for monsoon patrolling and prevention of *Akhand Shikar*
4. Intra-divisional coordination and coordination with police for joint patrolling strategy.
5. Intelligence gathering with the involvement of EDCs
6. Establishment of a Court liaison unit
7. Deployment of Special Tiger Protection Force (STPF) consisting of 108 armed Forest Guards, 3 Range Officers and 1 ACF with all infrastructures.
8. Raising of dog squads for detection of poisoning spots and search operation of wild animal articles.
9. Strengthening of infrastructure and capacity building program for staff

A strategy for forest fire control and prevention has been prepared elaborating the duties and responsibilities at all level. As per guidelines issued by the Govt. of Odisha, each year the District Action Plan will be prepared to tackle forest fire disasters in the tiger reserve.

Maintenance of boundaries is an important component of management. The core boundary is demarcated with paintings of trees. Where the core boundary coincides with the village boundary masonry pillars have been proposed to prevent encroachment.

The habitat management aiming at a good prey base, supporting viable population of tiger and co-predators is the main objective of the theme plan. The main component is the grassland & meadow management. There are very few open spaces like meadows and grasslands available for herbivores which are less than 2% of the tiger reserve area. The present tiger density is less than the carrying capacity of Tigers in STR. Unless maintained regularly there will be invasion of obnoxious weeds and woody species in the grasslands reducing its efficiency. The proposal has been made for regular maintenance of grasslands and meadows and their mapping.

Staff housing facilities for the frontline staff are now adequate in the reserve. As the inaccessible and remote location of their headquarters is not suitable for keeping families and providing education to their children proposal for group housing outside the reserve for family accommodation of the field staff has been proposed.

Research inputs on Ecological, Biological, and Socio-Economic parameters are urgently required for sound PA management and biodiversity conservation has been proposed. Training is the most crucial part of the management. The challenging wildlife conservation scenario today requires committed wildlife managers who possess scientific competence and social awareness aided by communication skills. They also need sharp detection and enforcement capabilities against organized criminal elements nursed by big-money illegal trade. Accomplished wildlife biologists and social scientists are also necessary. Frontline staff equally must have similar skills at the grassroots level. The current capacity building and personnel planning and management measures need to be greatly strengthened to meet these challenges. Therefore, the training programs aimed at upgrading the skill levels of the staff to match these challenges have to be part of the routine rather than an exception.

The tiger population management and monitoring is the most challenging task of the frontline staff and field officers. However, these management and conservation efforts are constrained by the absence of information-based and reliable monitoring system in place. The basic information such as the distribution and densities of the tiger, its co-predators, and prey population in the reserve is an important consideration for the management, hence the importance is given in this plan. The annual Phase IV tiger monitoring programme as per NTCA protocol has been discussed. A Tiger Cell has been established for year-round monitoring of the tiger population and their occupancy.

Ecotourism in Similipal is restricted mostly to buffer areas only and very few areas in the core is used for tourism. Eco-tourism activities are proposed to be developed in buffer and adjoining areas with the development of new destinations and substantial involvement of local community. Nature education programs for all stakeholders have been proposed.

In the buffer area to rejuvenate the degraded and denuded forest ecosystem, by adopting scientifically proven soil and water conservation methods and strategies to regenerate the natural and native vegetation, preferably bamboo forests, swamps, dry deciduous forests, and mountain grasslands have been proposed.

Massive Eco Development programs in the buffer villages to involve people participation and build up the support of stakeholders against any negative impact on biodiversity, its maintenance, and conservation have been suggested.

Wildlife health care and population management of each mega species have been elaborately discussed. The vaccination programme to create the immunity belt around the reserve has been the focal point in the plan. The management of captive elephants, their upkeep, health management, and engaging them for the physical work has been planned meticulously. The diet chart for the elephant has been worked out scientifically and will be reviewed by Veterinary Doctors and experts accordingly.

The emphasis is given to the staff deployment and staff development issues in the plan. The basic facilities for the staff and infrastructural up-gradation in the reserve gained importance in the plan. The Tiger Reserve Divisions have been restructured for smooth management and the entire TR has been brought under the unified control of the Field Director.

The plan objectives for the buffer area and scope of implementation and buffer area problems like man-animal conflict etc., have been discussed more elaborately in the buffer area plan.

Potential corridors connecting Similipal with other protected areas and forest areas have been identified and a strategy for protection and management of the corridors ensuring the safe passage of wild animals has been proposed in the Corridor Area Plan.

The annual budget for the plan period has been worked out by considering the ground realities. The budget source and the fund mobilization strategy have been identified. The man-animal conflict and the solution and also strategy to handle the problem have been discussed in the plan. The overall aim and objective of the plan is for biodiversity conservation keeping the tiger at the apex as it is the flagship species of conservation. The plan implementation has to be through the involvement of people as it is a people-participatory program.

As a standard practice with planning documents, all supportive detailed information in maps and annexures have been appended to the plan.

Plan Period

The plan has been prepared for a period of 10 years starting from the year 2023-24 to 2032-33. If any provision of the prescription is found incompatible to wildlife conservation during implementation the same can be revised/modified to suit the purpose during the plan period.

LIST OF CONTRIBUTORS FOR THE PLAN

Sl. No.	Name of the officers	Designation
01.	Shri M. Jogajayanand,IFS	Field Director, Similipal Tiger Reserve-cum-Regional Chief Conservator of Forests, Baripada.
02.	Shri T. Ashok Kumar,IFS	Field Director, Similipal Tiger Reserve-cum-Regional Chief Conservator of Forests, Baripada.
03.	Dr. Prakash Chand Gogineni,IFS	Field Director, Similipal Tiger Reserve-cum-Regional Chief Conservator of Forests, Baripada.
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05.	Shri Sai Kiran DN,IFS	Deputy Director, Similipal North WL Division, Jashipur.
06.	Shri Samaresh Kumar Biswal, OFS-I(JB)	Asst. Conservator of Forests, Similipal South WL Division, Baripada.
07.	Shri Bidya Sagar, OFS-I(JB)	Asst. Conservator of Forests, Similipal South WL Division, Baripada.
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09.	Shri Nikesh Kumar Mahapatra, OFS-I(JB)	Asst. Conservator of Forests, Similipal North WL Division, Jashipur.
10.	Miss Nibedita Nayak,OFS-I(JB)	Asst. Conservator of Forests, O/o Field Director, Similipal Tiger Reserve-cum-RCCF, Baripada.
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12.	Dr. Harshvardhan Singh Rathore	Researcher, WII, Dehradun.
13.	Sh. Saifuddin Mallik	GIS Expert, GIS Cell, O/o Field Director, Similipal Tiger Reserve-cum-RCCF, Baripada.
14.	Sh. Dharanidhar Mahakud	Guide, O/o Deputy Director, Similipal South WL Division, Baripada.

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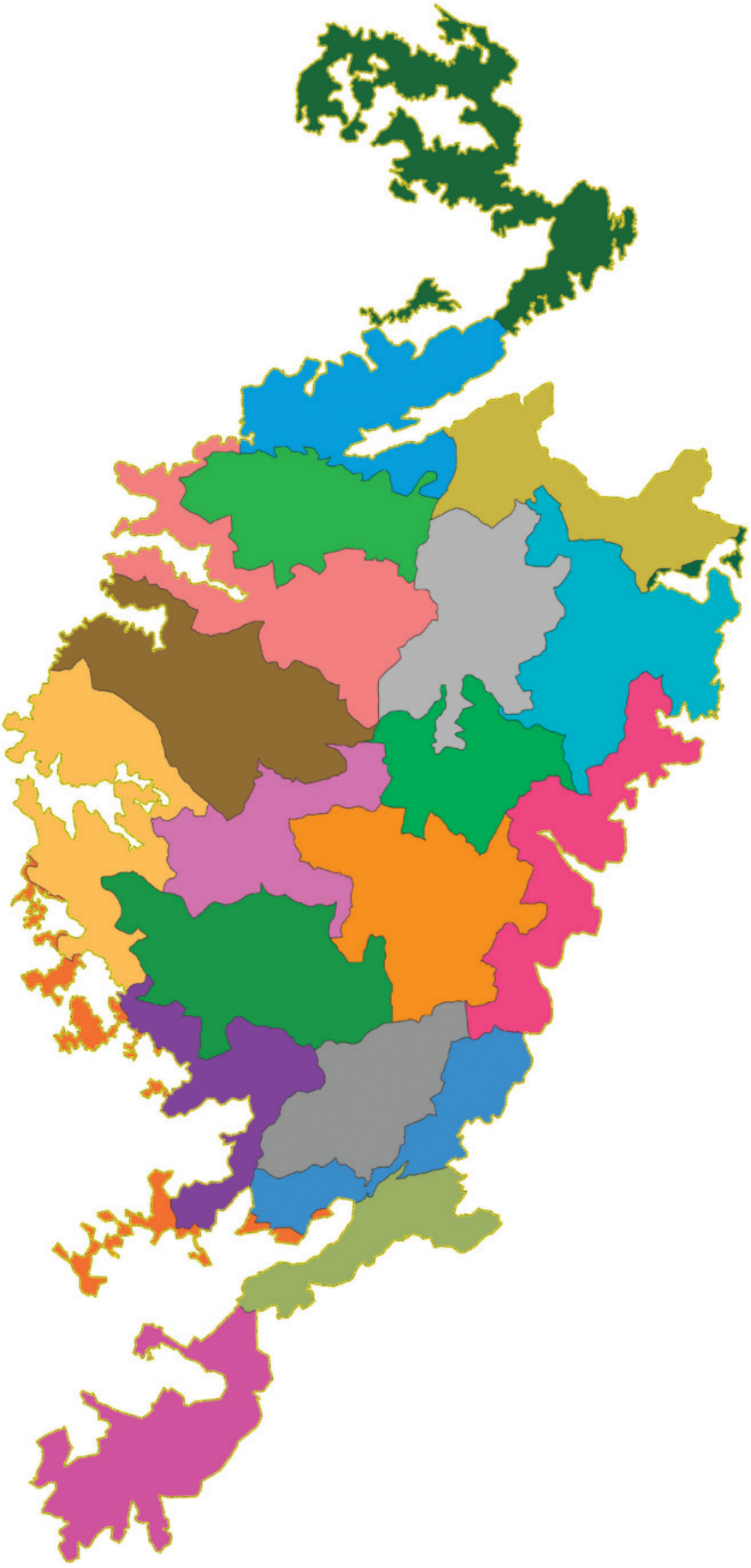


INTRODUCTION

DESCRIPTION OF THE TIGER CONSERVATION UNIT/ LANDSCAPE AND SIGNIFICANCE OF THE AREA FOR TIGER CONSERVATION.

Tiger inhabited forests in India are classified into five major tiger landscapes which are also called as Tiger Conservation Units. Currently tigers occur largely in the forest areas of 18 States in India. Nagaland, Meghalaya, Tripura, and Haryana have reports of occasional tiger occurrence. The distribution of tigers and their density in these forests vary on account of several ecological and anthropogenic factors like forest cover, terrain, natural prey availability, presence of undisturbed habitat and the quality of managerial efforts taken towards protection. Each of the TCU is considered to have tiger population sharing same genetic pool since the areas comprising these units are contiguous and historically have had good connectivity over long time. Tiger population in a TCU is also a source population for the adjoining protected areas and hence their conservation is essential for the maintenance of tiger population on a long term basis.

Similipal Tiger Reserve is the part of larger Central Indian landscape complex and specifically it is part of the Similipal – Hadagarh – Satkosia landscape unit. The Tigers in Similipal &Satkosia represent a unique lineage (Kolipakam et al. 2019). The closest genetic clusters of tigers of Odisha are found in Bandhavgarh TR in Madhya Pradesh (NTCA).Similipal has the single largest population of tigers in Odisha.

Map of Tiger Reserves in Central India& Eastern Ghats Landscape.

Biogeographic classification of Similipal Tiger Reserve.

Biogeographic Zone	Deccan Peninsula
Biogeographic province	Chhotanagpur
Biogeographic Region	Mahanadian

Similipal Tiger Reserve covers an area of 2750 km² covering Similipal RF and the surrounding contiguous Reserved Forests, Proposed Reserved Forests. The total breakup of land in the landscape and the boundary description is given in Annexure V.

SIGNIFICANCE OF THE AREA FOR TIGER CONSERVATION

Similipal stands ahead of any other Tiger Reserve in the country for long term conservation of tiger and its habitat because of the following reasons:

1. Similipal is the only home for the genetically unique pseudo-melanistic tigers. The tigers in Similipal represent a unique lineage of Central India Tiger Population in which the pseudo melanistic tigers are found.
2. Similipal has the potential to restock tiger population in the eastern region of the Central-India Landscape in general and the forests of Odisha. The forests of Rourkela, Bonei, and Sundargarh Divisions together with Bamra and Debrigarh WL divisions have the potential to sustain tigers of Similipal through forest corridors of Dhenkanal & Keonjhar WL Divisions (NTCA, 2018). A viable corridor exists between Similipal & Satkosia TRs. As tiger is locally extinct in Satkosia TR, Similipal is now the potential source for its restocking. Effective protection of tiger corridors within the state & across the neighbouring states will foster a viable tiger population with long term survival.

Map of the Tiger conservation Unit/ Landscape

3. The vastness of its area: The area of the Reserve extends over 2750 km^2 adorning it as the sixth largest in the Tiger Reserve network of India.

4. The presence of innumerable hills, dales and perennial streams makes Similipal an ideal haunt for tigers, co-predators and prey animals.

5. Similipal forests account for more than one-fourth of the total geographical area and two-third of total forest area of the district of Mayurbhanj. The surrounding forests have been well preserved by the people.

6. Except small scale mining activities at few locations like Badampahad, Kuldiha, nilgiri etc., no major industrial activity exists in close proximity to the TR. The district has mostly forest & agriculture-based economy with more emphasis on forest resources. Hence people are oriented towards forest conservation for sustaining their livelihood.

7. Similipal massif reaching beyond 1100m elevation at many locations has profound influence on the climate regime in the adjoining region including the adjoining districts of West Bengal & Jharkhand. It receives more than **2000 mm** rainfall on average each year. Innumerable rivers & streams originate from Similipal providing water all round the year in the plains surrounding it.

8. Traditional mass hunting practices (Akhand Shikar) by the tribals has dwindled over the past decade due to effective protection measures and massive participatory awareness campaigns. Organised poaching has also reduced to considerable extent. However, Sporadic poaching & hunting in small groups is still prevalent. With continuous efforts on effective protection & awareness activities, poaching & hunting in Similipal landscape will be a thing of past.

9. Consistent effort on relocation of villages from the core area and development of meadows at the relocated site has provided inviolate space for revival of tiger population, its co-predators & their prey base in Similipal.

10. Eco-Tourism has potential to provide alternate livelihood opportunity to the forest dependent communities in & around Similipal TR and elevate their Socio-economic conditions.

11. Similipal is the epitome of tropical forest in our country. The structural diversity and interspersion both in standing state and standing crop make it a unique ecosystem. It has therefore been declared as a Biosphere Reserve vide Notification No. 16/2/85-MAB-CSC dated 22nd June, 1996, of Ministry of Environment & Forests, Govt. of India.

LEGAL PROVISIONS CONTAINED IN THE WILDLIFE (PROTECTION) ACT REGARDING TIGER CONSERVATION PLAN AND THEIR BRIEF DESCRIPTION OF THEIR RELEVANCE IN THE TIGER CONSERVATION UNIT/LANDSCAPE

Section 38V, subsection (3), chapter IV B, of the wildlife protection Act, 1972 amended in 2006, requires every state government to prepare a tiger conservation plan for each area declared as a tiger reserve under subsection (1) of section 38 V. It also makes it mandatory to include staff development and deployment plan as an integral part of such tiger conservation plan. In the context of landscape approach to conservation, section (3) also requires the plan to ensure

a. Protection of tiger reserve while providing for site specific habitat inputs for a viable population

b. Ecologically compatible land uses in the tiger reserve and areas linking one reserve with another while addressing livelihood concerns

c. Compatibility of forestry operations in adjoining forest areas with the need of tiger conservation

Above legal provisions require the tiger reserve area to be managed as a part of larger landscape unit and all management decisions to be taken in a way that helps in improving the connectivity between different reserves that are part of the same landscape and larger landscape complex.

Section (4) requires a tiger conservation plan to ensure the agricultural, livelihood, developmental and other interests of people living inside tiger reserve and other tiger inhabited forests. This section has special relevance in the context of landscape approach as it defines tiger reserve to include core or critical tiger area habitat which are required to be kept inviolate and buffer or peripheral area where co-existence between wildlife and human activity is promoted with due recognition of rights of local people. The limits of such peripheral area are required to be determined on the basis of scientific and objective criteria in consultation with the concerned Gram Sabha and an expert committee. This legal provision firmly states that peripheral areas be given equal importance in management decisions as they are critical in providing connecting and dispersal habitat for wildlife. Besides, bringing peripheral areas under management influence of reserves will provide much needed protection to wildlife when it strays out of legal boundary of the reserve.

Section (5) provides for creation of inviolate areas for tiger conservation on the basis of voluntary relocation of people living inside the tiger inhabited areas on mutually agreed terms and conditions when other reasonable options of co-existence are not available.

DELINEATION OF AREA INTO CORE, BUFFER AND CORRIDORS

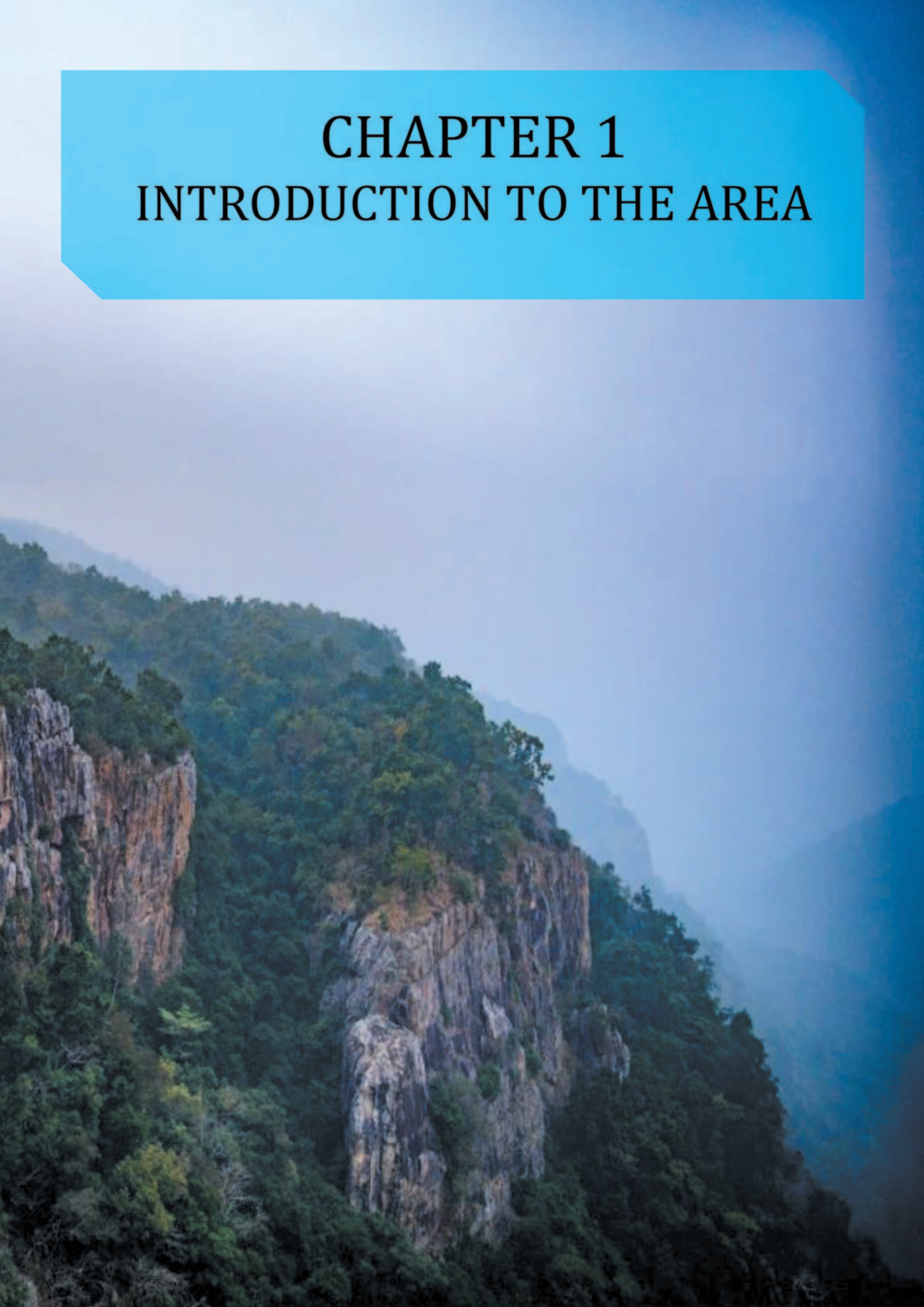
The Reserve has been delineated into core and buffer area as detailed below.

Core Area: Part of Similipal Wildlife Sanctuary (146 Compartments):	1194.75 km^2
Buffer Area: Balance of Similipal Sanctuary, 32 RF blocks, one PRF & 8 villages:	1555.25 km^2
Total:	2750.00 km^2

The boundary description and other details have been given in Annexure V.

CORE AREA

CHAPTER 1
INTRODUCTION TO THE AREA



CHAPTER

01

INTRODUCTION OF THE AREA

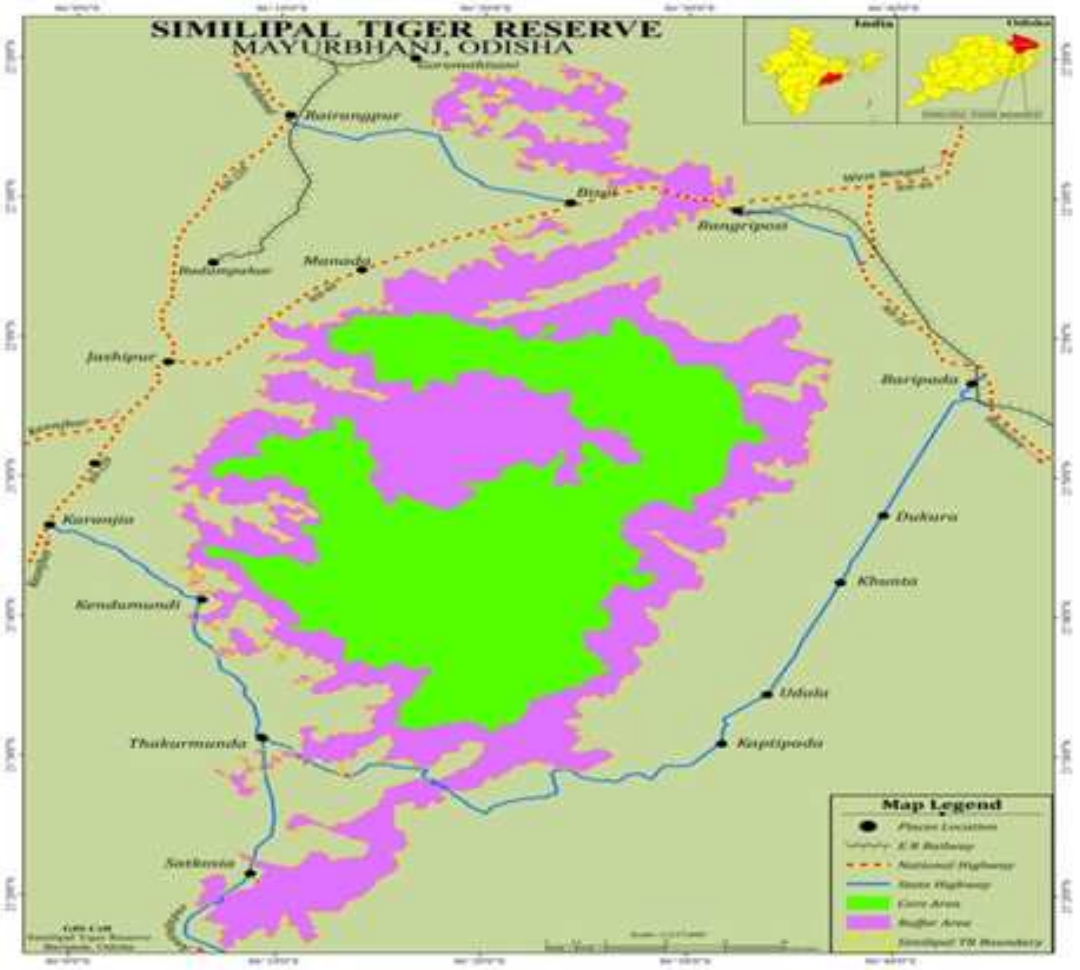
1.1.1 NAME, LOCATION, CONSTITUTION & EXTENT

1.1.2 Name Similipal Tiger Reserve

1.1.3 Location Map

Similipal Tiger Reserve is located between 21° 16' 06.7" and 22° 19' 57.8" North Latitude and 86° 04' 35.1" and 86° 37' 09.5" East Longitude. It is situated within Mayurbhanj District the Northern-most part of Odisha state and part of Hadgarh WLS which is inside TR falls in the administrative jurisdiction of Keonjhar Revenue District.

Map No.-1.A Similipal Tiger Reserve



1.1.4 Constitution

Similipal Tiger Reserve was constituted on 4th December, 1973 covering an area of 2750 km² as one of the first nine tiger reserves of India.

1.1.5 Extent (Area statement and Legal Status) :-

Initially the core area of the Similipal Tiger Reserve extended over 845.70 km² which was the area of proposed National Park. After amendment of Wildlife Protection Act in 2006 it was mandatory requirement for each Tiger Reserve to identify Core or Critical Tiger Habitat basing on scientific observation. For this purpose the Govt of Odisha vide No. 16428 Dated 16.10.2007 had constituted an Expert Committee to suggest the extent of Critical Tiger Habitat. The committee had meeting with the National Tiger Conservation Authority where the extent of the Critical Tiger Habitat for Similipal Tiger Reserve was decided to be to an extent of 1194.75 km² which was communicated vide letter no 1501/11/2007-PT(Part) Dated 03.12.2007. Accordingly the State Govt. notified the core or Critical Tiger Habitat of Similipal Tiger Reserve having an extent of 1194.75 km² which is a part of Similipal Wildlife Sanctuary. The Core or Critical Tiger Habitat has been declared under section 38 (V) of Wildlife (Protection) Act (Amended 2006}.

1.1.6 Notification

Similipal Tiger Reserve was constituted vide Govt. of Odisha Notification No.8F (T)-9/2007/20801/F&E dtd. 31st December 2007 (Annexure V).

1.2 APPROACH & ACCESS

1. Major Settlements surrounding the Tiger Reserve such as Bangiriposhi, Bisoyi, Rairangpur, Jashipur, Karanjia, Thakurmunda, Anandpur (Keonjhar), Kaptipada, Udala, Khunta, etc. have developed with the strengthening of road network connectivity in the last decade. Out of these 5 are Urban Local Bodies (ULBs); Baripada, Rairangpur& Anandpur (Keonjar) are Municipalities and Karanjia&Udala are Notified Area Councils (NACs). All these areas have access to basic public health facilities, Mobile Network Coverage, well developed Markets, regular public transportation services, Educational institutions, etc.

2. The villages in the Buffer Area are now well connected with the outside world with all weather motorable roads & bus and other modes of transportation services. Public health facilities, educational institutions, solar powered electricity & water swupplies, etc. have improved a lot in these villages.

3. Accommodation for visitors in the region have improved a lot outside the tiger reserve. Many private Hotels, restaurants, tourist operators have fluorished in the region, especially at Baripada, Jashipur&Udala. Many private nature camps have also come up at many locations due to active promotion of tourism in the state.

4. Night stay facilities in the Nature Camps at Barehipani, Gurguria, Kumari & proposed night stay facility at Nawana inside the Buffer Area of the Tiger Reserve and two at Jamuani, Ramatirtha (Jashipur) which are outside the Tiger Reserve boundary have been developed through community based Eco-tourism initiatives. Safari vehicles have also been procured & engaged for providing best experience of the nature to the visitors.

1.2.1 Road

Major road networks encircle Tiger Reserve in all directions. NH-18 runs along North-Eastern boundary, NH-49 (Howrah-Mumbai) runs along the North-West boundary & cuts across the buffer of the TR between Bangiriposi& Bisoi, NH-220 runs along Western boundary, SH-53 runs along the South-Western boundary and SH-19 runs along the Eastern boundary. One road connecting Udala (SH-19) &Thakurmunda (SH-53) cuts the buffer area across in the south of TR at Sarat-Noto RF.

There are two main entrances to Similipal Tiger Reserve, one through Jashipur and other through Pithabata gate, Baripada. However, nodal approach point remains at Baripada, headquarters of Field Director, Similipal Tiger Reserve.

The road distances of both the entrances from nearby cities are as follows:

Table No- 1.a Road Distance

To	Major Cities				
Entrance Gate	**Bhubaneswar**	**Balasore**	**Jamshedpur**	**Kolkata**	**Ranchi**
Jashipur	252 km.	156 km.	111 km	290 km.	235 km
Baripada	250 km.	56 km.	141 km	220 km	260 km

All Range Office headquarters, Anti-poaching Camps, Watchtowers, etc. are connected with all weather motorable road network, VHF Communication Network. Several locations inside the TR have mobile network coverage which enables the staff to remain connected with the outside world.

1.2.2 Rail

i. Balasore is a major Railway Station on the Howrah-Chennai Route, which is located 56 km away from Baripada. Trains from major destinations like Delhi, Guwahati, Kolkata, Bengaluru, Chennai, Coimbatore, Trivandrum, etc. stop here. Baripada&Balasore are well connected through regular Passenger trains.

ii. Tatanagar (Jamshedpur) is a major Railway station on the Mumbai-Howrah route, which is located 111 km from Jashipur. Trains from major destinations like Mumbai, Pune, Nagpur, Ahmedabad, etc. stop here. Trains passing though major towns & districts of western part of Odisha also stop here.

iii. Baripada is well connected with regular trains from Bhubaneswar & Balasore. Bangiriposi-Bhubaneswar Intercity Superfast Express plies daily on this route.

iv. Badampahar Station, which is 20km away from Jashipur, is well connected with Tatanagar (Jamshedpur) with regular passenger trains.

1.2.3 Air Terminals

Nearest Airports are located at Bhubaneswar, Kolkata & Ranchi. All three airports have direct flights from all major Domestic Airports of India. Kolkata is a major Air Port of India connecting national & International destinations. Amarda in Mayurbhanj district &Dhalbhumgarh near Tatanagar, Jharkhand, have been proposed for regional air connectivity under UDAN Scheme of the Govt. of India.

Table No-1b Air Terminals

	Airports			Proposed Airports under UDAN Scheme	
Entry Points	**Bhubaneswar**	**Ranchi**	**Kolkata**	**Amarda**	**Dhalbhumgarh**
Jashipur	242 km.	234 km.	286 km.	134 km	120 km
Baripada	254 km.	260 km.	230 km	39 km	82km

1.3 STATEMENT OF SIGNIFICANCE

The Similipal Tiger Reserve is the epitome of tropical forest in our country. It encompasses a rich biodiversity of both flora and fauna. The structural diversity and interspersion both in standing state and standing crop make it a unique ecosystem. The forest is a unique composition of different types of forest such as northern tropical mixed deciduous forest, northern tropical semi-evergreen forest, mixed deciduous hill forest, high level sal forest, dry deciduous sal forest, plain sal forest, grassland and savannahs. The biodiversity rich Similipal constitutes vast treasure of diverse wild genes with wide adaptability to diverse climatic and ecological conditions prevailing here.

The landscape harbours 7% flowering plants, 8% orchids, 7% reptiles, 20% birds and 11% mammals of India. Similipal stands as a link between the flora and fauna of Southern India and Sub Himalayan North-east India. It is the abode of more than 1253 species of flowering plants, 99 species of non-flowering plants, 21 species of amphibians, 62 species of reptiles, 361 species of birds, 55 species of mammals and many species of flora

and fauna still to be identified. 99 species of Ferns belonging to 31 Families & 43 Genera have also been documented inside Similipal. (A Pictorial Guide to Ferns of Similipal by Nirad Chandra Rout & Nabin Kumar Dhal, CSIR-IMMT, Bhubaneswar).

It bears 104 species of orchids, few of them endemic to Similipal landscape and most of are endangered and endanger list, and 72 species are Himalayan species, many species of insects, ferns and medicinal plants. There are many species of rare, endangered, threatened and vulnerable plants and animals. Mahaseer, Hornbill, Chowsingha, Mouse deer, Giant squirrel, Flying squirrel, Ruddy mongoose, mugger crocodile and Rufus tailed hare are examples of this unique biodiversity.

Above all, Similipal is famous for its tigers and elephants. It alone is the home of 65% tiger, 16% leopards and 25% elephants of Odisha. Similipal is the only home of actively breeding population of unique melanistic tiger in the world.

Similipal Reserve Forest, spreading over 2271.78 km^2area is a compact mass of unique natural forest that influences the climatic regime of whole of Odisha, West Bengal, Jharkhand and other areas in the eastern and northern parts of India. It is the richest watershed in the State of Odisha giving rise to many perennial rivers like Budhabalanga, Khadkei, Khairi, Bhandan, West Deo, Sanjo and Palpala. Perennial water flow is a part of typical ecosystem of Similipal hill forest.

Largest patch of sal forest in the sal-teak transition zone and similarities with elements of Western Ghats and North-east India in floral and faunal composition makes Similipal's ecology unique. In terms of forest cover as per percentage of the total area of Tiger Reserve, Similipal ranks are thirds amongst all the Tiger Reserve of the country with 94.17%.

Diversity in temperature regime between northern and southern region, wetland diversity, including perennial water sources, altitude ranging from 40m to 1100m with Khairiburu, the highest peak at 1168m, frost valleys in central and south Similipal and high rainfall area with 1800-2900 mm precipitation in 135-158 days annually make Similipal one of the distinct and diverse of ecosystems.

The park has a long history of management. It was once upon a time the hunting place of the maharaja of Mayurbhanj.

The park has a great potential for research as it has diverse types of flora and supports a very high density and biomass of prey community. The area forms a good research base for conducting long term study has been done.

Similipal is the original home of Birhors, Hill Khadias and Ujias which are some of the primitive tribes of Odisha. Similipal is a grand repository of indigenous knowledge pertinent to conservation of biodiversity, ethno botanical study and traditional ecological knowledge.

Similipal is famous for its founder Director Padmashree Late S. R. Choudhury (05.12.1973 to 04.05.1982) known for his worldwide acclaimed pugmark method of tiger census and the tigress "Khairi", his foster daughter.

Table No-1.c: The values of importance of the Park in different categories are listed overleaf.

Sl. No.	Category	Values
1	Global	The landscape harbours 7% flowering plants, 8% orchids, 7% reptiles, 20% birds and 11% mammalian species of India. 3 species of orchids are endemic to Similipal. Similipal is the only home of the unique pseudo-melanistic tigers. Due to vastness of the area and connectivity the tiger reserve has the potential for long term conservation of tiger. The tiger reserve is known for its founder Director Padmashree Late S. R. Choudhury whose pugmark method of tiger monitoring is acclaimed worldwide. Similipal TR stores approximately 15.72 million tonnes of Carbon. (Economic Evaluation by NTCA, 2019). The tiger reserve is a part of Similipal Biosphere Reserve which has been included in the Global Network of Biosphere Reserves in 2009.

2	National	Similipal stands as a link between the flora and fauna of southern India and sub Himalayan North-east India. It is the abode of more than 1253 species of flowering plants, 21 species of amphibians, 62 species of reptiles, 361 species of birds, 55 species of mammals and many species of flora and fauna still to be identified. The forest is a unique composition of different types of forests such as northern tropical mixed deciduous forest, northern tropical semi-evergreen forest, mixed deciduous hill forest, high level sal forest, dry deciduous sal forest
		plain sal forest, grassland and savannahs. Similipal is the only home of the unique pseudo-melanistic tigers. It bears 104 species of orchids, few of them endemic to Similipal landscape and most of are endangered and endanger listed, many species of insects, ferns and medicinal plants. There are many species of rare, endangered, threatened and vulnerable plants and animals. Mahaseer, Hornbill, Mouse deer, Giant squirrel, Flying squirrel, Ruddy mongoose and Rufus tailed hare are examples of this unique biodiversity. Above all, Similipal is famous for its tigers and elephants. It alone is the home of 50% tiger and 25% elephants of Odisha. The biodiversity rich Similipal constitutes vast treasure of diverse wild genes with wide adaptability to diverse climatic and ecological conditions prevailing here. Barehipani is the second highest waterfall in india.
3	Regional	Similipal RF, spread over 2172.37 km^2 area is a compact mass of unique natural forest that influences the climatic regime of whole of Odisha, West Bengal, Jharkhand and other areas in the eastern and northern parts of India. It is the richest watershed in the State of Odisha giving rise to many perennial rivers like Budhabalanga, Khadkei, Khairi, Bhandan, West Deo, Sanjo and Palpala. Perennial water flow is a part of typical ecosystem of Similipal hill forest. Largest patch of sal forest in the sal-teak transition zone and similarities with elements of Western ghats and North-east India in floral and faunal composition makes Similipal's ecology unique. There are many waterfalls inside Similipal. Joranda (181m), Barehipani (217m is the second highest waterfall in India), Uski, Sitakund, Olkudar and Deokund are few notable waterfalls among them. Diversity in temperature regime between northern and southern region, wetland diversity, including perennial water sources, altitude ranging from 40m to 1100m with Khairiburu, the highest peak at 1168m, frost valleys in central and south Similipal and high rainfall area with 1800-2900 mm precipitation in 135-158 days annually make Similipal one of the distinct and diverse of ecosystems.
4	Local	It sustains livelihood of the local inhabitants. It serves as a Centre of Conservation, Education and Nature Interpretation for the children, students, businessmen, govt. servants, politicians and on the whole the local people. The Tiger Reserve conserves soil and there by reduces the chances of siltation, stone accumulation on the adjoining agricultural lands. It acts as a watershed for the major rivers i.e. Budhabalanga, Khairi, Bhandan, West Deo, Khadkei, Sanjo and Palpala which facilitates Irrigation, Drinking Water Supply to the human habitations in and around the Similipal Tiger Reserve. It tremendously influences the micro climate of the area. The tiger reserve has historical importance. It was once the hunting ground of the Maharajas of Mayurbhanj. Similipal is linked with the religion and culture of the people of Mayurbhanj.

1.4. GENETICALLY UNIQUE PSEUDO-MELANISTIC TIGERS OF SIMILIPAL.

The historical records of Black tiger date back to 1772. However, the proof of Pseudo-melanistic tigers in India date back to October 1992 when a hide of tiger recovered from a smuggler in New Delhi. Later another hide of Pseudo-melanistic tiger was recovered in Similipal TR in the year 1993 when a young melanistic tigress was

killed by a young boy in self-defence at Podagad village. Later the sightings of pseudo-melanistic tigers were reported by various officials inside Similipal TR in the year 1996, 1997 and 1998. (Born Black: the melanistic tigers in India, by L.A.K. Singh.)

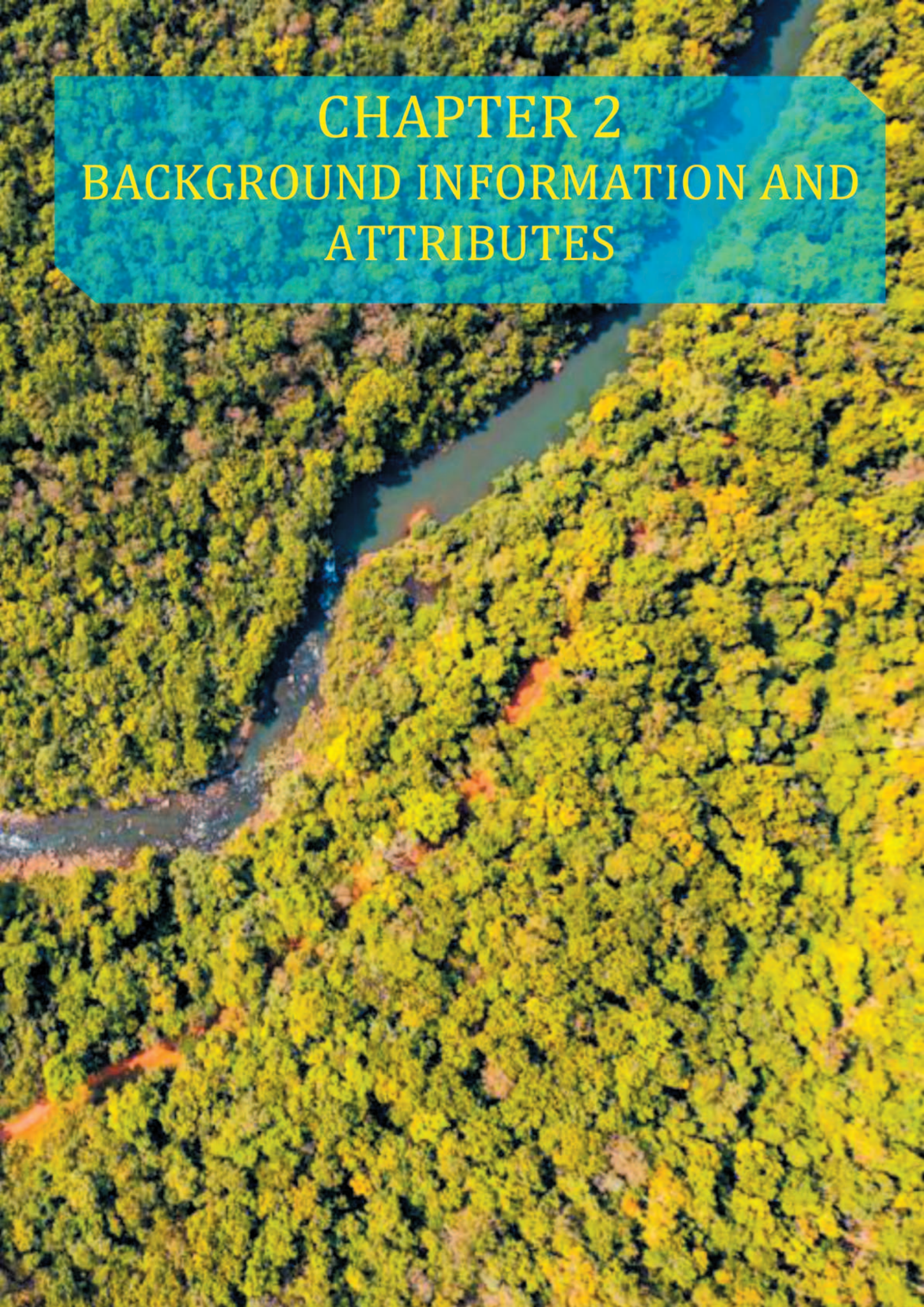
Geographical distribution has huge impact on the phenotypic manifestation of many physical characters. Body Pigmentation is one such physical character. Unique pigmentation has been observed in many animals ranging from albinism (absence of pigments) to melanism (extreme pigmentation). Studies have shown the alleles responsible for pigmentation vary geographically and are impacted by geneflow and drift. Tigers have a distinctive dark stripe pattern on a light back-ground, which can appear in several colour shades—white, golden, and snow white. 14 colour variations have been described by many Authors (Born Black A rare pattern variant, distinguished by pattern elements that are broadened and fused together, has also been observed in natural and captive tiger populations. Such tigers are sometimes called black tigers but the melanistic appearance is a consequence of expanded pattern elements rather than a uniformly darkened colour, also referred to as pseudo-melanism. Research has attributed this pseudo-melanism to the presence of Taqpep p.H454Y allele from their studies on captive pseudo-melanistic tigers and wild tigers from Similipal and other tiger reserves. It is also reported that this allele is likely absent or extreme rare in wild tiger populations outside Similipal. (Sagar et al., 2021, High frequency of an otherwise rare phenotype in asmall and isolated tiger population)

At present there is no reports pseudo-melanism in wild tigers outside Similipal TR making Similipal to be the only home of pseudo-melanistic tigers. The presence of pseudo melanistic tigers in Similipal TR in the recent tiger population estimate in AITE, 2022 is given blow:

ADULT			CUB			GRAND TOTAL
NORMAL	PSEUDO MELANISTIC	TOTAL	NORMAL	PSEUDO MELANISTIC	TOTAL	
9	7	16	4	5	9	25

Fig.1a: Pseudo-melanistic tigers of Similipal TR

Fig.1b: Pseudo-melanistic tigers of Similipal TR



CHAPTER 2
BACKGROUND INFORMATION AND ATTRIBUTES

CHAPTER

02

BACKGROUND INFORMATION AND ATTRIBUTES

2.1 GEOLOGY, ROCK AND SOIL

Similipal was a part of Gondwana land in the Palaeozoic era. The main layout of the formation layers is of three concentric cups of metamorphic rocks inter-bedded with sub-metamorphic layers i.e. volcanic with outer interspace and igneous with inner interspaces. The metamorphic rocks are granitoid gneiss, true gneiss and mica schist with pegmatite. The gneissic rocks are much intersected by dykes of basic and intermediate rocks. The sub metamorphic rocks are shale, haematitic rock laterites, limestone, calcareous deposits, quartzite, phyllites and micaceous schist. Haematitic rocks, laterite and shale occur in extensive formations in central and south Similipal. Outcrops of sub-metamorphic and quartzite haematite occur all over Similipal hills. The soils of Similipal are acidic in nature having a pH range of 4.8 to 6.8 in most areas. The main soil types are as follows:

- From haematitic rocks, rich red loam soil is derived having intense biotic activity and dense tall wood lots.
- Laterites produce deep soils, reddish in colour having the capability to support good tree growth. Where the depth of the soil is less, it supports poor tree growth but good grass growth for animals.
- Shale on weathering produces substantial deposits of clay and clayey loam soils good for biotic growth.
- Outcrops of sub-metamorphic sand stone and quartzite haematites on disintegration produce sandy soil. In deep layers, it supports good growth of plants and animals. Where the depth of soil is thin it favours the growth of grasses.

Presently, soil erosion does not pose any serious threat except for Budhabalanga valley. Integrated complex of rock, soil and vegetation held in a stable formation provide little scope for degradation. However, sporadic denudation in small pockets remains but it is not recognizable.

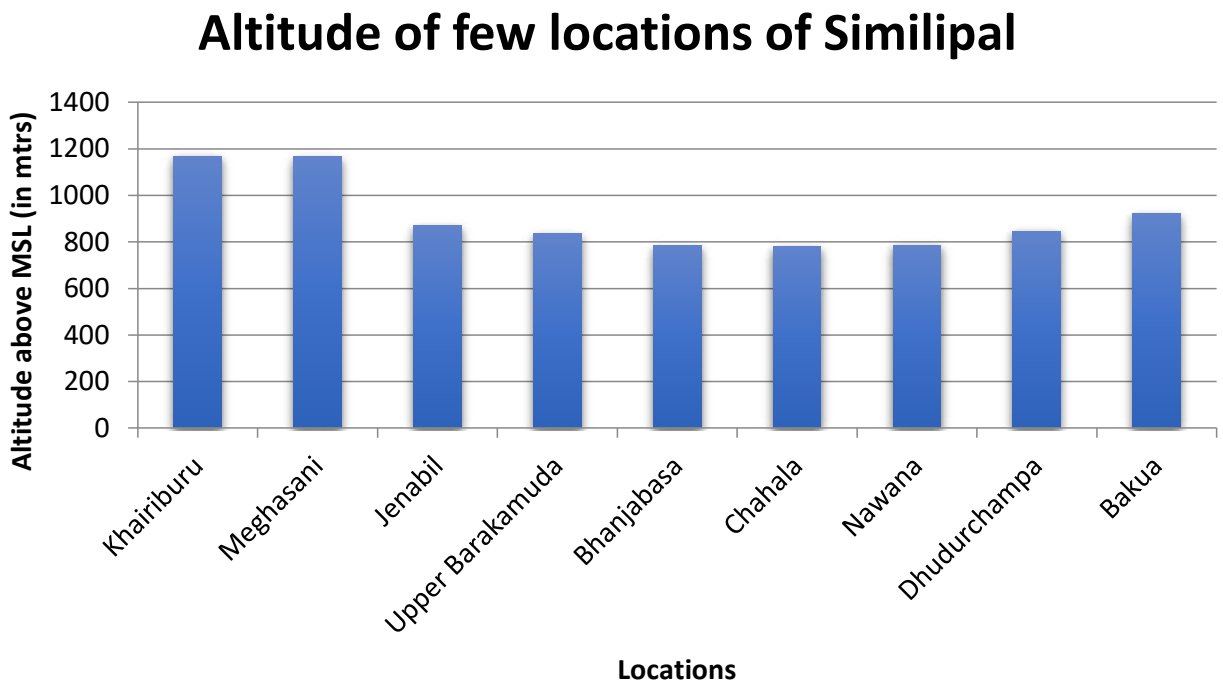
2.1.1 Terrain

The tract dealt with is mostly undulating and hilly interspersed with open grasslands and wooded areas. The inclined plateau has risen abruptly from the low coastal plains of the District. The steep side faces the Bay of Bengal and run northwards to finally merge with Chhotanagpur (average elevation of 500 mts). In the basin of the hills lie numerous valleys supporting meadows. The elevation of the highest point is 1168.00 m above MSL locally known as Khairiburu. It stands along with Meghasani at 1165.00 m above MSL as twin towers of natural grandeur. The elevation of the central region of the plateau near Dhudruchampa is 1009.95 m. the elevations of a few other points in the locality are mentioned below.

Table No-2.a List of Terrain

Place	Altitude above MSL in meter
Jenabil	870.00
Upper Barakamuda	834.80
Bhanjabasa	785.00
Chahala	780.50
Nawana	787.10
Dhudurchampa	846.40
Bakua	920.00

Chart No-1 : Altitude of few locations of Similipal



2.2 HYDROLOGY AND WATER SOURCES

The water level in the core area is very high and is woven with perennial water sources converging to three Rivers i.e. Budhabalanga, Salandi and Baitarani out of which the former two emerge from the Protected Area and the later one have its tributaries flowing from the Protected Area. The Rivers flow through the Districts of Mayurbhanj, Balasore and Bhadrak and serve as life-line for the districts and finally converge to Bay of Bengal. The other tributaries are Palpala, East Deo, West Deo, Khairi, Tel, Sanjo, Bherol etc. along with many rivulets and nullahs most of which are perennial. An analysis of water availability in the area has shown that more than 50% of the streams carry water during driest period of the year and the rest get totally dry. As the water requirement of herbivores is quite important, further augmentation has been achieved by creation of water bodies in the core area as detailed in Annexure XXVI.

2.2.1 Climate

The area has a subtropical climate with three distinct seasons' i.e, summer, monsoon and winter. Hot summer, well-distributed rainfall and a normal winter characterize the climate. November to February comes under the winter whereas March to May form the summer months. The monsoon is quite conspicuous during June to September. October constitutes the post-monsoon period.

2.2.2 Rainfall

The Similipal complex acts as a water tower of Odisha, West Bengal, Chhattisgarh and Jharkhand. The South-Eastern part gets more precipitation. The atmosphere in the South-Eastern portion normally remains humid due to the flow of sea wind. The Meghasani hills in Similipal acts as structural barrier and obstructs the wind flow. Vegetation present in this area contributes in formation of micro-climate which helps in giving more of precipitation in this side of Similipal. Thus, this complex of hill ranges get comparatively more precipitation due to the coastal effect, monsoonic flow of wind and micro-climate formation over Similipal Range of hills.

The rainy season is sultry, humid and occurs between June-October. The South-West monsoon brings nearly 90% of the total annual precipitation. Most of the rainfall concentrates during June-September which also constitutes maximum number of mean rainy days. Average annual rainfall is 2000 mm.

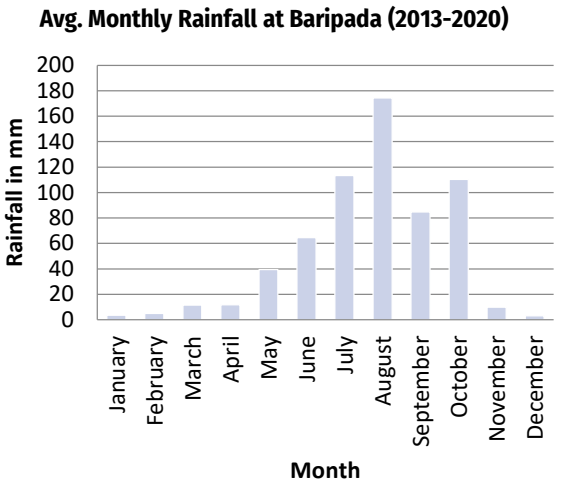


Chart No-2

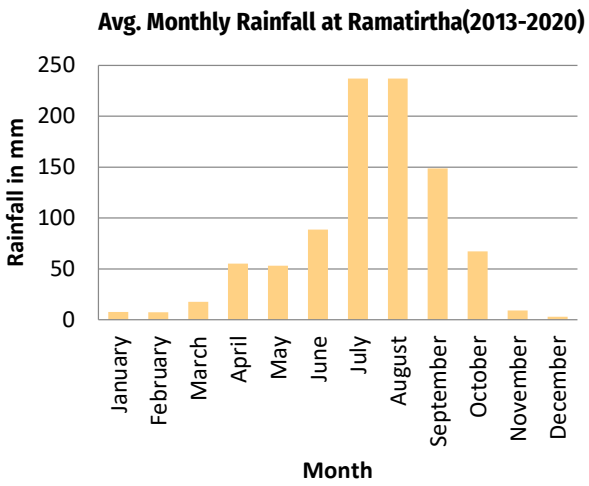
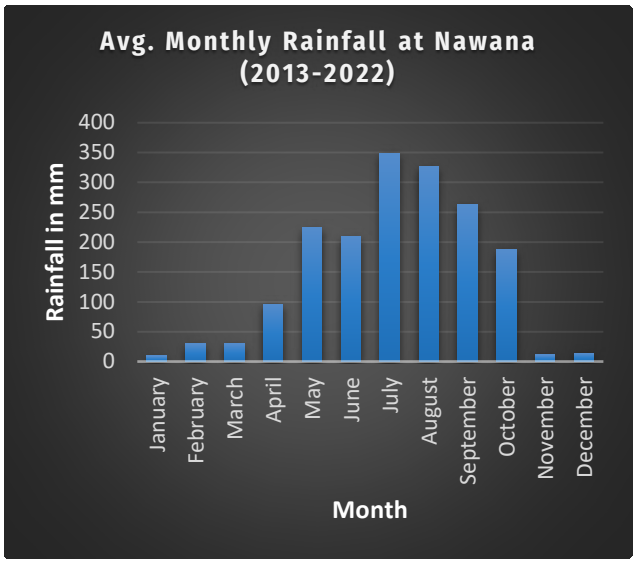


Chart No-3



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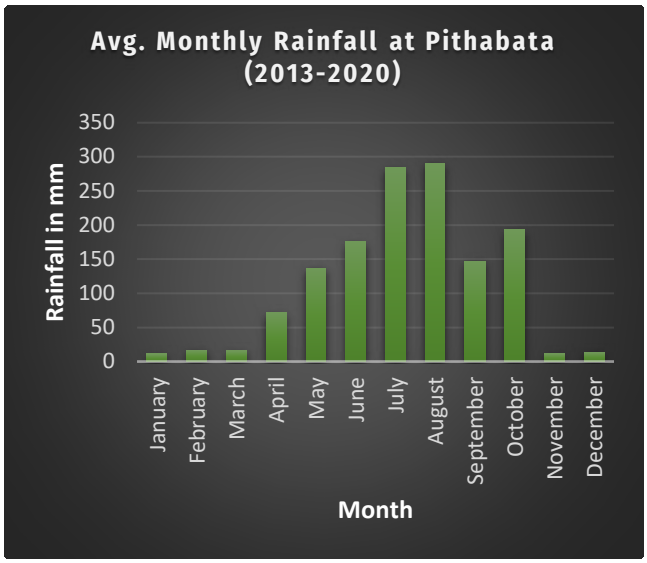
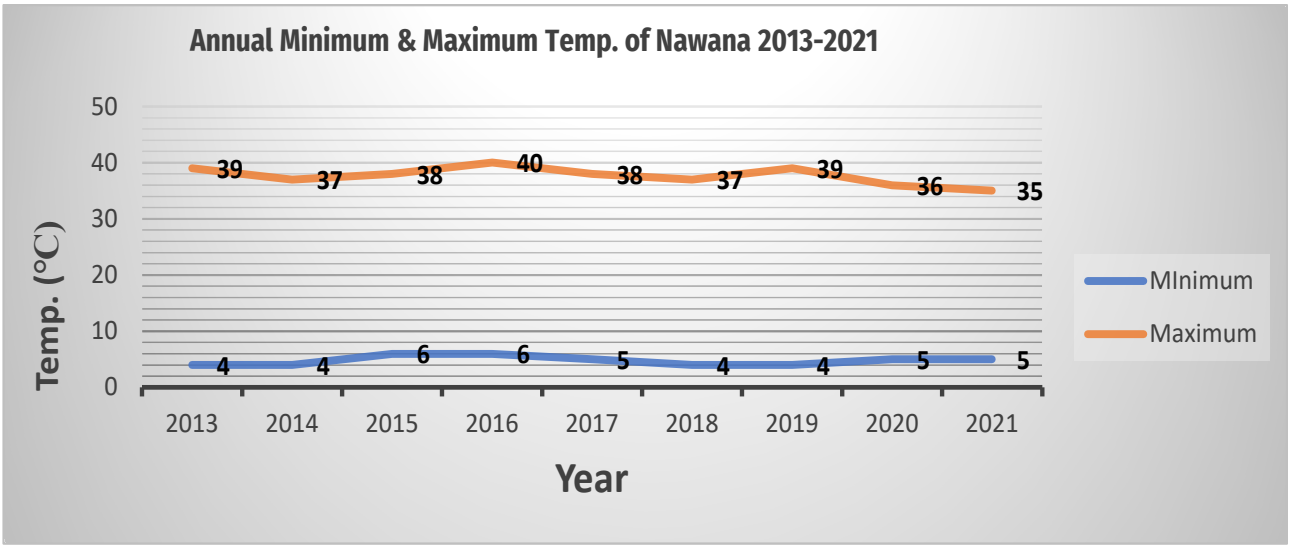


Chart No-5

2.2.3 Temperature.

Climatically this tract is comparatively hot. The North Similipal is comparatively drier than the South Similipal. In winter frost occurs in the Upper Barakamuda valley and other adjoining valley in South Similipal. Nawana valley in central Similipal also receives sporadic frost resulting in a significant dip in temperature in these areas. The temperature ranges from 4° C to 34° C.

Chart No-4



2.2.4 Humidity

The air is quite humid with relative humidity always extending 70%.

2.2.5 Wind

During winter a cold wind blows inside the reserve locally called as "Kaliani Paban". Spring breeze is quite common all through the area. There is hardly any cyclonic wind inside.

2.2.6 Drought

Since there are perennial water sources, the drought due to irregular monsoon and scarcity of rainfall is not felt.

2.3 VEGETATION COVER TYPES

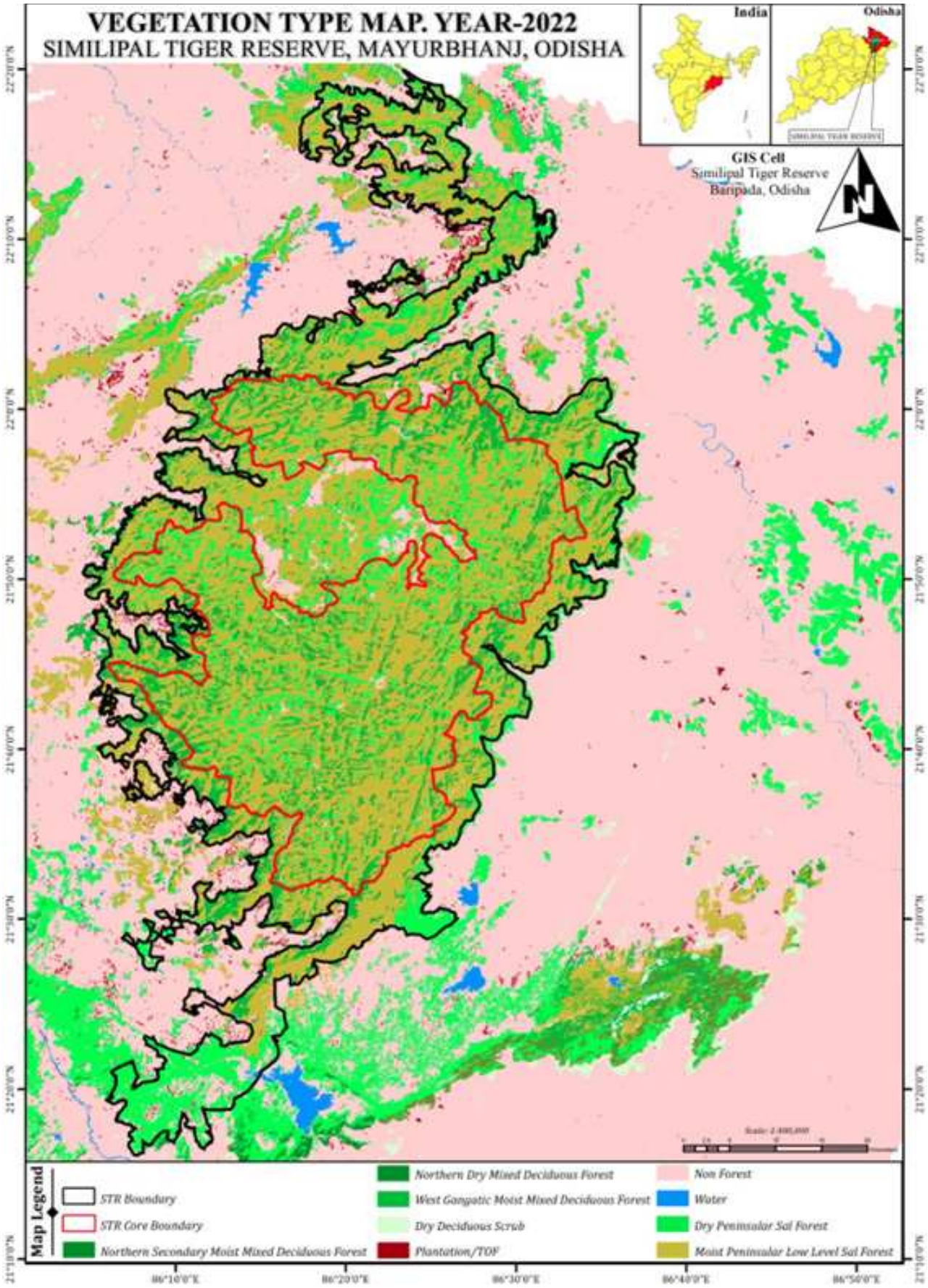
Table No-2-b Vegetation Cover Types

	Area
Very dense forest	1205.52
Moderately dense forest	1138.78
Open Forest	218.56
Total	2562.86
% of total forest cover w.r.t area of digitised Tiger Reserve boundary.	94.17
Scrub	0.05

As per assessment of forest cover in Chapter 'Tiger Reserves and lion Conservation Area' published India State of Forest Report 2021, Similipal has second largest forest cover among the Tiger Reserves of India. In terms of forest cover as percentage of the area of Tiger Reserves, Similipal stands at third position with 94.17%. Similipal Tiger Reserve has the highest area under VDF comprising 1205.52 Sq.km. which is 47.04% of its total forest cover.

With respect to 2011 the decadal change shows an increase of 6.04Sq. km. in forest cover.

Map No-2A: Vegetation Type Map



2.3.1 Forest Types

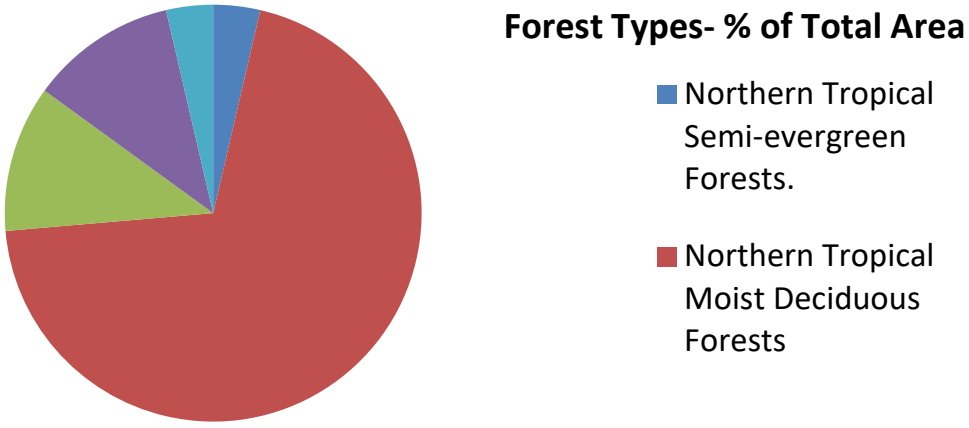
Table No-2c: Forest Types

Type	Area in Sq. km.
Tropical moist deciduous forests.	2082.89
Tropical dry deciduous forests.	495.42
TOF/Plantation	3.04
Total	2581.35

The various forest types found in Similipal Tiger Reserve is given below as per the coverage in the area of the Landscape (Champion & Seth's classification). The vegetation cover type of Similipal Tiger Reserve has been shown in a map section.

Chart No-7

Percentage of vegetation types/ ecosystem in core zone of STR



- Northern Tropical Semi-evergreen Forests. (Type: 2b/c3)

This type spreads over an area of about 80 km^2. The species found under this forest type depending upon the soil and micro climatic conditions are as follows:-

- On Stream Beds

*Salix terasperma, Trewianudiflora, Macaranga peltata, Aphanamixispolystachya, Symplocoscochinchinensis, Glochidion spp., Bischofiajavanica, Syzygiumcumini, Pongamia pinnata, Diospyros malabarica, Saracaasoca*and at places *Terminalia arjuna.*

- A little Higher up in Damp Areas.

Bombax ceiba, Alstoniascholaris, Ficus spp., Polyalthiacerasioides, Anthocephalus cadamba, Dilleniapentagyna, Litsea spp., and Citrus spp. are met with.

- Still Higher up

Micheliachampaca, Artocarpus lakoocha, Toona ciliata, Mangifera indica, Ailanthus excelsa, Mesua ferrea, Stereospermumchelonoides, Xylia xylocarpa and Bridelia retusa are met with.

- Northern Tropical Moist Deciduous Forests (Type: 3C/C2e)

It covers an area of about 1540 km^2. It is found all over Similipal except the moist valleys and on the southern and the eastern aspects of the hills. Sal forms 50% to 90% of the standing crop. Quality of sal being 'IV' on the steep drier aspects and 'II' on gentler slopes with deep soil and cooler aspects. Quality-I Sal occurs in

small pockets under good soil and climatic conditions. The common species found in this type of forests are *Terminalia sp., Pterocarpus marsupium, Anogeissus latifolia, Schleicheraoleosa, Haldina cordifolia, Toona ciliata (*rare*), Micheliachampaca, Mangifera indica, Bombax ceiba, Careya arborea, Dilleniapentagyna, Gmelina arborea, Garuga pinnata, Lanneacoromandelica, Syzygiumcumini, Ougeiniadalbergioides, Xylia xylocarpa, Kydiacalycina, Lagerstroemia parviflora, Bridelia retusa, Mitragynaparvifolia, Trema orientalis, Emblica officinalis, Zizyphus spp., Cassia fistula, Buchananialanzan, Sterculia villosa, Miliusavelutina, Helicteresisora, Indigofera pulchella, Croton oblongifolius, Colebrookiaoppositifolia, Flemingiachappar, Strobilanthes spp., Wendlandia spp., Imperata cylindrica, Themeda caudate, Cymbopogon martini, Eulaliopsisbinata, Thysanolaena maxima, Curcuma aromatica, Bauhinia vahlii, Millettia extensa, Smilax macrophylla, Combretum decandrum, Disocorea spp., Asparagus racemosus.* Ferns and orchids are found in moist places*. Ferns- Adiantum spp., Dryopteris spp., Cyathea gigantean, Spinulosa spp., Cyclosorus spp. and Holtt Tree Fern.*

- Dry Deciduous Hill Forests (Type: 5B/C1c and 3C/C3)

It is spread over an area of 250 km^2 (approx) mostly in the eastern and the southern Similipal with steep and exposed slopes, this type of forest has Sal as major species covering upto 30% of the crop. Other associates are *Anogeissus latifolia, Sterculia urens, Boswellia serrata, Dalbergia latifolia, Cleistanthuscollinus, Gardenia gummifera, G. latifolia, G. turgide, Erythrina suberosa, Cochlospermumgossypium, Helicteresisora, Nyctanthesarbortristis* with an abundance of herbs, shrubs and grasses as ground cover.

- High Level Sal Forest. (Type: 3C/C 2e(i))

This type of forest occurs on the plateaus above an elevation of 850m and extends over about 250 km^2. Pure stands of poor quality sal are found with *Dilleniapentagyna, Syzygiumcerasoides, Pterocarpus marsupium and grasses* like *Imperata cylindrica* and *Themedacaudata.* Large patches of *Phoenix acualis* occur.

- Grassland and Savannah. (Type: 3C/DS-I)

Similipal has 11.72km^2 of grassland spread all over core area in small and large patches. Altitudinally ubiquitous in nature, grasslands are found on hill tops over 900 metres high as well as in the frosty valleys and nallah banks. In the former it is perhaps a climax type where as in the later, it seems to be of seral origin, a stable "Pre-climax" under the combined influence of edaphic and climatic factors, mode of origin and intensity of biotic effects. In the frosty open valleys, Sal and other frost tender woody plants are annually bitten back to whippy growth. The species include *Syzygiumcerasoides, Symplocosracemosa,* and *Dilleniapentagyna*. The common member of Poaceae is *Imperata cylindrica, Themedagigantia*and *Saccharum spontaneum.*

- In Hills-

Pollinidium angustifolium, Pogonatherumpaneceum, Sehima nervosa.

- Moist Areas-

Apludamutica, Arundodonax, Eragrostisatrovirens, Phragmitiskarka, Sporobolusindicus, Sacciolepsis indica.

- Other Grasslands-

Bothriochloabladhii, Cymbopogon fresuosus, Cynodondactylon, Heteropogoncontortus, Imperata cylindrica and Themeda spp.

The list of grasslands and meadows available inside the core area of the Reserve is given in Annexure XXVII.

2.3.2. Cover

It is considered as a variation seen in a habitat which affords protection to animals from weather, predators or enemies by offering a better vantage point. Cover may be 'vegetal" or "non-vegetal". Vegetal covers are non-static; they change with time due to ecological successions. Thus each successional stage has its own

species composition and the cover value also changes accordingly. Topography of Similipal Tiger reserve is such that it itself provides adequate cover for certain animals like Tiger, Leopard which can make use of even the thick bouldery deposits on ground as ambushing cover.

A broad classification of cover and its status is given below:

Refuge Cover: This means vegetation from which the wild animals cannot be driven out during hunting. The status is reasonably very good in the Similipal Tiger Reserve. Ideal refuge cover areas are meadows in Upper Barhakamuda, Devasthali, Jamunagarh.

Ambush cover: This means any cover used by a predatory animal for ambushing its prey. It can be vegetal or non-vegetal. Thus status of non-vegetal cover is fairly good in Similipal Tiger Reserve. Grasslands and meadows in Jenabil, Jodapal, Badamakabadi, Upper Barakamuda etc. are the unique habitat to serve as ambush cover.

Loafing Cover: Some animals (Herbivores like Sambar, Indian Bison) at certain points of time may prefer to spend their time aimlessly at some secluded place in a habitat. Any place offering shade in summer and providing adequate protection from wind in winter can be treated as loafing cover. Pure Sal forest patches in the Khairi Forest Block, West Deo Forest Block, Palpala Forest Block, Budhabalanga East and Budhabalanga west Forest Blocks of Similipal Sanctuary.

Breeding Cover: This is much important in mammals since they exhibit parental care. Certain birds also have well built nests during the breeding season where the young ones are nurtured. Tall grass can serve as breeding cover to certain animals. The status of this cover at present is adequate. Upper Barakamuda, Kabatghai, Jamunagarh, Jenabil Grassland, Chahala grasslands serve as breeding cover for many birds, lizards and snakes.

Roosting Cover for Birds: Birds require a safe place for resting which is known as 'Roosting Cover'. All waterfall sites serve as good roosting cover. Barehipani water fall, Joranda waterfall, Chingudia Waterfall, Gunduria, Shisha, Dhundubasa Waterfalls are the roosting cover sites.

2.3.3. Food

Food is an essential pre-requisite for any organism. Its availability in a habitat changes with season. Herbivores depend on the plant material for their sustenance where as carnivores survive on the availability of prey animals. The herbivore food material is lower in energy when compared to those of carnivores.

Animals, especially herbivores are 'selective feeders' and their food preference is related to palatability. The most relished food material is the first choice or preferred food. Food second in choice but nutritionally good is called as *'staple food'* where as those ingested to fulfill short term requirements or to relieve hunger are known as *emergency materials or 'stuffers'* respectively. The animals here are occasionally forced to feed on low preferential food due to habitat disturbances. Carnivores resort to cattle lifting in search of an 'Economic Prey.'

2.3.4. Species and Communities of Conservation Importance; Key Areas

Bija: This is the most frequented species occurring in majority of the forest blocks in fair proportion attaining to good sizes. West Deo, Khairi, Bhandan, Palpala Forest blocks have good numbers of Bija trees and have good regeneration.

Terminalia: This is the characteristic species of clay loam soil and occurs in most of the blocks attaining very good sizes in. DHAURA, HALDU and MUNDI are normally found in most of the Forests in fairly high proportion. East Deo, Palpala, West Deo 27-32 Forest Block, Salandi Forest blocks, and at Budhabalanga FB of Similipal Sanctuary.

Saracaasoka: This is State tree of Odisha and belongs to the list of endangered plant species of Odisha. Saraca Ashoka is naturally found in Similipal forests. Some of the main areas of their occurrence are Gamchhacharan, Notto forest, Dangadiha etc.

Homaliumnepaulense : This tree is locally called as Dahanimari, village communities use bark of this tree as an ingredient while preparing country liquor. There is rampant felling of this tree by surrounding village people as a result the population of HomalumNepalense is decreasing gradually. A main area of occurrence of this tree is in the river banks of Palpala, West Deo, Sanjo, Budhabalanga etc.

2.3.5. Key Areas

Edges: Animals with limited mobility but having varied requirements from the habitat benefit more when the edges are present in abundance. An edge is the place of contact between plant communities or successional stages or vegetative conditions. The area which is influenced by the transition between plant communities or stages is called as an Ecotone. Inherent edges are relatively stable and permanent features of a particular area. It is obtained when plant communities meet in a habitat, which occur due to certain natural factors i.e. Difference in topography, geomorphic differences and changes in microclimate. Induced edge on the other hand is short lived and occurs when two succession stages or vegetative conditions within a plant community meet. Various environment factors like grazing, planting activities, fire, logging operations, and erosion create induced edges. Both induced and inherent edges are in sizeable proportion though of low contrast. All the forest blocks of the Similipal Tiger Reserve having meadows are having adequate EDGES or ECOTONE areas.

Snags: Snag means a standing dead tree which is devoid of leaves and branches. Snags can be classified as HARD or SOFT. Hard snags are free from decay where as soft snags show stages of deterioration. Many species of fungi, mosses, lichens use decayed wood as a substratum for growth. Invertebrates use the space in between bark and timber as a habitat. Birds excavate cavities or use the existing one for nesting, roosting or even perching. Mammals use them as dens or as escape cover, sometimes they are also used by bats for roosting. When a tree dies, it undergoes a series of changes known as SNAG SUCCESSION. Each stage of snag succession is of importance to a particular wild animal in a habitat. All the forest blocks comprising the Similipal core area is adequately represented with SNAGS. But snags are relatively less in buffer area of the tiger reserve.

Dead and Down Woody Materials: The dead and down woody materials on the floor of a forest has many valuable functions in a wildlife habitat. The trunks of dead and down trees constitute a source of food for certain birds like wood peckers, branches as perches and cavities for nesting purposes; the root portion is also used by many partridges. For nesting, small vertebrates and invertebrates use the space between the bark and the wood materials as a habitat. Fire which is most frequent in this area affects the dead and downy materials. Most of the slash which constitute fire hazard is completely destroyed by fire. Many wild animals even use the fallen logs as hiding cover and as sites for feeding and reproduction. After the judgment of Apex Court of the country, these dead and downy woody materials percentage has increased considerably.

Riparian Vegetation: Vegetation growing along the stream banks are called riparian vegetation. These vegetation harbours many animals and also serve as corridors for animal movement. Such sites are available in plenty throughout the core area. Such sites are found at Bhadragoda valley, Tarinibilla, Patbil and numerous small swamps at Devasthalli, Dhobighat, Nimia, Bachhurichara, Sapaghar, Matughar, Tiktali and Chahala.

All open areas, forested blanks, highly disturbed areas such as deserted villages, road sides, habitations, fire affected areas inside the Sanctuary have been invaded by weeds which are fast growing in nature and cover the entire area preventing any type of growth beneath to come up. As they are not palatable they reduce the forage availability to wild ungulates and destroy the habitat. The infestation of weeds is not alarming due to dense vegetation. The weeds available inside Similipal Sanctuary are *Eupatorium odoratum*, *Ageratum conyzoides*.

The obnoxious weed infestation is not very alarming in Similipal due to dense vegetation. However, the weeds like *Chromolaena odorata, Ageratum conyzoides, Bidens ternata, Bidensebiternata, Bidens pilosa, Stachytarpheta indica, Stachytarphetajamaicensin, Parthenium hysterophorus, Scoparia dulcis, Elephantopusscaber, Colebrookeaoppositifolia, Golmphostemmaniveum, Spermacoce latifolia, PLectranthupolinus, Phoenix acaulis, Mimosa pudica, Lantana camara, Pogostemonbenghalensis,* etc. have been observedin the meadows and along the roads in the buffer area.

The aquatic vegetation otherwise termed as riparian ones consist mainly of Arjuna, Jamun and Karanj species. The same is found in various forms i.e. standing, emergent, and floating as well as under submerged condition along streams, rivers.

Edge manipulation is a very common practice in habitat management. Many species of wild life are animals of edges and their abundance is increased in a habitat if the quantum of edge is enhanced per unit area. By resorting to planting the edge effect can be maximized provided, it is shaped in proper way.

Swamps and Marshes

Swamps and marshes in Similipal are locally called as "Daldali". The list of Daldalies inside Similipal core area is given in Annexure XXVIII.

2.4 WILD FAUNA, HABITATS AND TROPHIC NICHES

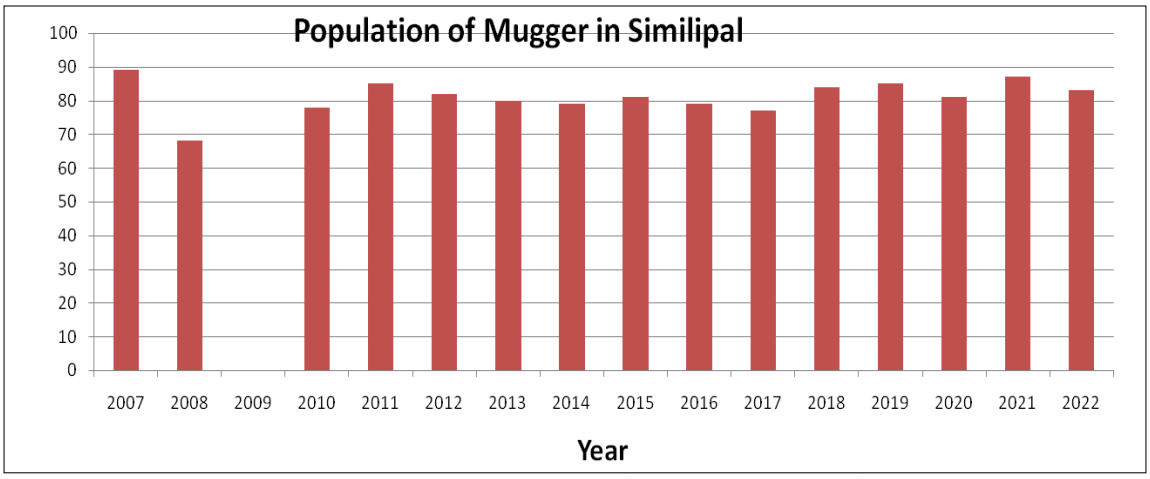
Many wild animals including some endangered ones like tiger, panther, elephant, gaur and four horned antelope etc. are found in different levels of abundance. Ratel, pangolin, giant squirrel, flying squirrel, sambar and chital are among the other few worth mentioning. The status of avi-fauna, herpeto-fauna is not precisely known. However, estimation of population density of different animals gives an indication about their status. Census figures for some of the major species are given overleaf.

2.4.1 Population of mugger in Similipal from 2014 to 2022

Table No.-2d: Population of Mugger in Similipal from 2014 to 2022

Sl. No.	Number	Year of census
1	89	2007
2	68	2008
3	No census	2009
4	78	2010
5	85	2011
6	82	2012
7	80	2013
8	79	2014
9	81	2015
10	79	2016
11	77	2017
12	84	2018
13	85	2019
14	81	2020
15	87	2021
16	83	2022

Chart No-8



2.4.2 Prey density estimates in Similipal Tiger Reserve (NTCA-2014 & 2020)

Table No- 2e Prey density estimates in Similipal Tiger Reserve (NTCA-2014 & 2020).

Species	Individual density/km² (SE)			
	2014	2018	2019	2020
Barking Deer	2.22 (0.86)	9.79 (0.68)	8.39 (1.19)	7.94(1.10)
Langur	3.41 (1.45)	NA	20.77(4.17)	21.49 (3.60)
Chital	NA	7.41 (1.19)	16.81(5.25)	18.29 (3.75)
Wild Pig	NA	6.16 (0.94)	2.26 (1.10)	4.86 (1.47)
Sambar	3.79 (1.16)	11.24 (1.23)	13.61 (3.08)	11.98 (2.03)

(The prey density estimates for the year 2014 and 2018 have been obtained from NTCA report on "Status of Tigers, Co-predators and Prey in India" and for the years 2019 and 2020 have been obtained from the Interim Report submitted under the project "Wild Tigers of Similipal: A study on spatial distribution, abundance and population genetics" by WII, Dehradun)

2.4.3 Population status of Tiger

Table No-2f Population status of Tiger (Tigers utilizing the TR)

Sl No.	Number	Year of census
1.	101	2004
2.	20	2008
3.	NA	2010
4.	17	2014
5.	12	2018
6.	20	2022

2.4.4 Population status of Leopard.

Table No-2g Population status of Tiger

Sl No.	Number	Year of census
1.	127	2004
2.	125	2018

2.4.5 Elephant population in STR (Core Area):

Table No. 2h Elephant population in STR (Core Area):

Census Year	Adult Bulls (>240 cm)	Adult Cows (>210 cm)	Adult US	Sub-Adult Bulls (151-240 cm)	Sub-Adult Cows (151-210 cm)	Sub-Adult US (151-210 cm)	Juvenile (121-150 cm)	Calf (< 120 cm)	Grand Total
2002	77 (01 Makhana)	237	3	-	-	-	27	68	412
2005	30	151	7	4	19	4	17	60	292
2007	29	137	-	37	31	-	11	53	298
2010	22	107	-	17	94	05	14	72	331
2012	15	155	-	25	49	-	37	53	334
2015	16	117	-	23	89	1	34	57	337
2017	19	152	-	19	51	2	30	57	330

2.4.6 Important invertebrates, their status:

The invertebrates are much more diverse in Similipal and equally significant in their ecological role compared to vertebrates. But they have been left unstudied to a large extent. All the major phyla including annelids, arthropods and molluscs occur in Similipal but taxonomic studies are yet to be taken up. Honeybees, Termites, Butterflies and Moths are found in abundance. Presence of certain insectivorous birds like Indian Roller, Flycatchers, Bee-eaters and Drongos in large numbers indicates the richness of insect population. Earthworms, ground leeches are the prominent annelids. Invertebrates are available all through Similipal with varying congregations.

Rao and Satpathy (2003) report about modal ecorace of silkworm *(Antheraea mylitta),* which isunique to Similipal and adjoining area. Sethy (2004) communicates 169 species of invertebrate fauna (Mollusca-9, all Gastropoda; Arthropoda-19, 1 millipedes, 2 centipedes, 1 crab, 2 scorpions, 13 spiders; Insecta-141, 42 grasshoppers/ crickets, 10 dragon flies, 42 butterflies, 6 true flies, 24 beetles, 6 termites/ants, 4 bugs, 4 bees, 3 aphids/leaf hoppers) as a brief report on the inventory of invertebrate-faunal diversity in Similipal based upon his 04 field visits covering three seasons during 2003. Jena (2004) reports two species of leeches (Gnathobdellide)in Chahala Range of Similipal Tiger Reserve.

Ramakrishna et al, 2006 reported the invertebrates; arthropods form the major group, adapted for life in terrestrial and aerial environment. Among the arthropods, the insect fauna are more abundant than arachnids, followed by myriapods and crustaceans, etc. in the reserve. Again of the insecta the butterflies (Lepidoptera) exhibit for greater species diversity/richness (54 spp.), followed by Orthoptera (32 spp.), Coleoptera (22 spp.), Odonata (14 spp.), Hemiptera (10 spp.), Diptera (6 spp.), Hymenoptera (6 spp), Homoptera (3 spp.). Elsewhere in the terrestrial habitat, in the Protected area, Arachnids are dominants [Araneae (22 spp.), followed by Acarina, Myriapoda (5 spp.), Scorpionida (4 spp.).

Das et al (2012) reported total of 58 species representing 37 genera from 9 family were recorded from the multiple use area of the reserve. (Table 1) Libellulidae was the dominant family with 31 species, followed by Coenagrionidae (11), Calopterygidae (3), Platycnemididae (3), Protoneuridae (2), Lestidae (2), Chlorocyphidae (2), Gomphidae (2) and Aeshnidae (2). Orthetrum was found to be the most species rich genera with 7 species.

Payra et al. in 2016 reported the "Butterfly Diversity in Two Selected Fringe Area of Similipal Biosphere Reserve, Odisha, India, with Notes on Some Important Sightings". And a total of 136 species of butterflies belonging to 87 genera representing 5 families were recorded from two selected study sites in the fringe area

of Similipal Biosphere Reserve during January 2014 to November 2015. Family Nymphalidae was dominant with 44 species, followed by Lycaenidae (42 species), Hesperiidae (22 species), Papilionidae (14 species) and Pieridae (14 species). Out of these 136 species, 15 species are protected under the Indian Wildlife (Protection) Act (1972).

2.4.7 Distribution of animals and habitats.

The census of tiger and panther reveals a distribution pattern of big cats and accordingly territories are mapped. Similar mappings cannot be attempted for elephants, as there is always internal migration throughout the year. Only preliminary work has been done on the distribution of herbivores under normal condition. A distribution factor has been assigned for some major mammal and distribution maps have been prepared for four-horned antelope, bison and giant squirrel. Based upon sightings and other evidences, it is quite clear that South Similipal possesses more herbivores than other area created by juxtaposition of grasslands, riparian zones and woodlands. However, the extent of such favoured habitats is highly restricted inside Similipal. The meadows inside the valley are prone to invasion of woody species. The details of tiger occupancy and prey animals have been discussed along with maps in Chapter- 3.

2.5 MAJOR CONSPICUOUS CHANGES IN THE HABITAT DURING THE PERIOD OF TIGER CONSERVATION PLAN 2013-14 TO 2022-23.

Due to managerial intervention and interpolation of various forest conservation practices the habitat has undergone changes like availability of water holes and salt licks. The meadows have been developed. Due to fire protection measures and protection of the forests against illicit felling the ground flora have become conspicuous and the canopy is being recouped. The positive and negative changes can be summarized as follows:

Positive:

1. Five Villages are been relocated from core area of Similipal Tiger Reserve which opened up vast area of grass lands and provided inviolate space for wildlife area 129ha.

2. The total lack of large lentic water bodies have been addressed by construction of water bodies like Dhuduram and Karkachia prior to the previous TCP period. New water bodies have been created in the core area at Nuagaon, Jamuna, Solabadi, Kairakacha, Pandabandha, Mandaljhari, Brundaban, Jodadiha during the previous plan period.

3. A series of meadows are being maintained in the core area, especially the southern side, which has increased the habitat for ungulates as a result total density of herbivore has increased substantially. Due to less open area in Northern core of Similipal and high canopy areas, under canopy (mainly sal trees) meadow management are being created and maintained which has resulted increased herbivore density in those areas.

4. As a result of effective protection measures and habitat improvement activities both in core area as well as buffer area the tiger population is increasing significantly. Camera trapping exercise shows that tigers are migrating from core area of southern side of Similipal to northern parts and adjoining Protected Areas like Hadgarh and Kuldiha Wildlife Sanctuary.

5. Continued and effective fire protection activities using state of the art technologies have resulted in drastic reduction of fire incidences in core area as a result there is improvement in luxuriant and moisture-loving ground flora, especially in semi-evergreen patches.

6. Massive awareness campaign in surrounding villages and large scale involvement of all the stakeholders has strengthened participatory conservation efforts.

Negative:

1. Over the past ten years population in buffer areas of Similipal has increased as a result anthropogenic pressure on forest resources and management is increasing.
2. Due to almost complete prevention of illegal felling and fire in the core area, meadows are getting encroached by woody vegetation which though is a natural process of succession, makes the effective habitat unavailable for herbivores.
3. There is gradual increase in inflow of tourists for visiting religious places and waterfalls which may pose challenges in wildlife management.
4. Due to lack of suitable habitat availability in Northern part of Similipal, the tiger movement is mainly restricted to Southern Similipal. If inviolate space is not created in buffer areas of Northern Similipal by relocating villages there may be conflicts due to migration of tigers from South to Northern side of Similipal.

CHAPTER 3
STATUS OF TIGERS AND CO-PREDATORS

CHAPTER

03

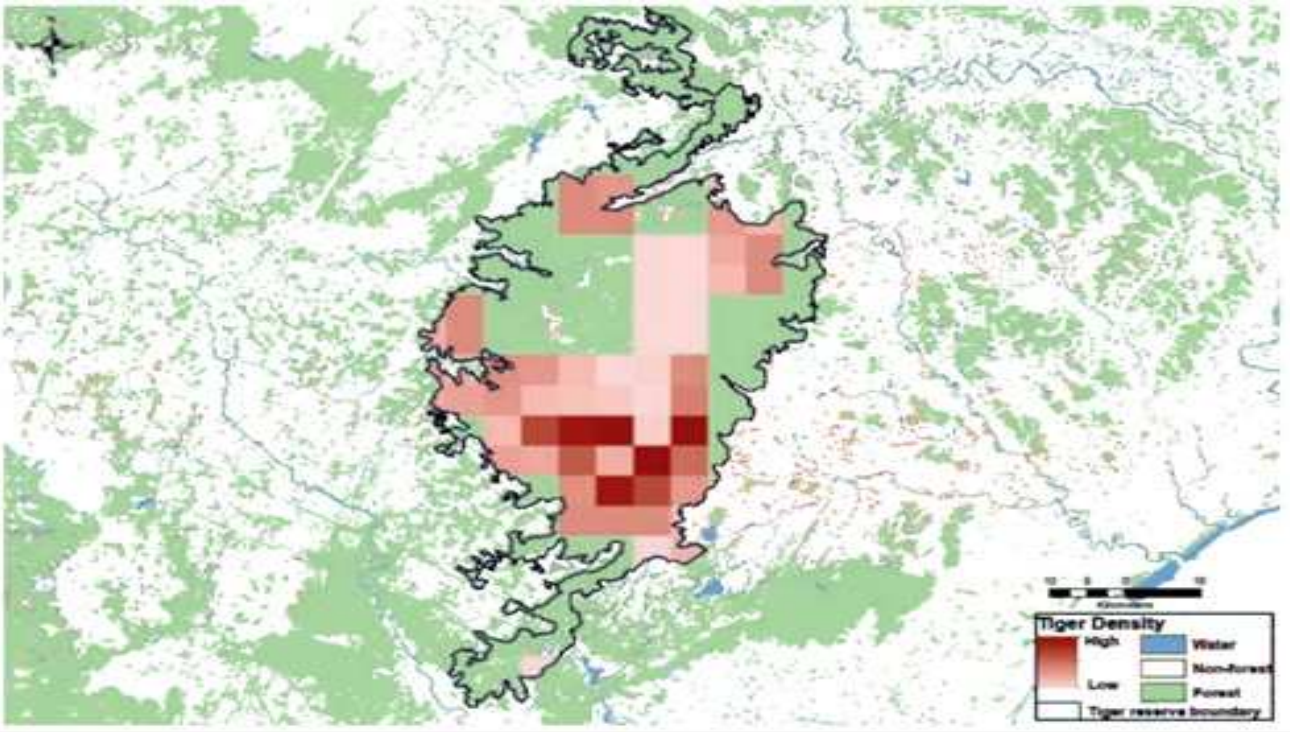
STATUS OF TIGERS AND CO-PREDATORS

3.1 DISTRIBUTION

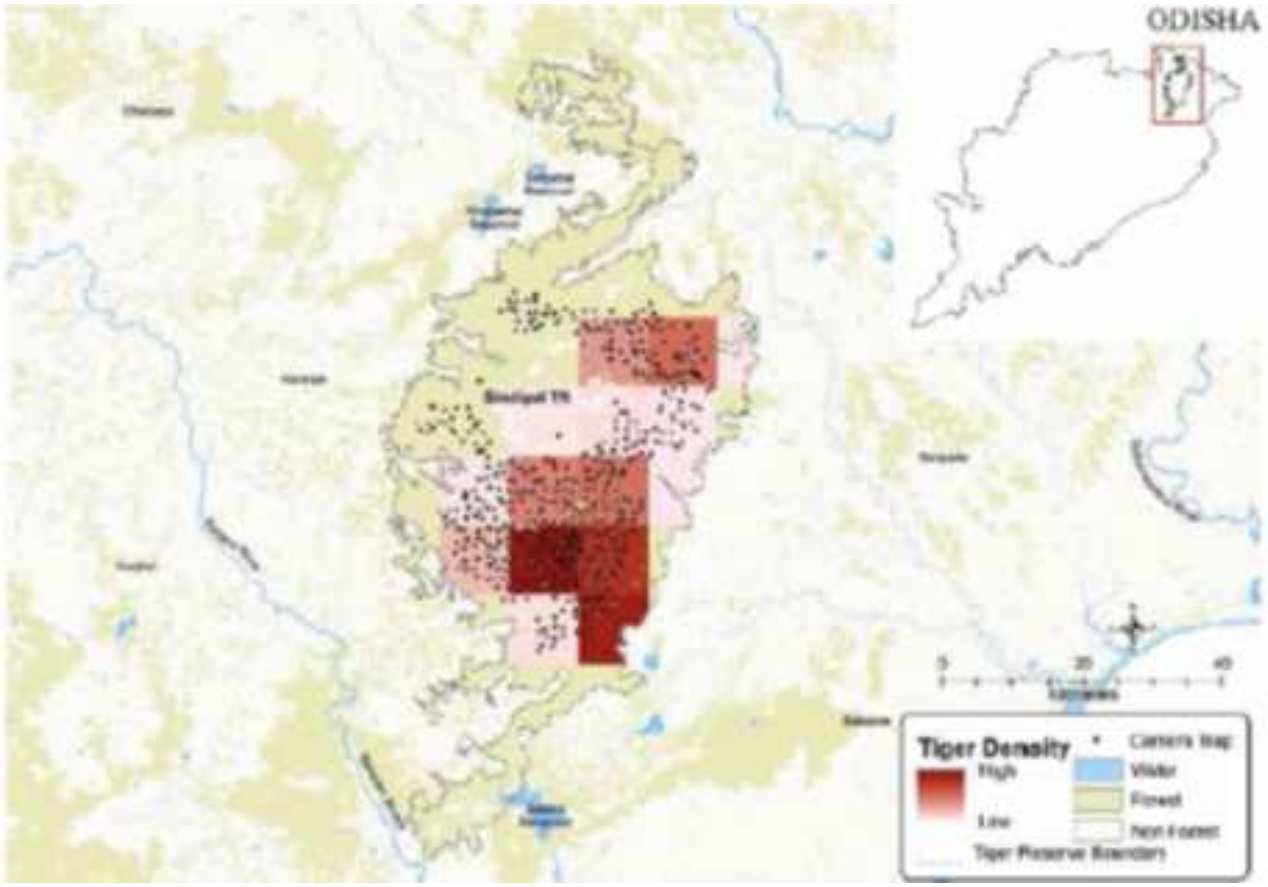
3.1.1. Tiger

Historical records based on census carried out by pug mark counting method indicates that Tiger was almost uniformly distributed throughout the reserve. But an analysis of the trends in spatial distribution based on the 2004 census revealed that they were concentrated mostly on the southern side of Similipal Tiger Reserve. Over the years after various rounds of tiger census it was observed that the distribution of tigers in the landscape is changing based on the need of the hour. There was a bottleneck period during 2009 due to Naxalite attack where wildlife protection activities were compromised as a result tiger numbers were drastically reduced due to various reasons. As per the "Status of tigers, co-predators and prey in India, 2010" published by NTCA, tiger occupied area in Similipal was 2297 km^2 in 2006 where as it was reduced to 1088 km^2 in 2010. This may be due to disturbance caused by Naxal attack in Similipal in 2009. During that time it was observed that tigers restricted their movement only in the selected Ranges of Southern Similipal. But due to gradual improved protection efforts post 2012 has resulted in increasing tiger numbers, at present tigers are observed in Northern part of Similipal also evidence was found during All India Tiger Estimation 2022 that tiger are migrating from Similipal to nearby Sanctuaries.

MAP No. 3A: SPATIAL DENSITY OF TIGERS IN SIMILIPAL TIGER RESERVE, AITE-2018



MAP No. 3A: SPATIAL DENSITY OF TIGERS IN SIMILIPAL TIGER RESERVE, AITE-2022



During 2006, estimation of tiger and co-predators had been done in collaboration with Wildlife Institute of India and the report was published in "Status of Tigers, Co-predators and prey in India" by NTCA in 2008. As per the report Similipal Landscape comprising of 3824 km² patch of forest has recorded tiger presence in 2 units having a total tiger occupancy of 2297 km² with an estimated tiger population of 20 (17-34) tigers.

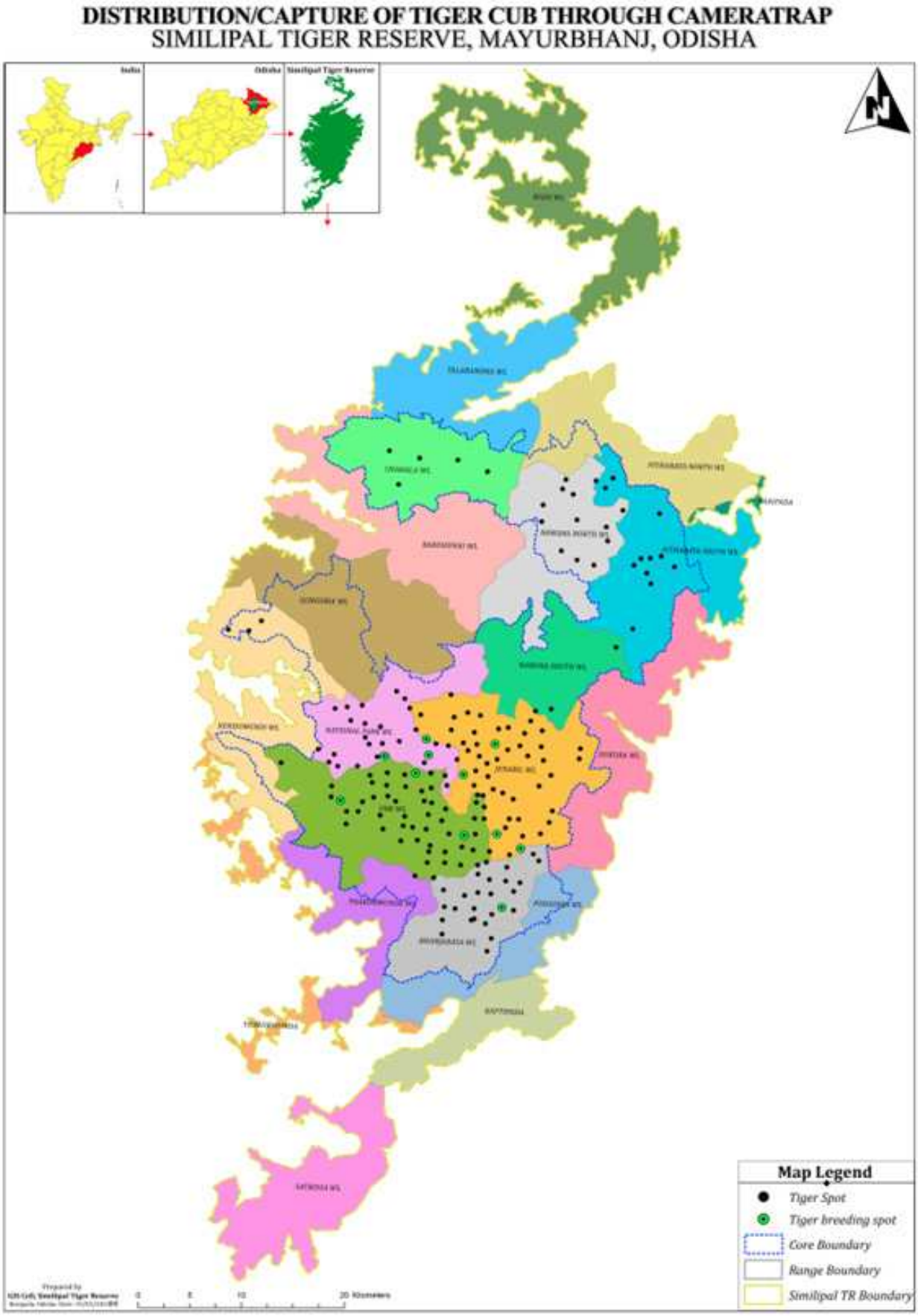
The results of initial 3 AITE Exercises (2006-2014) indicate significant decline in Tiger occupancy in Northern Similipal between 2006 to 2014. The similar trend of distribution of Tigers prevailed till the 4th Cycle of AITE, 2018, in which a total of 248 tiger images were obtained from which 8 individuals adult tigers (7 female and only one 2male) were identified. Tiger density was estimated at 1.02 (SE 0.39) tiger per 100 km. Higher tiger densities were observed in the upper Barahakamuda range and Jenabil range of the tiger reserve. These areas have contiguous forest patches with grasslands and rugged terrain.

The map 3-F showing distribution of tiger, leopard and other co predators indicate that Tiger density is more in southern Similipal areas mainly in core ranges like UBK, Jenabil, National Park and Bhanjabasa. The recent observations made during All India tiger census 2022 and phase IV monitoring done during 2023 indicates movement of tigers to northern Similipal. Camera trap photographs of tigers were captured from western side of Similipal like Kiajhari meadow in Kendumundi WL Range and northern side of Similipal such a pithabhata south WL Range and up to Chahala WL Range.

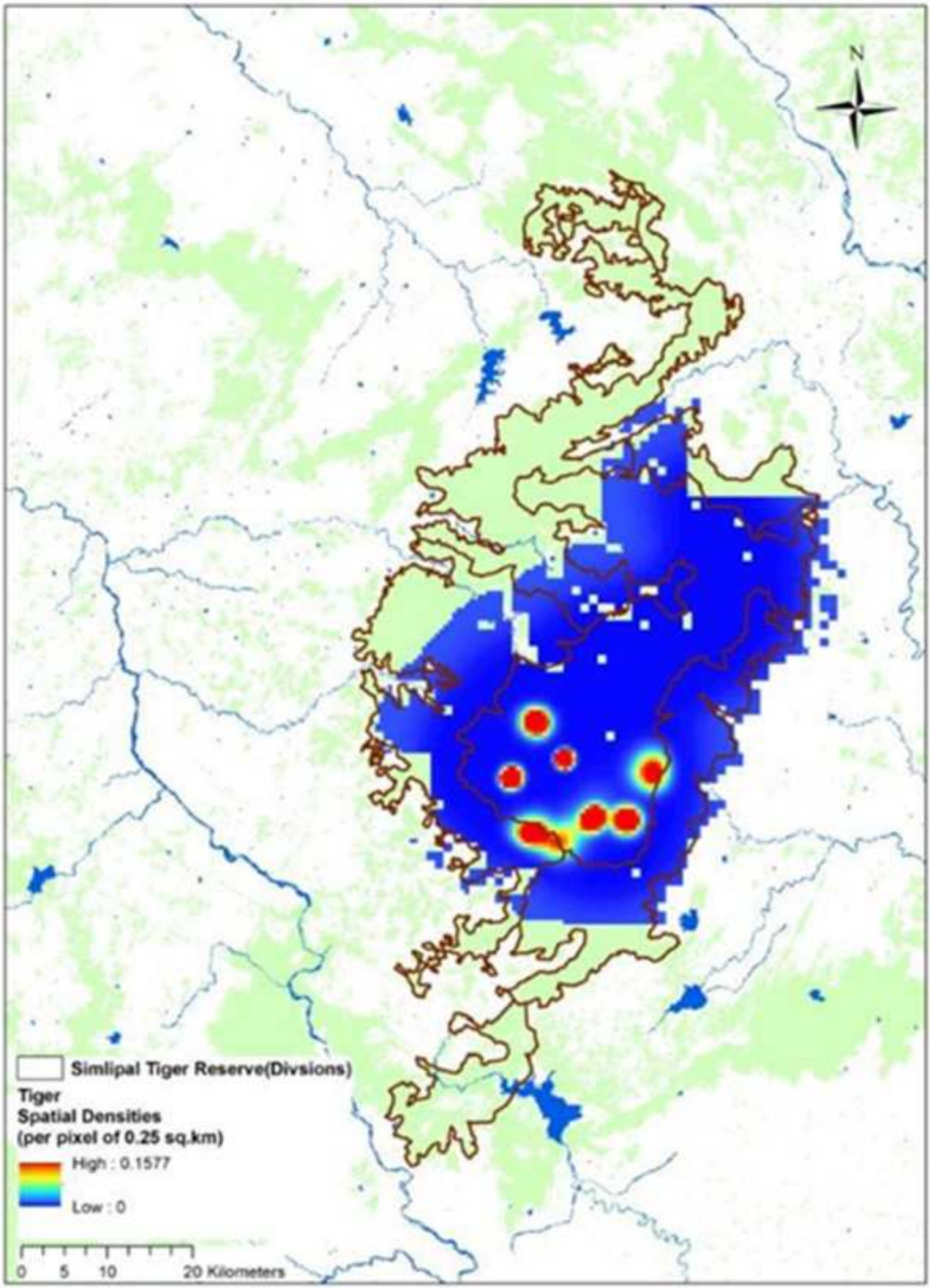
As of now Leopard density is evenly distributed throughout the Similipal TR with the increase in tiger numbers there may be fluctuations in their distribution in future due to competition with tigers for resources. As there were no photographs of dhole captured during 5th Cycle of All India Tiger Estimation, 2022, it may be assumed that there is no influence of dhole on predator-predator relationship.

The remaining small predators the leopard cats, Jungle cats, and palm civet, etc. are evenly distributed in northern and southern part of Similipal.

Map No. 3-B: Occupancy & Breeding Sites of Tigers in Similipal Tiger Reserve during 2021-2023

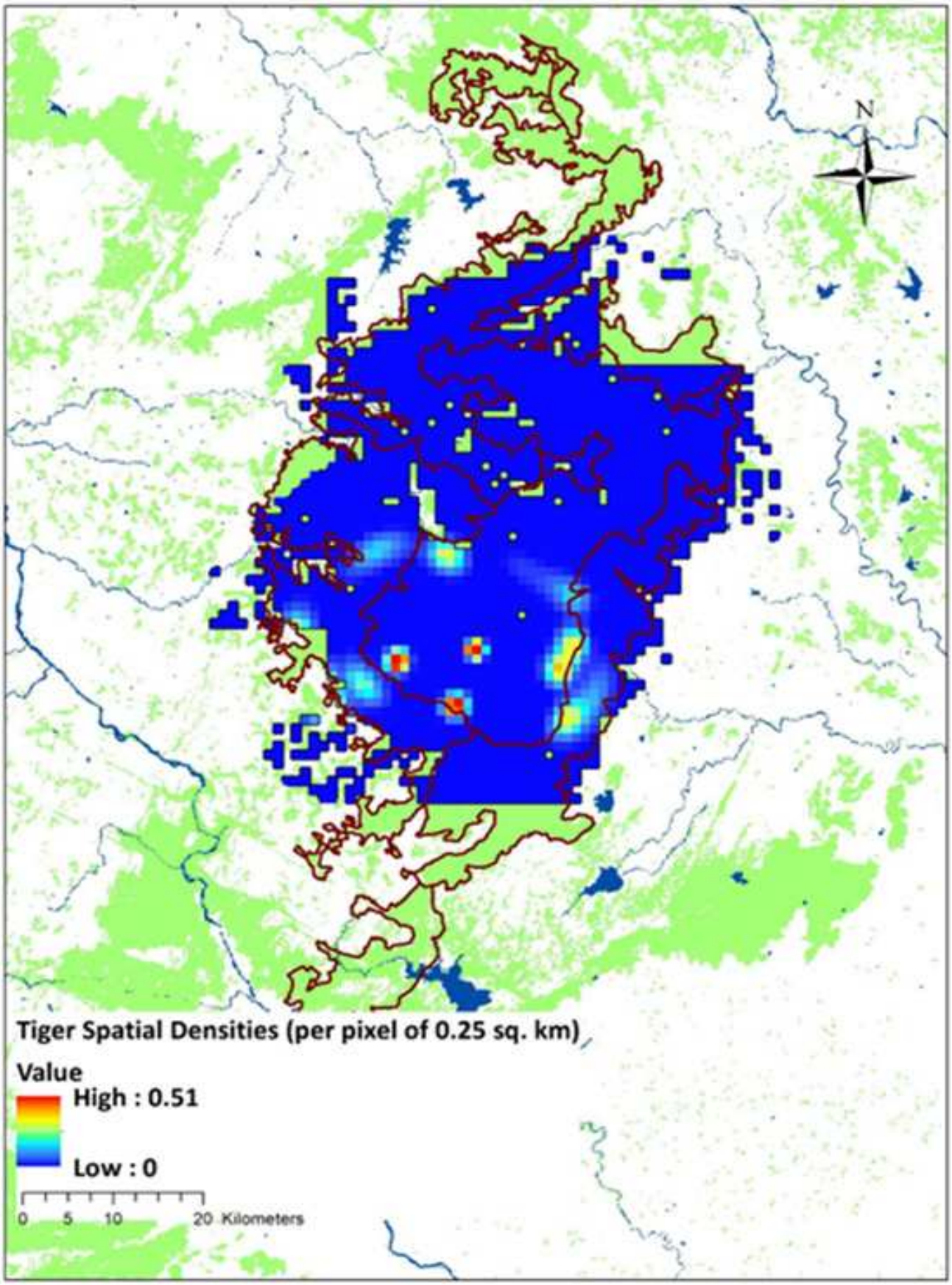


Map No 3C.: Distribution of spatial densities of tiger in Similipal Tiger Reserve, 2019.



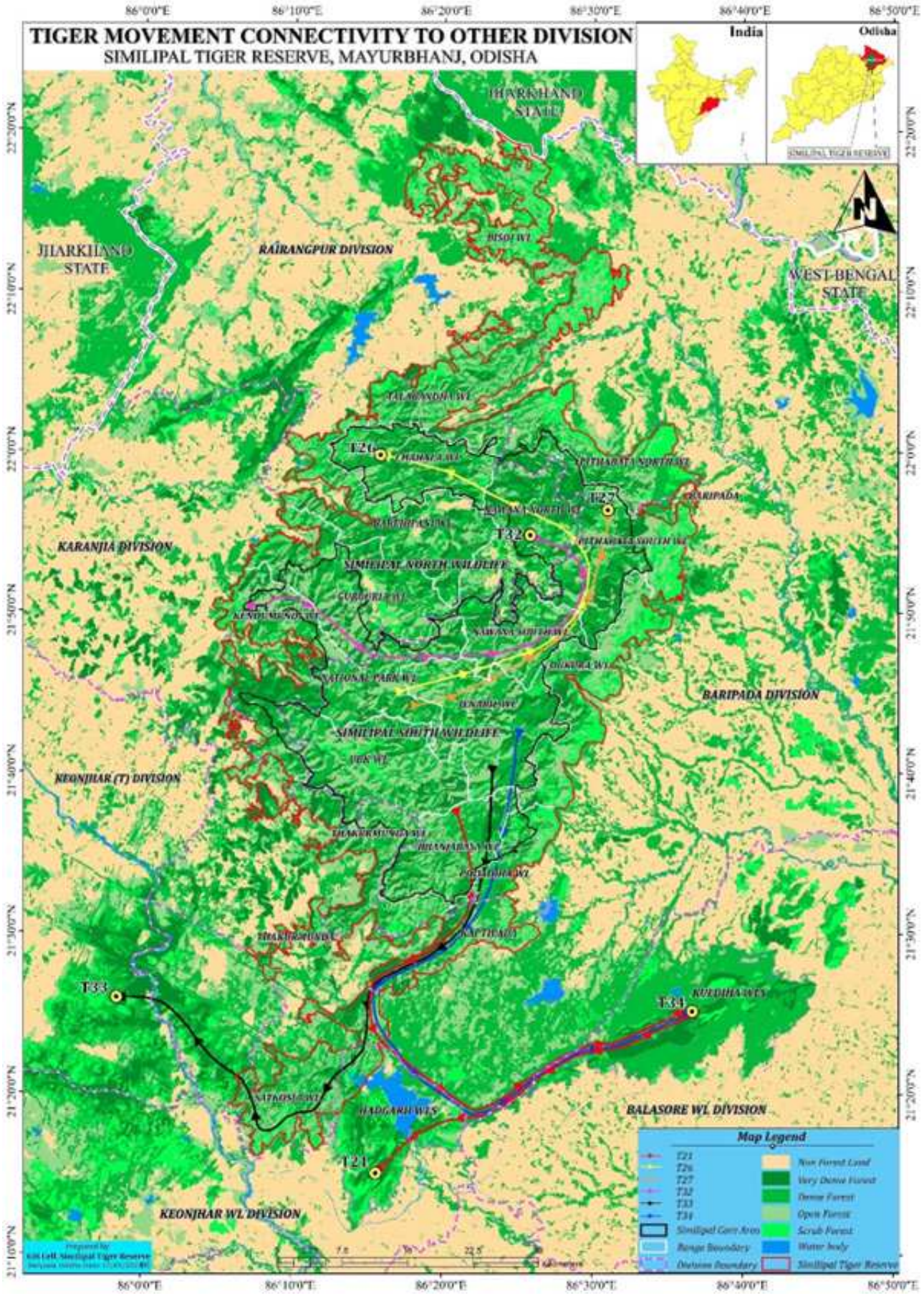
Source: Interim Project Report, 2020, "Wild Tigers of Similipal: A study on spatial distribution, abundance and population genetics"

Map No. 3-D: Distribution of spatial densities of tiger in Similipal Tiger Reserve, 2020.



Source: Interim Project Report, 2020, "Wild Tigers of Similipal: A study on spatial distribution, abundance and population genetics"

Map No. 3-E: Dispersal & Occupancy of Tigers of Similipal Tiger Reserve (2021-23)



The recent trend of tiger migration indicates that male tigers are moving to new places in search of suitable territory both in and out of Similipal sanctuary. Increase in number of tigers is the main factor behind migration of tigers to other places due to competition for resources. During the 5th Cycle of All IndiaTiger Estimation, 2022, a camera trap photograph of male tiger named T-21 was captured from Kuldiha Wildlife Sanctuary.Later the same tiger moved to Hadgarh Wildlife Sanctuary under Anandpur wildlife Division. Subsequently it died due to poisoning in that Division. In 2023, monitoring from trap camera photos revealed that one more male tiger namely T-34 moved to Kuldiha Wildlife Sanctuary from Similipal tiger Reserve. At the end of 2022 two young male tigers T-26 and T-27 started moving in Pithabata South WL Range and Nawana North WL Range from National Park WL Range. During 2023, the T-26 moved further North-West and frequently sighted in Chahala WL Range. Both T-26 and T-27 were pseudo-melanistic in colour. During April 2023, the tiger T-27 died due to possible infighting with another male tiger inside Badamakabadi-II Beat of Nawana South WL Range.

At the end of the year 2022, a male tiger named T-33 moved from UBK WL Range of Similipal South wildlife sanctuary to Keonjhar territorial division. It was photographed using camera trap from Atei reserve forest, Ghatgoan range of of Keonjhar territorial division. One more male tiger T-32 moved from national park range of Similipal south wildlife division to kiajhari medoaw in Kendumundi WL Range, Similipal north wildlife division. Most of the places where tiger migration is taking place are rich in prey density and they can be potential breeding ground for tigers. Continuous efforts are going on to monitor movement of tigresses to other places.

The results of analysis of camera trap photos indicates that as of now breeding spots of tigers are limited to four core ranges namely UBK, Jenabil, National Park and Bhanjabasa WL Range. The information on preferred breeding spots of tiger has been generated by separating camera trap photos showing mother with young cubs. The main reason for preferring this core ranges as breeding sites is lack of disturbances caused by anthropogenic factors as there are no villages inside these ranges apart from this high prey density also plays important role.

3.1.2. Leopard

Leopards are more widely dispersed, and their distribution as per the different census reports (Annexure XXXVIII). During 2018 census it was reported that the total number of leopards were 125 in Similipal Tiger Reserve. The distribution and abundance map prepared based on All India Tiger census 2022 data indicated that leopards are evenly distributed throughout the Similipal TR.

3.1.3. Dhole

Population of Dhole seems to have fallen steeply over the years, so much so that there have been no recent sight records for the past several years. This is not surprising as sudden fluctuations in wild dog populations with a cyclical rise and fall is a phenomenon, which has been known from other parts of our country, especially South India. Srivastava & Singh (2003) mentions that in Similipal Tiger Reserve, the wild dog (dhole, *Cuon alpinus)* was found “in small groups” during 1970s, and the status was “low” in 1980s. An estimate in 1990 put the number at 400-428 dogs in 104 packs. In the late 1990s the dhole was rarely sighted. Competition faced from village dogs is considered as one of the “introduced” factors responsible for the changing status of the dhole in Similipal. The gradual reduction in sighting of dhole in Similipal between 1970s and 1990s could be a positive sign for the growth of population of tiger but the possible reason for their gradual reduction is a matter of concern for biodiversity conservation. It is suggested that as long as households existed in PAs, it will be necessary to enumerate and monitor the populations of domestic and transient dogs along with populations of the humans and cattle. During Camera Trap exercise conducted from November 2017 to February 2018 a total of 7 numbers photographs were captured from Upper Barakamuda, Chahala, Pithabata and Nawana South whereas no photographs were captured during All India tiger census 2022.

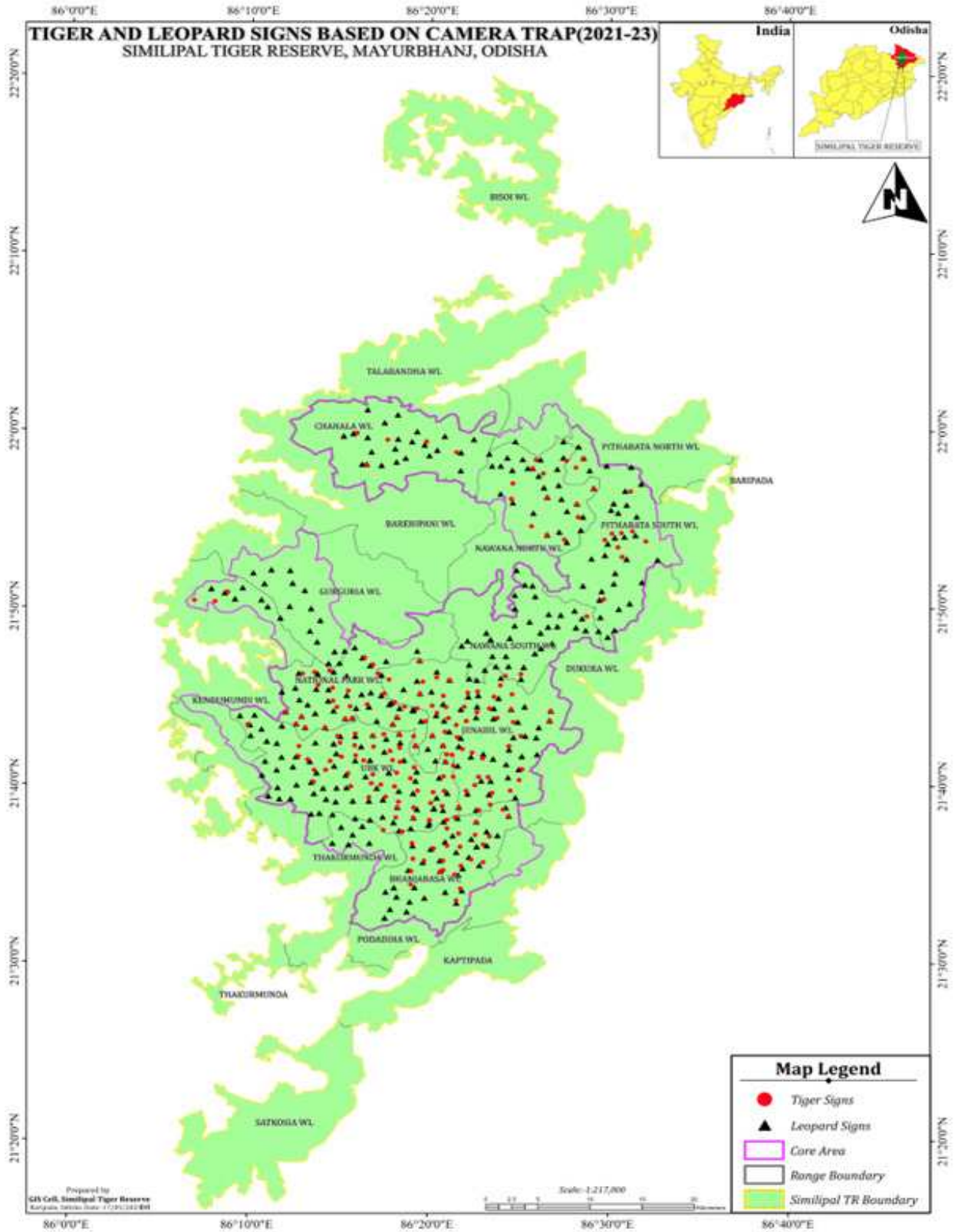
3.1.4. Hyena

Hyena, primarily a scavenger, occurs only in the fringe areas, mostly along the scrub and ravine country near villages and thus comes into no direct contact with either Tiger or the Leopard.

3.1.5. Sloth Bear

Sloth Bear has a patchy distribution inside the reserve, occurring in rocky slopes and dry deciduous slopes, mainly in the outer peripheral areas with verylowconcentration in the core area. The main areas of occurrence in the core area are Badghati-Brundaban in Chahala, Bhajam in Pithabata and Kulipal at Jenabil, Nigirdha at Nawana South and Talabandha Ranges of Similipal North Wildlife Division.

Map No.3-F:Tiger & Leopard Distribution based on images obtained through Camera Traps (2021-23)



3.1.6. Wolf

Wolf is virtually unknown from within the reserve, but for isolated reports from the fringe foothill areas and the adjoining scrubland including the vicinity of Manbhanga village at Kaptipada and scrub forests of Thakurmunda.

The status of distributional range of tiger and co-predators in the Critical Tiger Habitat of Similipal have been derived from the sign survey done in 2012 in the ongoing Phase IV monitoring which is given overleaf.

3.2 ABUNDANCE STATUS

Relative Abundance of all Photo captured Species in Similipal Tiger Reserve during 4th Cycle of AITE, 2018:

A total of 28 species of ungulates, carnivores, domestic animals, omnivores and Galliformes were photo captured in Similipal Tiger Reserve. Barking deer and giant squirrel were the most common species, while golden jackal, sloth bear and smooth-coated otter were rarest.

Table 3a: **Details of all photo captured Species and their relative abundance (relative abundance index (RAI)) in Similipal Tiger Reserve, 2019.**

Common name	No. of Photos per 100 trap nights	No. of trap nights required to get single capture
Asian palm Civet	9.11	11
Barking Deer	69.25	1
Chital	22.25	4
Elephant	2.34	43
Gaur	0.73	138
Giant Squirrel	0.02	4400
Golden Jackal	0.02	4400
Grey Mongoose	1.95	51
Hanuman Langur	3.02	33
Honey Badger	0.14	733
Indian Creasted Porcupine	3.43	29
Indian Hare	4.18	24
Indian Peafowl	4.32	23
Jungle cat	1.20	83
Leopard	2.70	37
Leopard Cat	4.68	21
Mouse deer	12.59	8
Red Junglefowl	2.34	43
Red Spurfowl	0.20	489
Rhesus Macaque	5.73	17
Ruddy Mongoose	5.27	19
Sambar	39.89	3
Sloth bear	0.02	4400

Small Indian Civet	2.73	37
Smooth Coated Otter	0.02	4400
Striped-necked Mongoose	1.59	63
Tiger	3.39	30
Wild Pig	4.32	23

3.2.1. Tiger

A total of 101 were estimated during the pug-mark census undertaken in 2004. The NTCA report released in 2008, says that 'Similipal Landscape comprising of 3824 km^2 patch of forest has recorded tiger presence in 2 units having total tiger occupancy of 2297 km^2 with an estimated tiger population of 20 (17-34) tigers. As per the Status Report of Tigers, Co-predators and Prey in India, 2010 published by NTCA, in 2010 the abundance was 23 (12-34). In the subsequent Cycles of AITE exercise the tiger population in Similipal TR were estimated to be 17 (14-19) in 2014, 12 (S.E.-01) in 2018 & 20 (S.E.-02) in 2022 (Table 3b). The Sampling details and parameter estimates of tiger from camera trap-based capture mark-recapture analysis for the years 2014, 2018 & 2022 are given in Table 3c, 3d & 3e respectively.

Table 3b: Tiger Population Estimates in Similipal TR in the five cycles of AITE

Year	AITE	Tiger Population Estimates	Unique Tigers Captured
2006	1st Cycle	20 (17-34)	-
2010	2nd Cycle	23 (12-34)	-
2014	3rd Cycle	17 (14-19)	05
2018	4th Cycle	12 (S.E.-01)	08
2022	5th Cycle	20 (S.E.-02)	16

Table 3c: Sampling details and parameter estimates of tiger from camera trap-based capture mark-recapture analysis in Simlipal Tiger Reserve, 2014

Variables	Estimates (SE)
Minimum bounding polygon (km^2)	369
Camera Points	298
Trap Nights(effort)	4990
Model	g0(.)σ(.)
Unique tigers captured	5
D ML SECR (SE) (per 100 km^2)	0.48 (0.20)
Sigma (SE) (km)	3.90 (0.28)
g0 (SE)	0.03 (0.01)

SE: Standard error; D ML SECR: Density estimate from Maximum Likelihood based spatially explicit capture recapture; σ (Sigma): Spatial scale of detection function, g0: Magnitude (intercept) of detection function

Table 3d: Sampling details and tiger density parameter estimates using spatially explicit capture recapture analysis in a likelihood framework for Similipal Tiger Reserve, 2019.

Variables	Estimates (SE)
Model Space (km^2)	847
Camera Points	141
Trap Nights (effort)	4400
Model	g0(.)σ(.)
Unique tigers captured	8 (7 Female & 1 Male)
D SECR (per 100 km^2)	1.02 (0.39)
σ (SE) km	4.23 (0.44)
g_0 (SE)	0.03 (0.01)

SE: Standard error; D SECR: Density estimate from Maximum Likelihood based spatially explicit capture recapture; (Sigma): Spatial scale of detection function; g_0: Magnitude (intercept) of detection functionσ (Sigma): Spatial scale of detection function, ^g0: Magnitude (intercept) of detection function.

Table 3e: Spatial Explicit Density and other parameters, Simlipal TR, 2022

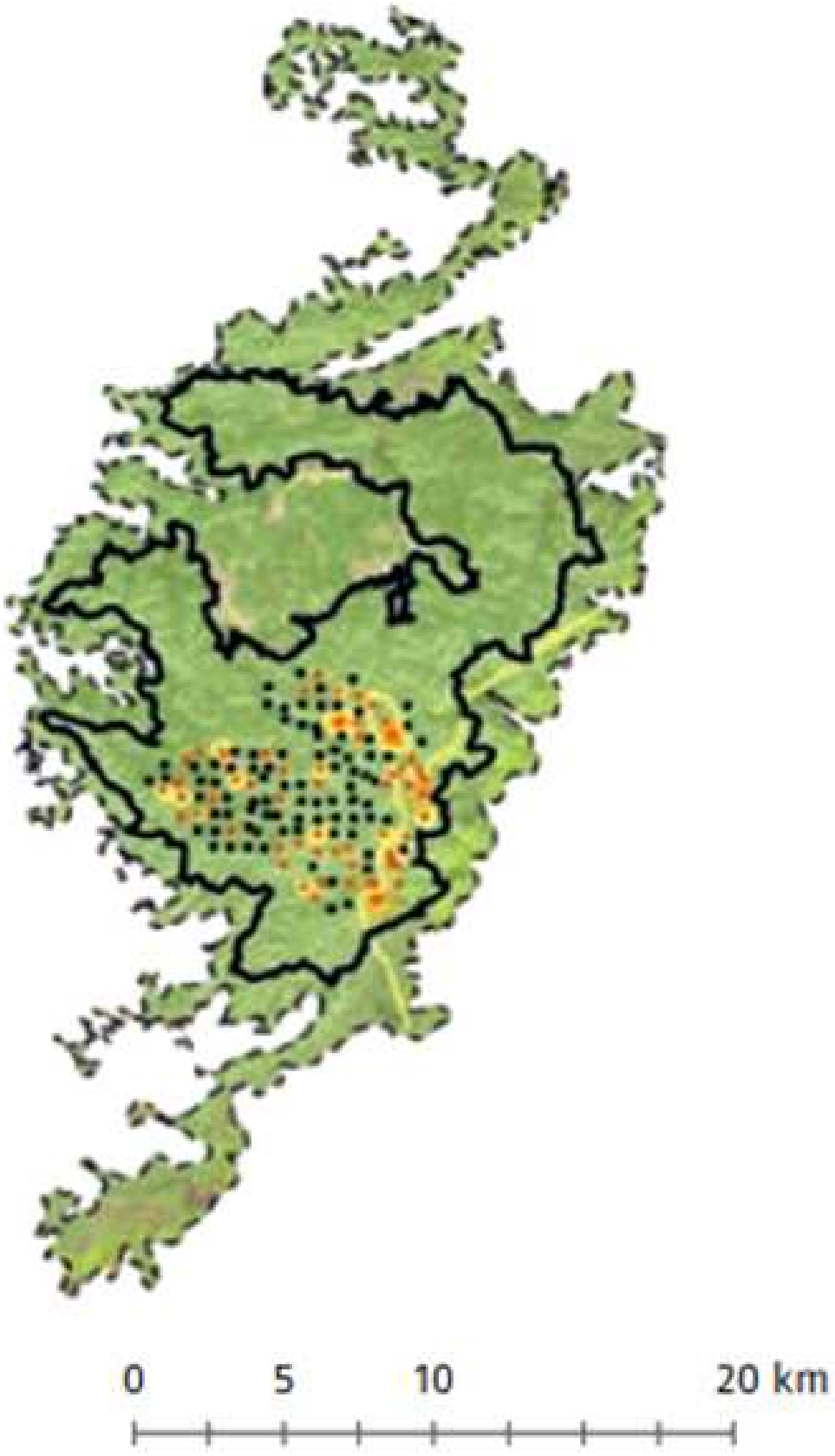
Variables	Estimates (SE)
Camera Points	459
Trap Nights (effort)	16217
Unique tigers captured	16 (11 Female, 5 Male)
Model	g0(sex)σ(sex)
Density (100 km-2)	0.91 (SE 0.23)
Population	20 (SE 2)
Sigma σ (SE) (km)	2.15(SE 0.08) Female
	5.2 (SE 0.32) Male
g0	0.033 (SE 0.003) Female
	0.021 (SE 0.002) Female

3.2.2. Leopard

In the 4th Cycle of AITE, 2018, Leopard was distributed throughout the camera trapped area. The capture hotspots were in the hilly to moderately hilly terrain of Jenabil range in the northern boundary and also near the boundary of Upper Barakamuda range in the southern part of the reserve. The hotspots coincide with rugged terrain and dense forests. In the exercise, the total number of leopards was estimated to be 125 in Similipal Tiger Reserve.

3.2.3. Dhole

A total of 24 were estimated during the animal census undertaken in 2004. During Camera Trap exercise conducted from November 2017 to February 2018 a total of 7 numbers photographs were captured from Upper Barakamuda, Chahala, Pithabata and Nawana South.



Map No. 3-G: Distribution and relative spatial abundance of leopard in Similipal Tiger Reserve (2018)

3.2.4. Hyena

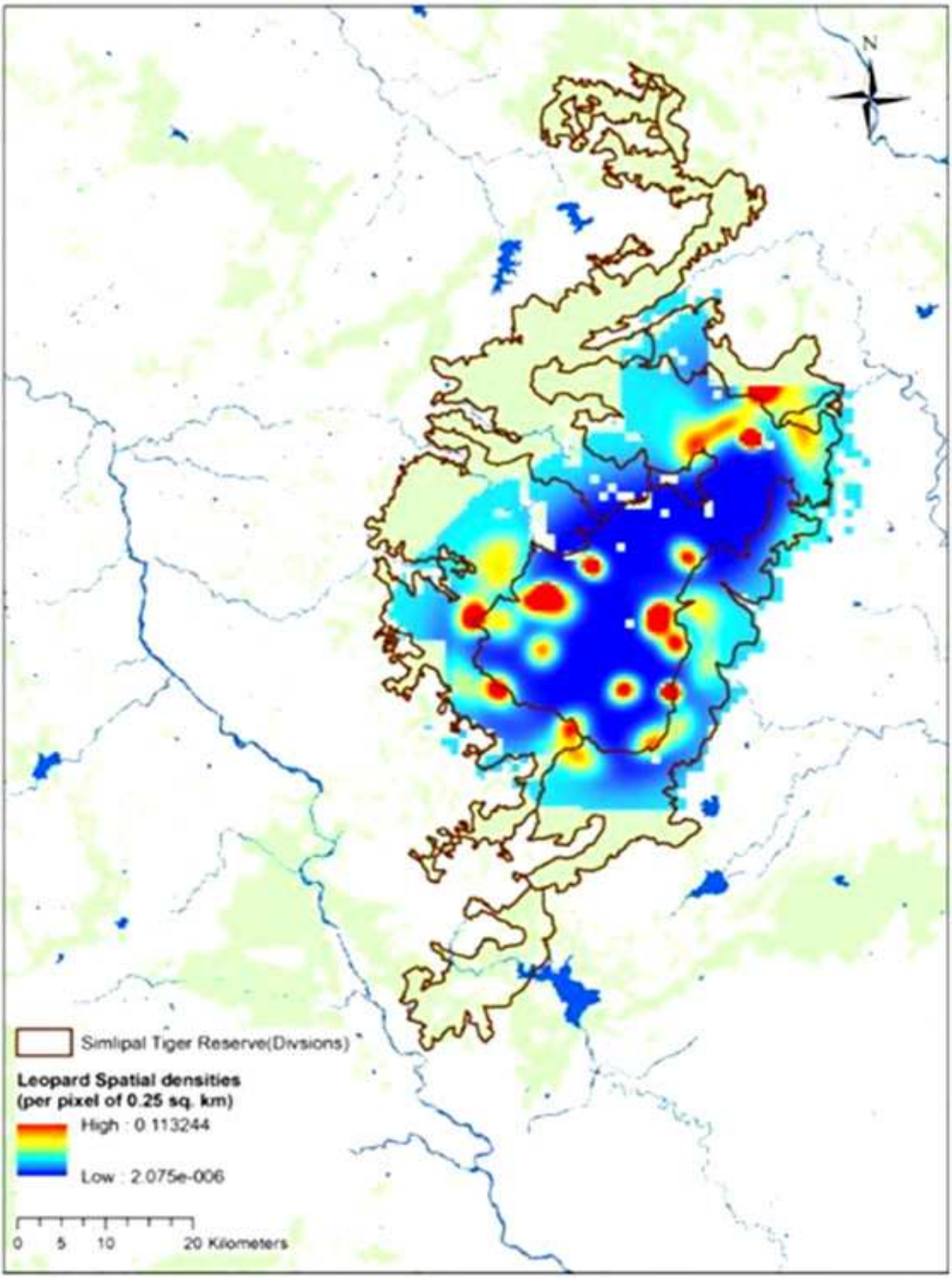
No estimate has been done.

3.2.5. Bear

No estimate has been done.

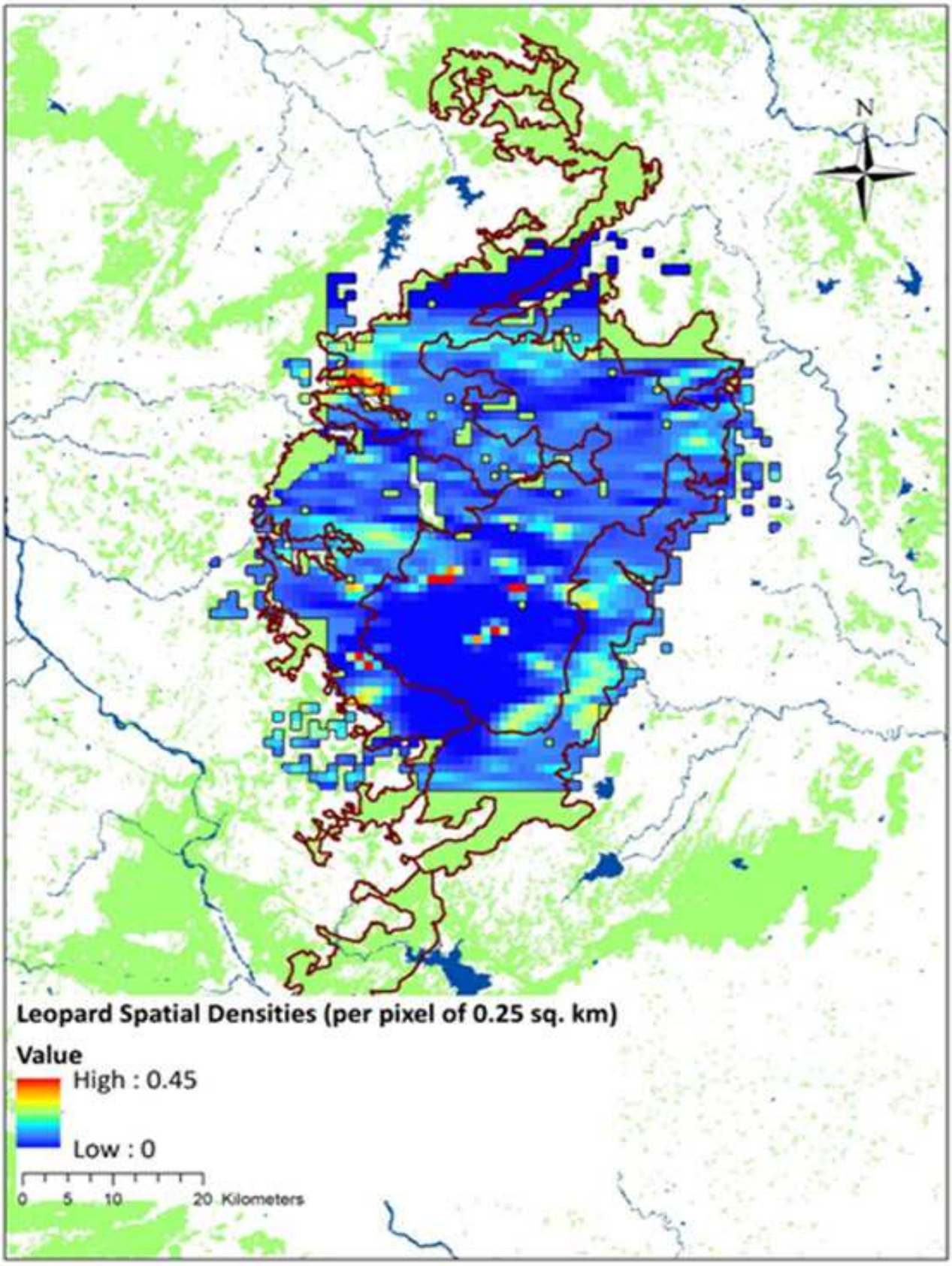
In the 4th Cycle of AITE, 2018, Sloth Bear had only one photo capture in the entire tiger reserve, on the hilly slopes near Damasahi range.

Map No. 3-H.: Distribution and relative spatial abundance of sloth bear in Similipal Tiger Reserve



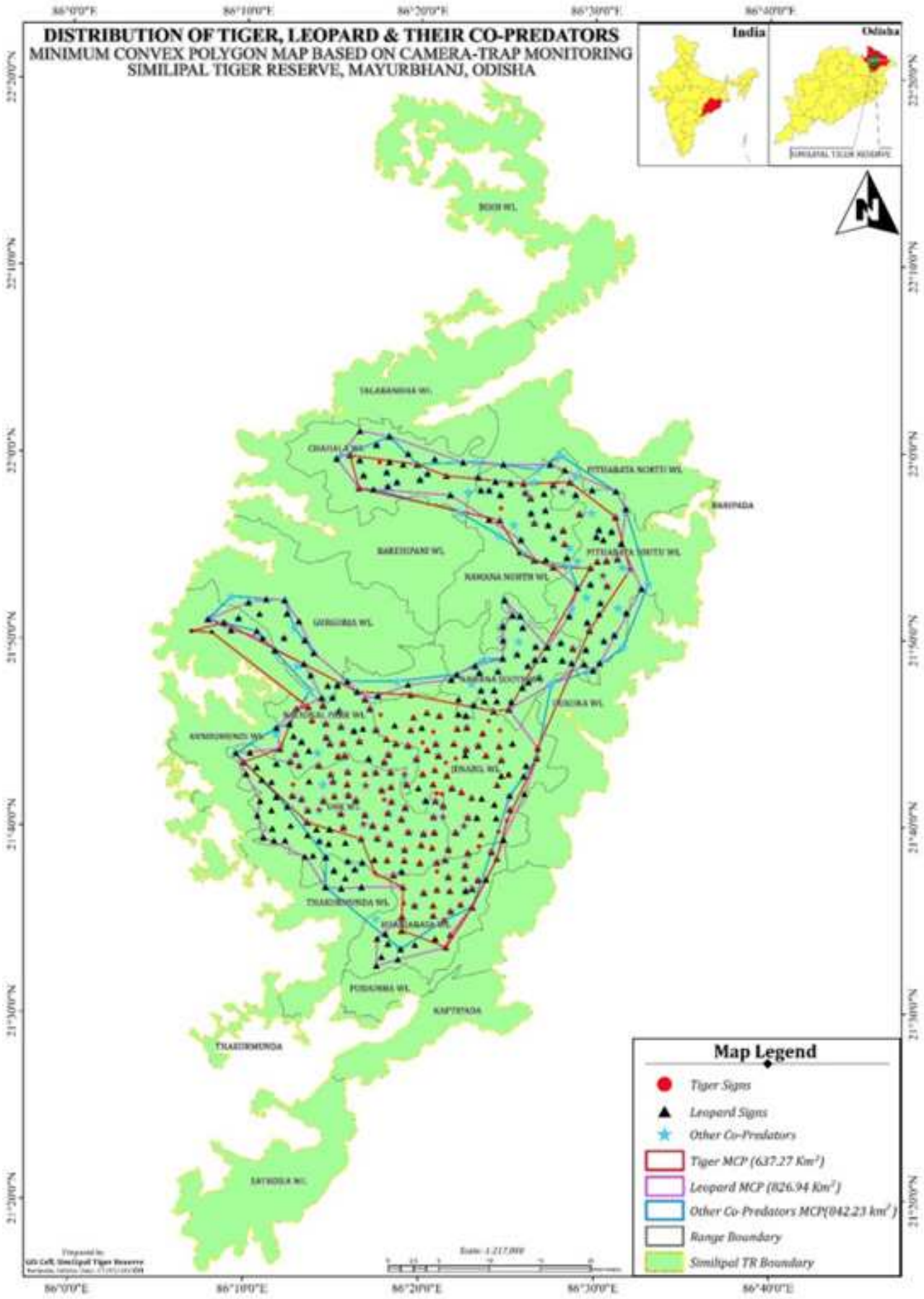
Map No. 3-I.: Distribution of spatial densities of leopard in Similipal Tiger Reserve, 2019.

Source: Interim Project Report, 2020, Wild Tigers of Similipal: A study on spatial distribution, abundance and population genetics



Map No. 3-J.: Distribution of spatial densities of leopard in Similipal Tiger Reserve, 2019.

Source: Interim Project Report, 2020, Wild Tigers of Similipal: A study on spatial distribution, abundance and population genetics

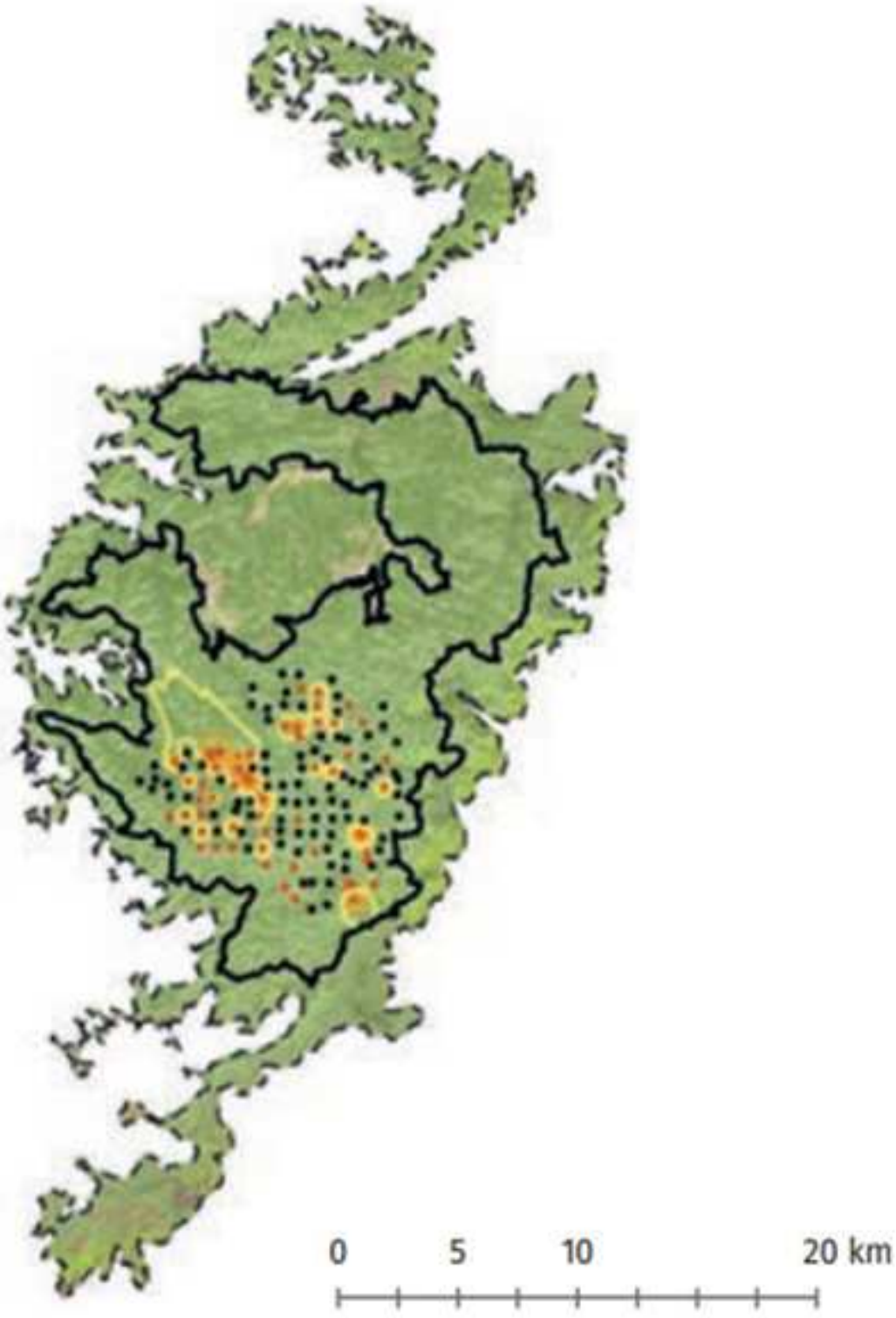


Map No. 3-K: Distribution of Tiger, Leopard &a their Co-Predators in Similipal TR

3.2.6. Wolf

No estimate has been done.

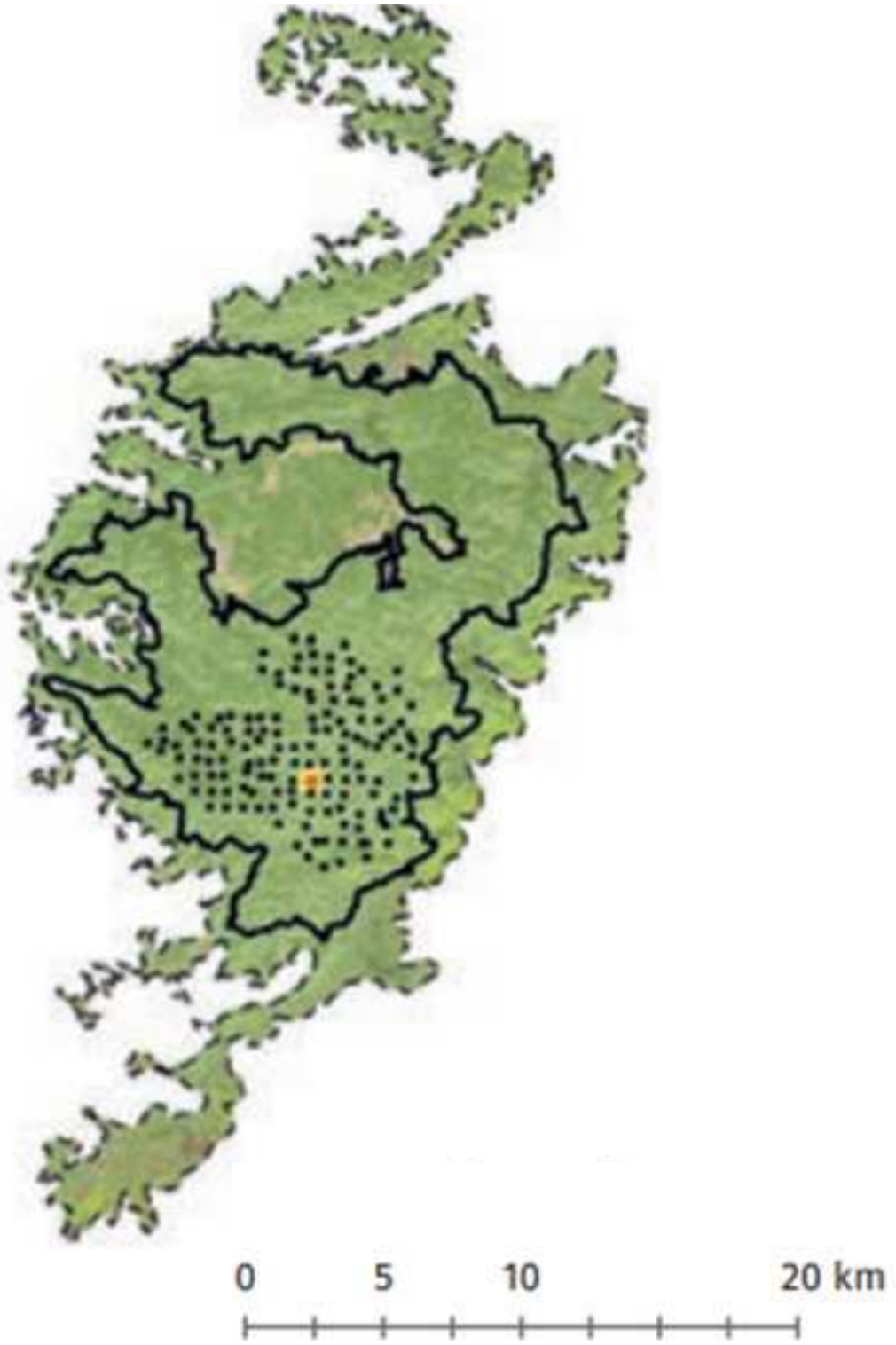
3.2.7. Elephant



Map No. 3-L: Distribution and relative spatial abundance of elephant in Similipal Tiger Reserve

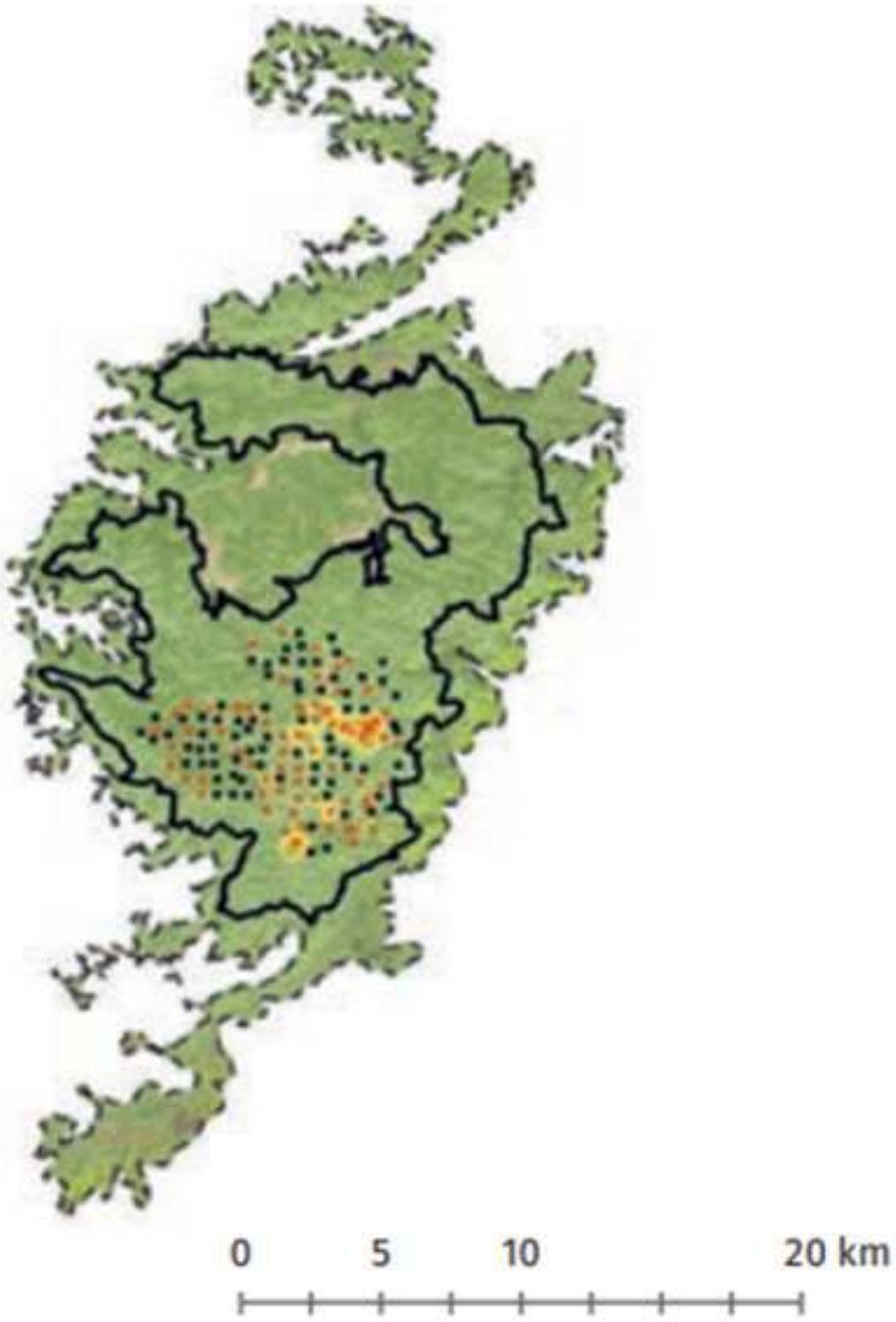
3.2.8. Jackal

In the 4th Cycle of AITE, 2018, only one camera trap recorded golden jackal in the center of the tiger reserve core



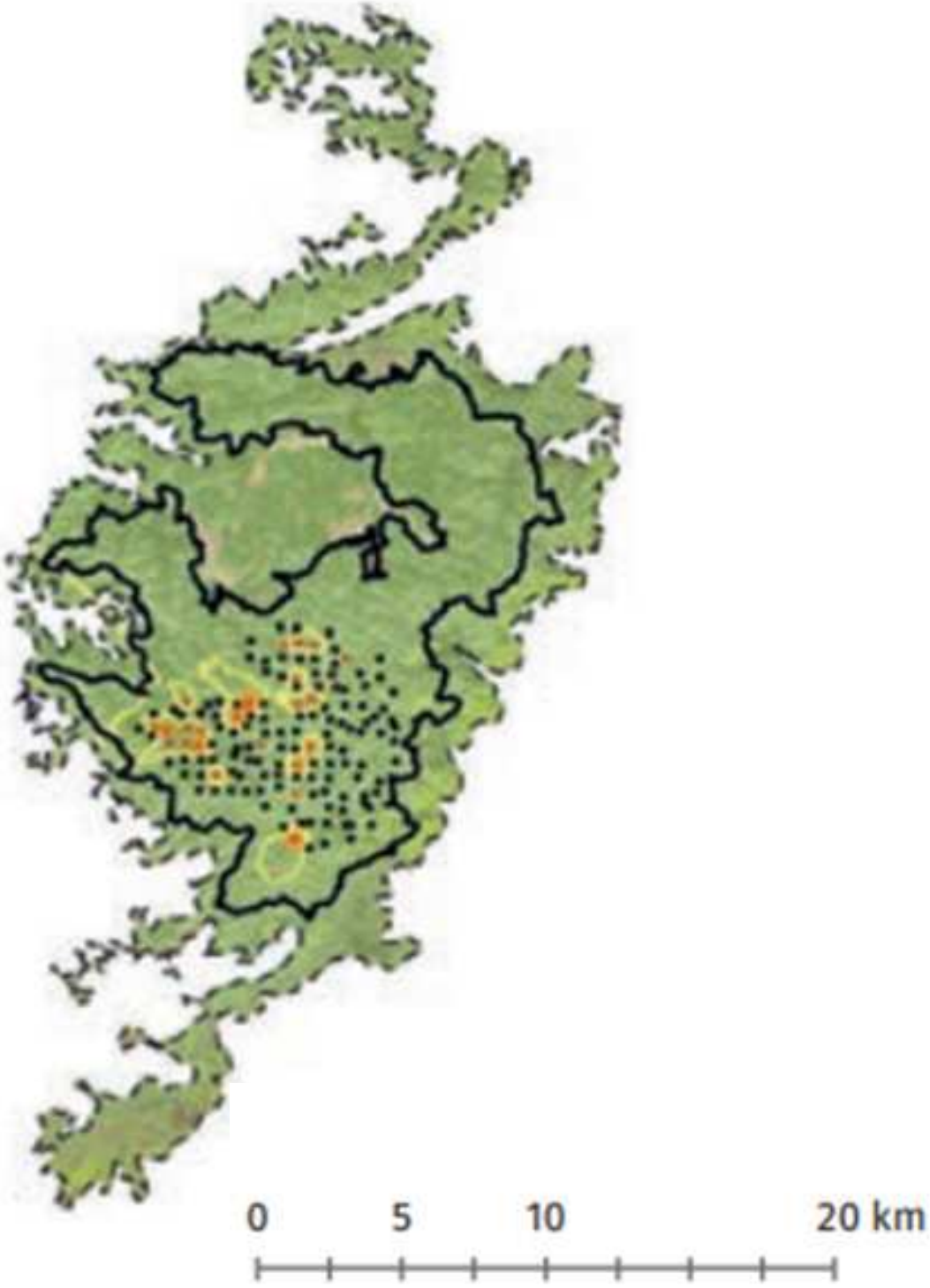
Map No. 3-M: Distribution and relative spatial abundance of golden jackal in Similipal Tiger Reserve

3.2.9. Leopard Cat



Map No. 3-N: Distribution and relative spatial abundance of leopard cat in Similipal Tiger Reserve

3.2.10. Jungle Cat



Map No. 3-O: Distribution and relative spatial abundance of jungle cat in Similipal Tiger Reserve.

3.3 PREY-PREDATOR RELATIONSHIPS

Though systematic investigations into the dynamics of prey-predator relationships have not been carried out, analysis of direct sightings, indirect evidences and scats reveal the prey preferences of Tiger and its main co-predator the Leopard. Large-sized prey like Gaur can be killed only by the Tiger, though Sambar and Wild Boar remains its preferred prey. Leopards seem to prefer Muntjac, Chital, Langur and smaller mammals like Porcupine. Hence, a sort of resource partitioning based on prey size exists. The virtual absence of Wild Dog makes the picture less complex as there is no direct competition for the Tiger as regards large prey.

3.3.1. Density of Prey species

The prey abundance estimation in the Tiger Reserve for the year 2021 was conducted through distance sampling on line transects. The field data from the line transect were for seven prey species viz. Chital, Sambar, Northern Red Muntjac, Hanuman Langur, Wild Pig, Gaur & Mouse Deer. Although Gaur & Mouse Deer were sighted on the line transects, but their observations were too low to obtain any ecological inferences & thus have not been considered for analysis of density. The results of the analysis for prey abundance for the year 2021 is given in the tables below:

Table 3f: Model Statistics and parameter estimates of line transect (n = 158, Total effort 1243 km) based distance sampling for prey species in Similipal Tiger Reserve, 2021.

Species	Best Model	Chi square px2	No. of observations (n)	Effective strip Width (ESW) [S.E]	Encounter rate (n/l) [%CV]	Detection probability [S.E]	Cluster size density [S.E]	Mean Cluster Size [S.E]	Density [S.E]
Chital	Hazard rate Simple Polynomial	0.907	74	27.30 [3.19]	0.05 [19.27]	0.31 [0.03]	1.09 [0.24]	5.58 [0.39]	**6.09 [1.43]**
Sambar	Hazard rate Simple Polynomial	0.926	122	23.37 [2.13]	0.09 [15.07]	0.36 [0.03]	2.10 [0.36]	2.55 [0.17]	**5.36 [1.01]**
Northern Red Muntjac	Hazard cosine	0.961	219	21.06 [1.33]	0.17 [9.49]	0.22 [0.01]	4.18 [0.47]	1.08 [0.01]	**4.51 [0.51]**
Hanuman Langur	Hazard rate Simple Polynomial	0.846	181	27.75 [1.65]	0.14 [10.13]	0.37 [0.02]	2.62 [0.30]	5.58 [0.31]	**14.64 [1.91]**
Wild Pig	Uniform cosine	0.939	64	27.61 [1.31]	0.05 [12.71]	0.53 [0.02]	0.93 [0.12]	4.41 [0.58]	**4.11 [0.78]**

[S.E] =Standard error.

Table 3g: Model Statistics and parameter estimates of line transect (n = 95, Total effort 754 km) based distance sampling for prey species in the core of Similipal Tiger Reserve, 2021.

Species	Best Model	Chi square px2	No. of observations (n)	Effective strip Width (ESW) [S.E]	Encounter rate (n/l) [%CV]	Detection probability [S.E]	Cluster size density [S.E]	Mean Cluster Size [S.E]	Density [S.E]
Chital	Hazard cosine	0.935	72	27.37 [3.26]	0.09 [18.80]	0.31 [0.03]	1.74 [0.38]	5.68 [0.40]	**9.92 [2.31]**
Sambar	Hazard Simple Polynomial	0.916	119	23.76 [2.20]	0.15 [14.11]	0.36 [0.03]	3.32 [0.56]	2.59 [0.17]	**8.61 [1.56]**
Northern Red Muntjac	Hazard cosine	0.946	188	20.65 [1.39]	0.24 [9.38]	0.21 [0.01]	6.03 [0.69]	1.06 [0.014]	**6.44 [0.75]**
Hanuman Langur	Half-normal Hermite Polynomial	0.915	132	24.97 [1.34]	0.17 [11.87]	0.33 [0.01]	3.50 [0.45]	5.61 [0.38]	**19.66 [2.89]**
Wild Pig	Uniform cosine	0.90	48	27.07 [1.10]	0.06 [14.76]	0.52 [0.02]	1.17 [0.18]	4.78 [0.68]	**5.62 [1.17]**

[S.E] =Standard error.

Table 3h: Model Statistics and parameter estimates of line transect (n = 63, Total effort 489 km) based distance sampling for prey species in the buffer of Similipal Tiger Reserve, 2021.

Species	Best Model	Chi square px2	No. of observations (n)	Effective strip Width (ESW) [S.E]	Encounter rate (n/l) [%CV]	Detection probability [S.E]	Cluster size density [S.E]	Mean Cluster Size [S.E]	Density [S.E]
Chital	-	-	2	-	-	-	-	-	-
Sambar	-	-	3	-	-	-	-	-	-
Northern Red Muntjac	Uniform cosine	0.884	31	22.34 [4.20]	0.06 [21.30]	0.45 [0.08]	1.41 [0.40]	1.16 [0.066]	**1.65 [0.47]**

Hanuman Langur	Hazard Simple Polynomial	0.609	49	28.89 [3.17]	0.10 [18.21]	0.57 [0.06]	1.73 [0.73]	5.69 [0.63]	**9.87 [2.36]**
Wild Pig	Uniform cosine	0.908	16	31.37 [6.60]	0.03 [23.44]	0.66 [0.14]	0.52 [0.16]	2.11 [0.47]	**1.10 [0.42]**

[S.E] =Standard error.

Table 3i: Comparison of Density of Prey Species in the Core Area, Buffer Area & entire TR

Species	Density [S.E]		
	Core Area	**Buffer Area**	**Entire TR**
Chital	9.92 [2.31]	-	6.09 [1.43]
Sambar	8.61 [1.56]	-	5.36 [1.01]
Northern Red Muntjac	6.44 [0.75]	1.65 [0.47]	4.51 [0.51]
Hanuman Langur	19.66 [2.89]	9.87 [2.36]	14.64 [1.91]
Wild Pig	5.62 [1.17]	1.10 [0.42]	4.11 [0.78]

From the above tables it can be inferred that the Chittal& Sambar are completely absent in the Buffer Area of the Tiger Reserve. Other prey species Northern Red Muntjac, Hanuman Langur & Wild Pig are present in the Buffer Area, but their density is significantly low.

3.4 ASSESSMENT OF THREATS

3.4.1. Infringement on Inviolate area.

All the villages in the core area of Similipal except one village are been relocated which has created least disturbed inviolate space for tiger and other animals. Whereas the villages present in the buffer area pose threat to wildlife movement from one patch of forest to other. Villagers adjoining core area are frequently entering forest for cattle grazing, NTFP collection etc. activities which disturbs wild animals particularly transient tigers.

3.4.2. Hunting & Poaching

Poaching has considerably reduced due to proper protection measure taken during last plan period. However, poaching is always a major threat to tiger population & its prey base. Poaching of major prey species in Similipal is of a major concern. Poaching pressure is more from the villages on the western part as well as eastern side of the Reserve. Poaching in Similipal is done through fire arms, bow & arrow, snaring and other local methods. Depletion of prey base in turn affects all other carnivores. Periodic poaching incidences may cause serious detrimental effect to the carnivores. Fishing by local communities has also been noticed in buffer areas.

3.4.2.1 Akhand Shikar (Traditional mass hunting)

The tribal communities surrounding Similipal have a tradition of ritualistic mass hunting called *"Akhand Shikar"* where the villagers in hundreds enter the park particularly during "*Maha Vishubha Sankranti*" in

April with bows and arrows for hunting of wild animals. Due to continuous effort taken by Forest Department the mass hunting practices are considerably reduced. Very rarely few incidences are noticed which are solved by creating awareness to people about the importance of conservation of wildlife.

3.4.3. Illicit felling

Although Illicit felling of timber has drastically reduced still few incidences are observed occasionally which are limited to selected pockets in core area like Baunskhal, Chakidi in Pithabata North WL Range and Digdiga in Pithabata South WL Range, it posses threat to the habitat. Selective felling of Dahanimari, teak Bija and Champa trees etc. in buffer areas has resulted in almost depletion of those trees.

3.4.4. Human animal conflicts.

Due to increase in population of tiger and leopard the straying incidences are also proportionally increased. Cattle killing by tiger and leopard near adjoining villages creates conflict situation which is also rises serious threat of retaliatory killing of major carnivores by poisoning the leftover cattle carcass. The elephants which are residing in Similipal forest are migrating to nearby agriculture field during crops season causing economic damage to farming communities. Although Govt. of Odisha is taking all the necessary steps to provide compensation to aggrieved families, still human animal conflict poses serious threat to wildlife conservation.

3.4.5. Pollution and other anthropogenic disturbances from increased tourism.

Very limited tourism has been permitted in the Core Area. Chahala, Devkund, and 18 km tourist roads between Bhajam & Nigirdha, 15 km between Haldia chhak to Chahala via Brundaban, 5 km transit route near Kalikaprasad gate, & about 0.5 km on the way to Devkund, fall in the tourism zone. Over the years tourism inflow has drastically increased as a result the associated problems like plastic pollution, noise pollution etc causing disturbances to wildlife. Frequent movement of vehicles is another cause of concern as it may affect breeding and other behavioral parameters of wildlife.

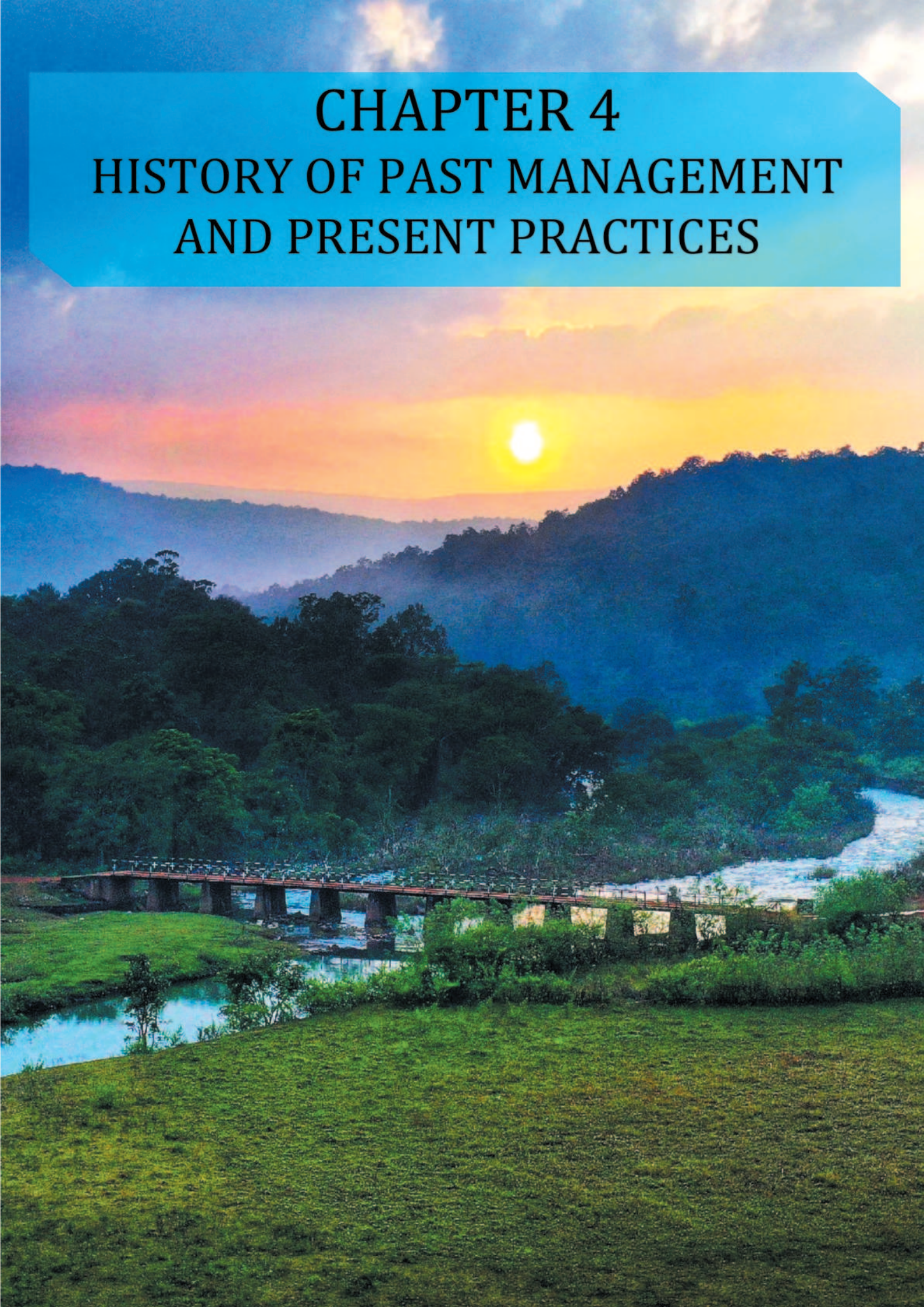
3.4.6. Land Use Change

To meet the developmental aspirations of local people and regional connectivity between important cities of the country, the surrounding areas of Similipal Tiger Reserve has witness infrastructural development activities like construction and expansion of road and railway network, electricity transmission line etc. in the last plan period. Although there is no direct impact on the core areas due to the above developmental projects, the indirect impact on the core cannot be overlooked.

3.4.7. Climate Change

Similipal being located close to Bay of Bengal coast experiences extreme weather phenomena like cyclones and torrential rainfall events. In the previous plan period Odisha faced several cyclones like Phailin (2013), Hudhud (2014), Titli (2018), Fani (2019), Bulbul (2019), Amphan (2020), Yaas (2021), Gulab (2021), Jawad (2021). These events may have profound impact on water regimes of Similipal which in turn might have impact on very sensitive endemic and RET flora and fauna.

CHAPTER 4
HISTORY OF PAST MANAGEMENT AND PRESENT PRACTICES



CHAPTER

04

HISTORY OF PAST MANAGEMENT AND PRESENT PRACTICES

4.1 CONSERVATION HISTORY

Forest management in Mayurbhanj dates back to later part of nineteenth century. A forest policy was declared before 1885 by the then Maharaja of Mayurbhanj. In the year 1888 one Forest Ranger and a Peon were appointed for management of forests. The Reserve Forests of Mayurbhanj were under the management and control of the forest department whereas other protected forests were under the charge of revenue department. The Reserve Forests were more or less stable and permanent in nature but protected forests were maintained to meet the requirement of the royats and residents and also subject to clearance for cultivation. The forest area was being given under 'Amal-Nama' lease by the revenue authorities and leases for reclamation of reserve forests were given under the special sanction of the Ruling Chief. Thus the extent of reserve forests and protected forests decreased.

In 1907 a State Forest Department was created with Mr. J. A. Martin, State Engineer as head of the Department. As the forest management intensified, the protective staff came under the jurisdiction of Mayurbhanj. In 1906 a survey party demarcated the boundary line from Talabandha to Similipalgarh to form a working circle for giving lease to M/S B. Borooah & Co.

In 1904 the Mayurbhanj narrow gauge railway line was built up to Baripada. This line was of immense use in transportation of timber. Huge quantity of timber used to be extracted from plain forest mainly Reserve Forests. The 30years lease of Bholanath Borooah & Co expired during 1946. There was no systematic working of the forests for which Similipal Reserve Forests during 36 years lease, was worked twice and north Similipal three times. East Similipal, which was withdrawn from the lease in the year 1922, was worked like the rest of the Similipal Reserve Forests through several contractors.

The first working plan was prepared by Mr. C. C. Hart in 1896-97. This was revised by Mr. B. M. Dasgupta in 1946. B. M. Dasgupta prepared the first working plan for whole of Similipal reserve forests for working under selection cum-improvement system. But after about 6 years Dasgupta's plan was replaced by the working plan of reserve forests of Mayurbhanj state by Mr. Sripal Jee during 1953-54 after integration of Mayurbhanj state to the Union of India on 6th November 1948, which became part of Odisha as a district on 1st January 1949 only. This plan was revised separately for Karanjia and Baripada Divisions by Sri R. Mishra and Sri S. Bose respectively during 1973-74.

Despite practicing commercial forestry, supplying railway sleepers and other utility timber outside Mayurbhanj, the Ruler was very rigid in his forest protection measures and employed large number of forest staff, much higher in number in comparison to other princely states and even the directly British administered areas with good network of forest roads and communication facilities.

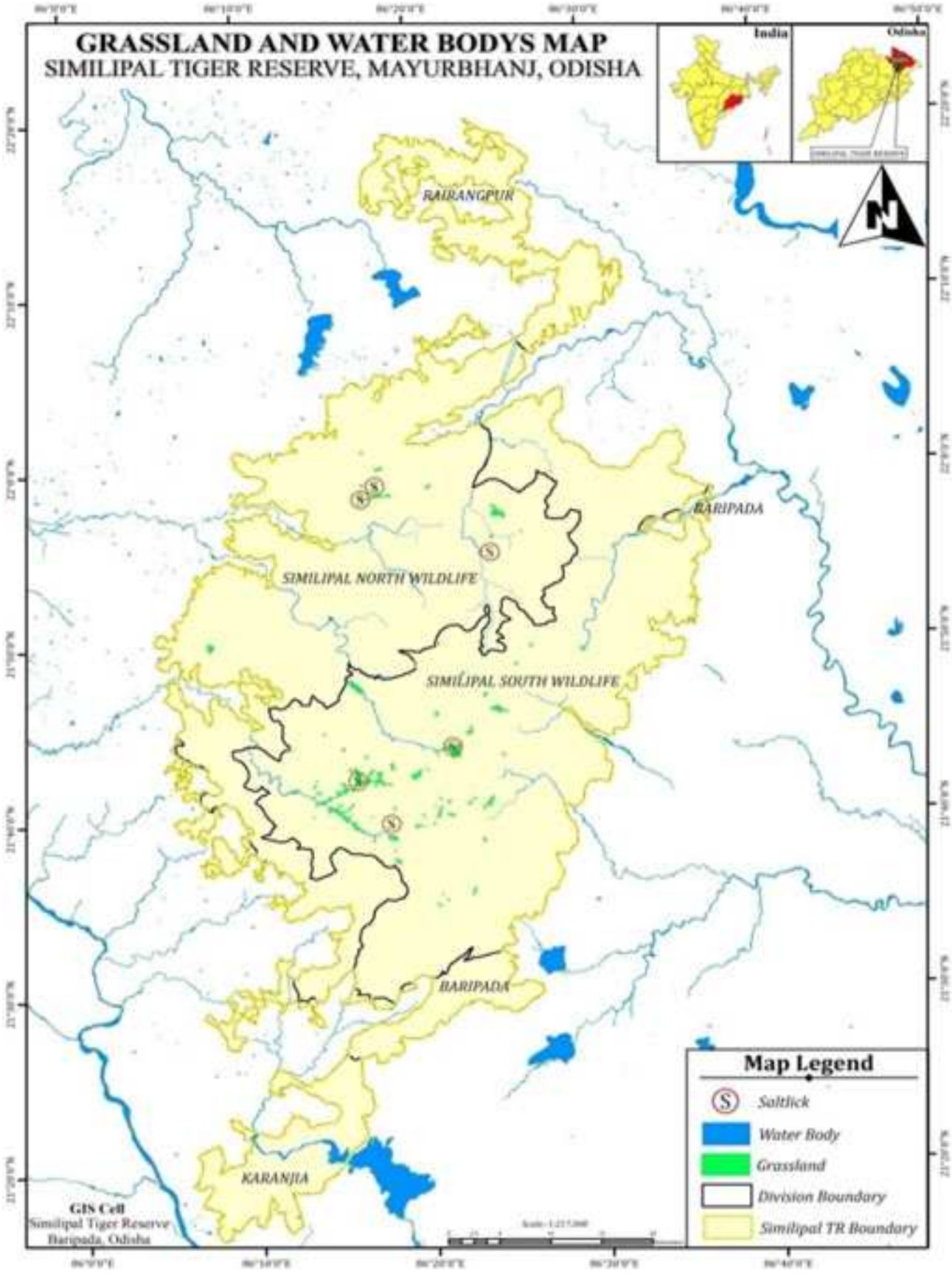
Protection suffered a lot after independence in 1947 when forests were drastically reduced. Mayurbhanj state merged with Odisha state in 1949. Mr. Saroj Raj Chaudhury, an eminent wildlifer of the country took charge as first Field Director of Similipal Tiger Reserve on dated 05.12.1973.The Govt of Odisha vide notification no.18703/FFAH dated 6th august, 1980 notified the intention of the Govt. to declare 303 km^2 of the northern portion of Similipal as National Park. This constituted the core of Tiger Reserve. As this area was not considered sufficient as core, 542.70 km^2 was added to this by notification no.19525/FFAH dated 11th June, 1986 bringing the total area of core to 845.70 km^2 which came fully under the control of the Project Tiger. Rest of the sanctuary area was under the control of Baripada, Karanjia and Rairangpur Divisions. Similipal Forest Development Corporation was formed in the year 1979 to work the timber and N.W.F.P. operations in Similipal besides taking up other developmental works within the forest. After complete moratorium in the tree felling was imposed in 1988, Similipal Forest Development Corporation (S.F.D.C.) stopped working in Similipal. The present core or Critical Tiger Habitat of 1194.75 Sq.km was declared in 2007.

During 2009 from 28th March to 15th April administration and management of Similipal Tiger Reserve faced an unprecedented set back due to sudden upspring of left wing extremism in Similipal Tiger Reserve. Most of the critical infrastructures were damaged by the naxalites and threatened Forest Department staffs (Annexure –LVIII). As a result all the staff vacated from their respective camps out of fear which facilitated entry of timbers smugglers and poachers. This situation continued for about one year after which normalcy returned and management was taken under control of Forest Department.

Later during 2010 onwards Forest Department started taking control of situation slowly by 2012 staffs started staying inside their respective camps in almost all the places (Annexure –List of anti-poaching camps). Anti-poaching camp and staff quarters were constructed in all strategic locations. Slowly situations started improving and problem of left wing extremism activities reduced. Presently no such activities are observed from Similipal Tiger Reserve. All camps inside Tiger Reserve are working with full capacity.

For better administrative management of Similipal Tiger Reserve as a whole one proposal for consolidation of all the Tiger bearing areas and to reorganise the Division with modifications was proposed in the previous Tiger Conservation Plan. The Expert Team which visited Similipal during 2018 as the part of management effectiveness evaluation exercise also stressed on the same issue after considering the complexity and variety of animals and plants found in the landscape and suggested that the entire Similipal should be divided into two smaller Wildlife Divisions. The main purpose of this suggestion is to protect unique flora and fauna from all kinds of threats. During 2019 as per the Notification No. 1F-(A)-71/2018-3913/F&E, Govt. of Odisha pleased to reorganise the Similipal Sanctuary covering 2306.61Sq. Km. of Similipal Tiger Reserve (2750Sq. Km) into two wildlife Divisions namely Similipal South Wildlife Division covering 1247.58Sq.km. with Headquarters at Baripada and Similipal North Wildlife Division covering 1059.03Sq.Km with Headquarters at Jashipur. Presently two Deputy Directors in each Division are looking after administration.

The two wildlife Sanctuary namely Kuldiha of Balasore Wildlife Division and Hadgarh Wildlife Sanctuary are the migratory corridors of Tiger and other wildlife. The Hadgarh Wildlife Sanctuary was under the Administrative control of RCCF, Rourkela. During 2017 as per the Notification No.FE-FE1-FE-0031-2017-7571/F&E the Administrative control of Keonjhar Wildlife Division was brought from R.C.C.F., Rourkela to Field Director, Similipal Tiger Reserve-cum-Regional Chief Conservation of Forests, Baripada with the intention of effective management of corridors. The Odisha State Board for Wildlife recommended a proposal to include Hadgarh Wildlife Sanctuary in the jurisdiction of Similipal Tiger Reserve. In response to this decision NTCA vide letter F. No.15-30 (6)/2015-NTCA dt.06.10.2016 communicated to Chief Wildlife Warden of Odisha that the proposal to include Hadgarh Wildlife Sanctuary in Similipal Tiger Reserve has been sanctioned subject to the condition that Kuldiha Wildlife Sanctuary shall be included in the proposal in a manner such that both the Hadgarh and Kuldiha Wildlife Sanctuary form part of Core of the Similipal Tiger Reserve with intervening structural and functional areas forming the buffer. But till now no further communication has been received from State Govt. in this regard. It may be pursued in the present Plan period to include both Hadgarh and Kuldiha Sanctuary in Similipal Tiger Reserve.57



Map No-4A : Grassland and Water Body

4.2 HABITAT MANAGEMENT

4.2.1. Meadows

Improvement to living condition of the wild animals is ensured through management of water sources, meadows and salt licks. The improvement works to the existing water sources has already been described in Chapter-2. The meadows are being maintained in every year through eradication of woody species and coarse grasses and introduction along with promotion of new grasses through sowing of grass seeds and biomass regulation by segment cutting of the meadows.

4.2.2. Saltlicks

Likewise the saltlicks both natural and artificial are being maintained through freshening and supplementation of salts. The list of saltlicks available in the core area is given in Annexure XXIX.

4.3 PROTECTION AND INTELLIGENCE GATHERING

4.3.1. PROTECTION FROM HUNTING, POACHING AND ILLEGAL FELLING.

The forest protection and collection of intelligence has gained prime importance. Since the inception of the Reserve it has undergone a series of changes with an eye to the ground realties. It has resulted in ensuring protection of the landscapes from the clutches of axe, saw, bow and arrow and gunshots. For the purpose of proper protection 108 anti-poaching camps have been established in the core area manned by one Forester/ Forest Guard and assisted by at least six Protection Assistants engaged on daily wages. The camps have been equipped with VHF and solar home light system. The staff of each camp goes on foot patrolling and vehicle patrolling as a daily schedule covering all the sensitive routes and points. The patrolling activity is monitored by MSTrIPES application. All the staff are been given mobile phones with MSTrIPES application. At the end of every month a report showing the total distance travelled by field staff during patrolling will be sent to NTCA. The staff also maintain a daily patrolling register at each camp. Special strategies such as joint patrolling with adjacent Divisions, combing operations in sensitive areas, flag marches in sensitive villages and awareness activities are adopted for patrolling during sensitive periods. As a result of systematic protection measures taken by Similipal Tiger Reserve Authority the practices such as Akhand Shikar (traditional mass hunting) has been considerably reduced. The list of anti-poaching camps in the core area is given in Annexure XXX.

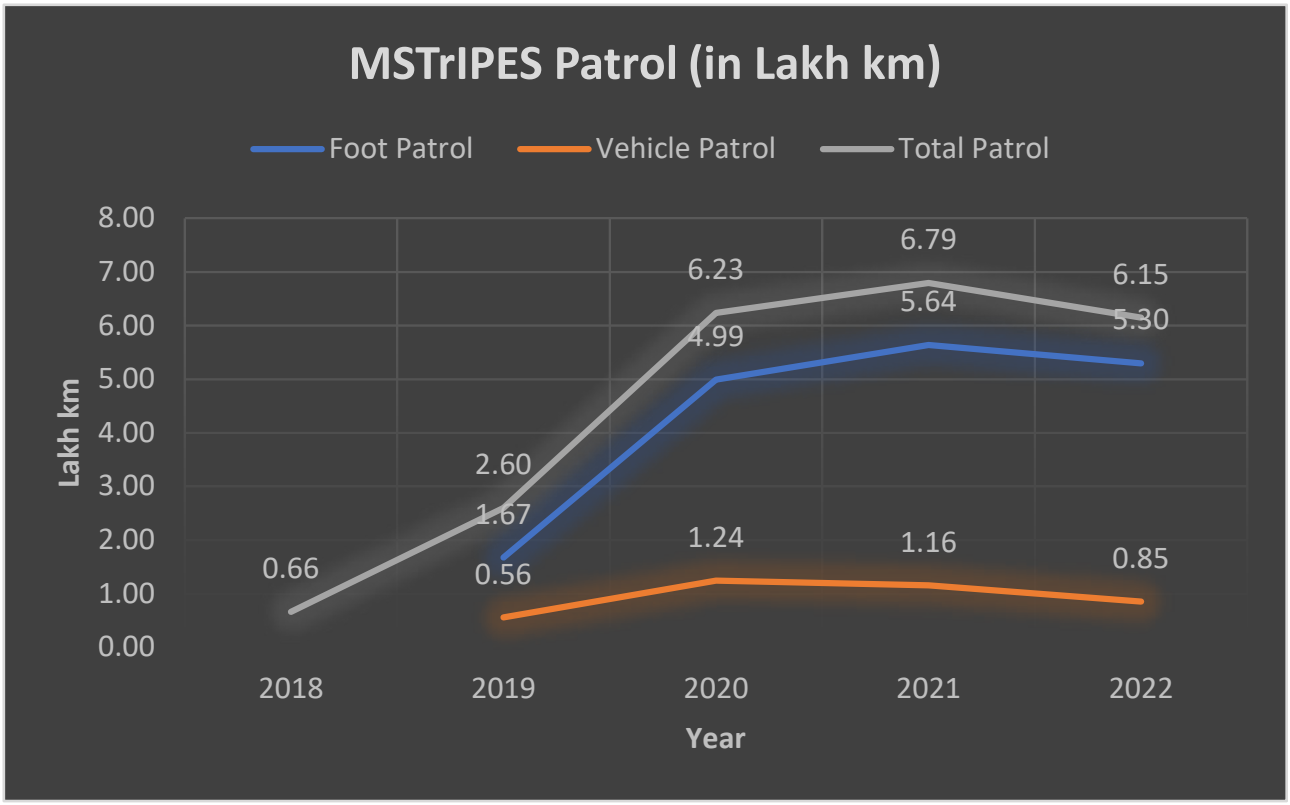
Table No- 4a : List of Camp

Name of the Division	No. of Camps	**Total**	
	Core area	Buffer area	
Similipal South WL Division	83	44	**127**
Similipal North WL Division	25	55	**80**
Karanjia Forest Division	00	10	**10**
Baripada Forest Division	00	08	**08**
Rairangpur Forest Division	00	11	**11**
TOTAL	**108**	**128**	**236**

The patrolling in Similipal TR is being monitored through MSTrIPES Mobile Application Since August, 2018 onwards. The year wise patrolling efforts made from 2018 onwards in Similipal Tiger Reserve through MSTrIPES Application are shown in the figure on facing page:

As seen in the Graph, the low patrolling in 2018 is due to introduction of MSTrIPES patrolling module in that year form August onwards. Staffs were not much conversant in using the application in smart phone. Gradually staffs were trained to use it and mobile phones with MSTrIPES patrol application were supplied to frontline staff. Later after re-organisation of the Divisions in Similipal Tiger Reserve a large portion of the Tiger Reserve area came under the jurisdiction of Similipal North and South WL Divisions. This strengthened

Chart No-4.1 MSTrIPES Patrol



implementation of MSTrIPES patrol module in the Tiger Reserve with supply of mobile smart phones to all the Beats of the Tiger Reserve. This is evident from the Graph that cumulative patrolling effort through MSTrIPES reached beyond six lakhs kilometers from the year 2020 onwards.

4.3.2. PROTECTION FROM FOREST FIRE.

Fire in Similipal Tiger Reserve is mostly man made. The local villagers put fire to leaf litter around trees like Mahua for collection of its flowers. In most of the cases these fires are left unattended which spreads and causes forest fire. The villages residing inside the Tiger Reserve put fire to forests around their villages to control tick population. People using walking path inside the forest also put fire to the leaf litter on the ground to clear the paths. Hunter and poachers are also known to put fire to the forest for hunting wild animals for their meat.

Fire is a regular phenomena in the Tiger Reserve post the winter season when dry leaf litter biomass pile on the forest floor. Due to accumulation of dry matter on the forest floor over the years, massive fire outbreaks are observed in a periodic cycle of three to four years in the landscape. While most of the fire points are observed in the buffer area of the Tiger Reserve, the core area relatively remains free of forest fire incidences. The less number of fire points in the core area may be attributed to the factors like higher moisture regimes, negligible anthropogenic activities and effective protection measures.

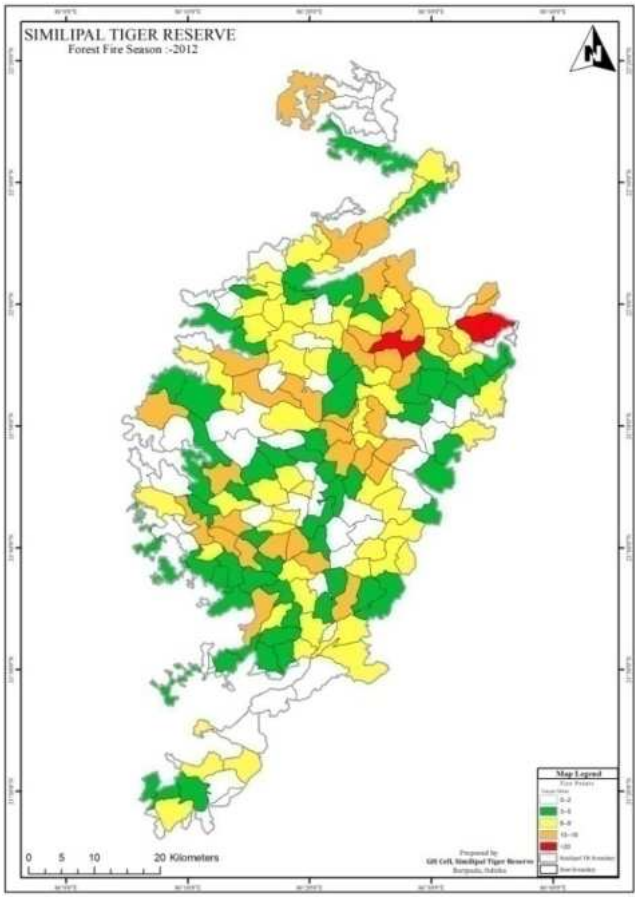
Forest fire incidences in the buffer areas pose threat to biodiversity and habitat of wild animals in the core. As a customary practice each year the fire lines are cleared before the onset of fire season and awareness meetings are organized in the villages in and around Similipal Tiger Reserve as preventive measures. During the fire season each year additional manpower and vehicles are deployed to combat the disaster. Temporary camps and machans are established in the difficult and inaccessible areas. The Control Room at the STR headquarters and all the VHF stations inside the Tiger Reserve are made operational 24x7 to ensure prompt delivery of messages and follow up actions. The GIS Cell monitors the Satellite data on forest fire on various online platforms like Van Agni Geo portal of Forest Survey of India (FSI), BHUBAN Forest Fire

Disaster Services of Indian Geo Platform of Indian Space Research Organisation (ISRO), Fires Information for Resource Management System (FRIMS) of National Aeronautics and Space Administration (NASA) of USA. These Platforms utilized the data from various Satellites like Aqua-MODIS, Terra-MODDIS, S-NPP VIIRS, JPSS, NOAA-VIIRS, etc. Monitoring fire points by the GIS Cell of STR saves the delay in prompt action to combat forest fire. The fire points are contained before they expand to large scale forest fires.

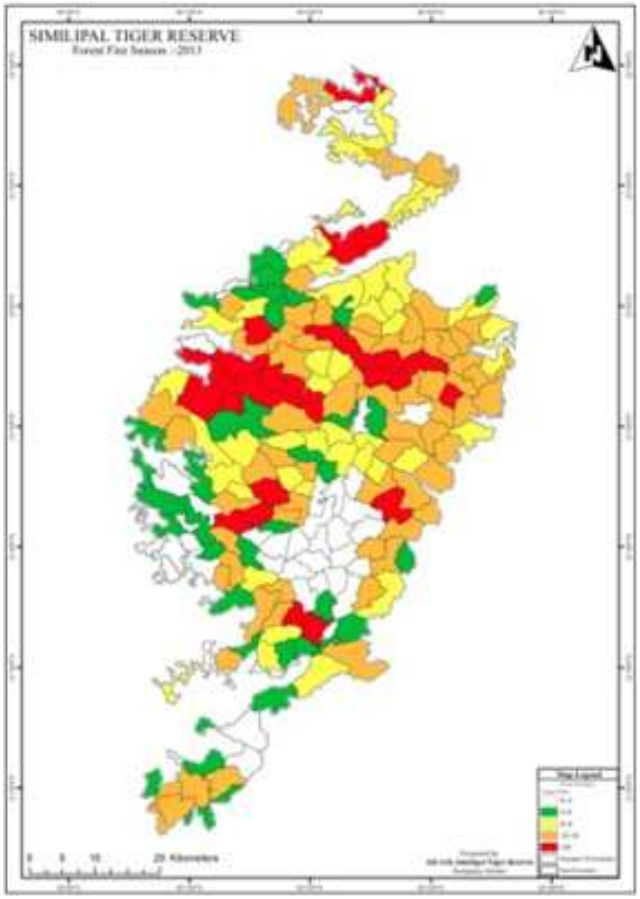
To ensure prompt action by frontline staff to combat forest fire and for its effective monitoring, the State Forest Headquarters has developed a GIS based mobile application called OFMS with help of Orissa Space Application Centre (ORSAC) and Forest Fire Alert System of FSI. With this applications' the frontline forest staff receives fire points with GPS coordinates to their registered mobile number on the map under his/her jurisdiction. The fire point received has to be attended within a stipulated period of time and report compliance in the same application.

From 2022 onwards Comprehensive District Action Plan under the Chairmanship of the Collector and District Magistrate, Mayurbhanj has been started for better coordination in case of combating forest fire in Similipal Landscape. Modern equipments, technological advancement and other resources are being effectively utilized for fire fighting with proper training and mock drills to the frontline staff and fire watchers. Widespread awareness campaigns are also organized with help of various stakeholders to create awareness amongst the villagers in and around the Tiger Reserve.

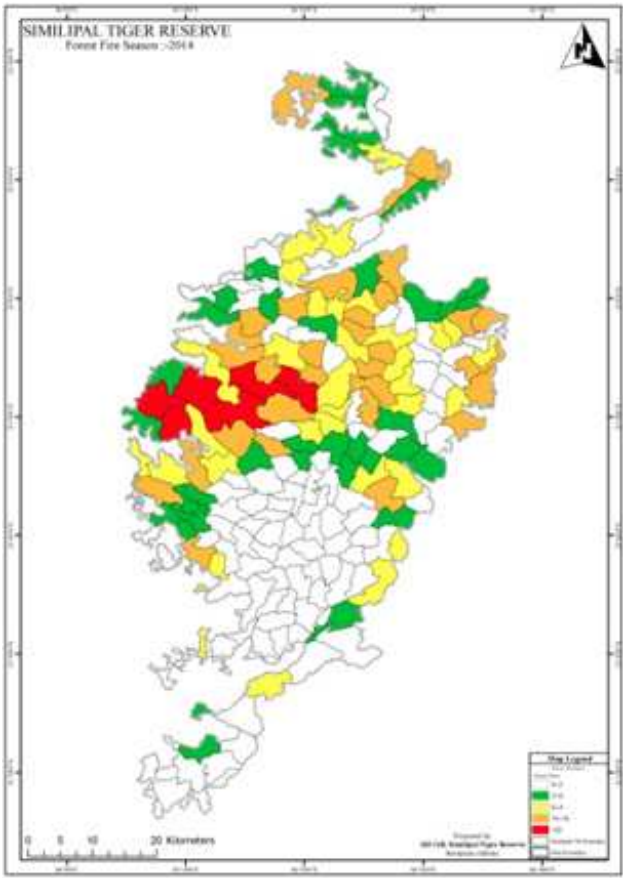
Map No- 4.B: Year wise Beat level data of fire intensity points (2012-2022).



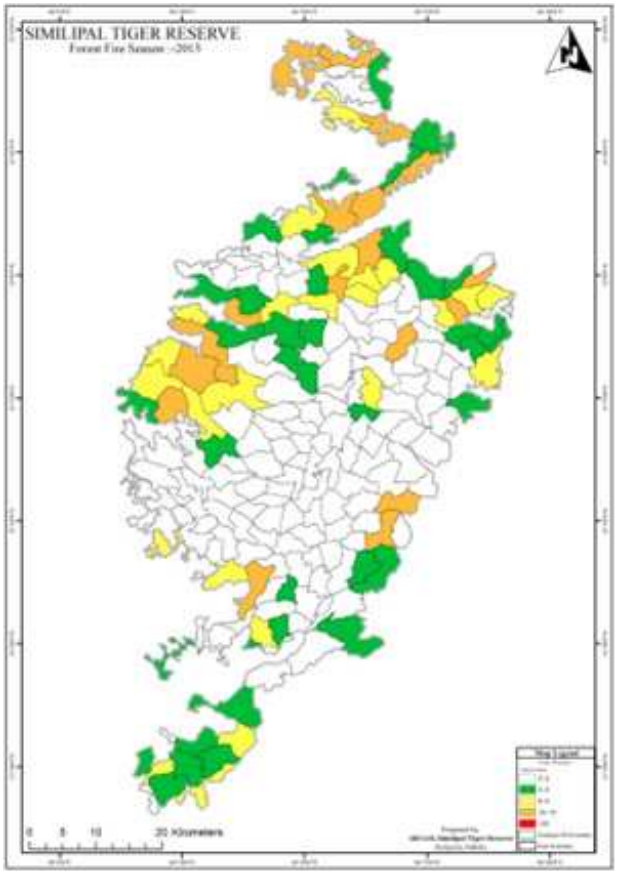
Forest Fire Season - 2012



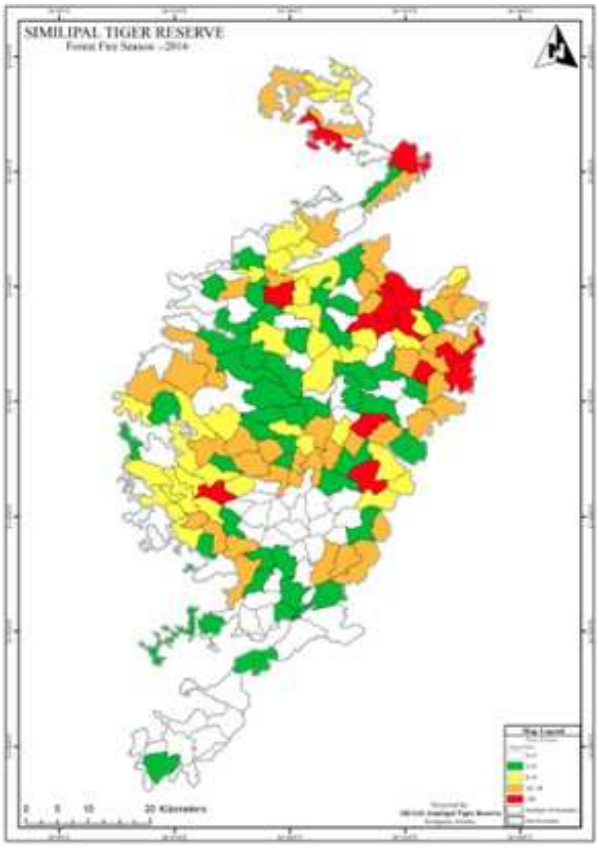
Forest Fire Season - 2013



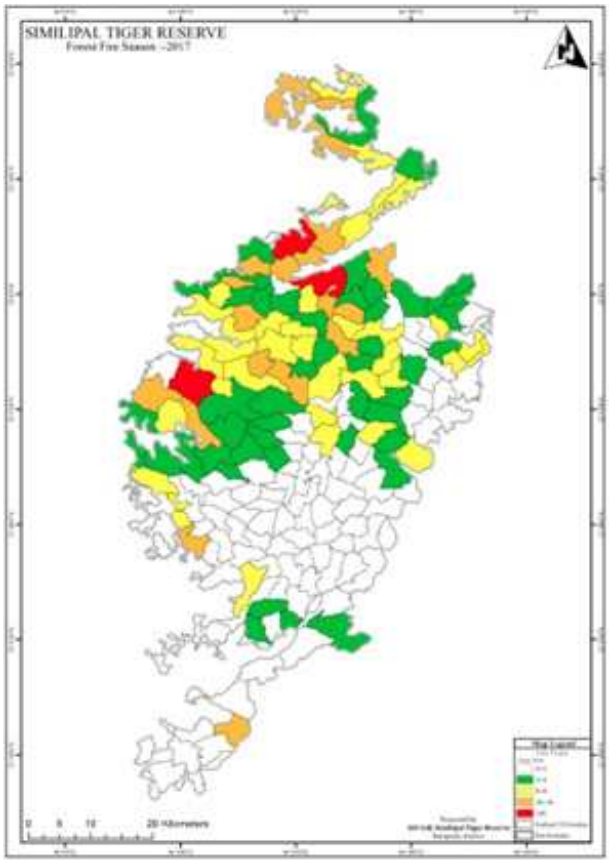
Forest Fire Season - 2014



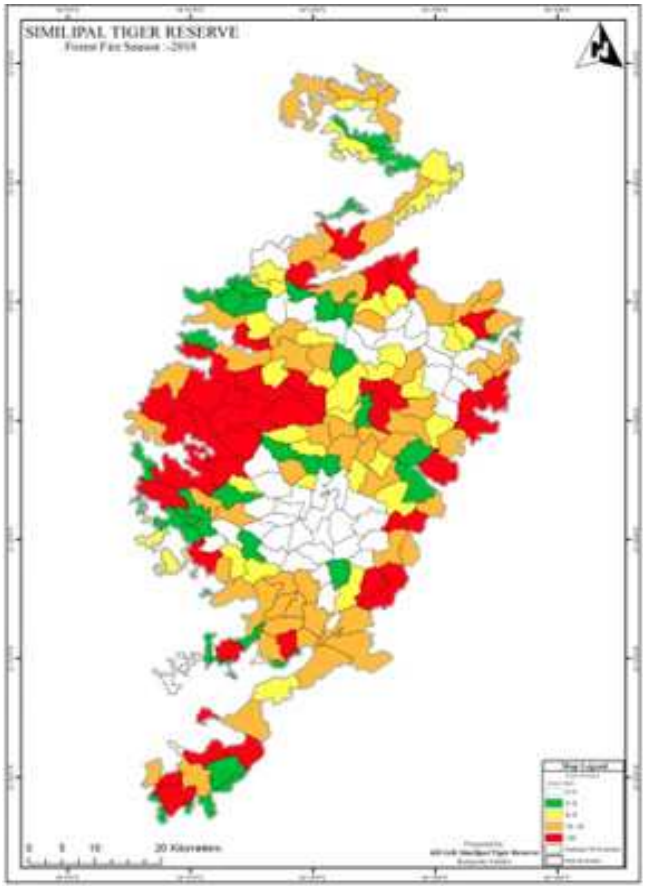
Forest Fire Season - 2015



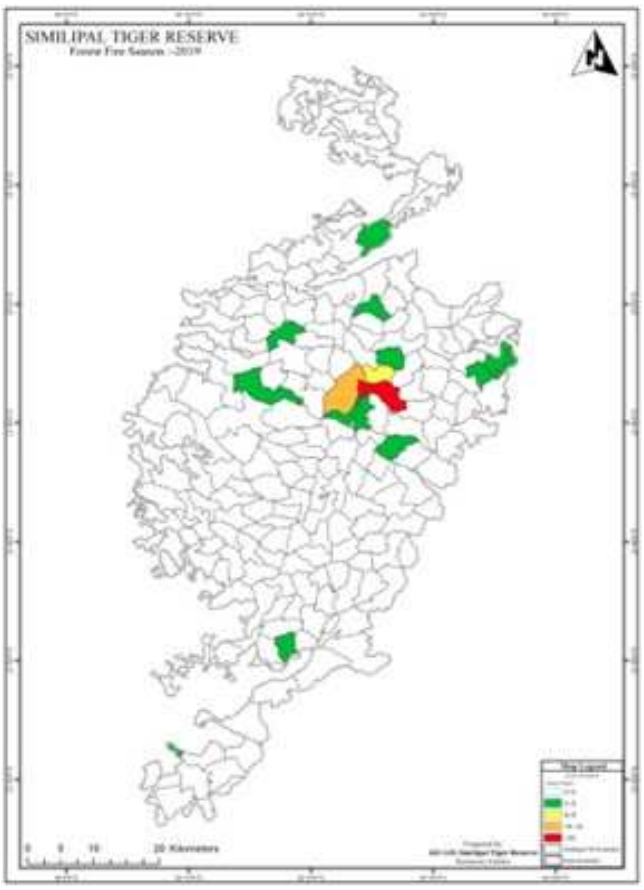
Forest Fire Season - 2016



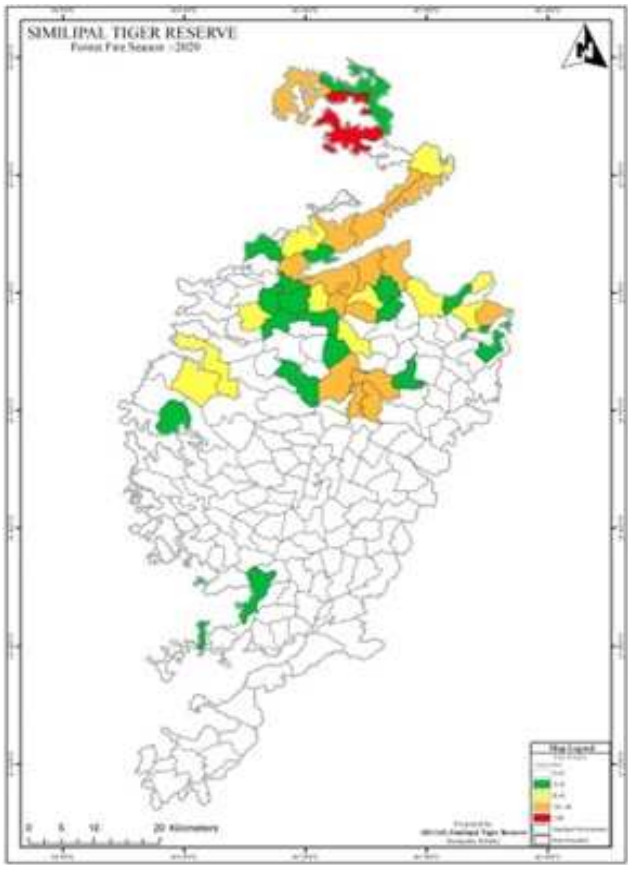
Forest Fire Season - 2017



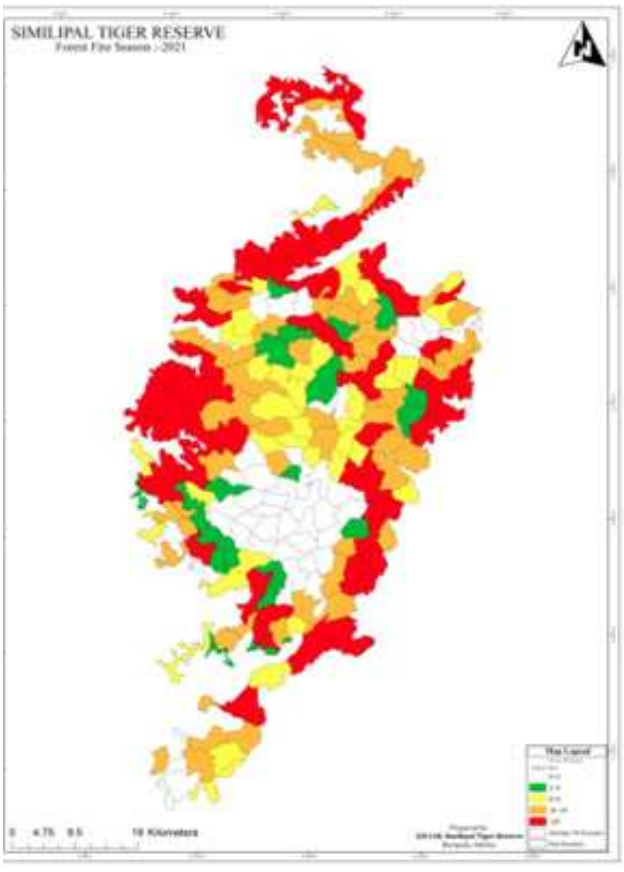
Forest Fire Season - 2018



Forest Fire Season - 2019

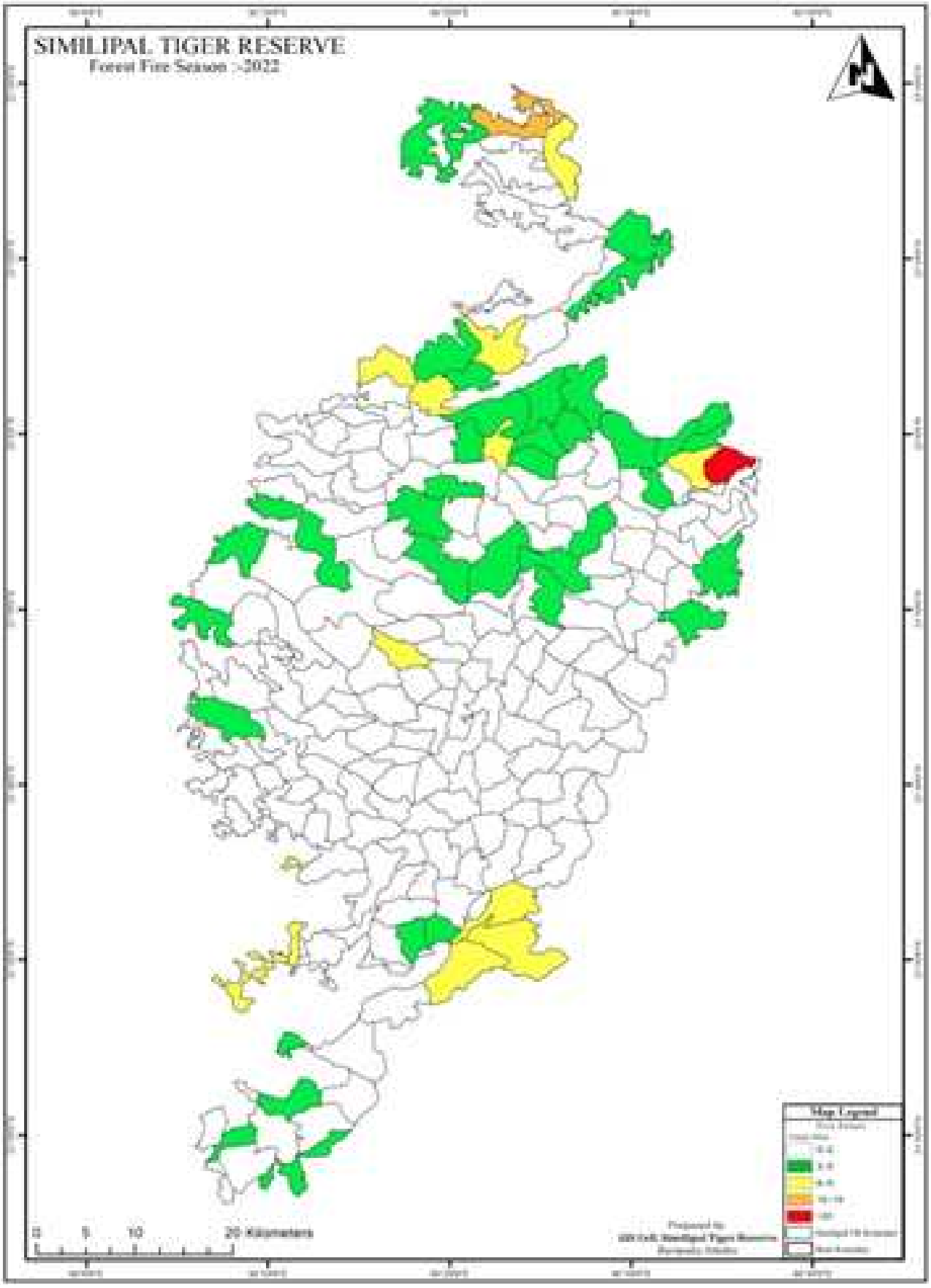


Forest Fire Season - 2020



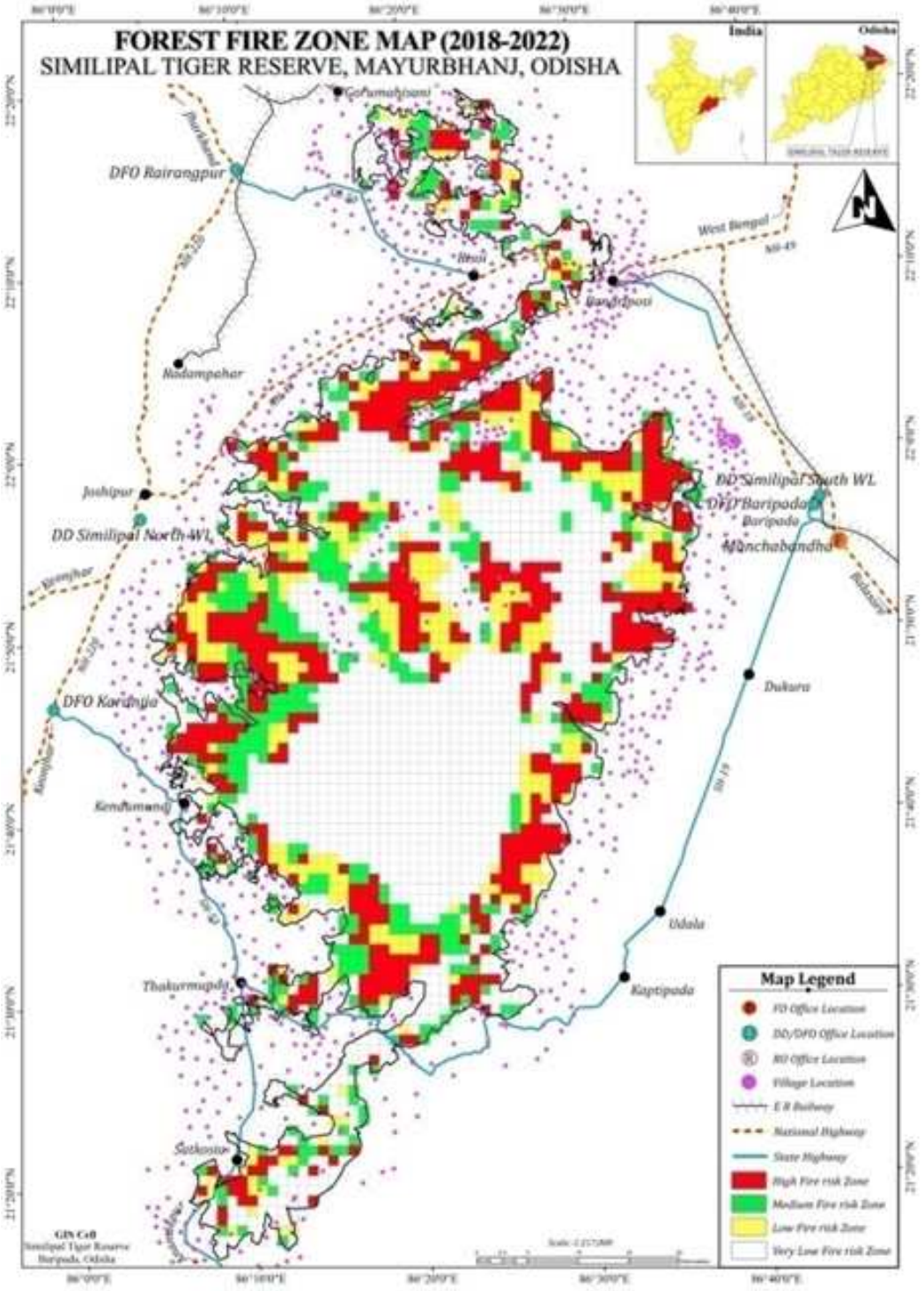
Forest Fire Season - 2021

Forest Fire Season – 2021



The above Beat wise fire intensity maps for the period from 2012 to 2022 shows the Beats vulnerable to fire in each year. From the above maps the wide spread intense fire events can be seen in the years 2013, 2016, 2018 and 2021. Therefore a major forest fire year was witnessed with an interval of three years in the last plan period.

Map No-4C



The above map shows the one Sqkm. Grid wise fire intensity map from the period 2018 to 2022. The map also shows that there is presence of 1068 villages inside the Tiger Reserve and within five kilometer radious from the boundary of the Tiger Reserve.

4.3.3. PROTECTION FROM DISEASES AND INFECTION.

Prophylactic vaccination drives in coordination with District Animal Husbandry Department for cattle population in the buffer are being regularly organized against spread of deadly diseases like Anthrax, hemorrhagic septicaemia (HS), foot and mouth diseases (FMD), black quarter (BQ) etc. Post monsoon sanitation of water bodies in the buffer and adjoining areas to prevent the spread of diseases to wild animals.

4.3.4. PROTECTION OF ENDEMIC AND ENDANGERED FLORA.

For protection and conservation of endemic and RET flora of the Tiger Reserve continuous monitoring and species augmentation programmes are being taken up with involvement of scientific institution. The mapping of endemic orchid like *Eria megahasaniensis* and restoration of several other orchids has been carried out.

4.3.5. PROTECTION FROM RETALIATORY KILLINGS.

To avoid any incidences of retaliatory killings of wild animal due to depredation of livestock or injury or death of humans, a robust mechanism is in place for earliest release of compassionate grant. A web portal and mobile platform based application has been developed and being utilized to deal with loss of life and property by wild animals. In addition to it awareness campaigns are being regularly organized to prevent loss of wildlife. The details of compassionate grant is dicussed in Paragraph 5.4 of TCP for Buffer Area.

4.4 TOURISM AND INTERPRETATION.

Similipal Tiger Reserve is one of the most preferred tourists destination in Odisha due to its rich biodiversity of flora and fauna as well as natural geographical features like waterfalls, hills, valleys and streams. Many are also attracted towards the socio-cultural life aborigin tribal inhabitants like Santhals, Kolhas, Bathudis and particularly vulnerable tribal groups (PVTGs) like the Khadias and Mankdias in Similipal and its surrounding landscape. Similipal Tiger Reserve has most of the wild tiger and elephant population in the State. It is the only place where the active breeding populations of wild pseudo-melanistic Royal Bengal Tigers are found in the entire world.

On an average more than 30000 tourists visited the Tiger Reserve in the previous plan period i.e. 2013-14 to 2022-23 (Annexure-LIII). In the year 2020-21 the Park reached its peak with 43358 tourists visited the Similipal Tiger Reserve after the rescind of the country wide lockdown due to Covid Pandemic. The year wise tourist visited the Tiger Reserve since 2010-11 onwards is shown in the Graph below.

Chart No- 4.2

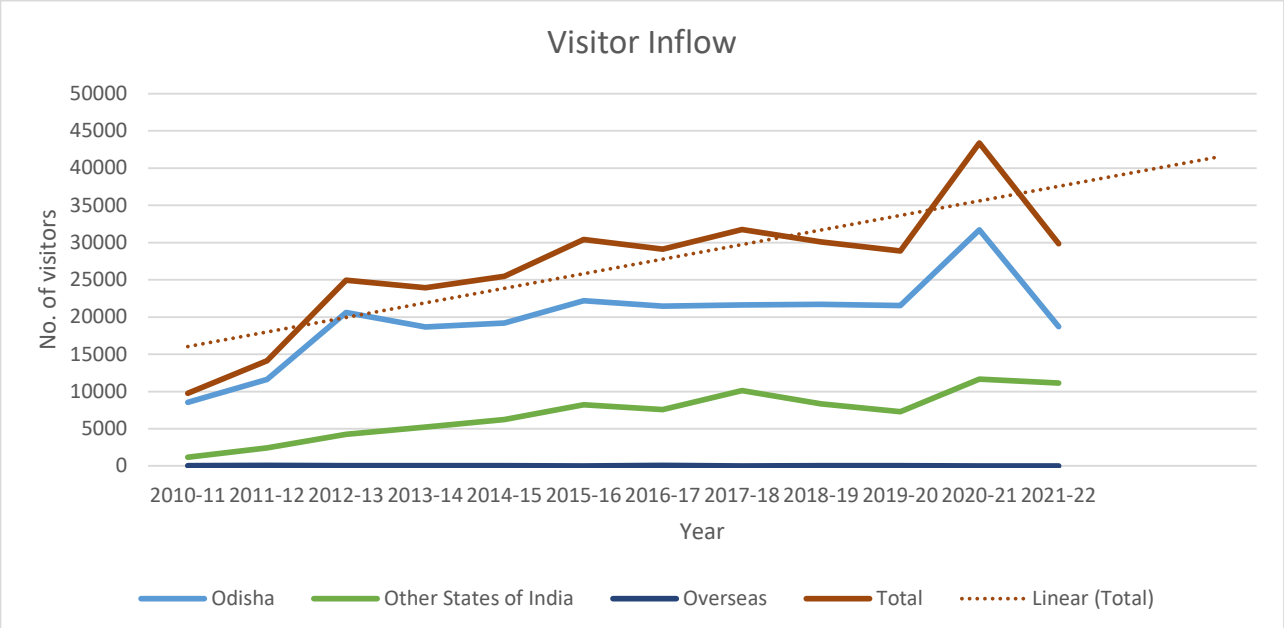
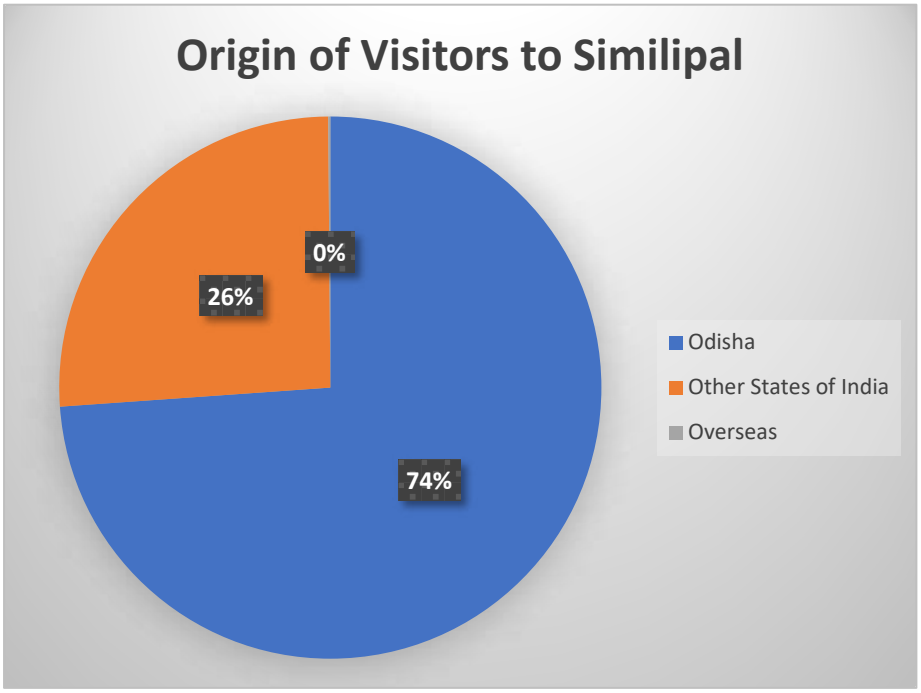


Chart No- 4.3

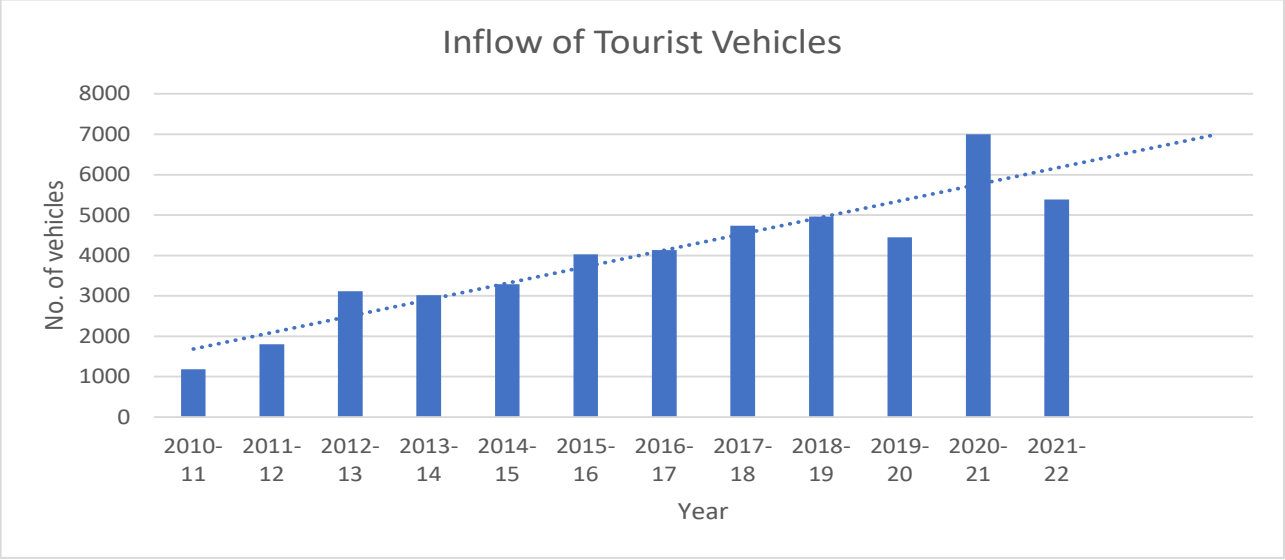
The trend analysis shows the average annual visitors to the Park will cross 40000 persons per year in near future.



From analysis of the origin of tourists visiting the Tiger Reserve from 2010-11 onwards, it is observed that on an average 74% of the total visitors are from Odisha and 26% of the visitors are from other States of India with most of them coming from West Bengal and Jharkhand. Overseas visitors to the Tiger Reserve are very negligible with an average of 34 foreign nationals visit each year.

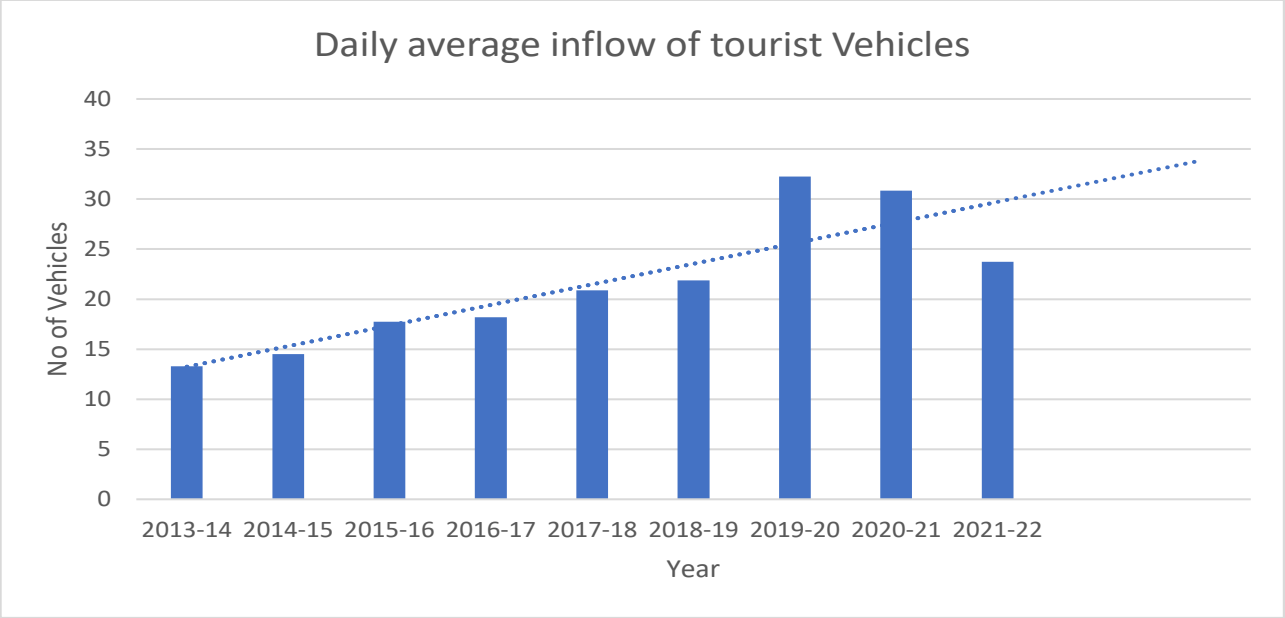
On an average more than 4500 vehicles enter the Tiger Reserve through the tourist gates in the previous plan period 2013-14 to 2022-23 with peak of 7001 vehicles in the year 2020-21. The trend analysis shows the vehicle inflow will reach 7000 per year in near future.

Chart No- 4.4



The daily average of tourist vehicles entering the Tiger Reserve was 21 which was much below the prescribed carrying capacity of 60 vehicles per day for the aforesaid period.

Chart No- 4.5 :Daily average Inflow of Tourist Vehicles



4.4.1 Tourism in core area

The tourism activity has been extended over 130 km road length, which is confined mostly to the buffer zone of the Tiger Reserve. Only a small area at Chahala (0.05 sq km) is coming under core area where day-tourists are allowed to visit. Besides, the tourist route passes through stretches of forests in core area between Bhajam-Nigirdha over 18 km, Haldia Chhak to Chahala via Brundavan over 15K.M and a small transit route near Kalikaprasad gate over 5 K.m. Out of the total road length of 600 km in the core area, thus 38 km of road have been used for tourism from the very beginning whereas there is no staying/halt facilities during their transit inside core area. Tourists were allowed to stay at Chahala complexes prior to naxal attack (2009), when the accommodation facilities in these locations were destroyed. However, no tourists are now allowed to stay at Chahala since then. A small stretch of road in core area is utilized by tourist to reach Devkund waterfall that attracts visitors from near and far places. Maa Ambika temple adjoining the Devkund waterfall is located inside the core area and has religious and cultural values for the local communities.

4.4.2 Interpretation in core area

No Interpretation Centre has been established in the core area of the Tiger Reserve as tourism in the core is limited and discouraged for providing inviolate space for wildlife. “Bagha Basa” the Interpretation Centre for Tigers has been established at Ramatirtha, Jashipur. Another Interpretation Centre for orchids has been established at Gurgudia close to the Orchidarium. These are described in detail in Chapter Eight of TCP for Buffer Area.

Tourist guides and nature interpreters accompanying the visitors interpret the biodiversity, social, economic, cultural values of the Park while passing through the roads in core area. Signages have been established for identification of important trees, locations, natural features for interpretation of the park by visitors. Documentaries, info-graphics, photographs are being published in the social media platforms for raising awareness and education.

4.5 RESEARCH AND MONITORING

Research constitute a very important aspect of effective and scientific management of wildlife Protected areas. Scientifically sound and technical inputs are crucial for management and monitoring of rare and endangered flora and fauna.

Research and Monitoring are two major activities in professional conservation practices. These activities can be in scientific, socio-economic and management oriented sectors. Similipal is an interesting and unique

place for ecological and wildlife studies because of its bio-geographical situation, geological features, the international recognition as one of the first nine prime areas for tiger conservation and for being one of the first eight Biosphere Reserves of India.

4.5.1. Research

In the management of an area, research plays a significant role. The various new pieces of information and facts that come into light ultimately find a place in the management prescriptions. Research is solely responsible for bringing back many endangered species from the threshold of extinction.

List of Broad Research Activities carried out in the Tiger Reserve (Details in Annexure-XXIV).

Table No-4b : Research Project

Sl. No.	Tiger Reserve management priorities.	Research activities. (Published in the National/International Journals)
01.	Conservation of Biodiversity	• Diversity of endangered flora and fauna. • Diversity of amphibians and reptiles. • Tree/vegetation biodiversity. • Aquatic flora and fauna. • Diversity of orchids. • Diversity of soil fungi. • Biodiversity of avian population. • Biodiversity of butterflies, odonates. • Temporal and spatial changes in vegetation biodiversity. • Status of rare, endangered and endemic flora of Similipal Biosphere Reserve. • Species diversity and habitat characteristic of fresh water fishes in the Similipal Biosphere Reserve.
02.	Sustainable resource utilization.	• Economic and biological potential of Similipal. • Ethno-botanical studies of Similipal Tiger Reserve. • Ethno-medicinal plant resources and medicinal plants. • Ethno-zoological studies and medicinal values. • Wild edible tuber, fruits, mushrooms and other edibles. • Sustainable extraction. • Effect of harvesting pressure on plant diversity and vegetation structure of Sal forest of Similipal Tiger Reserve. • Biodiversity conservation and local livelihood: A study on Similipal Biosphere Reserve in India. • Antimicrobial, antibacterial and Phyto-chemical, screening of medicinal plants. • Traditional ethno medicinal knowledge of tribes. • Indigenous knowledge. • Sustainable exploitation of natural resources of Similipal. • Determination of household collection of NTFPs and alternative livelihood activities in Similipal Tiger Reserve. • Economical and biological potential of NTFP in the Similipal hills of Odisha. • Impact of resource dependence by local communities on Similipal Tiger Reserve. • Peoples forest dependence: A case study of SBR, India.

03.	Management of the Protected Area.	• Issues and challenges of management of SBR. • Conservation and management effectiveness. • Anthropogenic threats. • Review of problems and challenges of conservation in Similipal. • Ecological significance of Core, Buffer and Transition boundary of Similipal Biosphere Reserve: A remote sensing study in Similipal. • Similipal Tiger Project and eco-development in the surrounding. • Similipal Biosphere; Genesis of historicity. • Dimensions of wildlife conservations with villagers prospective in Similipal. • Mapping of priority areas of conservation significance in Eastern Ghats: A case study of SBR using satellite RS. • Diversity assessment and community pattern in relation to disturbance gradient in SBR Odisha. • Biodiversity conservation, relocation and socio economic consequences: A case study of STR.
04.	Ecology and Eco-system functions.	• Ecology of Indian giant squirrel. • Vegetation ecology. • Phenology of moist deciduous forests. • Dietary preference EuphlyctisCynophlyctis Tadpoles in different habitats in and around SBR. • The study of water quality and Pearson's co-relation co-efficients among different physic-chemical parameters of river Salandi. • Study of live green biomass of a grassland community of SBR, Odisha • Anthropogenic interventions regulate forest structure and carbon stock in Transitional dry forest of SBR, India.
05.	Climate change and carbon emission.	• Estimation of carbon emission from forest fire. • Monitoring of precipitation and temperature. • Carbon stock Assessment and its relation with tree biodiversity in tropical moist deciduous forests of SBR. • Understanding the factors that influence household use of clean energy in STR, India. • Distressed lives and livelihood in Biosphere Reserves during anthropocene: Similipal forest blaze- 2021. • Identification and assessment of forest fire in STR with GIS.
06.	Land Use and Land Cover change.	• Long term changes in forest cover and Land Use of Similipal Biosphere Reserve. • Analysis of temporal and special changes in the vegetation density of Similipal Biosphere Reserve in Odisha using multi temporal satellite imagery. • Status of forest in Similipal Tiger Reserve, Odisha. • Monitoring vegetation and land surface temperature dynamics in SBR, Odisha.

07.	Anthropological and Social studies.	• Tribal culture in respect of Similipal. • Impact of relocation on income and livelihood of tribes in Similipal Tiger and Biosphere Reserve. • Supplementary food plants among the ErengaKhadia and Mankdias of Similipal Biosphere Reserve. • Ecology, culture and changing behavior pattern of the food gathering and hunter people hill Khadias. • Ethno medicinal practices of Kolha tribes. • Indigenous knowledge of ethnic tribes for utilization of wild edible. • The ethno-history of the Bathudi tribe of Mayurbhanj in Odisha.
08.	Wild animal population and behavior studies.	• Captive breeding and rehabilitation of mugger crocodile (*Crocodylus palustris*) in Similipal Tiger Reserve. • Population status and distribution of mugger crocodile (*Crocodylus palustris*) in STR, Odisha. • Assessing mammal abundance and diversity using remotely trigger cameras in STR and its implications for conservation. • Ungulate densities and biomass in tropical deciduous forests. • Trend of tiger population. • Seasonal occurrence of prey density. • Male-male aggression in elephants. • Elephants in Similipal: History, Status, Issues, Techniques and Biological notes on Elephants. • Population density, diurnal activity pattern and food preference of Indian Giant Squirrel (*Ratufa Indica*) in Similipal Tiger Reserve. • Status of wild dog (*Cuon alpinus*) in Similipal and possible impacts of village dogs. • Melanistic tigers of STR, India: Bane or boon? • Estimating the density of Red Jungle fowl *Gallus gallus (*Galliformes: Phasinidae*)* in the topical forest of STR, Eastern India. • Density of the Indian Peafowl (*Pavo cristatus*) and Red Jungle fowl (*Gallus gallus)* in STR, Odisha. • Photographic documentation and distribution of the smooth coated otter (*Lutrogaleperspicillata*) and Asian small Clawed otter (Aonyx cinereus) in STR, Odisha. • Distribution pattern of Grey Wolf in STR by camera trapping in STR. • Diversity and abundance of bats within the human dominated transitional zone of SBR, India: Implications for conservation. • Observation of Shaheen falcon in Odisha, India. • A viable tiger population in STR, India ? calculating if the ungulate prey base is limiting. • Distribution pattern of Jungle cat (*Felis chaus*) in STR, Odisha. • Records of the Globally threatened Rusty- spotted cat in Odisha, India. • High frequency of another wise rare phenotype in small and isolated tiger population.

09.	Economic valuation.	• Economics of conserving elephants with special reference to Similipal, Odisha. • Economic analysis of biodiversity conservation: A case of STR in Odisha. • Interpreting eco-tourism: The Scenario of Odisha. • Eco-tourism in Eco-parks and Sanctuaries: Building Blocks for a green economy in India. • Factor productivity and marketed surplus of NTFP in Similipal forests of Odisha.
10.	Prevalence of disease and health of wild animals and livestock.	• Seroprevalance and risk factors of brucellosis in livestock in the wildlife and livestock interface area of SBR, Odisha. • Fecal cortisol as an indicator of stress in free ranging and captive Asian elephants in Odisha.

4.5.1.1. Present status of research in Similipal

The ecological, biological, economical, social, cultural and spiritual values of the Tiger Reserve are well documented. Similipal being located in the heart of tribal dominated Mayurbhanj District, anthropological, ethno botanical, ethno zoological, ethno medicinal plant resources, ethno veterinary practices, traditional knowledge and socio economic conditions in the landscape are well studied and documented. The land is also home to many particularly vulnerable tribal groups (PVTGs) like Khadias, Mankadias and Lodha. Many studies on floral and faunal diversity, endemic and RET species and their habitat have also been carried out. Studies on livelihood opportunities, ecotourism, collection of NTFPs and their trade have also been carried out. In the year 2019, NTCA published its report on Economic valuation of Tiger Reserves in India- A value+ approach, Phase II, in collaboration with IIFM, Bhopal. The summary of the report is outline tabular format below.

Table No- 4c : Economic Valuation Similipal of Similipal TR

	Criteria	**Value**
1.	Flow Benefits	Rs. 16030.1 crore/year (Rs. 5.89 lakh/ha)
2.	Stock benefits	Rs. 49832.80 crore/year
3.	Tangible benefits	Rs. 69.21 crore/Year
4.	Intangible benefits	Rs. 65793.71 crore/Year
Ecosystem services		
1.	Provisioning of water	Rs. 7033.05 crore/year
2.	Gene pool protection	Rs. 2623.08 crore/year
3.	Climate regulation	Rs. 3482.72 crore/year
Total Economic Value (TEV) frame-work		
1.	Direct values	Rs. 89.53 crore/year
2.	Indirect benefit values	Rs. 13317.50 crore/year
3.	Option values	Rs. 2623.08 crore/year
MA framework		
1.	Provisioning services	Rs. 69.21 crore/year

2.	Regulating services	Rs. 15894.86 crore/year
Annual worth of service under Human values and Ecosystem assets Framework		
1.	Adequate Resources	Rs. 7042.03 crore
2.	Protection from disease	Rs. 20.34 crore
3.	Benign physical and chemical environment	Rs. 6284.43crore
4.	Socio-cultural fulfilment	Rs. 60.23 crore
5.	Ecosystem assets	Rs. 52455.88 crore
Collective worth of ecosystem services having direct indirect impact on human health	Rs. 29897.49 crore/ year	
Investment multiplier for STR	3038.31	

(Source: Economic valuation of Tiger Reserves in India- A value+ approach, Phase II by **NTCA-IIFM, 2021)**

4.5.1.2 Research on flora

Floristic survey

- A team from Regional Research Laboratory, Bhubaneswar led by Saxena and Brahmam (1989) recorded 1076 spp. of plants for the Similipal hills. There are only two species of Gymnosperm and 60 species of ferns. The dicotyledonous: monocotyledonous species %ratio is (71.5:28.5) for Similipal as against (68.9): (31.1) for Odisha and (81.3): (18.7) in the world flora. The higher percentage of monocotyledonous spp. for Similipal is due to higher number of grasses. There are 150 species of grasses in families Poaceae: 107 species and Cyperaceae: 43species.
- An updated checklist of flora of Similipal Biosphere Reserve has been published by STR (Kar & Nayak, 2014), which indicates presence of more than 1352 spp of flora.
- Mishra (1997) made an inventory of the endemic/endangered/vulnerable/ rare plants of 52 species of Similipal forest basing on his field observations, data from herbarium collections and published literature on the flora of Odisha.
- Dhal et. al., during 2011-13 conducted the work on diversity assessment and documentation of Pteridophytes of Similipal Biosphere Reserve. They report 71 species of Pteridophytes from Similipal Biosphere Reserve.
- Patra, J. K., Mishra, R. R., Rout, S. D., &Thatoi, H. N. During 2011 carried out an assessment of Nutrient Content of Different Grass Species of Similipal Tiger Reserve, Orissa.
- Sahoo, S., &Davidar, P. During 2013 evaluated the impact of local populations on vegetation structure and diversity of Sal (Shorea robusta Gaertn. f.) dominated forests of Similipal Tiger Reserve (STR), Odisha, using plot-based method.
- Singh, K. P., & Kamal, K. during 2012 recorded 141 species of lichens from Similipal Biosphere Reserve in Mayurbhanj district of Odisha state, while 129 species are new records for the state of Odisha and 3 species viz. *Conotrema lumbricoides Siepman, Megalotremisbiocellata Aptroot*, and *Ocellularialankaensis* are new records for India.
- Dash, P. K., Mohapatra, P. K., & Kar, M. During 2011carried out a study on diversity of cyanobacteria from freshwater bodies of similipal biosphere reserve, Orissa, India.from 10 freshwater streams, 8 reservoirs

and 4 waterfalls of Similipal Biosphere Reserve was estimated during the survey conducted from 2003 to 2008. They mentioned in total 65 species under 3 orders, 7 families and 24 genera are reported for the first time from the Biosphere Reserve.

- Palei, H. S., Sahu, H. K., & Nayak, A. K. In 2016 carried out an research on Ungulate densities and biomass in the tropical moist deciduous forest of Similipal Tiger Reserve, India. Here they find out the estimated densities of the ungulate species in the intensive study area were: sambar (6.65/km2), wild pig (4.81/km2) muntjac (3.82/km2) chital (2.82/km2) and mouse deer (1.88/km2). The estimated ungulate density and biomass of 19.98/km2 and 1264 kg/km2 respectively are relatively low compared with some other parts of the country. Anthropogenic pressures such as hunting and competition with livestock may be the cause of the low ungulate densities.
- Rout &Mohanta during 2022 carried out a research on Floristic diversity of climbing plants in tropical forests of Similipal Biosphere Reserve, Odisha, India. They documented 120 climber plant species belonging to 74 genera and 33 families. Among families, the most speciose families were Fabaceae (25 species) and Convolvulaceae (22 species) followed by Cucurbitaceae (11 species), Vitaceae (8 species), Dioscoreaceae (7 species) etc. Similarly, dominant genera were Ipomoea possessing the highest number of species i.e., 9 species followed by Dioscorea (7 species), Vigna (6 species) and Cissus (4 species) etc.
- Sahu, S. C., Mohanta, M. R., & Biswal, A. K. in 2018 carried out a research on Phytogeographical Affinities of Tree Species of Similipal Biosphere Reserve, Odisha, India. Here they find out total of 240 tree species were recorded and their phytogeographical affinities were compiled with different countries of the globe. An analysis of the affinities revealed that SBR has strong affinity with Sri-Lanka (46.66%) and Myanmar (45.83%) followed by China, Malaysia, Thailand, Australia and Africa. SBR has also affinity with Himalayan vegetation possessing several trees and orchids find distribution in both the areas. The phytogeographical affinity of SBR supports the migration, establishment and naturalization of flora from/to SBR. This hypothesis needs further study for biogeographical mapping of Indian sub-continent.

Orchids

- The work of Saxena and Brahmam (1989) mention 45 spp. of orchids. Mishra (1997) reports further 48 spp. of. Similipal is now having of 94 species of orchids which includes three endemic species, one representative of the Indian flora and a good number of rare/ phytogeographically interesting species.
- Siddabathula, N., & Misra, S. In 2021 described a new orchid *Oberoniasimilipalense*from the Similipal forest of Odisha, India.

Coix aquatica

- During winter, 1993-94 two Professors from the Botany Department of Marathwada University located the grass *Coix aquatica* near Ransa in Similipal. Earlier, the species was recorded outside the Tiger Reserve.

Bio-diversity Index

- Swain and Nanda (1997) made the vegetation study in the newly created preservation plot inside core area of Similipal (National Park Range) which reveals the Importance Value (IV) of *Shorea robusta* being the highest in the over wood whereas that of the *Mallotusphilippinensis* and *Cyperus rotundus* are highest in the middle storey and ground flora respectively. The population structure of some species was exhibited by having more numbers of intermediate or high girth classes with the absence of seedlings. Certain species indicate gap phase type regeneration (interrupted). This interrupted regeneration of a species indicates that one or more climatic or bio-edaphic factors inhibited the regeneration completely for certain periods of time and with the return of favourable condition the species was able to regenerate again.
- Mohanty (2001) report that the species diversity index of different layers of the vegetation varies from 1.798 to 3.107 for trees; 2.193 to 2.951 for shrubs and saplings and 2.057 to 3.496 for herbs and seedlings. In case of tree and shrub– sapling layer the species diversity index is more in core zone and less in buffer zone. However, the reverse trend is noticed in case of herbs and seedlings.

- Alam, A., Behera, K. K., Vats, S., & Iqbal, M. During 2013 carried out a preliminary study on bryodiversity of Similipal Biosphere Reserve (Odisha), India.

Medicinal plants

- Pandey and Rout (2005) report 267 species of medicinal plant in Similipal. Dicots and monocots are represented by 63 and 5 families respectively. Six families represent Pteridophytes. Sixty-three species have been introduced in the Medicinal Plant Nursery at Ramatirtha near Jashipur.

- Sachan, S. K. S., Patra, J. K., & Thatoi, H. N. in 2013 studied on Indigenous knowledge of ethnic tribes for utilization of wild mushrooms as food and medicine in Similipal Biosphere Reserve, Odisha, India. The study revealed that more than 10 enthnic groups (Santal, Kolha, Munda, Khadia, Bhumija, Bhuyan, Bathudi, Kudumi, Ho and Mankdias) of SBR were found to be mycophilic and have extensive traditional mycological knowledge. In total 14 species of fleshy mushrooms belongs to 8 genera and 6 families were collected through field visits and identified by phenotypic and microscopic characters. All these mushrooms are being used by the tribes as source of food as well as ethnomedicinal purposes including cure for malnutrition, weakness and other nutritional disorders etc. The study highlights the diversity and ethnomedicinal potential of some indigenous mushrooms from SBR.

- Jena, S. K., &Tayung, K. in 2013 carried out a study on Endophytic fungal communities associated with two ethno-medicinal plants of Similipal Biosphere Reserve, India and their antimicrobial prospective. The study revealed that medicinal plants associated endophytes could be a rich source of antimicrobial agents, a total of 458 endophytic isolates were obtained from leaf, stem and fruit tissues of Solanum rubrum and Morinda pubescence. The dominant endophytic fungi belong to genera Aspergillus, Colletotrichum, Curvularia and Mycelia sterilia. Maximum endophytic isolates were obtained from leaves segments followed by stem and fruit tissues.

- Panda, S. K., Padhi, L., Leyssen, P., Liu, M., Neyts, J., & Luyten, W. in 2017 studied on Antimicrobial, anthelmintic, and antiviral activity of plants traditionally used for treating infectious disease in the Similipal Biosphere Reserve, Odisha, India. In this study they tested *in vitro* different parts of 35 plants used by tribals of the Similipal Biosphere Reserve (SBR, Mayurbhanj district, India) for the management of infections. From each plant, three extracts were prepared with different solvents (water, ethanol, and acetone) and tested for antimicrobial (*E. coli, S. aureus, C. albicans*); anthelmintic (*C. elegans*); and antiviral (*enterovirus 71*) bioactivity. In total, 35 plant species belonging to 21 families were recorded from tribes of the SBR and periphery.

- Kumar, S., Mahanti, P., Singh, N. R., Rath, S. K., Jena, P. K., & Patra, J. K. in 2018 carried out a study on Antioxidant activity, antibacterial potential and characterization of active fraction of *Dioscorea pentaphylla* L. tuber extract collected from Similipal Biosphere Reserve, Odisha, India.The study for the first time showed that diosgenin present in *D. pentaphylla* tuber was responsible for antibacterial and antioxidant potential.The phytochemical analysis revealed the presence of saponin groups.

- Rout, P. G., & Panda, T. in 2017 studied the Ethnobotanical survey of medicinal plants used for the treatment of diarrhea and dysentery by the tribals of Similipal forest, Mayurbhanj, Odisha, India.About 47 plant species belonging to 45 genera and 33 families are used by the tribals of the Similipal forest for diarrhea and dysentery. The most cited species for the management of diarrhea and dysentery are *Acorus calamus L., Aegle marmelos (L.) Correa., Centella asiatica (L.) Urb., CurculigoorchioidesGaertn., Emblica officinalis Gaertn., Oroxylum indicum (L.) Vent., Syzygiumcumini (L.) Skeels. and Terminalia bellerica (Gaertn.) Roxb.*

- Rout, Y., Kumar, S., Das, G., & Patra, J. K. (2021). Wild Cucurbits: An Ethnomedicinally Important Plant Species for Aboriginals of the Similipal Biosphere Reserve, Odisha, India. In this study, they documented a total of 11 species belonging to 8 genera of WCs were enumerated that were used as food and medicines. Out of 11, Cucumis melo, Trichosanthuscucumerina, and Coccinea grandis were very common in all 76 parts of the study area. Solenaamplexicaulis and Mukiamadrespatna were rare in these localities.

4.5.1.3 Research on fauna

- Mishra, S. R., & Bisht, H. K. In 2019 survey the distribution Pattern of Grey Wolf in Similipal Tiger Reserve by Camera Trapping in Similipal Tiger Reserve, Odisha. Two number of photos captured from the Satkosia Ranges of Similipal Tiger Reserve. The entire photo captured from Buffer area of the Similipal Tiger Reserve.

Tiger and leopard

- Based on observation made on a free-living pet tigress, Khairi, Choudhury (1999) reports several aspects of reproductive biology, senses and inter-specific interactions of tiger. Singh (1997) informs that during the same period Mr. R. L. Brahmachary studied the marking fluids of Khairi for chemical description of the pheromones. The study was later pursued on tigers at Nandankanan.
- During 1989-1993 repeated surveys on Tiger population have led to inferences on the biology and population dynamics of tiger and leopard in the wild in Similipal. Polygamy is more pronounced in tiger when compared with leopard. The sex ratio may be 1:1 at birth but it favours females in the prime breeding territories. About 12% of female tigers litter every year and 72.2% of cubs belong to tigresses with hind pugmark lengths 12-13.9 cm. Young tigers with pug lengths 9.0-10.9 cm remain away from main territories while trying to set their own territories. (Singh, 1997).
- Singh (1997) further reports from analysis of the records of tigers with aberrant colours- the stripeless, white, melanistic and black etc. that the body colour of tiger can vary over a wide range of aberrant colours with 'no stripes' to 'completely black' tigers. The intermediary stages include various shades of white tigers, the pallid or golden tiger, various shades of normal yellow tiger, the brown tigers, the melanistic tiger and the blue tigers. All these possible colour occur according to a normal distribution curve in the wild gene pool of *Panthera tigris*. The dome is occupied by different shades of 'normal colour' tigers, while the aberrants occupy various regions of the dome of the curve. The aberrants reappear in a population in normal course of time as throwbacks and not because of identical repetitions of mutations. The details have appeared in a series of publication from Similipal including a final compilation as Singh, L. A. K. (1999): Born Black The Melanistic Tiger in India. WWF-India, New Delhi, 66p.
- Population estimate of tiger and leopard was earlier made by an indirect method of estimating the minimum size of the total population (whole count). It was carried out in the month of January once in two years by pugmark census technique. It was evolved during 1972 by Late S. R. Choudhury (Choudhury, 1972) and refined during 1990s [Singh, L. A. K. (2000): Tracking Tigers: Guidelines for estimating wild tiger populations using the Pugmark Technique. (Revised Edition).WWF Tiger Conservation Programme, India.]2004 pugmark census records tiger – 101 (male-28, female-41 & cub-32) and leopard – 127 (male-44, female-64 & cub-19). A new method of monitoring tigers, co-predators, prey and their habitats has been introduced since 2006 and monitoring is still in progress.
- Habitat utilization by tiger has been studied round-the year which highlight the dynamics of habitat-sharing by tigers and leopards of either sex.
- Sighting of tiger and its signs are recorded with GPS readings and mapped in a GIS domain.

Elephant

- Most of the available information on elephants have been compiled in a publication titled, Srivastava, S. S. and Singh, L. A. K. (2001): Elephants in Similipal (History, status, issues, techniques and biological notes on elephants) Volume-I. Similipal Tiger Reserve, Baripada, Mayurbhanj, Orissa. 200pages
- Important studies are on the identification of elephant habitats including corridors, the distribution pattern, population status and management issues relating to elephants of Orissa. Another study involved the analysis of the sighting trends of elephants in Similipal during nine years. The 'sighting trend' highlighted aspects relating to population biology of the elephant in Similipal. There has been a significant analysis of male-male aggressions among elephants leading to natural deaths (Singh, 1997).

- Mishra, S. R., & Bisht, H. K. In 2015 carried out a study on population structure of Asiatic elephant (Elephas maximus) in Similipal Tiger Reserve, Odisha, India. They mentioned that In 2012 total 334 elephants were sighted in the core area out of which 132 (39.52) from UBK Range, 62 (18.56%) from Chahala Range, 52 (15.56%) from Jenabil Range, 50 (14.97%) from Pithabata Range, 18 (5.38%) from National Park Range, 14 (4.19%) from Nawana North Range and 6 (1.79%) from Nawana South Range were sighted. In 2012 also the adult cow population is high (46.4%), followed by calf (15.86%), sub adult cow (7.48%), Juvenile (11%), sub adult bull (7.48%), adult bull (4.49%). However, the female proportion is much more than male in Similipal Tiger Reserve.
- Swain (2004) reports elephants in culture and heritage, evolution, taxonomy and distribution, social organization and population structure, food plants and the carrying capacity of forests, migration of elephants and elephant corridors, man and wild elephant conflict, captive elephants, economics of elephant conservation in general and that of Similipal in particular.
- Direct count of elephants has been used to estimate elephant population in Similipal. During 2012 census there were 456 elephants in Similipal and adjoining area (adult bulls 60, adult cows 273, adult unsex 01and Young/ juvenile 122). In the Similipal Elephant Reserve number of elephants in Similipal and adjoining area, which include Kuldiha and Hadgarh, was found to be 788.

Prey animals

- Prey animals include bison, wild boar, sambar, chital, barking deer, mouse deer, hanuman langur and rhesus monkeys. Pre-laid transects such as jeep able roads, animal tracks, foot paths, fire lines, core lines and other demarcating long clearances are covered by the staff around the year with recording of relevant observations on population estimates.
- During 2004, transect census of prey animals was conducted following the method of Brower et al (1990), according to which, there are bison –1243, wild boar – 14538, sambar – 10185, chital – 3548, barking deer – 12278, mouse deer – 4013, hanuman langur – 47265 and rhesus monkey – 3079 in Similipal.
- Mishra, S. R., & Mohan, M. In 2019 carried out the research on seasonal variation of prey density in similipal tiger reserve, odisha, india.

Giant squirrel

- Singh (1997) reports preliminary study on *Ratufa indica* which highlighted the distribution pattern of the species indicating the quality of forest canopy.
- Rout and Swain (2005) reports the census result of 10,660 giant squirrels in Similipal and 24 food plants of this species.

Herpetofauna

- Dutta et al (2005) reports about 77 species (one spp. of crocodilian, 17 spp. of frogs, 14 spp. of lizards, 40 spp. of snakes and 5 spp. of turtles) in Similipal Biosphere Reserve. In addition, about 5 un-described (probably new to science) and 5 un-recorded species have also been found to occur in the Reserve. The herpetofauna of Similipal is the amalgamation of species with wide distribution range, endemics (specifically new and un-described species of frogs), Western Ghat species (colubrid snake *Ahaetullapulverulentus:* first record from the State and agamid lizard *Calotesrouxii),* Northeast Indian species (one rhacophoris frog, one snake: *Psammodynastespulverulentus*), Himalayan species (one skink) and central Indian species (fresh-water turtles, lizards).

Crocodiles

- One of the important surveys included the survey of the status of mugger crocodiles (*Crocodylus palustris*) in Similipal and monitoring of rehabilitated population. There has been a positive trend of growth of populations of mugger in Similipal. However, because of continued human pressure on wetlands muggers have not done as well as it should be expected. These studies are significant when

voices are raised about commercial utilization of the crocodilian resources under an assumed plea that the group is safe in the wild.

- Studies on *Crocodylus palustris* have generated or supplemented data on biology, growth variations, and territorial resource partitioning with implication in sanctuary management. Although muggers may peacefully coexist with man and cattle, there are recommendations to consider the territorial habits of the species in order to mitigate man-crocodile conflicts.
- RATHORE, H. S., PATI, J., DAS, A., & PANDAV, B. In 2021 carried out a research on Population status and distribution of mugger crocodile *Crocodylus palustris* in the Similipal Tiger Reserve, Odisha, India. They recorded 82 individuals from all the rivers of the STR during the survey. Of these, 70 individuals (85 %) were recorded from the West Deo river system and a population occurs up to an altitude of 822 m making it the highest altitude habitat for this species in India. The STR population provides a unique opportunity for research on various facets of mugger ecology.

BATS

- Debata, S., & Palita, S. K. In 2020 survey the diversity and Abundance of Bats within the Human-Dominated Transitional Zone of Similipal Biosphere Reserve, India: Implications for Conservation. A total of 21 species representing three species of frugivore bats and 18 species of insectivorous bats in seven families were recorded during the study, of which 152 individuals in 13 species were captured in mist nets. Species diversity and capture rate were recorded higher in primary forest.

Avi-fauna

- Important Avian Surveys have been carried out in the past by U.N. Dev under an Eastern Ghat Project titled "Project Bihang", and by teams from the Bombay Natural History Society. In association with ornithologists from the BNHS and the U.S. Fish and Wildlife Service a checklist of raptors of Similipal has also been of fairly good order. As per his report, over 450 spp. of birds have been identified for Odisha. Of these 265 were recorded in Similipal. A study on the wetland birds in periphery of Similipal has also been taken up. Two reservoirs, namely Badajora and Haladia on the periphery of Similipal Biosphere Reserve attract winter birds. In this respect the habitat of Badajora is of particular interest. Both these habitats, however, promise for development as good bird-watching sites close to the district headquarters of Baripada in the outskirts of Similipal. As per the recent Checklist of Birds of Similipal Tiger Reserve, 2013 (Nayak & Naik, 2013), there are 361 Species of birds in Similipal (Annexure XV).
- After reporting about the range extension for *Lonchuramalaccamalacca* to east of its formerly cited limit in Raipur, a study on the nesting biology of the species was undertaken at Ramatirtha near Jashipur. The birds nest every year in the vegetation in the crocodile pens at Ramatirtha. Apart from nesting ecology of *L. m. malacca*, the study highlights multiple use of an exhibit and methods for environmental enrichment management of crocodiles (Singh & Rout, 1992).
- Panda, B., Pati, S., & Dash, B. P. In 2017 reported the Occurrence of Malabar Whistling Thrush: *Myophonushorsfieldii* in Similipal Biosphere Reserve of Odisha.

Invertebrates

- Rao and Satpathy (2003) report about the two most famous wild tropical tassarecoraces namely Modal and Nalia (*Antheraea mylitta*). Modal spins the highest silk bearing tassar cocoons in the world and it shows superior values in respect of commercial characters i.e., shell weight (3.64g), SR % (25.68) and filament length (1383m) and have least signs of deformity and diseases.
- The Zoological Survey of India, Kolkata and its Estuarine Biological Station at Berhampur record 217 taxa from major invertebrate groups and 400 spp. of vertebrate, and a first ever baseline data on alpha or regional faunal diversity from the region.
- Sethy (2004) communicates 169 species of invertebrate fauna (Mollusca-9,all Gastropoda; Arthropoda-19,1 millipedes, 2 centipedes, 1 crab, 2 scorpions, 13 spiders; Insecta -141, 42 grasshoppers/crickets, 10 dragon

flies, 42 butterflies, 6 true flies, 24 beetles, 6 termites/ants, 4 bugs, 4 bees, 3 aphids/leaf hoppers) as a brief report on the inventory of invertebrates faunal diversity in Similipal, based upon his 04 field visits covering 03 seasons during 2003.

- The checklist of fresh water fishes in Similipal has been updated in 2013-14.
- Jena (2004) reports two species of leeches (Gnathobdellida) in Chahala Range of Similipal Sanctuary.
- Mohanta et al(2014) Studies on lac insect (Kerria lacca) for conservation of biodiversity in Similipal Biosphere Reserve, Odisha, India
- Palei et al. (2016) assess the diversity and abundance of medium to large sized mammals in Similipal Tiger Reserve by using remotely triggered camera traps.

Villages

- IIFM, Bhopal has taken up a study in 2006 for a critical socio-economic analysis of the changing demographic profile and livelihood patterns vis-à-vis the concern for conservation of the biodiversity resources of the Similipal Biosphere Reserve (Funded under Central Plan, Similipal Biosphere Reserve).
- Anthropological Survey of India has taken up a study on cultural dimension of tourism – eco-oriented as man in the Biosphere during 2006.

4.5.1.4 Research on abiotic factors

Geology and Geomorphology

- Similipal is a lenticular elongated plateau with steep slopes of 500 to 600 m on the outer area to 1000 to 1100 m along the centre, which is underlain by an assemblage of volcano-sedimentary rocks consisting of alternate sequence of quartzitic and spilitic lavas. 'Amjhori Sill' was introduced as the last layer and occupied the central part of the plateau. Three drainage systems, Budhabalang from the North, Baitarani from the West and Salami from the South, originate more or less from the plateau traversing deep dissection of the plateau as waterfalls. The height difference between the plateau and surrounding plains along with weathered rock producing thick soil are suitable for development of dense forest which is less disturbed by biotic interferences. (Iyengar and Banerjee, 1964; Saha, 1994; Mahalik, 1997).

Meteorology

- Pujari (1997) states that Similipal stands as a water tower and obstructs the flow of monsoonic winds to North in Bihar, West Bengal and Madhya Pradesh. The behaviour of precipitation is comparatively different than other districts. Analysis of rainfall data of 93 years reveals that in this area a 32-33 years cycle is in operation. Distinct phases have been observed with special processes of rainfall behaviour. Further studies reveal that this area is losing substantial amount of precipitation in each phase. It may be pointed out that this hill complex has touched as low as 100 cm during 1974. Proper management practices may be the answer for managing the situation in future.
- In Similipal five different locations have been selected to record the data from April, 1988. These locations are Ramatirtha in the periphery of Similipal Tiger Reserve, Chahala and Nawana in North-Similipal, and Upper Barakamuda and Meghasini in South-Similipal. The parameters recorded at these stations are maximum-minimum ambient temperatures, relative humidity at 0600 hr, 1200 hr, and 1800 hr and the rainfall. The instruments used for the studies are standard maximum-minimum thermometers, dial-type hygrometers and manual rain gauge. New units are being purchased and set up in the place of old defunct ones.

4.5.2. TRAINING AND HUMAN RESOURCE DEVELOPMENT

Capacity building measures for the frontline staff is an integral part of the management of wildlife in the Tiger Reserve. Time to time various training programmes have been organized at Range level as well as Division level to enhance the capacity of staff to carry out scientific and technical works. The trainings provided to the frontline staff are as follows:

Table No-4d : Training and Human Resource Development

Sl. No.	Broad category	Topic
01.	Technology	• Use of VHF communication network. • Use of computers in data management. • Use of MSTrIPES mobile application for daily patrolling and ecological monitoring. • Use of Drone in wildlife management. • Use of wind blowers in combating forest fire. • Deployment of trap cameras in field and retrieval of data from it. • Use of Avenza mobile application for utilizing Geographic Information System (GIS) in day to day wildlife monitoring and protection activities.
02.	Self defense and endurance enhancement	• Enhancement of body strength through physical exercise for higher endurance in protection activities. • Use of protective gears. • Jungle survival techniques. • Rescue operations. • Visual communication techniques. • Team work and coordination in various operations. • Personal safety and first aid.
03	Mental and Spiritual wellbeing.	• Yoga and meditation. • Adoption of hobbies. • Sports and games. • Overcoming stress due to arduous working environment of Similipal.
04.	Wildlife management.	• Census techniques for elephant, crocodile, birds etc. • Techniques of All India Tiger Estimation. • Indirect signs of wild animals. • Behaviour of wild animal. • Monitoring health conditions of wild animal. • Identification of flora and fauna. • Identification of endemic and RET species. • Identification of orchids. • Restoration of orchids. • Handling and storage of camera trap data. • Functioning of Tiger Cell.
05	Habitat management.	• Identification of weeds. • Removal of weeds. • Identification of palatable grasses. • Development of seed plots of palatable grasses. • Identification of fodder trees. • Developments and management of grass lands and meadows.

06	Protection and enforcement	• Principle and procedures of intelligence gathering. • Forensic techniques in wildlife crime investigation. • Building of case records in wildlife crimes. • Training on use of arms and ammunition and their maintenance. • Interpretation and enforcement of forest and wildlife laws. • Tackling of offenders and their safety in custody. • IPC, CRPC, Evidence Act, Arms Act etc. relevant to forest and wildlife crime. • Modus operandi of hunters and poachers and other offender. • Knowledge on traps, snares, poisoning and arms and ammunitions used by offenders. • Identification of wildlife parts and articles made out of it. • SOPs on tiger mortality, straying of tigers inn human dominated landscape, disposal of carcasses etc. issued by NTCA from time to time. • SOP to deal with elephant mortality issued by Govt. of Odisha. • SOP on zero forest fire.

4.6 RELOCATION OF VILLAGES

Village relocation is having immense use when it comes to creation of inviolate space for wildlife. Efforts were made to relocate villages which were residing inside Similipal Sanctuary since the inception of Similipal Tiger Reserve. A total of five villages which were located in the core area of Similipal were successfully relocated. The first village where relocation efforts were started are Jamunagarh with 49 families and Kabatghai with 85 families in the year 1994. Kabatghai relocation was completed in 2016 and Jamunagarh village was completely relocated in 2022. One more village named Jenabil with 84 families was relocated in two phases starting from 1998 and completed in the year 2010. Another two hamlets one at Upper Barakamuda with 22 families and another at Bahaghar with 10 families were completely relocated in the year 2013. At present only one village namely Bakua is located in the core area of Similipal Tiger Reserve.

Table No- 4.e : Details of Relocation of Villages

Village	Family	Year	Year-wise break up of Families relocated & rehabilitated in the Rehabilitation Colony							Balance family (as per survey)	Remarks
			Kapand	Ambadiha	Asankudar	Nabra	Manada	Anukulpur	Total		
Jamunagarh	49	1994	11	-	-				49	0	Completely relocated & rehabilitated
		2015	-	-	-	35					
		2022	-	1 (06 Units)	-	2 (07 Units)					
Jenabil	84	1998	-	23	-				84	0	Completely relocated & rehabilitated
		2010		61	-						
Kabatghai	85	1994	30	-	-				85	0	Completely relocated & rehabilitated
		2003	-	8	-						
		2016	-	-	-	-	40	7			
Bakua	61	-	-	-	-				-	61 (1998 Survey)	The village have expressed their un-willingness to vacate their land for which land Acquisition process could not be taken up. Process has been going on for relocation.
Barakamuda	22	2013	0	0	22				22	0	Completely relocated & rehabilitated
Bahaghara	10	2013	0	0	10				10	0	Completely relocated & rehabilitated
Total	**311**		**41**	**93**	**32**	**37**	**40**	**7**	**250**	**61**	

4.6.1. Need for relocation

The core area of the Tiger Reserve forms the crucial natal area and a critical tiger habitat. It is imperative that this area is made absolutely sacrosanct and free from any kind of human interference.

4.6.2. Progress of relocation of remaining villages

4.6.2.1. Jamunagarh

Jamunagarh village was relocated in three phases during the year 1994, 11 families have been shifted to Non-forest land at Kopand and compensation has already been paid. Land acquisition proceeding under Orissa Land Acquisition Act 1894 has been finalized. During the year 2015 another 35 families are being relocated after obtaining their voluntary consensus and they are been given land to construct their house at Nabra village of UdalaTahasil. The left over families are been relocated to Nabra and Ambdiha villages of UdalaTahasil during 2022 with this entire Jamunagarh village has been successfully relocated from the Core area of Similipal Tiger Reserve.

4.6.2.2. Kabatghai

After following Land acquisition process under Orissa Land Acquisition Act 1894, the villagers i.e. 30 families in the year 1994 have been shifted to non-forest land at Kopand under Matiagarh GP of Jashipur Block in KaranjiaTahasil and during the year 2003, 8 families were shifted to Ambadiha colony and compensation has already been paid. Further during the year 2016 all left over families were relocated to Manada and Anukulpur of Jashipur Tahasil with that entire Kanbatghai village has been successfully relocated from the core area of Similipal Tiger Reserve.

4.6.2.3. Upper Barakamuda and Bahaghara.

The relocation of all families of Upper Barakamuda (22 families) and Bahaghara (10 families) was completed in 2013 in one phase. These families have been rehabilitated at Asankudar of Thakurmunda Block.

4.6.2.4. Bakua

The villagers have expressed their un-willingness to vacate their land for which Land Acquisition process could not be taken up. Continuous persuasion is going on to convince the villagers for voluntary relocation.

4.7 ADMINISTRATION AND ORGANISATION

After creation of the Tiger Reserve the Field Director was having control over the core area of the tiger reserve. Vide Notification No. 1669 Dated 25.01.1994 of Govt. of Odisha in F & E Deptt, the post of Field Director was changed as Conservator of Forest and Field Director who was given administrative control of the territorial Divisions of Baripada and Karanjia, i.e., the Divisions having part jurisdiction over the buffer area of Similipal TR. After revision of IFS cadre with effect from 27.11.2008, this post was split into two separate posts, 1. Regional C.C.F., Baripada (CCF rank) and 2. Field Director, STR (CF rank). Again vide Notification No 11884 Dated 02.07.2011 of Govt. of Odisha in Forest & Environment Department the post of Field Director was upgraded to the rank of C.C.F. and both the posts were unified as Field Director, Similipal Tiger Reserve and Regional C.C.F., Baripada who is having administrative control over Similipal tiger Reserve as well as territorial Divisions under Baripada Circle. During re-organization of Forest Department in 2003 vide Notification No 1F(A)-100/2003/13228/F&E dt.08.08.2003 of Govt. of Odisha in Forest and Environment Department the post of Deputy Director, in the rank of Deputy Conservator of Forests, was created in Similipal Tiger Reserve to look after the core area of Similipal Tiger Reserve. In 2011 another post of Deputy Director was created with headquarters at Jashipur to look after tourism and research activities of Similipal Tiger Reserve.

The Similipal Sanctuary covering 2306.61Sq. km. of Similipal Tiger Reserve with an area of 2750 Sq. km. was reorganized into two Wildlife Divisions namely Similipal South Wildlife Division covering 1247.58Sq. km. with headquarters at Baripada and Similipal North Wildlife Division covering 1059.03Sq. km. with headquarters at Jashipur in the larger interest of wildlife management. The left over area of Tiger Reserve other than Sanctuary area was also consolidated and distributed among three Territorial Divisions. After re-organaisation the Forest administration of Mayurbhanj District are having the following setup:

Table No. 4f : list of Range, Section & Beat of Similipal South WL Division

Similipal South Wildlife Division				
Sl. No	Name of Range	No. of Sections	No. of Beats	Remarks
01.	Pithabata North (WL)	05	11	All Ranges fall inside the Similipal Tiger Reserve.
02	Pithabata South (WL)	06	15	
03	Nawana South (WL)	04	09	
04	Dukura WL	04	10	
05	Jenabil WL	05	15	
06	National Park	04	09	
07	UBK (WL)	07	17	
08	Bhanjabasa (WL)	04	12	
09	Podadiha (WL)	02	05	
	Total -09	**41**	**103**	

Table No. 4g : list of Range, Section & Beat of Similipal North WL Division

Similipal North Wildlife Division				
Sl. No	Name of Range	No. of Sections	No. of Beats	Remarks
01.	Talabandha (WL)	03	08	All Ranges fall inside the Similipal Tiger Reserve.
02	Chahala (WL)	05	12	
03	Nawana North(WL)	04	11	
04	BarehipaniWL	06	13	
05	Gurgudia WL	04	08	
06	Kendumundi (WL)	06	12	
07	Thakurmunda (WL)	03	06	
08	Jashipur (Eco-tourism)	03 (Units)	04 (Sub-Unit)	
	Total-08	**34**	**74**	

Table No. 4i : list of Range, Section & Beat of Rairangpur Division which area falls inside Similipal Tiger Reserve.

Rairangpur Forest Division			
SL No	**Name of Range**	**Name of the Section**	**Name of the Beat**
1	BISOI WL	Bisoi	Gardari

2			Pokharia
3		Chadeipahadi	Chadeipahadi
4			Luhasila
5		Rajabasa	Rajabasa
6			Manada
7		Saragada	Joka
8			Saragadi I
9			Saragada II
10		Nischinta	Nischinta
11			Deopata
	Total 01 Range	**05 Sections**	**11 Beats**

Table No. 4k : list of Range, Section & Beat of Baripada Division which area falls inside Similipal Tiger Reserve.

Baripada Forest Division			
SL No	**Name of Range**	**Name of the Section**	**Name of the Beat**
1	BARIPADA	HALDIBANI	HALDIBANI
2		DIGDIGA	KHASADIHA
3	KAPTIPADA	NOTO	SANDAI
4			SARAT
5			NOTO
Total	**02 Ranges**	**03 Sections**	**05 Beats**

Table No. 4m : list of Range, Section & Beat of Karanjia Division which area falls inside Similipal Tiger Reserve.

SL No	**Name of Range**	**Name of the Section**	**Name of the Beat**
1	SATKOSIA WL	GODBHANGA	DHATIKIDIHA 1
2			DHATIKIDIHA 2
3			GODBHANGA
4		MAHULDIHA	JHARJHARI
5			MAHULDIHA
6			BHALIADAL
7		NODA	BALIDIHA
8			NODA
9		SATKOSIA	SATKOSIA 1
10			SATKOSIA II
11			SALCHUA
12	THAKURMUNDA	CHAMPAJHARA	BHEJIDIHI

13			CHAMPAJHARA
14		KENDUJHIANI	KHAPARKHAI
15			KENDUJHIANI
16		KENDUMUNDI	KENDUMUNDI
17			BISIPUR
18		KESHDIHA	PURUNAPANI
19		THAKURMUNDA	THAKURMUNDA I
20			THAKURMUNDA II
	Total 02 Ranges	**09 Section**	**20 Beats**

The Abstract of Core, Buffer and Corridor of Similipal Tiger Reserve in the forest administrative setup of Mayurbhanj District is given below:

Table No-4n : Area of Similipal Tiger Reserve

Division	**Similipal Tiger Reserve**			
	Total Area in Sqkm	**Core area in Sq km**	**Buffer in Sq km**	**Corridor Area in Sq km**
Similipal South WL	1247.58	841.57	406.01	-
Similipal North WL	1059.03	353.18	705.85	-
Baripada	70.1	-	70.1	40.48
Rairangpur	181.28	-	181.28	18.35
Karanjia	192.01	-	192.01	24.94
Total	**2750**	**1194.75**	**1555.25**	**83.77**

List of Range, Section, Beat and Compartments have been given in Annexure XLII. The cadre strength, staff position of the establishment of Field Director, Similipal Tiger Reserve is given in Annexure XLIV.

The co-operation of sister department such as Health, Veterinary, Irrigation, Police and Revenue Departments are inevitable in smooth management of the Sanctuary. The officers of such department extend their hands ungrudgingly as and when necessary.

4.7.1. Staff

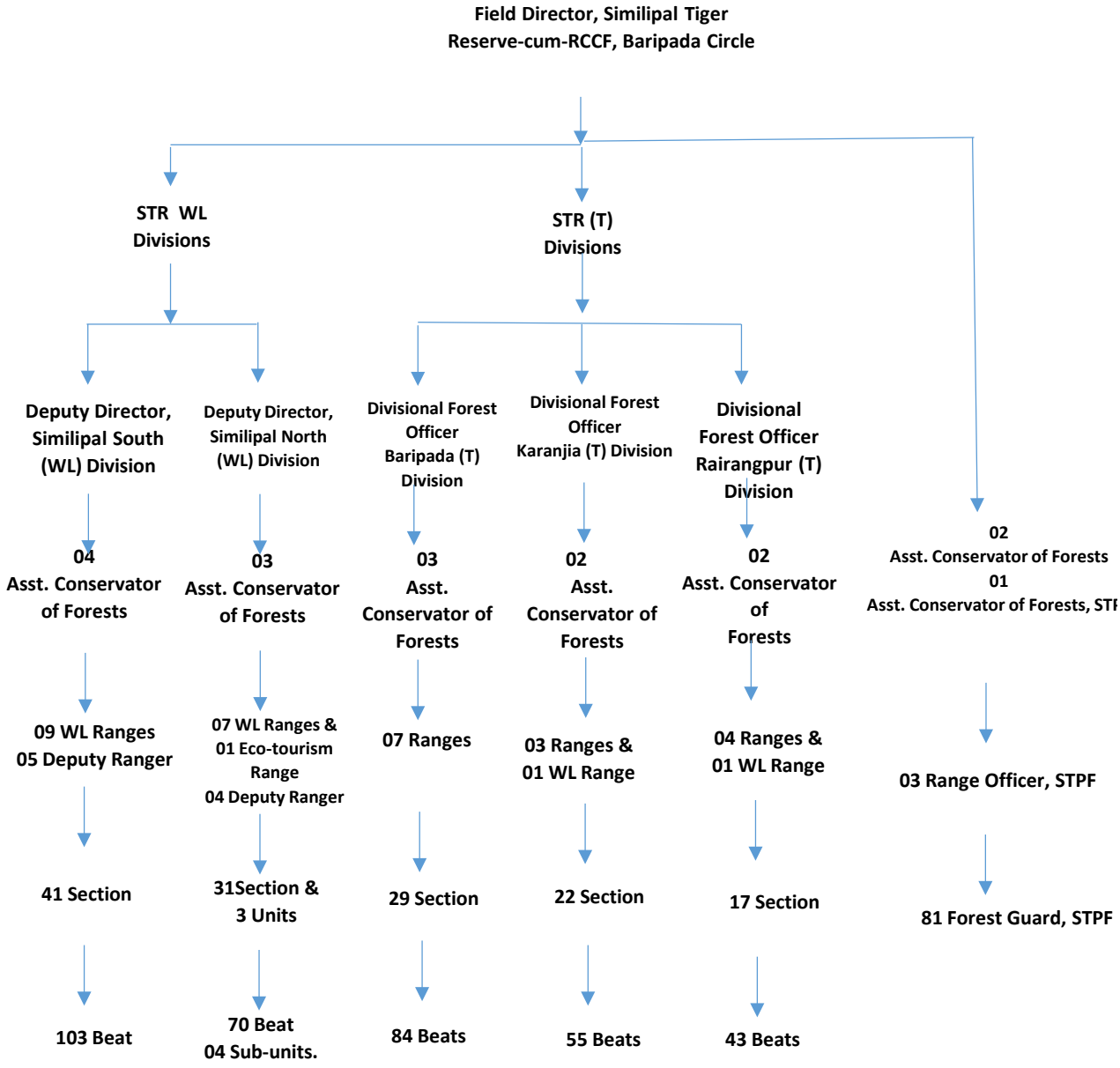
There are 7 Ranges, 23 Sections and 75 Beats to look after the area in core Division as per the statement in Annexure XLII.

4.7.2. Housing

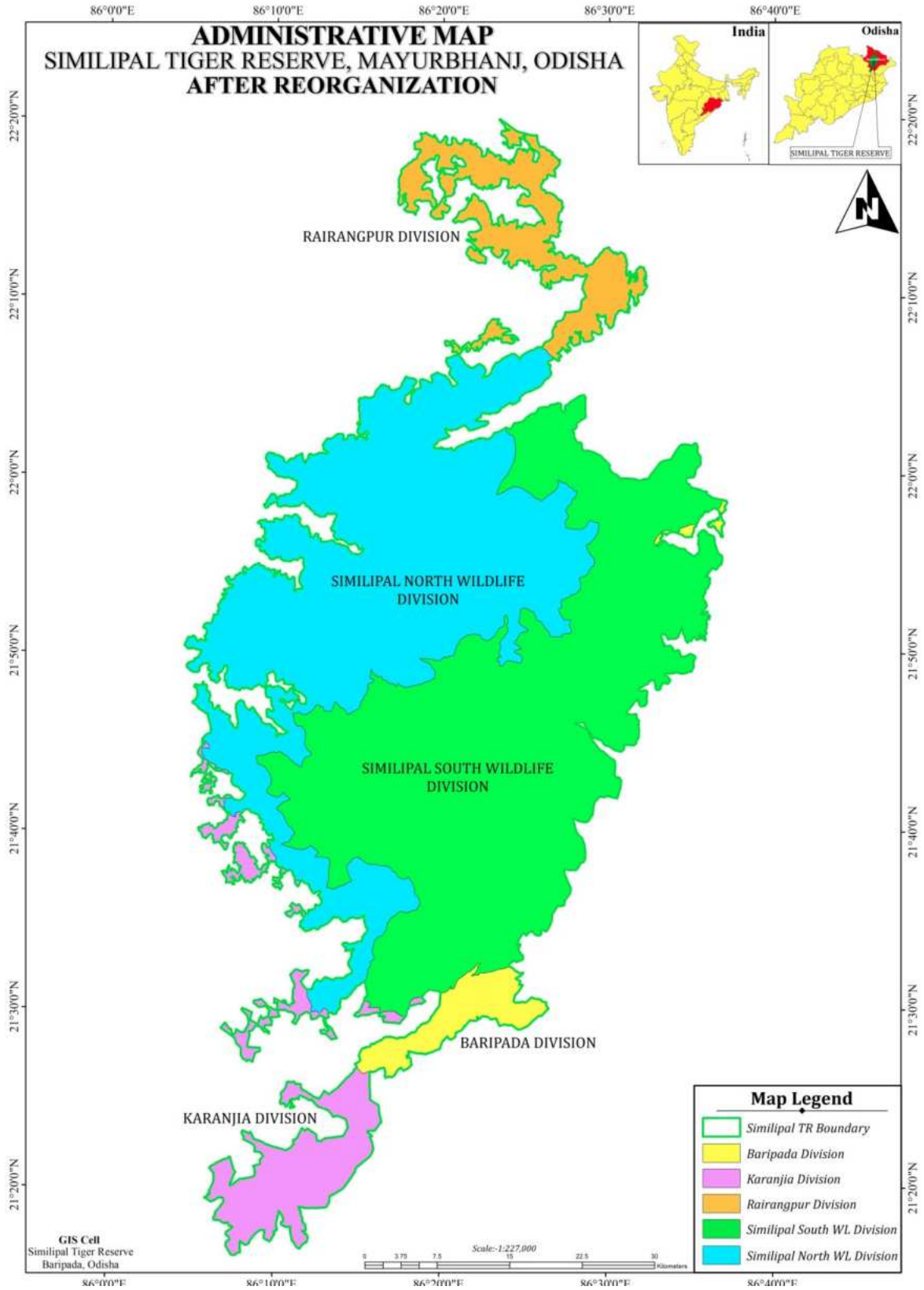
The PA does not have the amenities to cater to the need of the staff barely necessary for stay. The housing facility is quite inadequate and there are no facilities like communication, electricity, telephone and other electronic devices. The climate is very harsh and extremely malaria-prone. The question of providing education to the scions of the staff working inside is a daydream. This type of environment compels the staff to remain absent from duty at the detriment of forest protection. The situation will improve upon only when the staff are provided accommodation at places nearer to the PA with facilities for education of their children, health care, electronic communication. Two family hostels have been constructed at Jashipur and Baripada for accommodation of 7 families of core area staff. The list of buildings available inside the PA is given in Annexure XXXI.

Administrative structure of management of Similipal Tiger Reserve.

Chart No- 4.6 : Administrative structure of management of Similipal Tiger Reserve



Map No- 4D : Administrative Map of Similipal Tiger Reserve



4.7.3. Office and Residential Accommodation

Office accommodation for all the officers is available at their respective headquarters. The Foresters and Forest Guard Quarter are in the verge of saturation.

There is no residential accomodation facilities available for ACFs posted in office of the Field Director, Similipal Tiger Reserve-cum-Regional Chief Conservator of forests, Baripada, Deputy Director, Similipal South WL Division, Baripada and Deputy Director, Similipal North WL Division, Jashipur. It may be moved to State Govt. to provide required funds to construct quarters for ACFs in the present plan period.

4.7.4. Check posts

There are 34 nos. of check posts as detailed in Annexure XXXII inside the core area of the Tiger Reserve.

4.7.5. Watch Towers

At Present there are 17 watchtowers and hide-outs inside the Tiger reserve, The list is furnished in Annexure XXXIII.

4.7.6. COMMUNICATION

4.7.6.1. Roads

There is an arterial type of distribution of road inside the landscape. The detailed length of the forest roads is given in Annexure XXXIV.

4.7.6.2. Vehicles

The vehicles as detailed in Annexure XXXV are being used for management of the landscape.

4.7.6.3. VHF Communication Facilities

In the Tiger Reserve at present there are 59 fixed VHF stations as given in Annexure XXXVI.

One VHF maintenance unit is existing at Baripada with one Wireless Technician. It caters to the need of repair and maintenance of VHF sets not only in STR but also of other Divisions, whenever it is required.

4.7.6.3.1. Call pattern through VHF at STR Hqrs

Table No.: 4n : Call pattern through VHF at STR Hqrs

Time	Type of call
6 AM	Group call with core stations
7 AM	Group call with buffer stations, Meteorological data
8 AM	Group call with core stations, Staff position
9 AM	Group call with buffer stations
10 AM	Group call with core stations
11 AM	Group call with buffer stations
12 Noon	Group call with core stations, Tourist figure
1 PM	Group call with buffer stations
2 PM	Group call with core stations, Tourist figure
3 PM	Group call with buffer stations
4 PM	Group call with core stations, Protection Assistants position by Ranges
5 PM	Group call with buffer stations, Collection of PAs position by Meghasani station
6 PM	Group call with core stations, Tourist exit position, Collection of PAs position
7 PM	Group call with buffer stations
8 PM	Group call with core stations, Range Officers position
9 PM	Group call with buffer stations

CHAPTER 5
LAND USE PATTERNS & CONSERVATION-MANAGEMENT ISSUES

CHAPTER

05

LAND USE PATTERNS & CONSERVATION-MANAGEMENT ISSUES

5.1 LAND USE CLASSIFICATION

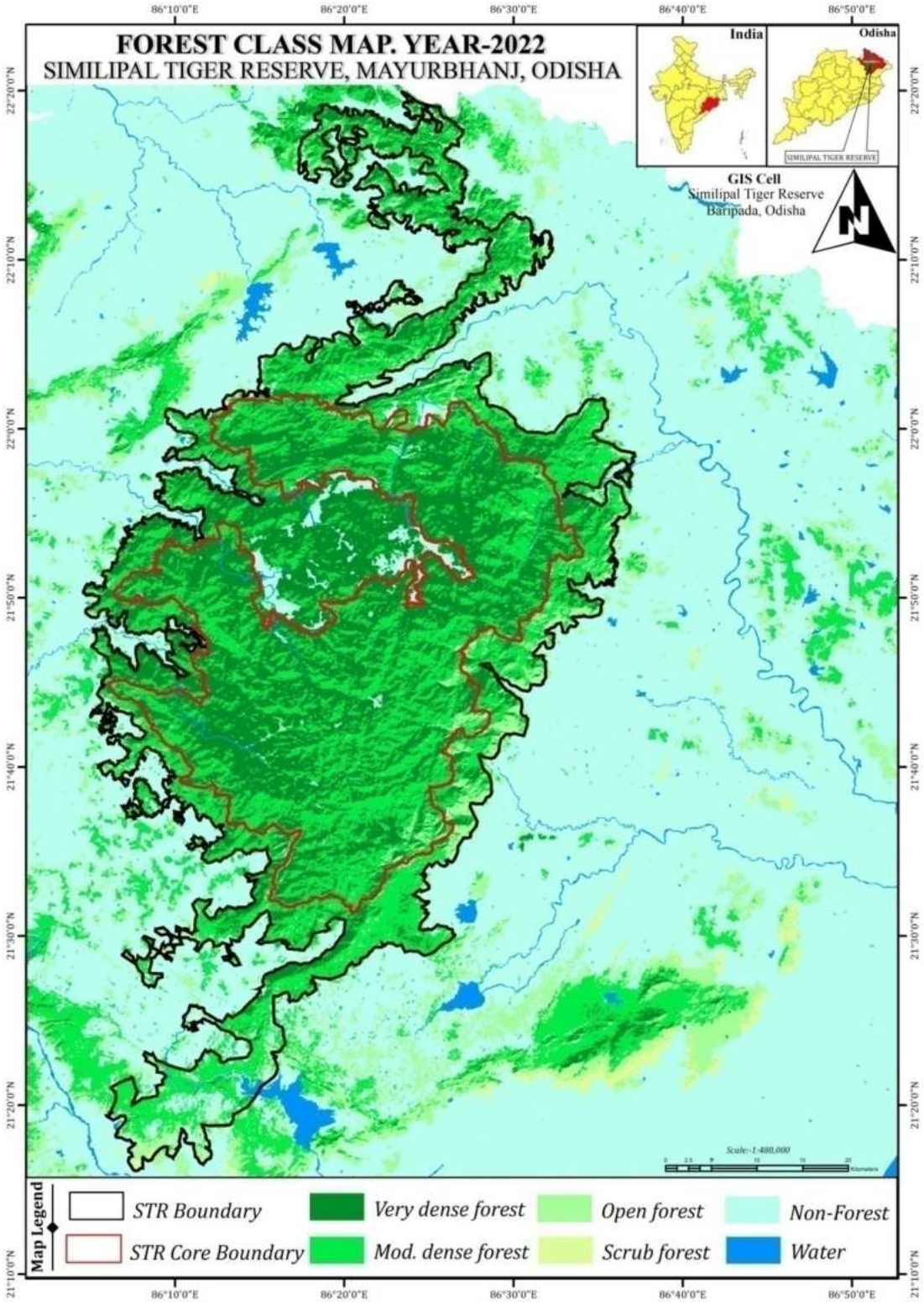
Different types of land use and their extent in Similipal Tiger Reserve is shown below.

Table No.-5-a : Different type of Land and their extent

Class	Area (sq km)	% of area
Semi-evergreen	162.14	5.90
Moist Deciduous	2368.13	86.11
Dry Deciduous	78.06	2.84
Savannah-Woodland	36.67	1.33
Sub total	**2644.99**	**96.18**
Scrub	61.25	2.23
Grassland	1.82	0.07
Agriculture	37.86	1.38
Barren land	3.42	0.12
Waterbody	0.65	0.02
Sub total	**105**	**3.82**
Grand total	**2,750**	**100**

The entire land of the core area is forest land except one revenue village i.e. Bakua under Gudgudia Gram Panchayat of Jashipur Block. The land occupied by Bakua village in the core area is under cultivation and human habitation.

Map No-5A : Forest Class Map



5.2 SOCIO-ECONOMIC PROFILE OF VILLAGERS.

There is one human inhabited revenue villages in the core area, viz. Bakua which is the only village situated inside Core area of Similipal Tiger Reserve. The village is located in Jashipur block of Mayurbhanj district in Odisha. As per the Population Census 2011, there are total 25 families residing in the village Bakua. The **total population of Bakua is 104** out of which 51 are males and 53 are females thus the **Average Sex Ratio of Bakua is 1,039**.

The population of Children of age 0-6 years in Bakua village is 23 which is 22% of the total population. There are 11 male children and 12 female children between the age 0-6 years. Thus as per the Census 2011 the **Child Sex Ratio of Bakua is 1,091** which is greater than Average Sex Ratio (1,039) of Bakua village.

As per the Census 2011, the **literacy rate of Bakua is 6.2%**. Thus Bakua village has lower literacy rate compared to 54.3% of Mayurbhanj district. The male literacy rate is 12.5% and the female literacy rate is 0% in Bakua village.

Population	104
Families	25
Literacy	6.17%
Sex Ratio	1,039

As per constitution of India and Panchyati Raaj Act (Amendment 1998), Bakua village is administrated by Sarpanch (Head of Village) who is elected representative of the village.

5.2.1 Bakua Data as per Census 2011

As per the Population Census 2011 data, following are some quick facts about Bakua village.

Table No-5-b : Population Census 2011 data about Bakua Village

	Total	Male	Female
Children	23	11	12
Literacy	6.17%	12.5%	0%
Scheduled Caste	0	0	0
Scheduled Tribe	103	50	53
Illiterate	99	46	53

5.2.2 Caste Data as per Census 2011

Schedule Caste (SC) constitutes 0% while Schedule Tribe (ST) were 99% of total population in Bakua village.

5.2.3 Working Population as per Census 2011

In Bakua village out of total population, 69 were engaged in work activities. 1.4% of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 98.6% were involved in Marginal activity providing livelihood for less than 6 months. Of 69 workers engaged in Main Work, 0 were cultivators (owner or co-owner) while 0 were Agricultural labourer.

Table No-5-c : Working Population as per Census 2011

	Total	Male	Female
Main Workers	1	1	0
Other Workers	1	1	0
Marginal Workers	68	34	34
Non Working	35	16	19

No Scheduled Castes were recorded.

Table No-5-d : Details Population as per Census 2011

Indicator	Value
Number of households	25
Total population - Person	104

Total population - Males	51
Total population - Females	53
Persons aged 0 to 6	23
Males aged 0 to 6	11
Females aged 0 to 6	12
Scheduled Tribes - Persons	103
Scheduled Tribes - Males	50
Scheduled Tribes - Females	53
Literate population - Person	5
Literate population - Males	5
Literate population - Females	0
Illiterate population - Person	99
Illiterate population - Males	46
Illiterate population - Females	53
Total worker population - Person	69
Total worker population - Males	35
Total worker population - Females	34
Main working population - Person	1
Main working population - Males	1
Main working population - Females	0
Main cultivator population - Person	0
Main cultivator population - Males	0
Main cultivator population - Females	0
Main agricultural labourers population - Person	0
Main agricultural labourers population - Males	0
Main agricultural labourers population - Females	0
Main household industries population - Person	0
Main household industries population - Males	0
Main household industries population - Females	0
Main other workers population - Person	1
Main other workers population - Males	1
Main other workers population - Females	0
Marginal worker population - Person	68
Marginal worker population - Males	34
Marginal worker population - Females	34
Marginal cultivator population - Person	27
Marginal cultivator population - Males	23
Marginal cultivator population - Females	4

Marginal agricultural labourers population - Person	33
Marginal agricultural labourers population - Males	3
Marginal agricultural labourers population - Females	30
Marginal household industries population - Person	0
Marginal household industries population - Males	0
Marginal household industries population - Females	0
Marginal other workers population - Person	8
Marginal other workers population - Males	8
Marginal other workers population - Females	0
Marginal worker population (3-6 months) - Person	57
Marginal worker population (3-6 months) - Males	29
Marginal worker population (3-6 months) - Females	28
Marginal cultivators population (3-6 months) - Person	25
Marginal cultivators population (3-6 months) - Males	21
Marginal cultivators population (3-6 months) - Females	4
Marginal agricultural labourers population (3-6 months) - Person	25
Marginal agricultural labourers population (3-6 months) - Males	1
Marginal agricultural labourers population (3-6 months) - Females	24
Marginal household industries population (3-6 months) - Person	0
Marginal household industries population (3-6 months) - Males	0
Marginal household industries population (3-6 months) - Females	0
Marginal other workers population (3-6 months) - Person	7
Marginal other workers population (3-6 months) - Males	7
Marginal other workers population (3-6 months) - Females	0
Marginal workers population (0-3 months) - Person	11
Marginal workers population (0-3 months) - Males	5
Marginal workers population (0-3 months) - Females	6
Marginal cultivators population (0-3 months) - Person	2
Marginal cultivators population (0-3 months) - Males	2
Marginal cultivators population (0-3 months) - Females	0
Marginal agricultural labourers population (0-3 months) - Person	8
Marginal agricultural labourers population (0-3 months) - Males	2
Marginal agricultural labourers population (0-3 months) - Females	6
Marginal household industries population (0-3 months) - Person	0
Marginal household industries population (0-3 months) - Males	0
Marginal household industries population (0-3 months) - Females	0
Marginal other workers population (0-3 months) - Person	1
Marginal other workers population (0-3 months) - Males	1

Marginal other workers population (0-3 months) - Females	0
Non working population - Person	35
Non working population - Males	16
Non working population - Females	19

As per primary survey of 2013-14 made under a study carried out by Madhusmita Das and Bhagiratha Behera, the basic characteristics of Bakua village is given in the table below.

Table No-5-e :The basic characteristics of Bakua village

Sl. No.	Key parameter	Quantity
1.	Average Household Size	6
2.	Education (Literacy rate)	22
3.	Average household Land holding Size (acre)	3
4.	Average Livestock Ownership (no.)	20
5.	Average annual Income (INR)	28739
6.	**Share in total income of the households (%)**	
7.	Agriculture	38
8.	Livestock	23
9.	NTFPs	15
10.	Wage	10
11.	Others	14
12.	**Total**	**100**
13.	**Remoteness and Market Access**	
14.	Distance to Block Headquarter	30
15.	Distance to nearby village Haat	4
16.	Nearest Public Distribution System (PDS)	6
17.	Distance to Primary Health Centre (PHC)	8
18.	Nearest Urban Market	30
19.	Nearest Bus stand	30
20.	Nearest Police station	30
21.	**Access to Natural Resources**	
22.	Distance to degraded forest	1.5
23.	Distance to good quality forest	3
24.	**Infrastructure**	
25.	Road Forest patch	Forest patch
26.	Electrification	Non electrified
27.	Irrigation	River water
28.	Education	No school
29.	Housing Quality	Mud thatched

All the villagers of Bakua belong to Kolha tribe. From the above table it can be inferred that the average livestock holding in Bakua is 20 which reflects a strong dependence on livestock resources. However, the livestock rearing is not profitable due to reduced access to market resulting in distress sales of cattle through middlemen. Agriculture is the major source of household income followed by livestocks and NTFPs. The villagers cultivate paddy and other crops like horse gram, maize, mustard, sugarcane and sesame. Agriculture is mostly rain fed, non-mechanised and organic. Cow dung is used as the only form of manure. For irrigation, the household solely depend on rainfall and river water. Lack of primary school in the village has resulted in very low literacy rate of 22. The access to market, public transport and health facilities are limited. The average annual income is quite low i.e. Rs.28,739.00.

5.3 RESOURCE DEPENDENCY OF VILLAGERS.

The people of Bakua in the core area entirely depend on forest for agriculture as they get the water required for the purpose from the perennial streams. In order to meet their requirements other than food they depend on the forest as they collect NTFPs and sell them in the local market

The inhabitants of Bakua derived many goods and services from the forest of Similipal Tiger Reserve. These include the collection of fuelwood and NTFPs, particularly, medicinal herbs (known as Chera Mulika), fodder, wild spices etc. All the households use fuel wood for cooking, heating and lighting (Dash et al., 2018). Due to insufficient cash income and lack of market access, almost all households inside the park use wild spices such as turmeric, garlic, ginger, etc., available inside the reserve forest. The tribal communities solely depend on medicinal herbs for different health problems as there is little or no access to modern medical facilities inside the core area of STR. It has been found that 77 percent respondents of Bakua village report NTFPs as their major livelihood source. Except firewood, all other NTFPs collected from the park are sold by local residents either in the local market and/or to the middlemen, who frequently visit the two villages. The communities also derive some cash income by selling medicinal herbs and Kakada bark 6 (*Rhus succedanea* Linn). Besides, the villagers perceive that the cooling atmosphere and pure air inside the forest area allows them the peace of mind and strength to sustain in a subsistence economy. (Dash and Behera, 2018).

In spite of socio-economic backwardness, most of the inhabitants are aware of the importance of biodiversity conservation for promotion of sustainable livelihoods of both the present and future generation of the community. Sal trees are treated as sacred groves locally called JAHIRA by the tribes of Similipal. As part of this, no harvesting is allowed without performing community rituals. The villagers also consider the elephant as a good friend as it creates new paths inside dense and virtually inaccessible forests of Similipal.

At certain instances villagers from the periphery of the Tiger Reserve have been noticed to venture into the core area for collection of NTFPs. Many offence cases have been booked against the offenders are observed to venture into the core area for collecting the bark of Dahanimari tree (*Homaliumnepaulense*) which is an ingredient for cooking country liquor. This may be due to the reason that extracting the bark of standing trees leads to their mortality. Hence, the Dahanimari trees have vanished from the buffer due to lack of regeneration.

5.4 ISSUES AND PROBLEMS OF THE VILLAGERS.

As Bakua village is very remotely located inside the Core Area of the Tiger Reserve, the amenities available in mainstream society have not reached to its people. Lack of alternate empoyement opportunities in its locality and access to modern technology due to its geographical disadvantages has posed hinderance to the socio-economic progress of the villagers.

The villagers are completely against their relocation to outside the Tiger Reserve. A study carried out by Dash and Behera, 2018, has found that age, gender, household size, level of education, income derived from NTFPs, influence of modern life style and better opportunities, the tribe to which the villagers belong, etc. affect the willingness to relocate outside the Protected Areas. Male members are more willing to relocate as compare

to female members. This may be due to the reason that female members are more attached to the forest areas as compare to the male members. Younger people are more likely to be willing to relocate as compare to the older ones. This may be due to the fact that older people are more attached to their original place, hence, are unwilling to relocate. Whereas due to influence of modern life style and better opportunities available outside, the young people are more willing to come out of the Tiger Reserve. Educated people are more willing to relocate. While the opportunity cost of living inside the Tiger Reserve is high for the educated people, the uneducated individuals are more likely to get engaged in gathering forest products and practicing subsistence's agriculture. The households having more members are willing to come out of the Reserve as compare to those having fewer members. People deriving lesser income from NTFPs are more willing to relocate from the remote area for better livelihood opportunities outside the Reserve. The tribe category is also assumed to have a positive effect on the household's willingness to relocate. Literature depicts that Santal is one of the largest, advanced, and educated tribes of India as compare to other tribal groups (Lal, 2005). Therefore Santal tribes in other villages inside the Tiger Reserve may be more willing to relocate as compare to the Kolhas of Bakua.

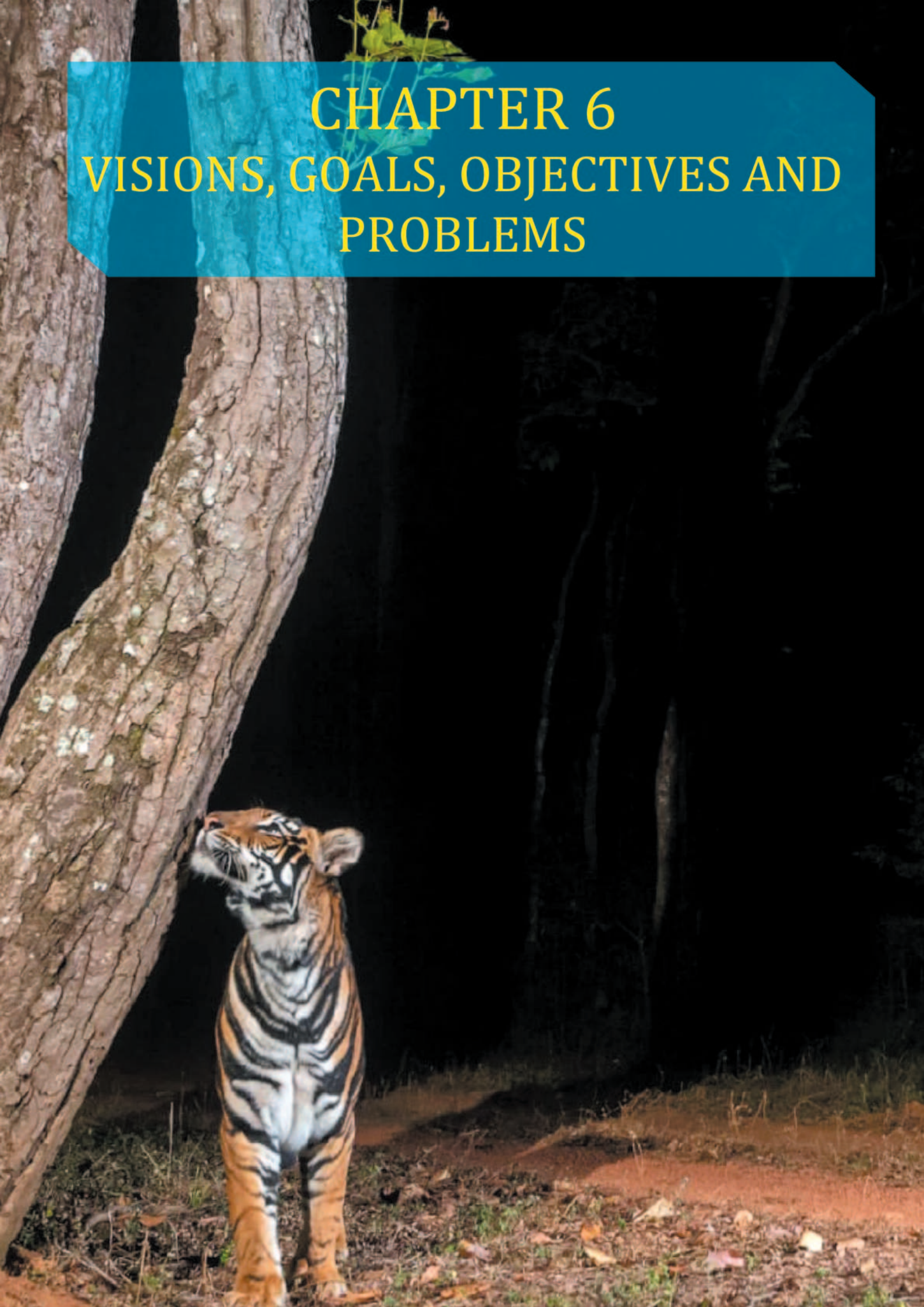
5.5 HUMAN WILDLIFE CONFLICTS

No such incidence has been noticed so far except one incident of killing of a daily wage protection assistant by elephant at Upper Barakamuda on dated 14.11.2012.

No human wildlife conflicts are observed inside the core of Similipal Tiger Reserve.

5.6 ASSESSMENT OF INPUTS OF LINE AGENCIES / OTHER DEPARTMENTS

Two villages namely Kabatghai and Jamunagarh were completely relocated from the core area of the Tiger Reserve in the previous Tiger Conservation Plan period. The line Departments of Mayubhanj District have extended all possible supports for relocating the villages. At present only one village namely Bakua remains inside the core which is under the process of relocation. Regular health checkup & supply of medicines are being undertaken by the Health & Family Welfare Department. The Panchayatraj Department is distributing food grains to the villagers under Food Security programme of the Govt. through Public Distribution Systems. Some villagers are also getting allowances/ pensions under various schemes of the Govt. through the Panchayatraj Department.



CHAPTER 6
VISIONS, GOALS, OBJECTIVES AND PROBLEMS

CHAPTER

06

VISIONS, GOALS, OBJECTIVES AND PROBLEMS

6.1 VISION

The vision of this plan is to see Similipal Tiger Reserve as a globally important site with integration of all ecological functions with a healthy and viable breeding population of tiger in a large inviolate area.

To mainstream wildlife conservation in the Tiger Reserve and its surrounding landscape by creating alternative livelihood opportunities for the communities residing within as well as in the vicinity of the Tiger Reserve.

To revive Tiger population in Similipal to act as a source population in eastern forest of Central India & Eastern Ghats Landscape.

To manage entire Similipal landscape as a whole with empgasis on the ecological value of the adjoining Hadgarh Wildlife Sanctuary and Kuldiha Wildlife Sanctuary.

6.2 MANAGEMENT GOALS

To make the core area a safe haven for a healthy breeding population of the tiger and co-predators and minimizing biotic interferences in buffer area to give additional protection to core area and to involve forest dependent communities in protection and conservation activities by creating sustainable alternative livelihood opportunities.

6.3 MANAGEMENT OBJECTIVES

To protect and conserve native biodiversity to ensure a viable breeding population of tiger, co-predators and its prey base by creating inviolate habitat and facilitating movement of prey base all over the Tiger Reserve so as to extend home range and number of tigers.

To ensure healthy habitat for mega herbivores with focus on to maintain a viable population of elephants in Mayurbhanj Elephant Reserve and to enrich elephant habitat to reduce human elephant conflicts in Zone of influence of Similipal Tiger Reserve.

To promoteregulated community based eco-tourism in Similipal Tiger Reserve.

To enhance professional competency of staff through training, capacity building and welfare measures.

To promote, facilitate and strengthen long term and need based scientific research, adoption of state of the art technology and monitoring of animals and their habitat, which will form a strong scientifically based decision support system for the Tiger Reserve management.

To develop species specific management and monitoring programmes for unique flora and fauna, water resources and impact of climate change on them and surrounding environment of the Tiger Reserve.

Involvement of forest dependent communities in protection and conservation activities by creating alternative sustainable livelihood opportunities. To mainstream wildlife conservation in the landscape for ensuring ecological and livelihood security.

Strengthening management and public interface to disseminate information related to wildlife conservation and forest protection activities to create awareness, gaining public support and increase transparency.

To maintain and restore the native gene pool through management interventions like translocation, reintroduction, re-wilding etc. of wild animals.

To manage stray, problematic and orphaned wildlife and make efforts for their rehabilitation.

6.4 PROBLEMS IN ACHIEVING OBJECTIVES

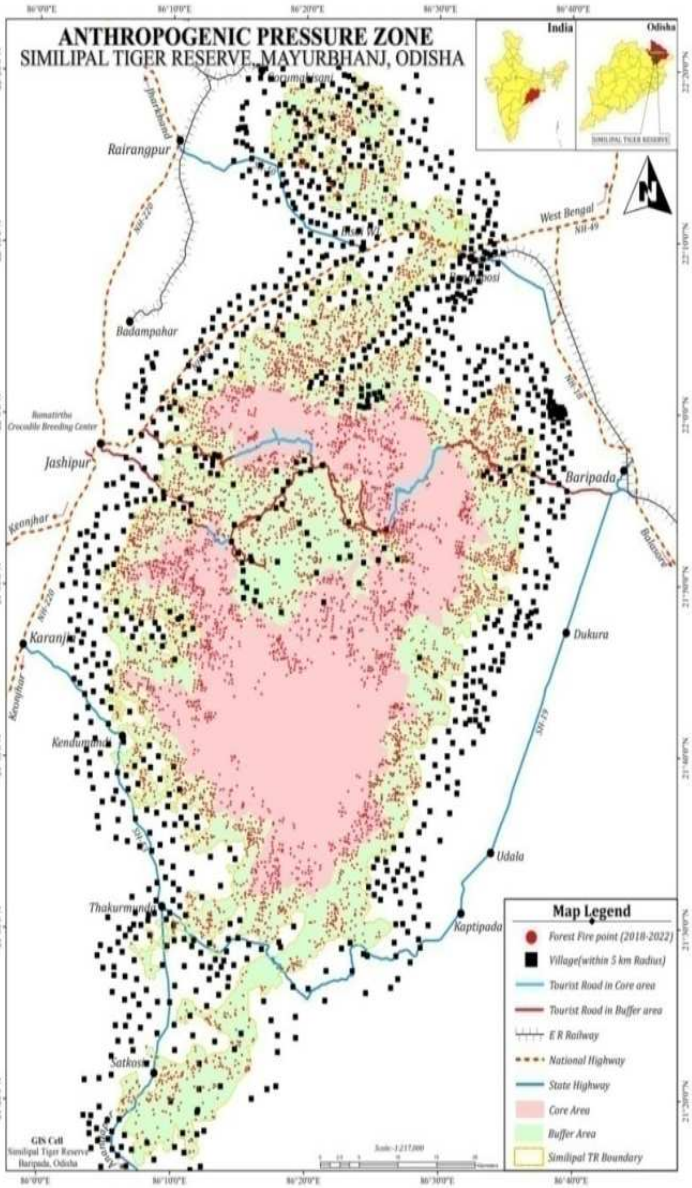
Above objectives are examined against anticipated issues/problems, which may hinder partially or fully achieving objectives, these issues and problems anticipated are given as under.

6.4.1 Problems in achieving objective no. 1:

6.4.1.1. Biotic pressure

There is one village located in core area and about 65 villages in the buffer zone of the Reserve which have sizable human population. They depend upon natural resources for their day to day need like fuel wood, agriculture equipment, food security, minor forest produce etc on the buffer and core zone. The increasing population is putting more and more pressure on resources, causing degradation of forest and habitat.

*Map No-6 A :*Biotic pressure



The above map shows the villages in the core, buffer, and in the periphery of the Tiger Reserve which are depended on the forest resources of Similipal Tiger Reserve for meeting their bonafide requirements and livelihood. For collecting NTFPs and to hunt wild animals they set fire to the forest. The fire points obtained through satellite between the period from 2018-2022 is depicted in the above map. It can be seen that the effective inviolate space in the core is very less as compared to the core area.

6.4.1.2. Poaching

The villages in the vicinity of Similipal Tiger Reserve are tribal dominated and the villagers resort to hunting for subsistence often. The tribal had a traditional practice of mass hunting called *Akhand Shikar* where they enter the sanctuary with weapons in large numbers in festive occasions for hunting of wild animals. At present the customary practice of Akhand Shikar has considerably reduced due to protection efforts of Forest Department. However, the sporadic hunting / poaching incidences continue to be reported from different parts of the Tiger Reserve.

6.4.1.3. Limited grasslands

Though plenty of grass is available in the open forest and grass land but the grasslands are about 0.43% of the geographical area of the Tiger Reserve. This low proportion of grasslands is one of the strong limiting factors for increasing prey base for sustaining tiger population as per the carrying capacity calculated for the Tiger Reserve. The grasslands are also being invaded by woody growth and obnoxious weed species, which reduces overall palatability of grass species.

6.4.1.4. NTFP Collection

Although there is ban on removal of forest produce from PAs, but still illegal collection of NTFP like Honey, Sal resin, Amla, Tubers, Barks, Fuel wood, & Medicinal plants is carried out by the local tribal inhabitants. The major threat is due to over and destructive collection which is degrading the habitat and causing disturbance to wildlife. Removal of fuel wood often involves lopping/cutting down of trees. The bark of Dahanimari tree (*Homaliumnepaulense*) which is an active ingredient for cooking of country liquor is harvested by peeling the bark from standing live trees. This destructive harvest has resulted in decline of these trees in the buffer area of the Tiger Reserve. Local inhabitants venture into the core area for harvesting Dhanimari bark as there are less/no trees left in the buffer.

At present there are 65 villages in the buffer area and one village in the core area of the Tiger Reserve. The villagers from these buffer area and core area venture into the core area for collection of NTFP, fishing and hunting activities.

The villagers of Bakua village, which is only village located in Core area are still not voluntarily ready to get relocated which causes problem in creating inviolate core area. Further the villages close to the core area need to be relocated to reduce pressure on the core area especially in the North and North-Eastern part of the core.

6.4.3.2. Grazing

Cattle population of the villages in the buffer zone surrounding the core is very high, which pose a serious problem of grazing, resulting in disturbance to wildlife, invasion of weeds and destruction of habitat on the fringes of the core. Domesticated dogs often accompany the graziers into the core area are known to indulge in hunting of wild animals. The dogs also pose threats to the wild animals as a carrier of many diseases along with cattle.

6.4.2. Problems in achieving Objective No. 2:

Similipal Tiger Reserve forms the core of Mayurbhanj Elephant Reserve. The surrounding landscape of the Tiger Reserve has been facing unprecedented human elephant conflicts since last few years due to human

population growth in this region. This has resulted in wide spread loss of life and property in the surrounding Tiger Reserve Forest Divisions. This is also creating a negative public sentiment towards conservation of wildlife in the landscape which would impact Tiger conservation in Similipal in the near future. A small population of other important mega herbivore i.e. Indian Bison preset in Similipal which needs special attention. Due to small size of population and lack of connectivity with other forests having gaur there is a threat of inbreeding. Therefore necessary studies how to be conducted to enhance gene pool of Indian Bison and to give them proper protection.

6.4.2.1. Elephant deaths

Elephant deaths in the core area are negligible. Death cases were noticed mainly due to natural causes. Human elephant conflicts in the buffer and adjoining areas of Similipal Tiger Reserve is also one of the major reasons for retaliatory killing of elephants.

6.4.2.2. Research and monitoring of elephants.

At present the State Forest Department has developed a robust monitoring and reporting of movement of elephants through GIS based web portal platform and mobile application. The data generated through direct and indirect sighting need to be analyzed for predicting movement and behavior of elephants for minimizing conflicts.

Scientific research need to be carried out to identify suitable elephant habitat and carry out habitat enrichment activities to prevent crop raiding by elephants outside the Protected Area.

The elephant and human conflict areas need to be identified and necessary management intervention need to be undertaken therein to avoid conflict situation in future.

6.4.2.3. Captive elephants.

The existing Kumki elephants in the elephant camp of the Tiger Reserve are not sufficient in terms of number as well as skill to manage exigencies. The number of trained Kumki elephants need to be strengthened in the elephant camp of the Tiger Reserve for managing straying tigers and leopards as well as rogue elephants in the adjoining landscape.

6.4.3. Problems in achieving Objective No. 3:

Although tourism inside the core of the Tiger Reserve is limited whereas vehicle movement in the core area wherever tourism is permitted may be regulated.

6.4.3.1. Right of passage.

The villages in the central part of the Tiger Reserve have been granted right of passage through the core from Nigirdha to Pithabata. This has disturbed the inviolate space for the wild animals in the North-Eastern part of the core area. The villagers indulged in hunting and poaching activities in the pretext of their right of passage. It has resulted in degradation of wildlife habitat and subsequent depletion of wildlife population in the Northern part of the core area.

Devkund located in the Eastern side of the Tiger Reserve is a place of tourist interest due to presence of a waterfall with pool as well as Maa Ambika temple adjoining it. This place falls inside the core of the Tiger Reserve. In the past, when it was under the Administrative jurisdiction of Baripada (T) Division, the tourism at the site was actively promoted. But after re-organisation of Baripada Circle it has come under the Administrative jurisdiction of Similipal South Wildlife Division. The place is habitat for leopards, elephant, birds, and many other diverse flora and fauna. The tourism activities are now gradually regulated as per the guidelines of National Tiger Conservation Authority (NTCA) for Tiger Reserves. At present there is initial resistance from the locals towards the regulation of tourism at the site. Tourism at the site will be mainstreamed as per guidelines with passage of time.

6.4.3.2. Unorganised tourism operators and nature guides.

Lack of proper system for monitoring and regulation of tourism operators and nature guides leads to violation of guidelines prescribed for tourism in the Tiger Reserve.

6.4.4. Problems in achieving Objective No. 4:

Lack of required funding and large vacancy in staff strength are the limiting factors to provide staff adequate training.

Lack of psychological conditioning & mental wellbeing of staff working under arduous work environment and cut off from mainstream society diminishes the working ability, interest and enthusiasm towards work.

Prevailing professional hazards also minimizes the work output of staff. Improper implementation of prescribed human resource development plan poses hindrance in achieving desired objective.

6.4.5. Problems in achieving Objective No. 5:

To promote, facilitate and strengthen long term and need based scientific research, adoption of state of the art technology and monitoring of animals and their habitat, which will form a strong scientifically based decision support system for the Tiger Reserve management.

6.4.5.1. Insufficient infrastructures.

Lack of proper laboratory facilities and trained man power is a limiting factor for conducting in-house research and monitoring activities. Research may be undertaken through project mode by hiring Experts/ Subject Matter Specialists as Project Scientists, Research Associates / Research Fellows with the Field Director and Deputy Directors as Principal Investigators or Co-Principal Investigators. There is also need for formal collaboration with outside scientific institutions for better quality research activities. Annual Research Seminars and Workshops must be organized to foster scientific work and temper in the landscape.

6.4.5.2. Insufficient database.

Though a number of studies have been made on the flora, fauna and other aspects, sufficient data have not been generated, particularly on status and distribution and changes in vegetation, dynamics of grass lands and invertebrates etc. There is no system for analysis of available data for enabling a sound Decision Support System (DSS) on wildlife management.

6.4.5.3. Insufficient Funds.

There is no provision for setting up a small laboratory and trained man power for taking up research activities under the funds allocated through Central Govt. and State Govt. schemes.

6.4.6. Problems in achieving Objective No. 6:

Lack ofsufficient scientific infrastructure, funds and man power are major limiting factors in achieving objective no.6.

6.4.7. Problems in achieving Objective No. 7:

Lack of understanding of customs & culture of local communities, lack of trust on forest staff, non-availability of dedicated funds to organise regular meetings, tapping of resources by Outsiders (middlemen). Lack of streamlining of wildlife conservation in the surrounding Territorial Divisions.

6.4.8. Problems in achieving Objective No. 8:

Due to non-availability of subject matter specialist in the area of sociology, anthropology, media management etc. there is no dedicated social media awareness strategy design to disseminate information to public.

6.4.9. Problems in achieving Objective No. 9:

Due to habitat fragmentation Similipal Tiger Reserve is not well connected with any other Tiger Reserves for mutual gene pool exchange. Therefore there is always threat of inbreeding depression in various animal populations including tigers. Limited availability of Scientific information causing difficulty in population management interventions.

6.4.10. Problems in achieving Objective No. 10:

Lack of well-designed Institutional rescue & rehabilitation system. Non-availability of dedicated team to execute rescue operations.

6.5 STRENGTHS-WEAKNESSES-OPPORTUNITIES-LIMITATIONS (SWOT) ANALYSES.

6.5.1 Strength.

- Substantial area of intact contiguous forest area which has excellent long-term conservation potential.
- The park has connectivity with adjoining wildlife areas like Kuldiha and Hadgarh.
- Adequate tiger population which can serve as the nucleus of a healthy source for the buffer and adjoining landscape.
- Excellent road network, VHF and general protection infrastructure.
- Support of Govt in management.
- The area has five forest types as classified by Champion and Seth and varied habitat components thereby making it rich in diversity.
- The area has a long and rich conservation history.
- Adequate water resources, about 14 perennial rivers originate from Similipal.
- The hilly terrain of Similipal is a natural geographical barrier against encroachment and other anthropogenic pressure.

6.5.2 Weakness

- Multiple settlements in buffer and one village in core.
- Long boundary with large interface with adjoining villages.
- Largely illiterate tribal population with very backward socio-economic conditions.
- Vacancy in frontline staff.
- Non-functional EDCs in adjoining areas.
- Poor coordination mechanism with NGOs and Institutions.
- Absence of updated baseline data.
- Isolation of tiger habitat from nearby potential tiger bearing areas.
- Increasing man animal negative interaction (Human-wildlife conflicts).
- Unorganised staff welfare measures.
- Lack of administrative control of wildlife Divisions over the villages in the two kilometres radius of the Tiger Reserve boundary.
- Lack of organised education and awareness through print and electronic media to mainstream wildlife conservation.
- Low conviction rate of forest and wildlife offence cases.

6.5.3 Opportunities

- Excellent opportunity to work out an integrated protection-cum-habitat management in the core to increase the carrying capacity and maintain a healthy tiger population with long-term conservation potential.
- Excellent potential for long-term research into tiger habitat selection, ranging, social dynamics and prey-predator interrelationships.
- Opportunity to work with large communities surrounding the park.
- Opportunity for Inter-Governmental coordination.
- Opportunity to create livelihood for large number of forest dependent communities through sustainable eco-tourism activities.
- Expanding technological advancement intervention in management and monitoring through adoption of technology in wildlife monitoring, management of habitat, protection activities, personal safety of frontline staff.
- In house research and monitoring activities for robust Decision Support System (DSS) for the management of Tiger Reserve.
- Strengthening the Similipal Tiger Conservation Foundation (STCF) through eco-tourism activities, Corporate Social Responsibility(CSR) initiatives, Site specific management plans in case of mining and other forest diversion activities in the Similipal landscape and its zone of influence. Donations, etc. for carrying out socio-economic development works for tribals and other forest dependent communities in Similipal landscape to mainstream wildlife conservation.
- Institutionalised training modules for frontline staff to enhance their capacity.
- Addition of new meadows after village relocation to enhance prey base.

6.5.4 Threats

- Inadequate strength and vacancy of trained frontline staff.
- One village inside the park still to be relocated.
- The population of the fringe communities has shown a manifold increase which has impacted the resources of the Park in a significant way.
- Inhospitable terrain, climate and endemic malaria-proneness.
- Limited grasslands.
- Narrow width of core area in the Northern and North-Western part of the Tiger Reserve.
- Many villages located in the heart of the Tiger Reserve.
- Lack of connectivity with nearby Tiger bearing areas for genetic exchange.
- Anthropological and cultural orientation towards non-vegetarian food habit in the surrounding landscape leading to bush meat hunting.
- Connectivity issues due to presence of villages in between Northern and Southern part of the core.
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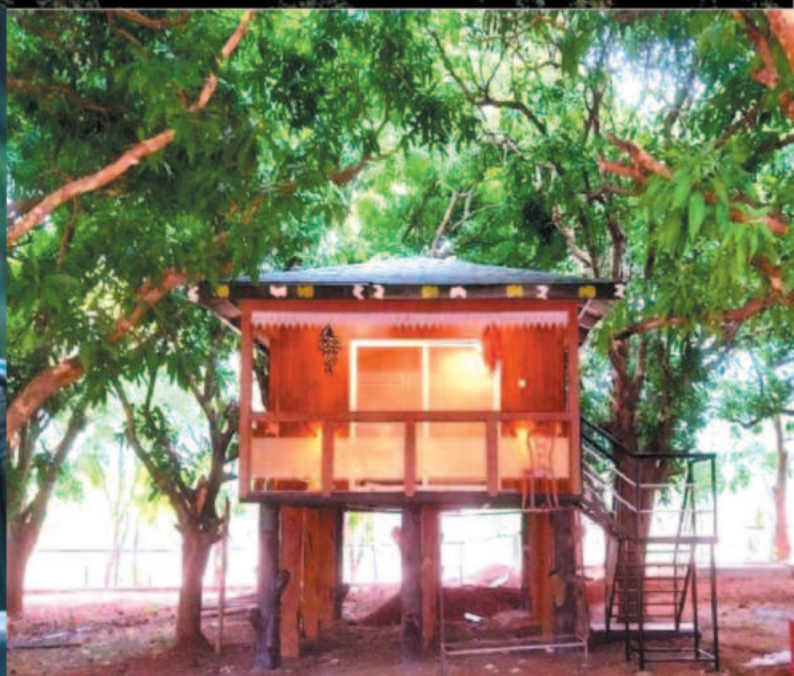
CHAPTER 7
MANAGEMENT STATEGIES



CHAPTER

07

MANAGEMENT STRATEGIES

7.1 DELINEATION OF CRITICAL TIGER HABITATS AND INVIOLATE AREAS.

Bio-geographic approach for conservation of wildlife and biodiversity (that significant representation of all ecosystem and bio-geographic regions, biomes etc in the protected area network) is essential. The main cause of decline of the tiger and other endangered fauna in human dominated landscape is competition and conflict with the growing human population and the demand of modern market driven lifestyles as well as the dominance of livestock in the traditional agrarian society of India. The land use pattern is incompatible between man and wildlife, as high density of both adversely affects either way.

The conservation of the flagship species i.e. the top predator of our eco-system ultimately conserves our entire eco-system and biodiversity.

Tiger is a territorial animal, which advertises its presence in an area and maintains a territory. There may be a partial overlap of the territories of two male tigers. However, increase in the degree of overlap may result in infighting. Several female territories do occur in an overlapping manner within the territory of a male tiger.

The tiger land tenure dynamics ensures presence of prime adults in a habitat, which act as source populations, being periodically replaced during old age by young adults from nearby forest areas.

The on-going study (Tiger its co predator, prey base and their habitat by NTCA and WII) and analysis of available research data on tiger ecology indicate that the minimum population of tigresses in breeding age, which are needed to maintain a viable population of 80-100 tigers (in and around core areas) require an inviolate space of 800 -1200 sq km. Tiger being an “umbrella species”, this will also ensure viable populations of other wild animals (co-predators, prey) and forest, thereby ensuring the ecological viability of the entire area / habitat.

Based on the demographic parameters and life history traits of tigers population simulation models suggest that if a core area having territories of 20 breeding tigresses were made inviolate, the resultant tiger population with an adequate buffer (multiple use area with eco-sensitive land use) has a very low probability of extinction. Tigress’s territories are determined by prey availability which in turn is dependent on the productivity of the area. The size of this inviolate area depends on the average territory size of tigresses. These range between 40 to 60 km2 within most of the tiger areas in the sub-continent. Thus, for a population of 20 breeding tigresses we need an inviolate area of 800-1200 km2. An ecological sensitised zone of 1000-3000 km2 (buffer, Co-existence area, multiple use area) around this inviolate space is needed for sustenance of dispersal age tigers, surplus breeding age tigers and old displaced tigers. This buffer and the tiger population within it is essential to make the core of 20 breeding females viable for long term, since it sustains the dynamics of source and sink. Such a tiger reserve will sustain a population of 75-100 tigers.

Delineation of Critical Tiger Habitat and inviolate areas in Similipal.

Similipal Tiger Reserve consist an area of 2750 Sq.km. The Tiger Reserve has been clearly demarcated into core and buffer areas. An area of 1194.75 Sq. km. is declared as Core area or Critical Tiger Habitat as per the Notification No.8F(T)-9/2007/20801/F&E of Govt. of Odisha.

7.1.1 Appropriateness and adequacy or Inadequacy of Current Core:

1194.75 sq. km. area, the core area of Similipal Tiger Reserve has been declared as Critical Tiger Habitat. The Critical Tiger Habitat have been determined as per recommendation of the expert committee constituted for the purpose by the State Government as per the guidelines issued by NTCA as well as provisions under Section 38V of Wildlife Protection Act, 1972. Similipal Tiger Reserve is situated within a vast tract of forests connecting with PAs of Kuldiha and Hadgarh. This provides more inviolate habitat to tiger. It is obvious that the present legal boundary of the Tiger Reserve does not serve as ecological boundary for many species of fauna. To and fro movement from the adjoining forest areas although not frequent, but reported often. Connectivity is one of the critical factors for Similipal as regards future conservation of tiger and other mega mammals are concerned.

7.2 ZONE AND THEME APPROACHES TO MANAGEMENT STRATEGIES

The "zone" and "theme" approaches have been adopted in the proposed management strategies of Similipal Tiger Reserve. A Zone, is an area of specific management category distinguishable on account of its objectives. The number and kind of zones required, depends on objectives and how different the objectives are with respect to each other, so as to necessitate separation of strategies by areas. Zones, cannot be planned in isolation, but must relate realistically to the surrounding areas of other zones and where relevant, to areas outside the PA. Using the GIS technology, all the zones have been worked out considering vegetation, physiography and Park administrative infrastructure boundaries. Various managerial situations and needs can be taken care of by an effective combination of the "zone" and "theme" plans. Under this approach, several specific objectives and problems relevant to an identified part of the PA can be recognised as a "management zone". This management zone would have its own measures and strategies. Furthermore, several objectives and different problems, created by a combination of factors, can be tackled by a "theme strategy" under which measures can be prescribed for the entire area.

Zone Plans

The Core area is divided into the following three zones.

Fully Inviolate Zone (1189.588 km^2)

Restoration Zone (5.01 km^2)

Ecotourism Zone (0.152 km^2)

7.2.1 FullyInviolate Zone (Core Zone)

The 'Core Zone' as a management entity was for the first time introduced for the management of wildlife in India in the year 1973. In fact, the term used was 'Sanctum Sanctorum' which changed to 'Core' with usage. Such areas, require to serve as centres of ecological reference and ecological processes so as to maintain at least a good percentage of the key habitats, elements of conservation importance such as species, communities and population under reduced threats. Main objective of constituting this Zone is to preserve it in as near natural condition as possible by providing all protection. Protection shall be against all forms of biotic interference and only scientific studies permitted.

7.2.2 Zone Plan for Restoration Zone.

The Restoration Zone would include the area of the seven revenue villages in the core area out of which one village is human inhabited and its relocation is under process.

7.2.3 Zone Plan for Ecotourism Zone

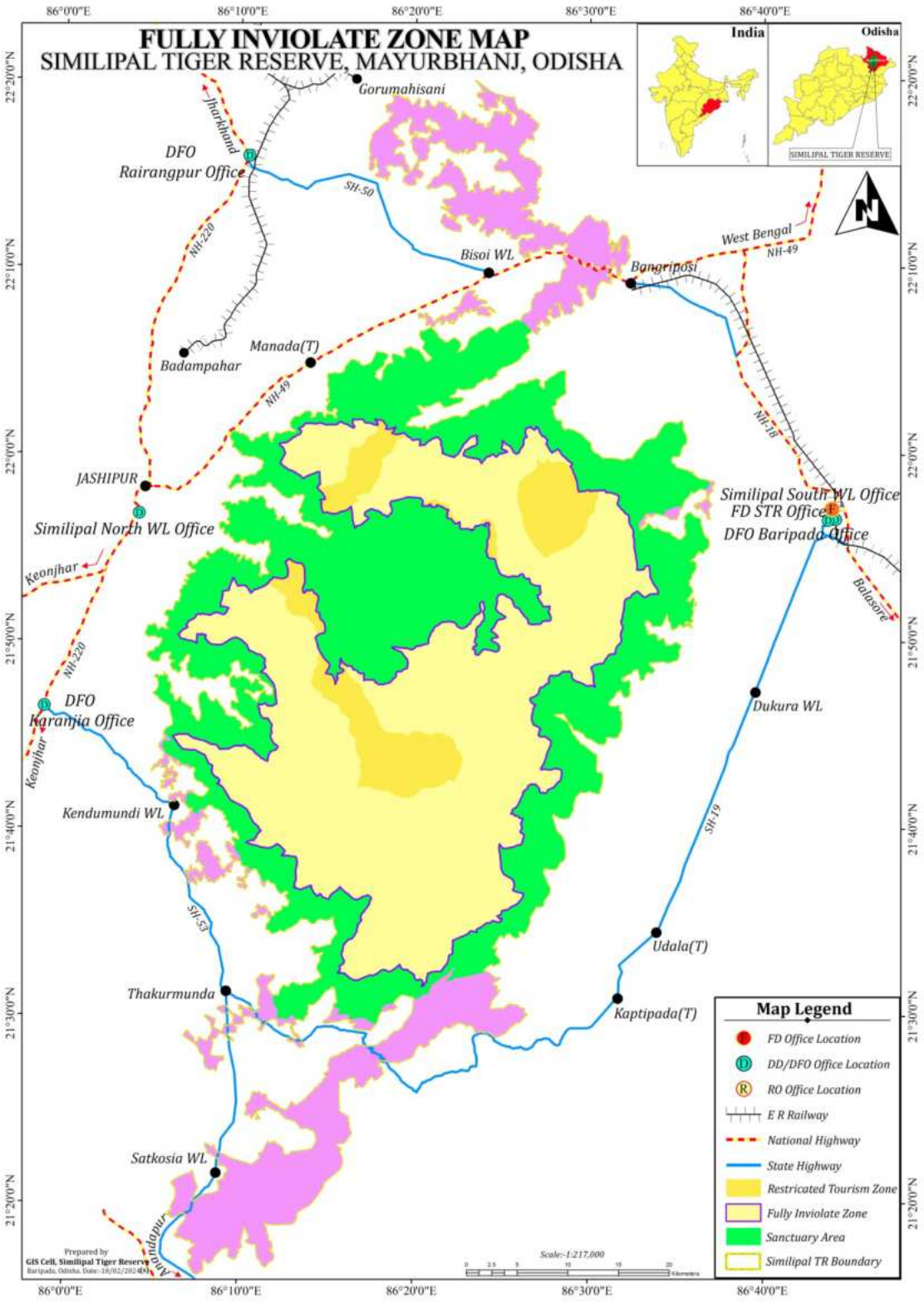
Ecotourism is mostly restricted to buffer area in Similipal Tiger Reserve. Only some stretches of tourist routes pass through core area (0.102 km^2) and about 0.05 km^2 area near Chahala is earmarked for the visitors for animal sighting. At Devkund a small stretch of road consisting of about 0.7km and a waterfall coming under core area is used for eco-tourism activities.

7.3 Zone Plan for Fully Inviolate Zone

7.3.1. Constitution

The area under Fully Inviolate Zone of the Tiger Reserve is the entire Critical Tiger Habitat over 1189.588 km² excluding the revenue village areas present within it. At present there is one village inside the core area, remaining all villages have been completely relocated. After complete relocation and its restoration, these areas will be added to the area of the core zone.

Map 7-A : Fully Inviolate Zone



7.3.2 Objectives

This Zone, is constituted with the main objective of preserving the area in as natural a state as possible by providing it all protection from various biotic factors. Natural course of ecological succession is to be promoted.

7.3.3 Strategies

- The core zone has typical PA values and is a habitat of rare, threatened and endangered fauna. The following strategies are laid down for management of the core zone.
- Protection will be given top most priority.
- Illegal cutting and removal of any tree will be checked.
- Collection of NTFP from the area will be strictly prohibited.
- Movement of vehicles except for the purpose of inspection, protection and scientific studies shall not be allowed inside.
- Grazing inside the area will not be allowed.
- Water and soil conservation measures to be taken up but in a low scale
- Improvement of habitat through eradication of woody encroachments in existing meadows, early burning of grasslands and enrichment of a couple of existing saltlicks will be done.
- Construction of buildings and other forms of civil construction except for protection and monitoring purpose will be restricted.
- Blocks and compartments will be demarcated in the ground and monitored with respect to the changes in the flora and fauna.
- Limited scientific research will be allowed in this zone.
- A portion of the core zone, about 500 km² area consisting of part of Upper Barakamuda, Jenabil, Bhanjabasa and National Park Range will be treated as "Core within the Core" to keep the breeding habitat of tigers absolutely inviolate. The area shall be declared as 'No – Go' area where restrictions shall be imposed on movement of all vehicles including departmental vehicles except for exigencies of protection. Research activities and movement of outside people will be restricted in this area.
- The strategies discussed in the theme plans will be enforced in this zone.

7.4 ZONE PLAN FOR RESTORATION ZONE

7.4.1 Constitution

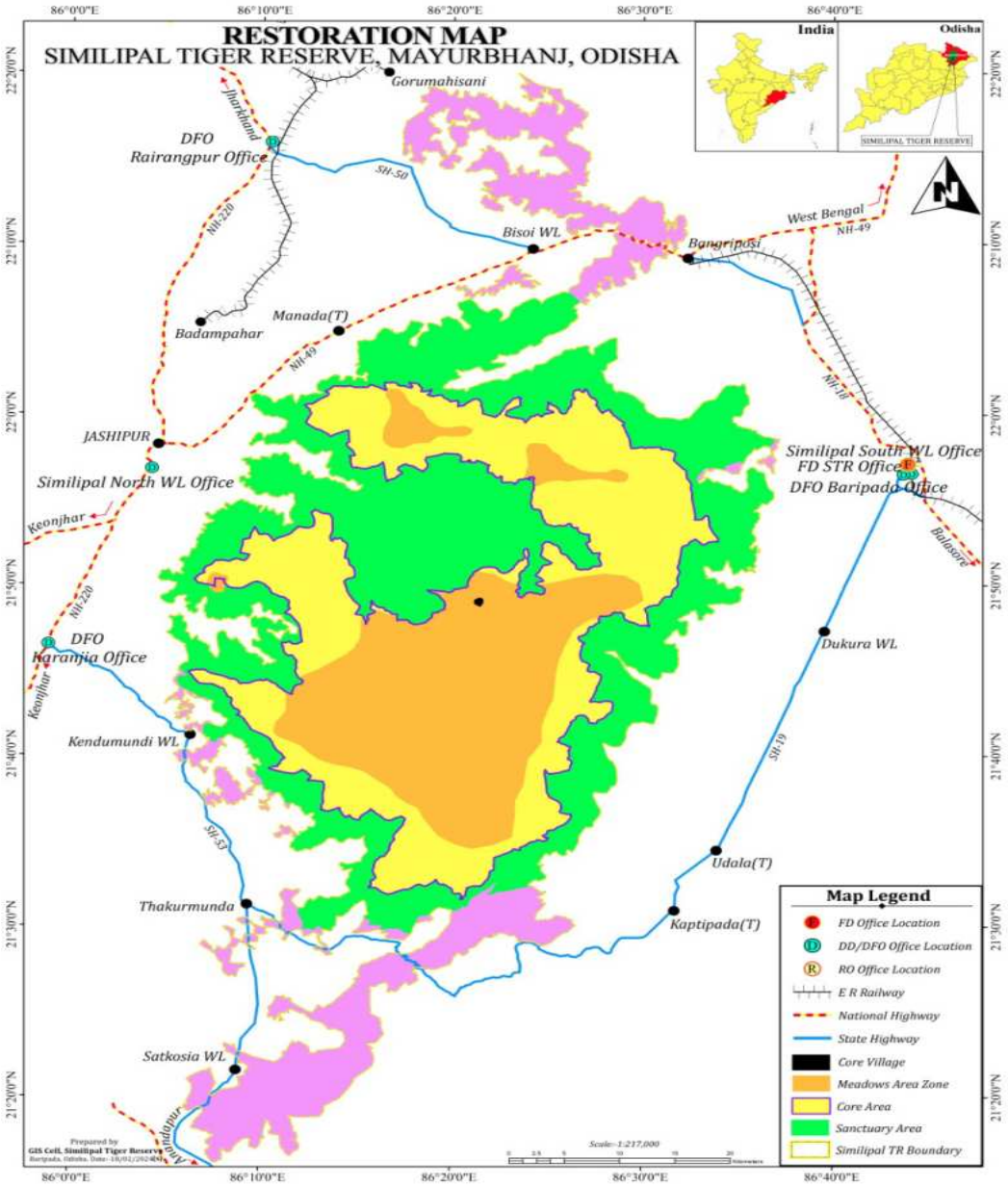
There were seven revenue villages inside the core area of Tiger Reserve with an area of 5.01 km², out of which Jenabil, Kabatghai, Jamunagarh villages are been completely relocated and one village namely Bakua is under the process of relocation. Balance three village namely, Daldali, Chahala and Dhuduruchampa are uninhabited villages. Area statement of the villages is given below.

Table No- 7-a : Area statement of the villages

Sl No	Name of village	Area in Km²	Remark
1	Kabatghai	0.92	Relocated
2	Jamunagarh	1.4	Relocated
3	Bakua	0.59	Inhabited
4	Jenabil	1.4	Relocated

5	Daldali	0.06	Uninhabited
6	Chahala	0.04	Uninhabited
7	Dhudurchampa	0.6	Uninhabited
	Total	**5.01**	

Map 7-B: Restoration zone



7.4.2 Objective

The objective is to restore the left out blank areas after relocation and develop these areas as meadows with minimal intervention.

7.4.3 Strategies

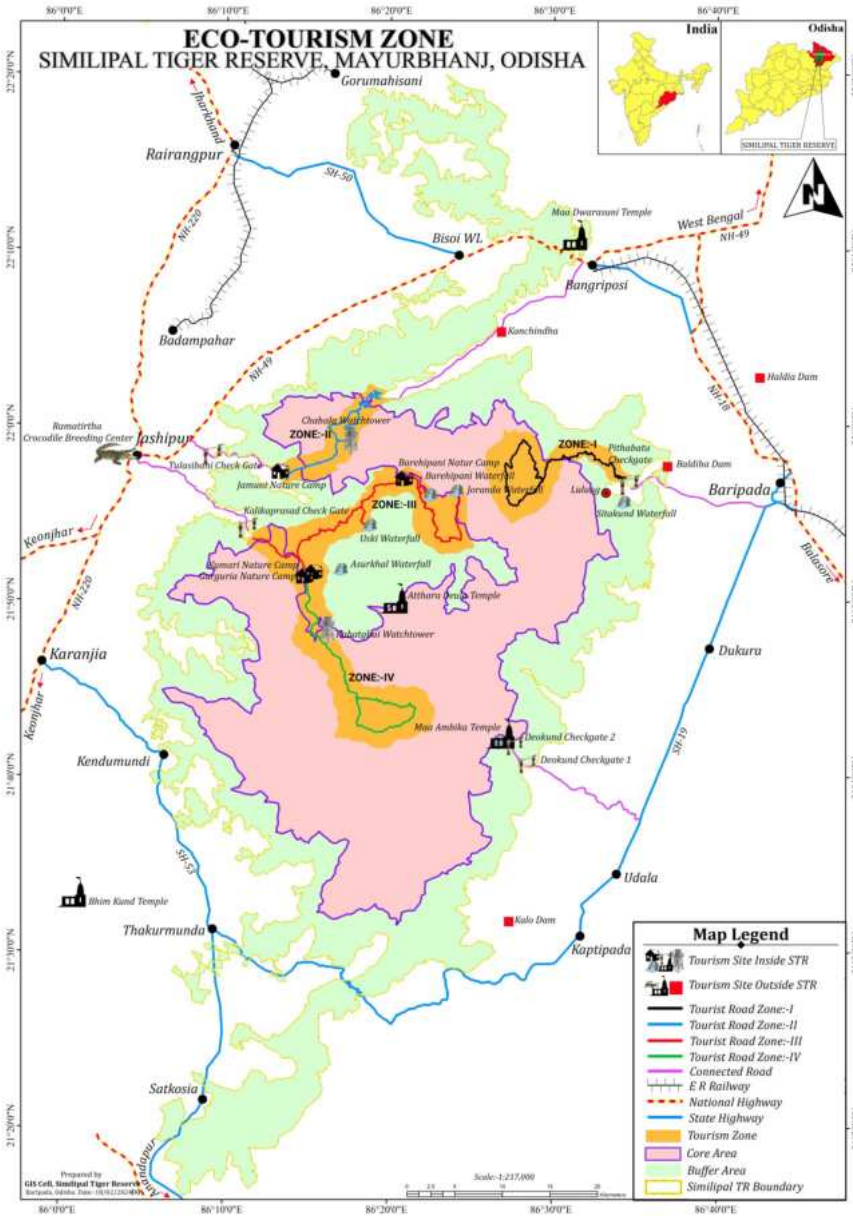
- The area will be left blank and developed as a meadow.
- A time series monitoring in the GIS shall be initiated for the changes in the habitat after relocation, complemented by regular data collection of change in plant species composition and animal use pattern.

- Water conservation measures like small check dams, earthen or loose boulder structure to be constructed on the nullah with natural look to enhance the water regime of the soil.
- Soil Conservation Measure to be taken up by seeding/planting cuttings of fodder species which are not exotic to the area.
- Invasive weeds will be uprooted.
- One watchtower at each village area to be created to have a close watch on forest fire, poacher movement and monitoring of large mammals and pachyderms.

7.5 ZONE PLAN FOR ECOTOURISM ZONE

Eco-tourism in context of Tiger Reserve is ecologically sustainable nature-tourism, which is emerging as an important component of tourism industry. It is distinct from mass tourism, having sustainable, equitable, community based effort for improving the living standards of local host community living on the fringes of the Tiger Reserve. Eco-tourism is proposed to be fostered in accordance with site-specific Eco-Tourism plan and carrying capacity of Tiger Reserve in the buffer areas. The Core / Critical Tiger habitat would be

Map 7-C: Ecotourism Zone



minimally used for any form of tourism The development of tourism related facilities within the buffer zones of Tiger Reserve would continue with inputs under Project Tiger.

The STR management envisages a strategy where tourism will be encouraged in the buffer and adjoining area. Tourists shall be permitted into those areas where minimal infrastructure is available at present. No further tourist infrastructure shall be developed anywhere inside the core area. Hence, the plan of action shall largely pertain to the buffer and adjoining area. Whereas there are few popular tourist destinations which are falling in the periphery of core boundary. These places have huge potential to generate sustainable livelihood to people residing in and around Tiger Reserve. As livelihood generation through tourism is a vital component of participatory forest management, a separate Theme Plan has been described.

7.5.1 Organisation Setup and Management

7.5.1.1 Administrative set-up

No separate Range for management of tourism is there. Very few staff are engaged in tourism management. The booking counter at Pithabata is managed by Range Officer, Pithabata WL Range and entry permit is issued by the Forester/ Forest Guard at Pithabata. In 2011 one post of Deputy Director, Tourism & Research has been created with headquarters at Jashipur whereas after reorganization of Similipal Tiger Reserve during the year 2019 a separate post namely Deputy Director, Similipal North WL Division has been created who is also looking after tourism management in Similipal North WL Division. The booking counter at Jashipur is managed by Range Officer, Eco-tourism. To facilitate public for getting easy entry through tourist gates and to reduce workload on staff, online booking facility through Similipal Tiger Reserve website has been started from the year 2022.

7.5.1.2 Staff Requirement

One post of Forester with two Forest Guards need be created to assist Deputy Director, Similipal South WL Division for tourism management at Pithabata gate and other places of Similipal South WL Division and similar set of provisions can be given at Chahala and Nawana North for effective tourism management.

7.5.1.3 Infrastructure requirement

The details have been elaborated in the Chapter 14 for eco-tourism in buffer area plan.

7.5.2 An analysis of tourism activities at present

The ecotourism in core area of Similipal Tiger Reserve is restricted to only one place i.e. at Chahala. Only a transit route from Bhajam to Nigirdha about 18 K.ms and Haldia Chhak to Jamuani via Chahala which has length of length 15 K.ms and a small transit route near Kalikaprasad gate of length 5 K.m pass through the core area. Out of the total road length of 600 km in the core area, thus 38 km of road are used for tourism activity, which is about 6 % of the road length of core area. The total area of the tourist routes passing through core area would be 0.102 km^2. On the transit route none of the core area is exposed to the ecotourism except for a small area at Chahala and a limited number of vehicles are allowed to pass at an interval of 1/2 hour for a group of 10 vehicles. An area of 0.05 Sq Kms. at Chahala are earmarked for the ecotourists to observe wild herbivores silently. Thus the total area assigned for ecotourism in core area is 0.152 sq.km. The park is open to tourists from October till middle of June next year. The opening date will be notified by Field Director, Similipal Tiger Reserve considering prevailing situations to ensure safety of both tourists and wildlife. Only 100 vehicles are allowed entry through two entry gates i.e. Pithabata Check gate from eastern side of the STR and Jashipur entry permit booking counter at the western side. The provision of eco-guide with every tourist vehicle has been made mandatory from both the gates since 2012. Tourists were allowed to stay at Chahala earlier for which facilities are available. But after the naxal attack in 2009-10, the tourists are not allowed to stay. Only basic amenities are provided to tourists in core area to ensure minimum disturbance to wild animals.

Estimation Of Carrying Capacity of Similipal Tiger Reserve (AS per NTCA guidelines)

A. Physical Carrying Capacity (PCC)

Criteria :

- Vehicular movement is permitted on forest roads only.
- There is a required distance of at least 500m between 2 vehicles to avoid dust (V/a).
- At least 4 hours are needed for a single park excursion (Average time of one visit).
- Similipal Tiger Reserve is open to tourists for 8 months in a year and 11 hours per day (Opening period).
- Total roads are opened for tourism is 85 KM

PCC=A* V/a * R.F.

Where, A is the available area for public use. Here linear road lengthwithin the touristzoneistakenand thetotalroad length is130KM.

V/a = Requireddistanceofvehiclestoavoiddust.

= 2 vehicles/km

R. Fistherotation factor which is calculate das

R.F. = OpeningPeriod

Average time of on evisit

R.F. = 11/4 = 2.75

Therefore P.C.C.

= 85 km* 2 * 2.75 = 467.5 visits/day

B. Real Carrying Capacity (RCC)

RCC is the maximum permissible number of visits to a site, once the 'reductivefactors'(corrective) derived from the particular characteristics of the site have been applied to the P.C.C. These corrective factors are based onbiophysical, environmental, ecological, social and management variables.

R.C.C=P.C.C –Cf1–Cf2.....Cfn;

Where, Cf is a corrective factor expressed as a percentage. Thus, the formula for calculating R. C. C is,

$$R.C.C = \frac{P.C.C - 100 - Cf1 \times 100 - Cf2 \times ..... 100 - Cfn}{100 \quad 100 \quad 100}$$

Corrective factors are 'sitespecific' and are expressed in percentage as below:

Where,

M_1 = limiting magnitude of the variable

M_t = total magnitude of the variable

The corrective factor for erosion, CFeis

= Road with mediumerosion risk*weighing factor 2+Road with high erosion risk*weighing factor 3

Total road length

= (16*2) + (8*3) / 85=65.88 %

Cfw (Disturbance to wildlife)

$$= \frac{\text{Limiting months /yr} \times 100}{\text{Tourism months / yr}}$$

Cfw_1 (spotted deer) = (2/7) × 100 = 28.6 %

Cfw_2 (tiger) = (2/7) × 100 = 28.6 %

$Cfw = Cfw_1 + Cfw_2$ = 57.2 %

Cf_1 (Temporary closing of road) – For maintenance and other managerial reason, 2 weeks may be taken into account.

$$\frac{\text{Limiting weeks / yr} \times 100}{\text{Total weeks / yr opened}}$$

$= (2/ 28) \times 100 = 7.1\ \%$

$$RCC = \frac{PCC*100}{100} - \frac{CFe*100}{100} - \frac{57.2*100}{100} - 7.1$$

$$RCC = \frac{PCC*100 - CFe*0.428 * 0.929}{100}$$

$= 467 * (100-65.88)/100* 0.428 * 0.929= 63.35=63$

C. Effective Permissible Carrying Capacity (ECC)

ECC is the maximum no. of visitors that a site can sustain, with the available management capacity (MC). MC is defined as the sum of the conditions that PA administration requires, if it is to carry out its functions atoptimum level. Limitations in management like lack of staff and infrastructure limit RCC.

Owing to storage of staff, inadequate infrastructure, the management capacity (MC) is taken as 50 %.

$ECC = RCC \times MC$

$= 65 * 50\ \% = 32.5=32$

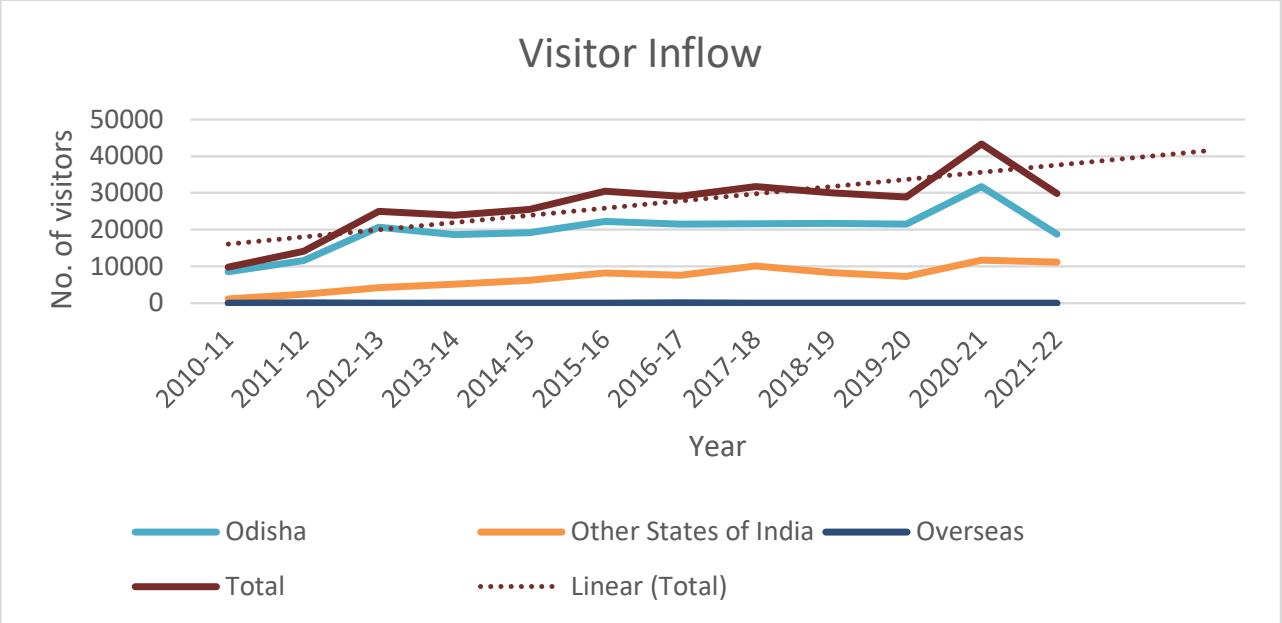
Hence, the Effective Permissible Carrying Capacity for Similipal Tiger Reserve for a single day in the Core Area is **30 vehicles per day**.

7.5.3 Tourist Inflow

Every year Similipal is visited by numerous tourists from India and abroad. Proximity to big cities like Kolkata, Jamshedpur and Bhubaneswar makes it an ideal destination for holidaying, recreation and nature study. The tourist inflow figure has been given in Annexure LIII.

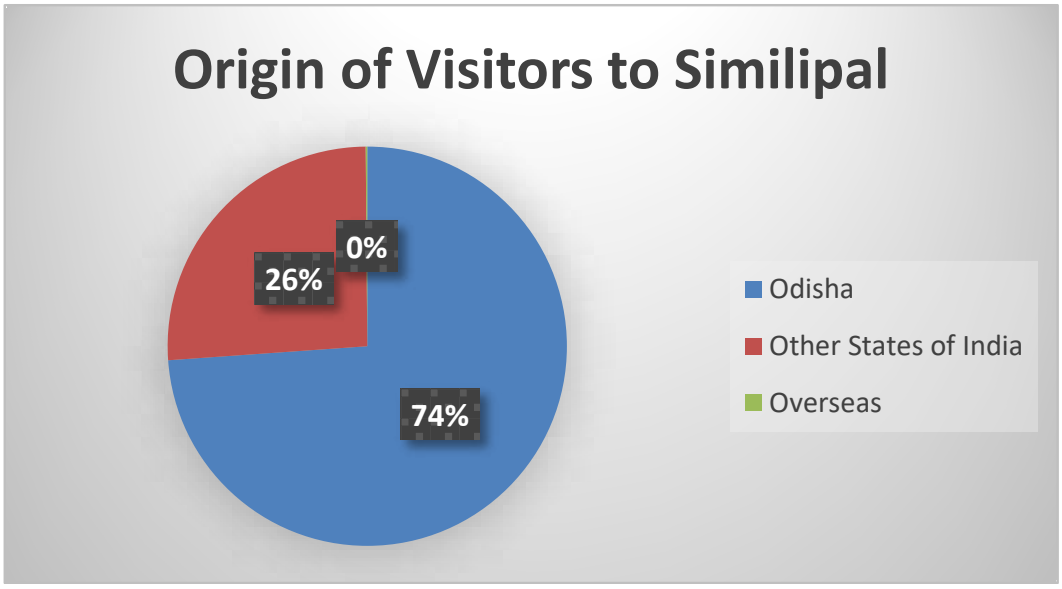
On an average more than 30000 tourists visited the Tiger Reserve in the previous plan period i.e. 2013-14 to 2022-23. In the year 2020-21 the Park reached its peak with 43358 tourists visited the Similipal Tiger Reserve after the rescind of the country wide lockdown due to Covid Pandemic. The year wise tourist visited the Tiger Reserve since 2010-11 onwards is shown in the Graph below.

Chart No- 7-1 : Visitor inflow



The trend analysis shows the average annual visitors to the Park will cross 40000 persons per year in near future.

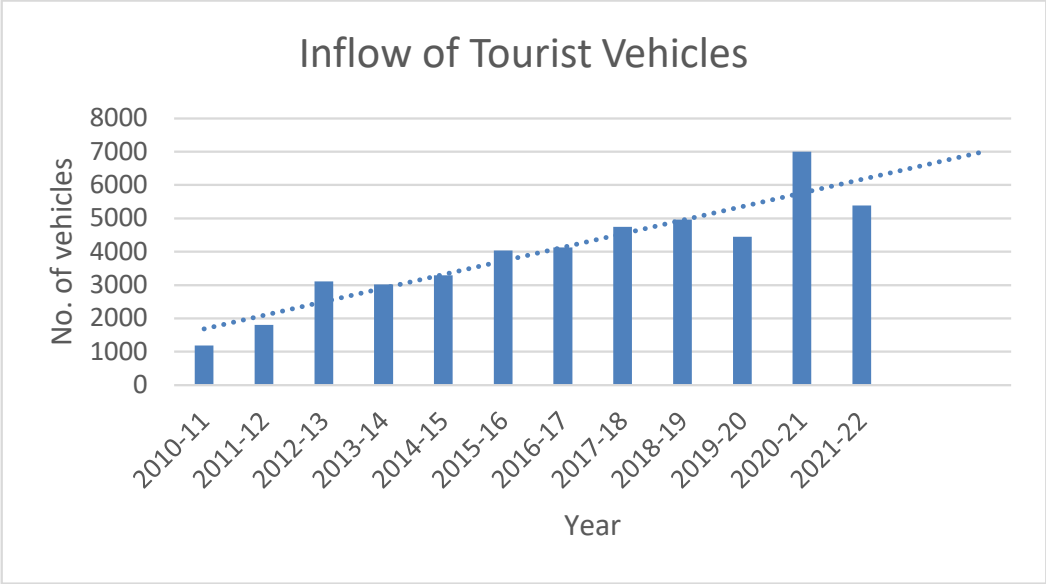
Chart No-7-2 : Origin of Visitors to Similipal



From analysis of the origin of tourists visiting the Tiger Reserve from 2010-11 onwards, it is observed that on an average 74% of the total visitors are from Odisha and 26% of the visitors are from other States of India with most of them coming from West Bengal and Jharkhand. Overseas visitors to the Tiger Reserve are very negligible with an average of 34 foreign nationals visit each year.

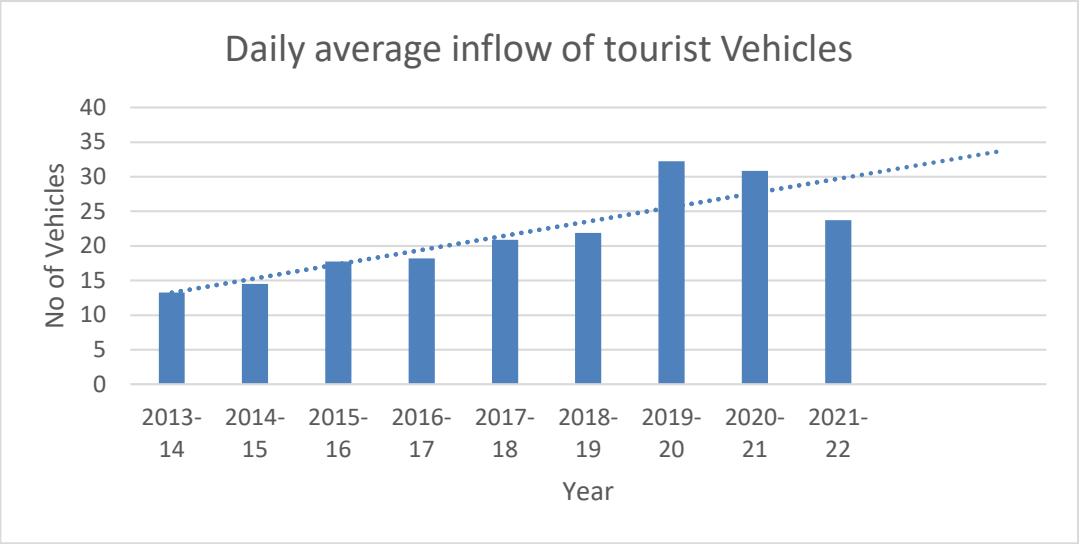
On an average more than 4500 vehicles enter the Tiger Reserve through the tourist gates in the previous plan period 2013-14 to 2022-23 with peak of 7001 vehicles in the year 2020-21. The trend analysis shows the vehicle inflow will reach 7000 per year in near future.

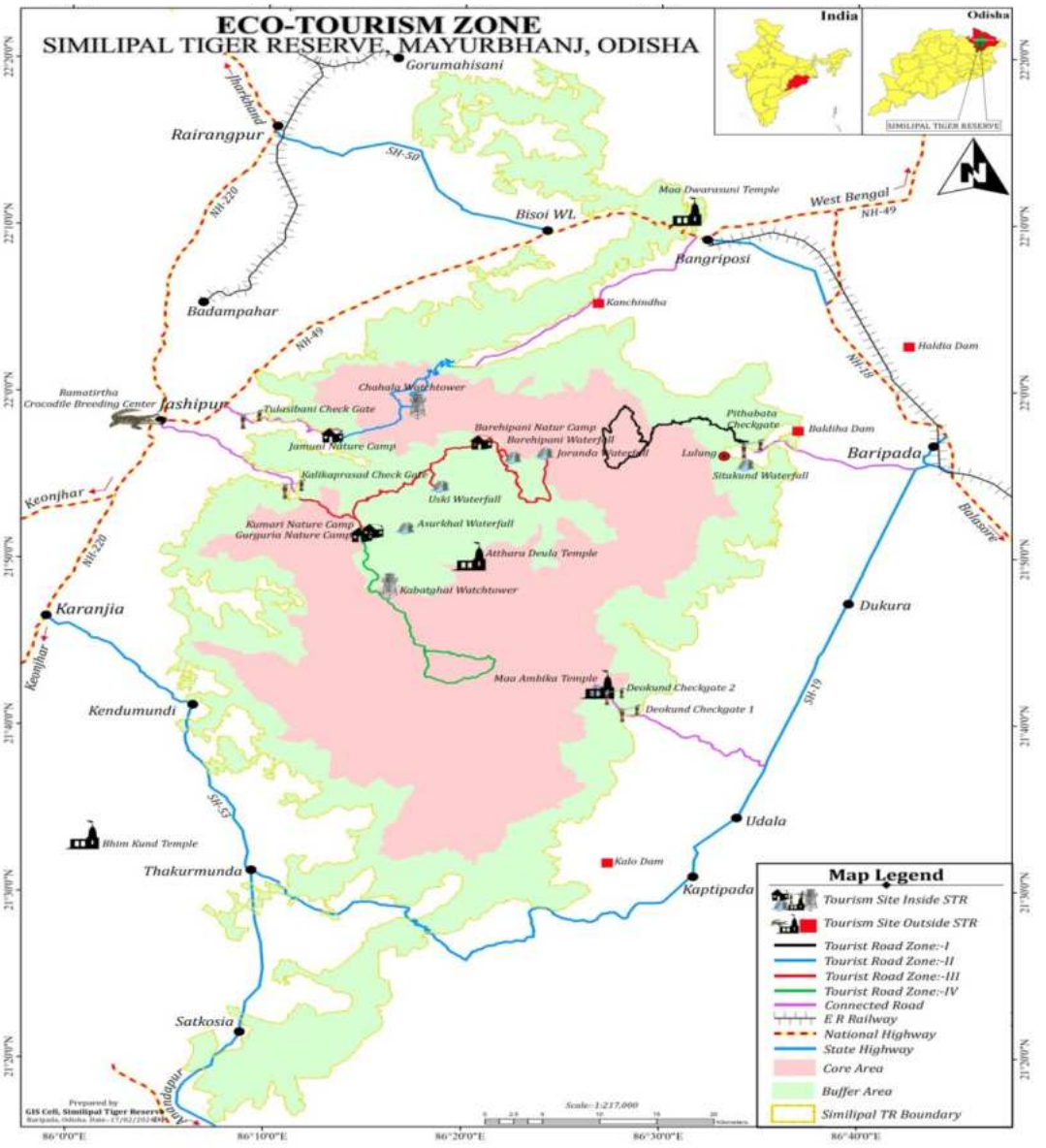
Chart No-7-3 :Inflow of Tourist Vehicles



The daily average of tourist vehicles entering the Tiger Reserve was 21 which was much below the prescribed carrying capacity of 60 vehicles per day for the aforesaid period.

Chart No-7-4 :Daily average inflow of tourist Vehicles





Map No-7-D : Eco-Tourism Zone in Core Area

7.5.4 Accommodation Facilities

No accommodation is permitted to tourists in the core areas, as per guidelines issued by NTCA. The details of accommodations available for stay of the tourists **in the buffer area**is given in Annexure XXXVII.

7.5.5 Transport Facilities and Entry fees

Four wheel driven vehicles are preferable considering the hilly terrain and kachcha road. Vehicles are also available on hire from Jashipur and Baripada. Drivers of the private owned vehicles of Jashipur and Baripada are sensitized about rules and regulations of Similipal Tiger Reserve regularly before the onset of tourism season. EDC managed safari vehicles are available at both Jashipur and Baripada side to provide better experience and safety to tourists. Details of vehicle regulations and entry fees charged from the tourists have been given in Chapter 14 of Buffer Area Plan.

7.5.6 Revenue from Tourism

Although modest, yet revenue from wildlife tourism can be recycled for the development of Similipal. The year-wise revenue collected is furnished in Annexure LIV.

7..5.7 Similipal Eco-tourism Society (SES)

The SES was formed in 2006 with a view to promote sustainable nature-based tourism in Similipal and its vicinity. With the formation and functioning of Similipal Tiger Conservation Foundation, during the year 2016 the Similipal Eco-tourism Society was merged into Similipal Tiger Conservation Foundation.

7.5.8 Determination of Carrying Capacity:

The carrying capacity for tourists inside Similipal have been calculated as per NTCA guidelines in Zone Plan for Ecotourism in Buffer Area which comes to 100 vehicles per day.

7.5.9 Implementation of Ecotourism Guidelines

On 15.10.2012 NTCA have formulated a comprehensive guideline for management of eco-tourism in tiger reserves called as the National Tiger Conservation Authority (Normative Standards for Tourism activities and Project Tiger) guidelines, 2012. Govt of Odisha vide Notification No 14990 Dated 08.08.2012 have issued the Odisha Forest Sector- Eco-tourism Policy (Appendix LXIV). The prescriptions of the above guidelines will be followed while managing eco-tourism activities in and around Similipal Tiger Reserve.

7.5.10 Park Interpretation Programme

Interpretation center has been developed at Ramtirtha through CEE, Ahmedabad to educate the visitors on the PA, the objectives of the PA and the policies that govern its management. It would also educate the visitor to appreciate the importance of the PA to the region and the nation and thereby create a constituency in support of the PA. This group can become an important ally in lobbying for support for conservation.

7.6 THEME PLANS

The goal of the plan is to restore, maintain and enhance the biodiversity, habitat and conservation value of the Reserve so as to ensure perpetuation of the tiger as flagship species. This can be ensured through a multifaceted approach to the complexity of the problems noticed at the time of management. Theme plans include the activities those are common to more than one zone. They are:

1. Protection (Security Plan)
2. Fire Protection
3. Maintenance of boundary
4. Tiger population estimation and monitoring
5. Village relocation
6. Genetic diversity & specie diveritymanagement

7. Wetland management
8. Management of unique flora & fauna.

7.6.1 Theme Plan for Protection (Security Plan)

The theme plan for protection (Security Plan) will be for the entire Similipal Tiger Reserve over 2750 sq km (both core and buffer area).

The protection is one of the most important activities in the biodiversity conservation of the Reserve. It lays stress on defence against interference, damage or destruction of any kind by the human beings and the cattle including illicit felling, grazing, NTFP collection, poaching, encroachment and fire etc. However, the following factors militate against efforts of Park management in ensuring protection:

1. The Park is surrounded by large number of human habitations.
2. The poverty and unemployment in the fringe areas coupled with the demand for the forest and wild animal products exerts a considerable pressure on the Park.
3. Inadequacy of skilled manpower resources.
4. Inadequate intelligence network for providing timely information about impending activities.
5. Difficulty in detection and prosecution of cases.
6. General lack of education, awareness, understanding and support from the fringe communities.
7. Ritualised mass hunting by tribal.
8. Difficult terrain and connectivity.

7.6.1.1 Objectives

1. To maintain and conserve bio diversity by providing efficient protection
2. To maintain and conserve viable population of tiger and its prey species
3. To check illegal harvesting of NTFP and fuel wood
4. To check biotic pressure
5. To enhance capacity building of staff
6. To provide infrastructure for protection
7. To provide efficient monitoring system.

7.6.1.2 Problems in achieving the objectives

1. Inadequate staff and infrastructure.
2. Patrolling is difficult in monsoon
3. Destructive and illegal collection of NTFP
4. Inadequate coordination and cooperation with other law enforcement agencies and administration
5. Inadequate arms and ammunitions.
6. Lack of special training for combing and scientific patrolling.

7.6.1.3 Strategy

The overall patrolling strategy of the Tiger Reserve includes the following features:

- Staff / camps listed with duty allocation and route chart
- The teams are equipped with mobile wireless sets and firearms
- The patrolling teams systematically cover the One Sq.km. grid area allotted in different Beats.
- Special instructions/ provisions for squads
- Surveillance: hotels, tourist points, vehicles, bus stand, trains and other means of transportation on the fringe of the park and nearby towns.
- Surveillance of traditional hunters
- Coordination with local police
- Sanctioning Protection Assistants for patrolling
- Improving Communication Networking
- Preparation of daily schedule
- Regular checking of market
- Surprise checking of barriers
- Preparation of "crime maps" with periodic updating with update in Beat information System.
- Monitoring cattle kill, human kill, injury incidences and crop raiding
- Monitoring issues relating to compensation
- Monitoring water points near habitation
- Preparation of crime gang dossiers at range level
- Preparation of individual crime dossiers
- Monitoring of habitual offenders
- Preparation of monthly Crime Map on 1:50,000 scale indicating location of each crime with date.
- Conveying progress to Field Director/ Dy. Director on a daily basis through wireless
- Deviating from routine schedule during emergencies
- Taking note of offences registered in local police station
- Using tape recorder/ camera etc. to record evidences
- Special monitoring of water holes near human habitation during the pinch period
- Surveillance of half eaten carcasses of livestock on account of carnivore depredation to be carried out to eliminate the possibilities of poisoning for retaliatory killing by local people.
- Continuous monitoring of the area where more than three incidents of livestock depredation are reported within a fortnight.
- Village level crime register to be maintained at the EDCs level to keep track of villagers involved in wildlife offences.
- Maintaining list of vehicles passing through manned barrier and surprise check by senior officer at such point every month.

7.6.1.4 Administrative Units

The Similipal Tiger Reserve has been reorganized into two separate wildlife Divisions namely Similipal North WL Division and Similipal South WL Division which are managed by two Deputy Directors, both Divisions are under the overall control of the Field Director, Similipal Tiger Reserve-cum Regional Chief Conservator of Forests, Baripada. Three Divisions are having territorial jurisdiction over the tiger reserve. The respective Deputy Directors of Similipal Tiger Reserve looks after protection and management of entire Similipal wildlife Sanctuary whereas three territorial DFOs are having jurisdiction over the balance buffer area of Tiger Reserve. The area statement thus comes as below:

Table No-7-b: Area statement

Division	Sanctuary area	Other RFs	Total	
	Core	Buffer		
Dy. Director, Similipal South WL Division	841.57	406.01	-	1247.58
Dy. Director, Similipal North WL Division	353.18	705.85	-	1059.03
DFO, Baripada	-	-	70.1	70.1
DFO, Karanjia	-	-	192.01	192.01
DFO, Rairangpur	-	-	181.28	181.28
Total	1194.75	1111.86	443.39	2750.00

Till reorganization of Similipal Tiger Reserve during 2019 there used to be one Deputy Director with headquarters at Jashipur to look after tourism and research activities. For proper management and protection, there was a proposal to bring entire core area over 1194.75 sq. km. under the control of one Deputy Director, STR and the three territorial Divisions need to have jurisdiction only over the buffer area of 1555.25 sq. km. The detailed proposal for restructuring has been given in Annexure XIII. During the year 2019 entire Similipal Tiger Reserve was consolidated and made into two separate Divisions namely Similipal North WL Division and Similipal South WL Division which are managed by two separate Deputy Directors. Most of the Core area management was brought under the Deputy Director, Similipal South WL Division. A small patch of Core area and most of the tourism potential areas are brought under the management of Deputy Director, Similipal North WL Division.

The Ranges covering the entire Similipal Tiger Reserve are shown below.

Table No-7-c: Ranges covering the entire Similipal Tiger Reserve

Sl. No.	Division	Range	Headquarters	Jurisdiction
1	Similipal South WL Division	Pithabata South	Pithabata	Core
2		Pithabata North	Badgaon	Core and Buffer
3		Nawana South	Dhudurchampa	Core
4		Jenabil	Hatighar	-Do-
5		Upper Barakamuda	Barakamuda	-Do-
6		Bhanjabasa	Bhanjabasa	-Do-
7		National Park	Kabatghai	-Do-
8		Podadiha	Podadiha	Core and Buffer

9		Dukura	Dukura	Buffer
1	Similipal North WL Division	Chahala	Chahala	Core
2		Gudgudia	Gudgudia	Core and Buffer
3		Kendumundi	Kendumundi	Core and Buffer
4		Barehipani	Barehipani	Buffer
5		Thakurmunda WL	Thakurmunda	Core and Buffer
6		Nawana North	Nawana	Core and Buffer
7		Talabandha	Talabandha	Buffer
8		Eco-tourism	Jashipur	Buffer
1	Baripada	Baripada	Baripada	Buffer
2		Kaptipada	Kaptipada	Buffer
1	Karanjia	Satkosia WL	Satkosia	Buffer
2		Thakurmunda	Thakurmunda	Buffer
1	Rairangpur	Bisoi WL	Bisoi	Buffer

The other administrative units having jurisdiction over Similipal Tiger Reserve have been detailed below.

Table No-7-d: administrative units of Similipal Tiger Reserve

Division	Range	Section	Beat
Similipal South WL	09	41	103
Similipal North WL	08	33	74
Baripada	02	03	05
Karanjia	02	09	20
Rairangpur	01	05	11
Total	22	91	213

The Camp office of Field Director and Deputy Director, Similipal South WL Division.

There are two camp offices of Field Director and Deputy Director, Similipal South WL Division, one located at Upper Barakamuda and another at Bhanjabasa under the administrative jurisdiction of Similipal South WL Division. Similarly one camp office of Field Director and Deputy Director, Similipal North WL Division is located at Chahala under administrative jurisdiction of Similipal North WL Division. As this establishment is coming within the core area of Similipal Tiger Reserve only authorized persons may be allowed to use the camp office for field inspection. An anti-poaching barrack has been constructed at Jenabil and Nawana South Range Office which will be used by ACFs for inspection. One wooden rest house which was at Jenabil Range was burnt by naxalites during 2009.

Anti-poaching camps

There are 214 Anti-poaching Camps strategically located to effectively control illegal entry, poaching, timber smuggling etc. the details are given in Annexure XXX.

The existing anti-poaching camps have to be maintained. All the camps will be require full staff strength of at least one Departmental staff and six nos. of daily wage Protection Assistants equipped with fire arms and walkie-talkies. All the protection camps will be made full-proof equipped with basic communication

facilities and amenities like wireless sets, hand held sets, solar lights and charging equipment, drinking water, toilets and fencing around the camp.

Apart from the above, temporary camps will be established in shape of *machans* or other low cost camps at vantage locations as per field requirement in specific occasions like fire season or *Akhand Shikar* control. The annual maintenance of camp sheds including furnishing; uniform etc will be assessed by the Deputy Director and concerned DFOs which will be incorporated in the Annual Plans.

Relocation of existing Protection Camps.

The location of existing anti-poaching camps will be reviewed. At present the camps are distributed throughout the reserve. Presence of protection staff and their day to day activities may disturb the wild animals and their habitat in an inviolate area. In order to provide a proper inviolate area to the wildlife it is essential that the anti-poaching camps will be gradually relocated to the periphery to prevent the entry of the poachers to the core area. Only a few camps at most vulnerable points will be present. The new sites will be selected considering the entry routes of poachers, availability of water source for the staff and existing road communication etc.

Review of Illicit Activities for last 5 years

The details of offences of last 5 years are furnished in Annexure LI.

Protection from Poaching and timber smuggling

The list of sensitive sites from protection point of view have been given in Annexure XLV.

Illicit Felling locations

Joranda, Khejuri, Chhatadanda, Lembuguda, Baunskhal, Kachudahan, Bulundah, Bhajam, Bakua, Dhuduram, Kusumbani and Bhatunia, Lulung, Baniabasa, kairakacha, Haldia, Barehipani, Champajhar, Bhejidiha, Kendumundi, Lalpani, Digdiga.

Illegal Entry points

The list of illegal entry points to Similipal is given in Annexure XLVI.

Sensitive Villages

The list of sensitive villages from poaching and illicit felling point of view have been given in Annexure XLVII.

7.6.1.5 Patrolling

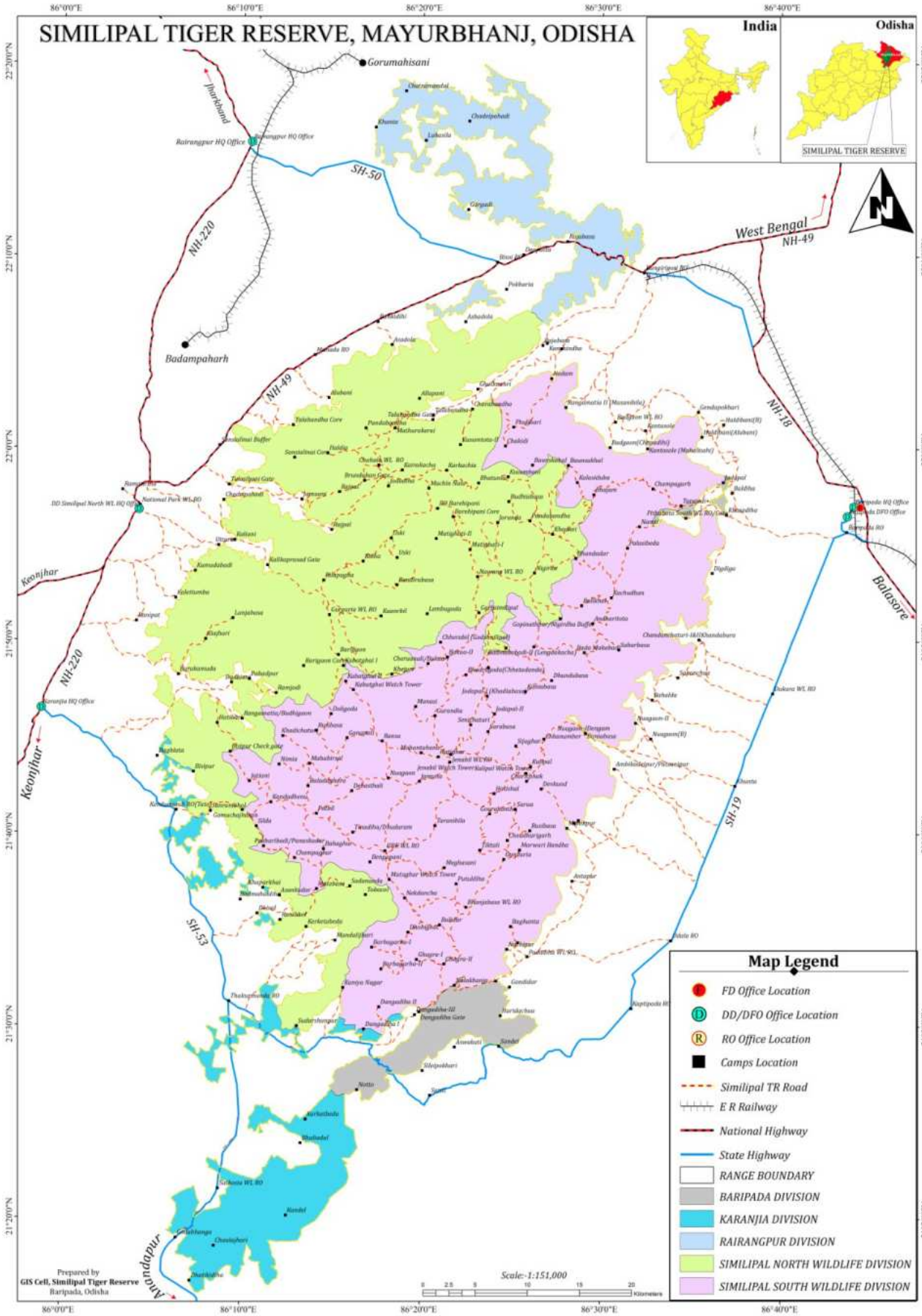
Patrolling inside Similipal Tiger Reserve is regularly monitored with the help of an application called MSTrIPES developed by NTCA. The application gives information about both quantity and quality of patrolling done by staff both foot as well as vehicle mode. The application has been installed on mobile phones and distributed to every Beat. Time to time trainings are been organized to field staff to make them familiar with use of application. At the end of every month both quantity and quality will be analyzed at division office and discussed with Range Officers during Range Conference. To ensure efficient patrolling entire Similipal Tiger Reserve has been divided into one Sq.km. grids.

Extensive patrolling on foot and on vehicle is of paramount importance. The Patrolling should be focused on following sensitive spots -

a. Water Sources and their approaches and signs of poisoning if any.

b. Saltlicks and their approaches and signs of poisoning if any.

c. Nala beds specially junctions with other nalas and roads and signs of poisoning if any.



Map No-7-E : Similipal Tiger Reserve-Illegal Entry Points

d. Fire sensitive areas

e. Checking the water holes outside the TR during summer season - Laying out impression pad near water point in villages to ascertain the presence of carnivores in the area.

f. Signs of human presence

g. Cattle kill by tiger

h. Snares, traps etc

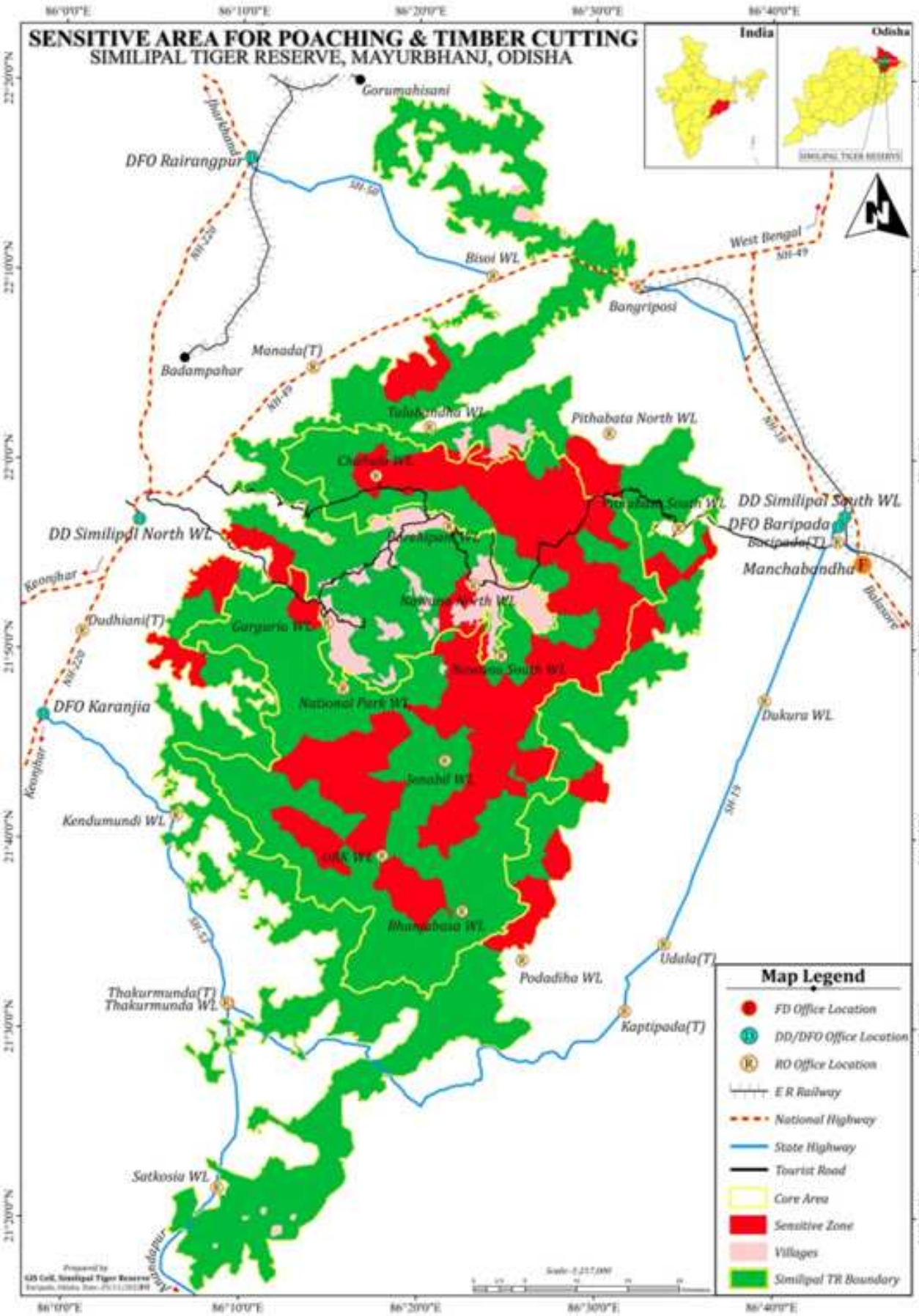
The following schedule of patrolling is prescribed.

- Antipoaching camps patrol team should cover all the Grids in their respective areas in a given month.
- Range officer should join any of the patrol team once in every week.
- Deputy Director/ DFOs to join randomly patrol team once in every fortnight.
- Field Director to join the patrol team once in every two months.

There are 214 anti-poaching camps with housed staff. All of these camps are provided with solar lights, drinking water etc. and trench fencing to protect structures from elephants and wireless network connection. For drinking water, high quality water filters have been provided to all the anti-poaching camps. The list of equipments given for camps and patrolling has been given in **Annexure---- New**.

Each camp will maintain

1. one patrolling register,
2. one duty register and
3. one message register
4. Form No.06
5. Form No.42
6. MSTrIPES Mobile application.



Map No:7-F : Sensitive Area for poaching & Timber Cutting

Details of the daily patrolling including the time, routes and area covered and all important observations will be recorded in the patrolling register. Message register will be maintained for recording of all wireless messages received and sent. All the registers will be periodically checked by all the superior officers starting from the Foresters to the DD/ DFO. Similarly the Range Officer will chalk out foot patrolling programmes with all the anti-poaching squads of his Range apart from his regular patrolling schedules. The ACFs and the DD/ DFOs will also make monthly schedules for patrolling with the squads.

MONSOON PATROLLING

Similipal Tiger Reserve becomes more vulnerable to illicit felling and poaching during monsoon as large part of the park becomes inaccessible and mobility of staff is considerably impaired. To meet these challenges a special protection strategy for monsoon is required. Keeping the ground reality in mind, and to make optimum use of available resources to achieve best result towards protection of Similipal Tiger Reserve following strategy is made out for the coming monsoon.

7.6.1.6 Strategy

The following strategy will be adopted which will be largely preventive in nature but can also be reactive if situations so demand.

1. Deployment of Protection labourers in all the anti-poaching camps.
2. Strike force manned by Forest personnel.
3. Prevention of poaching through intensive awareness drives with special emphasis on identified village Haats (weekly markets)
4. Collection of intelligence secretly with the available experience, from the dossiers list and counter acting effectively and timely through available resources.
5. Use of state of the art technologies to monitor wildlife trade and other illegal activities on different platforms like social media.
6. The provision for preventive detention of habitual offenders during poaching and fire sensitive periods may be explored.

A. Deployment of Protection Assistants in The Anti-Poaching Camps

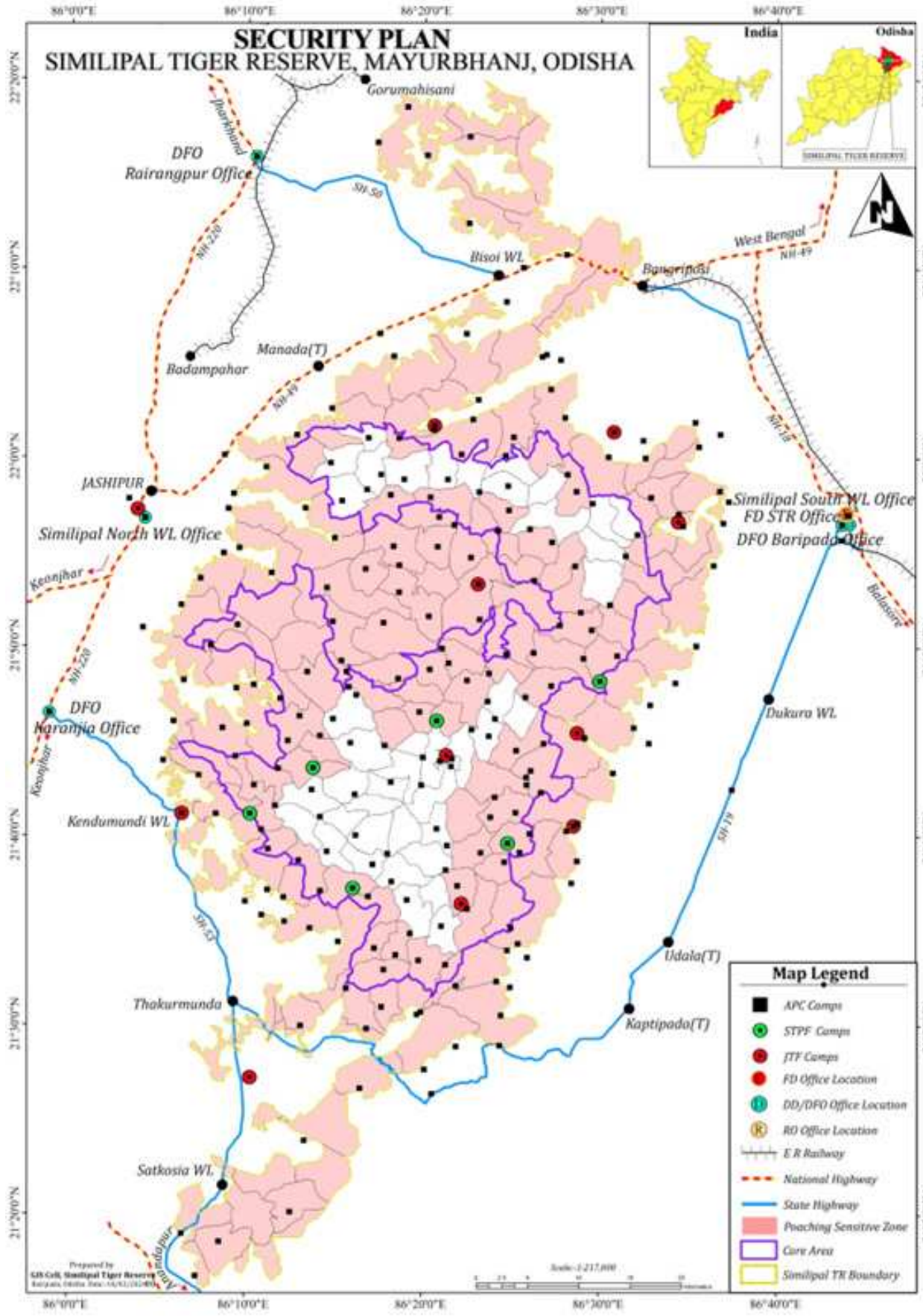
1. Organisation of Anti-poaching camps

There are anti-poaching camps covering the entire area of the sanctuary and beyond that covering the Tiger Reserve. Each camp will be fortified with 6 Protection Assistants drawn from surrounding villages, preferably from the buffer area villages. The Protection Assistants should be given patrolling gears like camouflage uniform, shoes, caps, rain coats, winter dress, lathis, torch etc.

If the Divisional Forest Officers/ Deputy Director, Similipal Tiger Reserve feels that the staff strength need to be changed due to field conditions or other logistic problems it can be done based on field requirements. All the camps will be supplied with first-aid kits with medicine and accessories. In case of emergency, the patients will be transported to the nearest hospital by the departmental vehicles.

2. Patrolling pattern (on foot)

All the regular staff and Protection Assistants will be in proper uniform. Every day each camp will march towards the adjoining camp, and some times during night, if needed, along foot paths/animal tracks and put their dated signature in the Camp Register of the camp they have visited and return to their original camp. The next day they will proceed to another adjoining camp. This will continue till all the adjoining camps around the command area of a particular camp are covered. The cycle will then be repeated. On completion of the day's work, they will mention their observations in their camp Register. During patrolling staff should



Map 7 G: Security Plan of Similipal Tiger Reserve

use mobile phones installed with MSTrIPES application and record all observations as features described in the MSTrIPES application. MSTrIPES being offline application at the end of every month. Data should be downloaded by specified staff and submit the same to Division office before 5th of every month. At Division office data should be analyzed by trained data analysis assistants using desktop based analysis software before 10th of the month. A copy of analyzed data should be submitted to NTCA as well as PCCF (WL) and CWLW, Odisha. It is mandatory that every camp should cover all the one Sq. km. Grids in their respective areas.

3. Vehicle patrolling.

Some of the vehicles used inside Tiger Reserve are Govt. vehicles and others are engaged on hiring basis. All the vehicles should only be used for patrolling and protection related activities. During patrolling it is mandatory to use MSTrIPES application for proper monitoring of vehicle usage. Vehicle patrolling should be mainly done in sensitive areas which are nearer to villages. Unnecessary used of vehicle patrolling in Core area should be avoided to reduce disturbance in Core area. Vehicles should be driven by experience drivers and regularly maintain properly. All the Range Office campus should have proper place to keep the vehicle to protect them from rain and sunlight. All patrolling vehicles should be installed with GPS tracking devices to monitor their movement. Similipal being difficult terrain, only four wheel drive vehicles can be used for patrolling. Considering the condition of roads, terrain, maintenance etc. it is difficult to get four wheel drive hired vehicles. Therefore State Govt. may be requested by Field Director to make special provisions to purchase four wheel driven patrolling vehicles for Similipal Tiger Reserve.

Preparation of route chart

The Range Officer in consultation with Divisional Forest Officer / Deputy Director, STR will prepare a map indicating all the foot paths, roads and animal tracks diverging from or converging to a camp with connectivity to other camps. With reference to the map, he will prepare a camp-wise chart for all the camps in his Range, indicating the movement pattern of the staff, which will act as a guideline for movement of staff as outlined in item No.2 above. While preparing the route chart the Range officer should give importance to the water holes, salt licks and critical habitats of wild life in the compartment. The patrolling party would look around for any destructive activity in the area and immediately report it to the concerned Range Officer. The list of vulnerable salt licks and routes of entry of poachers and wood cutters during monsoon is given below for guidance of protection staff. The route chart should be in such a way that it should cover all the Grids of Tiger Reserve for efficient patrolling.

Natural Salt Licks & Other Sensitive Area

UBK Range:

1.Bachhurichara meadow towards Sarudala, 2.Nawana grassland, 3.Ginahaja, 4.Baladaghara entire meadow towards Mahabirsal, 5.Ankurbasa, 6.Baladaghara on Kandadhanu roadside towards West Deo, 7.Golkund meadow(three places), 8.Pokhridanda towards Dhudram, 9.Baragadia meadow, 10.Khadichua, 11.Tarinibilla towards Baunsdiha, Janagada (meadow), 12.Matughar, 13.Bengapani, 14.Champagada (Bahaghar), 15.Chakasil, 16.Dhudram, 17.Tarinibilla transect at meadow, 19.Nekedanacha foot path side, 20.Mandachaturi, 21.Bhalukanthi, 22.Balidar near camp meadow, 23.Ujiapinda, 24.Kadalibadi, 25.Mahulhudi, 26.Maruadibandha,

Bhanjabasa WL Range

1. Dhobighat

Jenabil Range:

1.Sunpokhari, 2.Dalkikacha, 3.Adhamukha, 4.Gorukantha, 5.Baunsdiha, 6.Sarua to Tiktali footpath at different places of meadow, 7.Ashoknala head, 8. around Tiktali camp (6 places), 9.Tiktali to Kiabasa footpath side, 10.Janagada meadow on dividing ridge of Jenabil& UBK, 11.Gurandia towards Dhalamati on road side, 12.Gayalgada meadow,

National Park Range

1.Nuagaon towards Mahantahana footpath side, 2.Patuagada, 3.Ganapati near proposed camp, 4.Nemia towards Kandadhanu, 5.Kalkam meadow near Khadibasa after crossing nalla, 6.Old fire watch tower at Ganapati,

Nawana South WL Range

1.Bhadragada, 2.Rajabhadi near old FRH Dhudurchampa meadow, 3.Jodapal, 4.Balikhal, 5.Champa Barehi,

Pithabata South WL Range

1.Badamakabadi meadow, 2.Sabarbasa, 3.Andharitota, 4.Bhajam, 5.Kalipahad, 6.Dalkikacha (Lalpani), 7.Jambhirakhal, 8.Satnalia, 9.Chhitajharan

Nawana North WL Range

1.Joranda ring road side, 2.Pandabandha, 3.Pansia, 4.KhadkeiBaunskhal road side, 5.Bhandadhar

Chahala WL Range

1.Bhatunia, 2.Brundaban towards Kundagarh footpath, 3.Daladali ring road side, 4.Rangapahad, 5.Kairakacha Brundabhol,

Kendumundi WL Range

1. Pokharibadi Buffer area in Kendumundi Range near core of Kandadhanu area

Entry routes of poachers/ wood cutters

Outside Similipal

1. Dangadiha towards Sanghagara
2. Mandaljhadi/ Baliposi/ Khediaposi- Judamnala, Bathudiabasa, Dhudram towards Bamandiha, Bengapani
3. Edelbeda, Ranibhola, Khaparakhai- Panskudar, Silda, Pokharibadi, Ginahaja, Baladghar, Ankurbasa
4. Manbhanga, Dobala, Nachipur- Chingudia, Salting Ghati, Bengapani, Dala
5. Bisipur/ Dudhiani- Nemiadanda, Baladghar
6. Dudhiani/Budhigan/ Ramjodi- Nemia, Mahabirsal, Baladghar
7. Pahadpur, Kaliani- adjacent to Similipal
8. Manada- Chahala, Haldia
9. Bankidihi- towards Haldia Chahala ring road
10. Ghatkuanri/ Talabandha – towards Chahala, Haldia, Kairakacha, Bhatunia
11. Chakidi- Kusumbani
12. Jaldiha, badagaon, Chapadihi via Baunskhal
13. Haldibani, Bhuasuni- Bulunda, Bhajam
14. Baldiha, Sitakund, Digdiga- Lulung, Namti, Munibasa, Satnalia
15. Digdiga& adjoining villagers- Kalipahad, Jambhirkhal

16. Chandanchaturi- Jambhirakhal, Murari, Kachudahan
17. Bangra, Bahalda- Badamakabadi, Andharitota, Belpanidanda
18. Baniabasaetc- Jadapal, Dhundbasa
19. Deokund, Phulbadia, Dalkikacha, Ambaghati, Maruadibandha, Manikpur, Taldiha
20. Podadiha, Chakradharpur, Hudisahi- Bhanjabasa, Gunduria, Tangiria, Mahulhudi

Inside Similipal

1. Kabataghai/ Kandibil/ Kasira/igaonetc- Kabatghai, Ransa, Gayalgada, Basudevpahar
2. Khejuri, Bharadachua&adjoiningvillages- Basudevpur, Bakua towards Gurandia&Athardeuli
3. Lembugada, bandiriabasa, Astakunar, bagdega, Phulbadia- In & around the village area
4. Gurguria, Kolha, Uski, Barehipani, Barsia- Kolha, bandiriabasa, Rangapahad, Uski
5. Kalikaprasad& adjoining area- Uski, Kolha
6. Kukurbhuka, Nawana, Nigirdha, makabadi- Taranda, Jhandapahad, Kusumbani, Champabarehi
7. Garasimilipal, Bagdega, Budhabalanga, Bakua- towardsGurandia, Bisaldanda, Bhadragada, Chhatadanda

En-route Interception

The Divisional Forest Officers will ensure that all the routes used by the timber smugglers outside the core area of Tiger Reserve are patrolled with the Divisional mobile squads and all the Forest check-gates function in right earnest. The DFOs will keep vigil on known poacher-villages and collect information from local haats about poaching plans, as such plans are generally hatched there. Any information on movement would be passed on to the adjacent Ranges/ camps both in buffer and core area and special vigil would be kept on movement of poachers. Having prior knowledge of movement of locals for poaching and illicit felling is most important part of our protection strategy and will be given topmost priority with all sincerity and devotion.

VHF communication

There will not be any negligence in transmission of message from the field VHF stations directly to the monitoring cell at Headquarters i.e. “LION” station, or through “MAINA” station and “SAMBAR” Station. VHF set of territorial frequency has also been installed at “MAINA” to facilitate communication between Core and Buffer camps. It will be ensured that all the camps are equipped with VHF. All the staff i.e. Range Officers and Foresters, while in the field, should have the walkie-talkie with them. Requirement of VHF sets to be brought to the notice of Field Director.

Collection of intelligence

Secret payment /awards to informer can bring advance information on poachers, etc. and can be a very effective tool in protection. The field staff would cultivate such contacts. Payment can be met from secret funds and other sources. Special care will be taken to track the movement of unidentified persons moving in the fringe area, as during monsoon, poachers from outside states like Jharkhand, West Bengal and North East India have come for poaching of tuskers, RBT, Leopard, Pangolin in the past. A list of villages having persons involved in poaching and poisoning of animals, particularly elephants are given below.

List of villages suspected to be involved in poaching / poisoning

Inside Similipal

1.Bagdega, 2.Gadsimilipal, 3.Saruda, 4.Budhabalanga, 5.Benipur, 6.Gopinathpur

Outside Similipal

1.Balinal, Hudisahi, 2.Chakradharpur, Badakhaman, 3.Manikpur, 4.Manabhanga, dobala, 5.Sarat, 6.Dangadiha, 7.Mandaljhari, Baliposi, Kirkichipal, 8.Edelbeda, Ranibhol (Kendumundi), 9.Khalpada (Dudhiani), 10.Kundagada, 11.Tambalbandha/ Charabandha, 12.Kandibil, Kashira, 13.Phulbadia, Bandiriabasa

The movement of the staff in the camp will be monitored with the help of advanced technologies and also by traditional methods. Every staff during patrolling should use MSTrIPES application and record the data. AT the end of the month the data should be analised at Division office and the information should be used for improving the patrolling efficiency. In the meanwhile the concerned Forest Guard/Forester of the Beat/ Section should review patrolling on a daily basis and would be checked regularly by the concerned Range Officer. Each camp will have five registers (i) VHF message register, (ii) Attendance register (both for regular staff and casual labourers) and (iii) Patrolling register (Detailed day to day observations are to be noted), (iv) Form No.6, (v) Form no.42, (VI) MSTrIPES Mobile data. All the registers will be updated daily and produced on demand by any visiting supervising officer, who will sign it after entering his observations.

B. Strike Force

A group of 8 to 10 staff would be ready round the clock at each Range Hq. to act as striking force and move whenever required by the RO. If sufficient staff are not available, the Range officer shall requisition staff from other camps or even other nearby Ranges.

Modus operandi of strike force

The staff stationed in each camp will thoroughly cover the area assigned to them by foot, day or night, as required. In case of any incidence of poaching/presence of poachers, they will contact the nearest camp who will contact the Range headquarters immediately. The Range Officer will mobilize the staff from within his Range (and neighboring Ranges if the situation so warrants) and immediately proceed to the spot to combat the poachers. Unidentified person will not be allowed inside the sanctuary and, if noticed, they will be detained and the Range Officer will conduct enquiry and immediately report to the concerned DD, STR/ DFOs of the outcome of such enquiry**.**

Deployment of vehicles

In order to ensure movement of the striking force, one vehicle for each Range has been provided for all the Ranges. They would be authorized to use hired vehicles. The DFOs may hire vehicles to deal with emergency situations with permission from the Field Director, STR and RCCF, Baripada in case sufficient Govt. vehicles are not available with them.

Patrolling with captive elephants

There were six captive elephants under Similipal Tiger Reserve out of which two elephants namely Rajkumar and Mohindra are transferred to Satkosia Tiger Reserve to assist during Tiger translocation experiment. In the remaining four elephants two elephants namely Sobha and Bhabani have crossed 65 years of age hence they are retired. The remaining two elephants namely Babloo of seven years old and Shibani of 13 years old are under training at elephant camp Jenabil.During 2022 one male elephant calf of one year age was rescued by Baripada Territorial Division and shifted to Pithabata South WL Range. The calf was named as Jagannath as it was rescued during Ratha Yatra period. The calf is under observation by veterinary Officers, after getting required reports on the health of the calf by veterinary officers it will be shifted to elephant camp Jenabil. Therefore, as of now there are no elephants of suitable age to engage in patrolling. Bobloo and Bhabani may be engaged in patrolling activities after their completion of training period.

C. Monitoring of Patrolling

Daily monitoring

Every Range Officer of STR shall report to the concerned Asst. Conservator of Forests at 8:00 pm over VHF regarding the daily monitoring report of his range.

Asst. Conservator of Forests shall report to the concerned Divisional Forest Officers/ Deputy Director on receipt of the information.

Deputy Director/ Divisional Forest Officer shall report to the Field Director at 9:00pm every night over VHF/ Phone regarding the daily monitoring report of the ranges within his jurisdiction.

Monthly monitoring

Mandatory monitoring duties to be performed every month at the level of executive field functionaries are outlined below:

Forest Guard

Apart from regular monitoring of the anti-poaching camps in his beat jurisdiction / areas allotted under his charge, each Forest Guard shall lead the patrolling team at least four days in a week (16 days in a month) with 25% night patrolling.

The Forest Guard shall personally check and exhaustively review every camp under his jurisdiction, at least thrice a month and submit a report to the Forester.

Forester

Apart from regular monitoring of the anti-poaching camps in his section / areas allotted under his charge, each Forester shall lead the patrolling team at least twice a week (8 times a month), of which 25% of the time shall be spent in night patrolling.

The Forester shall personally check and exhaustively review every camp under his jurisdiction at least twice a month and submit a report to the RO.

Range Officer

Apart from regular monitoring of the anti-poaching camps in his range jurisdiction / areas allotted under his charge, each Range Officer shall lead the patrolling team at least four times in a month, of which 25% of the time shall be spent on night patrolling.

The Range Officer shall personally check and exhaustively review every camp under his jurisdiction at least once a month and submit a report to the ACF, who in turn shall incorporate his observations and submit it to the Divisional Forest Officer.

Night patrolling dates are to be fixed at random by the Range Officers in consultation with the ACFs.

Divisional Forest Officers/ ACFs can ask for surprise patrolling during any given day of the month.

Asst. Conservator of Forests

The ACF shall visit 50% of all camps in the division in a month and shall submit a report to the Divisional Forest Officer by 20th of every month. He will lead the patrolling duty twice a month, once during day and another during the night.

Divisional Forest Officer

The Divisional Forest Officer shall personally review 20% of the camps under his jurisdiction every month and submit a report to the Field Director.

Co-ordination Meetings

1. There shall be a Tiger Reserve Level Conference of all buffer and core area Divisional Forest Officers/ Dy. Director, STR along with their ACFs and Range Officers chaired by the Field Director, STR on the 10th of every alternate month or any such convenient date.

2. The performance of the camps will be evaluated in all the meetings.

7.6.1.7 STRATEGY TO PREVENT AKHAND SHIKAR

The pernicious practice of tribal mass hunting, *Akhand-Shikar*, and associated habitat destruction is scourge of Similipal Tiger Reserve. Although the intensity of mass hunting has reduced substantially due to intense patrol effort of frontline staff, still few scattered incidences of mass hunting are reported regularly.

A six-pronged comprehensive strategy will be adopted which will be largely preventive in nature but can also be reactive if situation so demands.

A. Deployment of temporary Protection Assistants in all the Anti-poaching Camps.

B. Prevention of poaching through intensive awareness drives with special emphasis on identified village *Haats* (weekly markets).

C. Collection of intelligence secretly and counter acting effectively and timely through our Range Striking Force.

D. Effective Multilayered Monitoring.

E. Designing strategies for combing in sensitive areas and marching in village areas.

F. Providing better alternative source of livelihood through eco-development activities.

A. Deployment Of Temporary Protection Assistants In Anti-Poaching Camps

Allotment of Area

At present, following strategic camps have been set up covering all the 226 compt. of Similipal RF (2271.78 sq km) and are managed by FG/Forester assisted by temporary Protection Assistants. The whole area of Similipal RF has been distributed compartment wise among each camp so that no compartment is left beyond the command area of a camp. Further each Compartment is sub-divided into one Sq. km. Grids for effective coverage by patrolling staff. The area can be reallocated by Deputy Directors/Divisional Forest Officers under intimation to the Field Director, STR, if circumstances so warrant (Annexure XLIII).

Table No- 7-e : Division wise compartments and area covered would be as shown overleaf.

Sl. No.	Core/Buffer Area	Similipal South WL		Similipal North WL	
		Beat	Compartment	Beat	Compartment
1.	Core	71	100	20	44
2.	Buffer	27	46	39	109
3.	Core and Buffer overlapping	5	-	11	-
	Total	103	146	70	153

Table No- 7-f : Administrative Unit

Sl. No.	Name of the administrative unit	No. of compartments	Area in km^2
1	Deputy Director, Similipal South WL Division	146	1247.58
2	Deputy Director, Similipal North WL Division	153	1059.03

There shall be at least six temporary Protection Staff (daily wagers) per camp in core area and ten in buffer area. It is observed that at any given point of time, there are at least one / two persons absent due to various reasons.

Out of the deployed persons one person should remain in the camp to attend VHF calls and preparation of food. If the Deputy Directors/ Divisional Forest Officers of respective Divisions feel that the strength to be reduced due to logistic problem it can be reduced with approval of Field Director, Similipal Tiger Reserve. In no case the strength of the camps will be fragmented. The authorities can temporarily shift the camp, en masse, to another place if they feel necessary.

Patrolling pattern

The staff in each camp will march towards the adjoining camp each day and some times during night, if needed, along foot paths/animal tracks. They would put their dated signature in the Camp Register in the camp which they have visited and return to their original camp. The next day they will proceed to another adjoining camp. This will continue till all the adjoining camps around the command area of a particular camp are covered; the cycle will then be repeated. On completion of the day's work, they will mention their observations in their camp Register giving details of observation.

For a given month each one Sq. km. grid allotted under the jurisdiction of each Anti-poaching camp shall be covered by foot. More number of patrolling shall be done in the poaching and illegal felling sensitive areas. During the fire season more patrolling shall be done in the fire prone area.

Preparation of route chart

The Range Officer, in consultation with the concerned Dy. Director/Divisional Forest Officer, shall prepare a map indicating all the footpaths, roads and animal tracks diverging from or converging to a camp with connectivity to other camps. With reference to this map he shall prepare a camp-wise chart for all the camps in his Range, indicating the movement pattern to be followed by the staff of each camp. As this chart will work as a guide/ reference, the Range officer would give due importance to water holes, salt licks, old Shikari camp and critical habitats of wild life in the compartment, while preparing the route chart.

The Patrolling Party, while patrolling, would look around closely for any sign of poaching /destructive activity and report to the concerned forester/ Range Officer at the earliest whenever it finds any.

Monitoring

The movement of the staff in the camp shall be monitored by the concerned Forest Guard/Forester of the Beat/Section on daily basis, and this shall be checked regularly by the concerned Range Officer. All the patrolling registers shall be updated daily and produced on demand by any supervising officer, who shall sign it after recording his observations. The detailed date lines and procedure is discussed separately.

B. Targeted Awareness Drives

Lack of awareness is a major reason for poaching and ritual hunting. The core area staffs do not come in contact with buffer villagers often. The staff of buffer and adjoining areas under Territorial Divisions shall have to play a proactive role in creation of awareness and generation of information network. The following steps need be taken.

1. Educating the people.

Since the poachers are from the villages located in the buffer or near the boundary of STR, it is imperative on the part of the staff of buffer and adjoining area under Territorial Forest Divisions to create awareness among the people. Displaying of signage, distribution of handouts and beating of drums at the local *haats* would add to their effort.

2. Awareness of Local leaders

Local tribal priests "Dehuries" and local elected representatives will be approached to spread the message that the traditional practice of "akhand shikar" is not in consonance with present time. It is not only illegal, punishable with imprisonment up to seven years; it destroys the highly endangered fauna of Similipal.

The Honorary Wildlife Wardens can also play an important role in these initiatives. Also, the concerned EDCs may be sensitized by holding awareness campaigns before the "akhand-shikar" season.

The Nature Guides, Resorts, Hotels, Tourist Operators who are benefiting from tourism in and around the Tiger Reserve may be roped in for creating awareness against poaching and forest fire.

C. Collection Of Intelligence & Counteracting Effectively

Killing of animals is often not taken with due seriousness by the local people hence they hardly come forward with any information on poachers. So the staff working in field will have to create a network of informers. This can be ensured by engaging spies at vulnerable villages and rewarding the informers in lieu of their services. The fund required for this purpose can be met from secret fund etc.

Plugging legal loop-holes

It is observed that although forest and wildlife laws are very stringent, the forest officers responsible for enforcing them often fail to enforce them with due effectiveness for want of sound knowledge of Rules and Regulations and proper legal procedure. This defeats the purpose of such legislations. The staffs need to be properly guided, trained and helped in preparing case records. This would plug legal loopholes and make it difficult for the culprits to evade punishment.

Dossiers of offenders

In each Range dossiers of Forest and Wildlife offenders shall be kept updated and this will be made available to each section in-charge also to help him in investigation and prevention. The ROs will be instructed to prepare such dossier and they are expected to keep it updated.

Close Watch on Dehuries

As they lead the shikar expedition of tribal, a close watch will be kept on their movement. Reaching the congregation ground before the different groups meet at the onset of expedition, is comparatively easy way to tackle them. Also reaching the spot where puja, before shikar expedition, is being done, would force them to abandon the plan of shikar as any disturbance by outsiders especially by enforcement agencies, is considered inauspicious before going to *akhand shikar*.

4. Identification and monitoring of manufacture and sale of country made gun by Bindhanis around the Tiger Reserve to keep an eye of poachers.

D. Counteraction

Modus operandi in Emergency situation.

The staff stationed in each camp shall thoroughly cover the area as assigned to them by foot. In case of any incidence of poaching/presence of poachers, they shall contact the nearest camp who shall contact the Range headquarter immediately. The Range Officer shall mobilize the staff from within his Range

(and neighboring Ranges if the situation so warrants) and immediately proceed to the spot to combat the poachers. The vehicles kept at the disposal of the Range Officers for prevention of illicit felling, poaching and fire protection shall be made use off for this purpose.

The concerned RO of the buffer range at the foothills, (from where the shikaris have originated and to which they will return) would be alerted to plug possible exit routes and catch them unawares.

Often, the services of a magistrate / police also become essential while tackling large number of shikaris. Hence the concerned DFO will contact the Dist. Administration, if the situation so warrants. The DFOs/DD would keep the police and district administration informed so that they are not caught unaware.

No unidentified person will be allowed inside the tiger reserve. If noticed, the person to be detained and the range officer to conduct enquiry and immediately report the fact to concerned DD/DFO.

Accountability

As the entire area has been brought under the command of one or the other anti- poaching camp, the sphere of responsibilities has been clearly defined. This would ensure greater accountability too. For any lacunae in prevention of poaching and apprehending the poachers, concerned Forest Officer, having jurisdiction over the area of occurrence, shall be held responsible.

Multi layered Monitoring And Evaluation

The monitoring programme suggested above in Para on Monsoon Patrolling strategies will also be followed during programme for prevention of Akhand Shikar.

7.6.1.8 INTER DIVISION CO-ORDINATION

For better coordination and effective management strategy two zones can be formed namely Territorial Division - Buffer of STR and Buffer of STR-Core of STR.

For joint patrolling and coordination among the core and buffer staff the entire tiger reserve has been divided into three landscapes as given below.

Table No- 7-g : Buffer STR-Core STR Range coordination schedule.

Landscape No.	Name of Core Ranges	Name of Buffer Ranges
Landscape No. 1	National Park WL Nawana North WL Nawana South WL	Barehipani WL Gurguria WL Kendumundi WL
Landscape No. 2	Jenabil WL UpperBarakamuda WL Bhanjabasa WL	Dukura WL Podadiha WL Thakurmunda WL Thakurmunda Satkosia WL Kaptipada
Landscape No. 3	PithabataNorth WL Pithabata South WL Chahala WL	Pithabata North WL Pithabata South WL Talabandha WL BisoiWL

Table No- 7-h :- Buffer STR-Territorial Range coordination schedule.

Landscape No.	Name of STR Ranges	Name of Territorial ranges
Landscape No. A	Gurguria WL Kendumundi WL Thakurmunda WL UBK WL Podadiha WL Satakosia WL	Dhudiani Karanjia Thakurmunda
Landscape No. B	Chahala WL Talabanda WL Barehipani WL Bisoi WL	Manada Bangriposi
Landscape No. C	Pithabata North WL Pithabata South WL Nawana North WL Talabanda WL	Bangriposi Baripada
Landscape No. D	Dukura WL Podadidiha WL Bhanjabasa WL Jenabil WL	Baripada Udala Kaptipada

The Range Officers will meet at Landscape level regularly and chalk out strategies for joint patrolling and other activities relating to protection. The ACFs of the concerned Divisions will coordinate and also attend the Landscape level meetings without fail.

In Order to effectively control the illegal entry points, control of fire during fire seasons, sharing of good practices, sharing the photo ID and addresses of regular offender the following schedule of Inter Division and Interstate Co-ordination is prescribed.

The Forest Station staffs during the course of patrolling shall meet the Section Staff of Inter Division and Interstate once a week and maintain record of meeting.

The Range officer will meet the Inter Range officer once a month and discusses the Inter Range and Interstate Range issues and report to Deputy Director.

The Deputy Director will meet the Divisional Forest Officer and discuss the issues and report to the Field Director.

The issues where Intervention at higher level is necessitated will be brought to the notice of Chief Wildlife Warden who in turn will place the matter before the State Level Steering Committee, Governing Body of Foundation, and state level Monitoring Committee for appropriate decisions.

The following information will be shared during the above stated meetings

- Sharing Land Line & cell phone numbers at section, Range, Division and Circle level.
- Sharing photos, addresses of Regular offenders at Range and Division level.
- Sharing information on illegal entry points at section, Range, Division and Circle level.
- Sharing names of candid informers for rewards at Range, Division and Circle level.
- Sharing information on investigation in Wildlife related crimes having interstate ramification.

- Sharing information with crime control bureau at DFO and Circle level.
- Sharing information on licensed gun holders in the vicinity at DFO Level.
- Joint annual inspection of boundaries.
- Sharing information on Good practices and staff welfare.
- Synchronized cattle vaccination, fire line clearance, wildlife census etc.
- Sharing information related to inter state migration of major species with main focus on tiger.
- Creation of awareness regarding protection from fire and poaching in the villages which are located adjoining to Similipal Tiger Reserve.
- Joint patrolling near illegal entry and exit point.
- Joint raids on Dhabas and other places for controlling illegal firewood and exploitation from Similipal.

7.6.1.9 JOINT PATROLLING WITH POLICE

The vastness of area and degree of pressure on Similipal require co-ordination with police officials and a strategy to be in place for joint patrolling with police staff. The followingprogramme is proposed for joint patrolling by police and forest staff to prevent poachingand timber smuggling within Similipal Tiger Reserve which will be followed on regular basis every year.

1. There will be monthly Sub-Divisional level coordination meeting between Range Officers and IICs to be chaired by concerned SDPO. DFOs will plan out and coordinate such meetings.
2. DFOs will take initiatives and will make planning for joint patrolling of timber smuggling routes.
3. Meetings of forest and police officials will be held before commencement of *Akhand Shikar* for planning out strategies to check this mass hunting activity. Such strategies will also be adopted during other vulnerable periods during festive occasions as the mass hunting is more or less linked to the rituals of the tribal. A list of such vulnerable periods during the year is listed below.

- Before *Makara Sankranti* i.e, before 14th January
- Before *Maha Shivaratri*
- Before *Holi*
- Before *Maha Vishubha Sankranti* i,e, period before 14th April
- Before *Raja Sankranti* i.e, before 14th June
- Before *Durga Puja*
- Before *Kali Puja*
- Before Christmas

4. Activities of renowned poachers and timber smugglers will be kept a close watch.
5. Random house raids of known poachers, timber smugglers will be made jointly by forest and police officials which will be done more frequently before *Akhand Shikar*.
6. Flag march in the suspected villages will be done jointly by forest and police staff frequently. The list of suspected villages involved in poaching and illicit felling is given in Annexure- XLVI & XLIX.

Inside Similipal

Bagdega, 2.Gadsimilipal, 3.Saruda, 4.Budhabalanga, 5.Benipur, 6.Gopinathpur, 7.Kukurbhuka, 8.Nigirdha, 9.Bakua, 10.Gudgudia, 11.Barigaon, 12.Bandirabasa, 13.Chakidi, 14.Kandibil, 15.Bada Kashira, 16.Sana kashira, 17. Charabandha, 18.Kusumtota.

Outside Similipal

Balinal, Hudisahi, 2.Chakradharpur, Badakhaman, 3.Manikpur, 4.Manabhanga, dobala, 5.Sarat, 6.Dangadiha, 7.Mandaljhari, Baliposi, Kirkichipal, 8.Edelbeda, Ranibhol (Kendimundi), 9.Khalpada (Dudhiani), 10.Kundagada, 11.Tambalbandha/ Charabandha, 12.Phulbadia, 13. Sana Ramchandrapur.

Police force as per availability will be provided to forest officials when requisitioned for any operation.

CHECK GATES

To check illegal entries, pilferage of natural resources and regulate the entry to Similipal Sanctuary the existing check gates will be maintained. The list of check gates on the entry routes to Similipal have been given in Annexure XXXII.

The check gates play a vital role in checking illegal intrusion of outsiders into Similipal. It was reported that people from Jharkhand often enter Similipal on the plea of meeting their relatives in Similipal, remain there as refuge, conduct crimes like poaching and go away. Some people also stay back by encroaching forest land with the help of local inhabitants. The Check gates at Pithabata, Kaliani, Kalikaprasad and Tulsibani are the entry points for people to Similipal. These gates will be strengthened to effect proper checking of all vehicles and people entering through these gates, may be tourist, bonafide inhabitants, business vehicles etc. Close circuit camera have been installed at Kaliani check gate for surveillance of people and vehicles passing through the gate. CC cameras will be installed at other entry gates also.

ROADS

The list of existing road network has been shown in Annexure XXXIV. All the roads are kachha/ murrum roads. Annual maintenance of the roads will be done along with minor repair of wooden bridges and other cross drainage structures for the patrolling and protection of the Tiger Reserve.

VEHICLES

The protection related existing vehicles have been detailed in Annexure XXXV. At present some of the Range Officers have been provided with four wheeler vehicles. New four wheel driven vehicles are required in all most all the Ranges of Similipal Tiger Reserve replacing the existing old vehicles which are giving trouble running in difficult terrain. Most of the vehicles have become old which will be gradually replaced within the plan period

The existing vehicles need annual maintenance according to necessity.

COMMUNICATION

The communication needs to be strengthened to apprehend the offender, red alert, seeking additional assistance, informing the various officers depending on the gravity of the case including inter division and inter state. The list of wireless stations, in Similipal Tiger Reserve has been given in Annexure XXXVI. Earlier the wireless communication of Similipal Tiger Reserve core area is being managed with low band sets where as the wireless communication of buffer Divisions is being done with high band sets as a result communication between core and buffer staff through wireless during patrolling or for sharing of information was not possible. Hence to bring the entire Similipal Tiger Reserve to a uniform system of communication during 2013 high band single frequency communication system was adopted.

During 2022 internet connection to Upper Barakamuda and Jenabil Range campus was given successfully. Similar facilities may be given to other remote Range offices using same technology. In future based on availability advanced technology may be used to provide internet and telecommunication facilities to remote areas of Similipal Tiger Reserve to enhance living condition of staff and to provide advanced protection technologies.

7.6.1.10 ARMS AND AMMUNITIONS

The list of arms and ammunitions available with the Divisions is furnished herewith.

Table No- 7-i: List of Fire Arms and Ammunitions which are in working condition.

Sl. No.	Name of equipment	Number	Ammunitions
	DBBL Gun	52	1461
	Rifle	15	1380
	Revolver	12	1992

During 2009 as per directives of Home Department, Govt. of Odisha the arms and ammunitions were deposited in the District Armoury in view of safety from naxalite attacks. The arms and ammunitions have been returned back to field staff for their use in protection duty. State Govt. will be moved to provide immunity to the forest staff against criminal action in case of use of fire arm in the line of immunity given to police officials under the provisions of Section 197 of Indian Penal Code providing immunity from prosecution without prior sanction. Regular training of field staff on use and maintenance of fire arms will be organised.

The arms and ammunitions with the Tiger Reserve needs to be upgraded with procurement of Glock 17 Pistols, INSAS Rifle, SLR, Pump Action guns and other advanced weapons for use by frontline staff during patrolling and anti-poaching operations. At present the ACFs and many ROs lack Pistol/ Revolver which needs to be provided at the earliest.

7.6.1.11 INTELLIGENCE GATHERING

Intelligence networking is a very important pre-requisite for prevention of crime as well as for follow-up after the crime has taken place. Intelligence deals with all things, which should be known in advance for taking actions in the direction of crime prevention. In this process after gathering the information, it is evaluated, analysed and used in the decision making. Advance information is key to success for prevention of crime and this emanates from intelligence. It is almost axiomatic that no poaching can occur without the passive knowledge or active help of villagers living in and around the Tiger Reserve. While the villagers do come to know about poaching activities around their area, they are not willing to inform the Tiger Reserve Management for three reasons.

1. The General lack of rapport between officials and the villagers
2. Fear of reprisals by the culprits involved in poaching
3. The most important reason being a wide spread hostility in the villages against the Tiger Reserve which have put severe restriction on the use of the forest for their basic needs- grazing, firewood, small timber and collection of NTFP for livelihood.

The poachers and criminals need protection, hideouts and information about movement of animals and Tiger Reserve staff. Therefore most pertinent point at Tiger Reserve level is building bridges for trust between the Tiger Reserve and the local people. The prescription for building bridges and trust are prescribed in Plan for buffer Zone in Eco Development & Ecotourism Chapter.

Collection of Information

The Range Officer, Strike Force and Territorial Range Officer will maintain a directory of phones from locals in fringes, residential areas of offenders, teachers, students, people's representatives, NGOs and generate informers which may lead to candid informers in due course. The Range Officer, Strike Force and Territorial Range Officers will list the candid informers and maintain and also supply the same to Deputy Director/ DFOs/Field Director. The Range Officer Strike Force/Range Officer Deputy Director/ Territorial DFOs/Field Director will provide a code to candid informers and keep it confidential. In no circumstances the candid informers shall be exposed to Public or any law enforcement agency.

Rewards for providing information

The motivation of persons providing intelligence information could be varied and needs to be treated accordingly. A credible reward system is the sheet anchor for generation of information. There need to establish and operate a cash reward system for providing information. The reward should be just, appropriate and made on the spot. As is being done in Customs Department, payment of rewards should vary according to the value of the items recovered by the information. Payment should be delinked from the disposal of cases in the Court; Rewards should be paid to all giving information, including Forest and Wildlife officials. Cash rewards should be payable for:

a. Information leading to the seizure of wildlife products and arrest of the offenders.

b. Information leading to successful prosecution of cases in courts; and

c. Information pertaining to the organization, modus operandi and other details of gangs indulging in wildlife trade.

The Deputy Director/ DFOs will take action to implement the provision of Section 60A of Wildlife (Protection) Act 1972 "Reward to persons". As per Subsection 1 of Section 60A fifty per cent of the fine imposed by the court can be rewarded to person who renders assistance in the detection of the offence or the apprehension of the offenders. As per sub sec 2 of section 60A fifty percent of amount of compounding can be rewarded to person who renders assistance in the detection of the offence or the apprehension of the offenders.

Similipal Wildlife Intelligence Network (S-WIN)

In order to systematically collect Intelligence and control wildlife poaching in Similipal Tiger Reserve, an Intelligence Network has been formed with one ACF as In-charge and 25 field staff consisting of Dy. RO or Foresters or Forest Guatds from the STR Divisions.

Public should know whom to contact:

To enable the public to contact promptly, in towns and cities, a specific telephone number shall be allotted. This telephone shall be managed round the clock by wildlife officials and prompt action would be taken by enforcement personnel.

7.6.1.12 PROCEDURE FOR REGULAR OFFENDERS

(I) Establishing a Criminal Profile Directory:

Office of Field Director will maintain records of persons with a history of poaching and/or wildlife trade in the locality. This will include details about physical appearance, identification marks/signs, employment, family, key associates, criminal history, convictions if any, pending cases etc. Sudden and long absences of such persons from their normal place of stay must be investigated. Sudden acquisition of movable and immovable assets must also be investigated for possible transaction of wildlife materials and sources of such transactions. Photographic dossiers can be very useful in investigation. Maintenance of crime dossiers at Tiger Reserve level is very important. These dossiers can be collated with other states on a need base. Such dossiers shall have information about poachers from both sides of the borders who are known to be active in the area. In every case, the link of old crime to new offenders and old offenders to new crime shall be regularly analysed. To assist in maintaining criminal profile directory a separate Legal Cell consisting of One Range Officer and one Forester with provision to consult/ hire subject matter experts may be established.

(II) Maintaining Dossier at EDC Level

As per guidelines issued by Project Tiger, a dossier of local offenders shall be maintained at each EDC level. The EDCs shall be activated in this line and taken into confidence. Help of *Gramrakhies* deployed at each village would also be taken.

(II). Forfeiture of Property derived from illegal Hunting and Trade

Every person and his associate who has been convicted of an offence punishable under Wildlife (Protection) Act 1972 with imprisonment for a term of three years or more is liable to proceed against him for forfeiture of property by following the procedure detailed in Sec 58A to 58Y of Wildlife (Protection) Act 1972. The Deputy Director/ DFOs will closely monitor such cases and submit proposals for forfeiture of property of such persons.

7.6.1.13 Communication & Infotech in Wildlife Protection & Crime Risk Management:

Wildlife protection and crime risk management in the present scenario requires a widely distributed information network using the state-of-the art technology. GIS is a user-friendly tool for data integration to facilitate prompt action. With Internet and Intranet technologies, complemented by VSAT, GPS and wireless communication in networking, the PA/ Tiger Reserve HQ can be connected to the state HQ, Police HQ and Project Tiger Directorate to disseminate information for field action in apprehending the offenders. The crime data base of Similipal Tiger Reserve may be integrated with CCTNS (Crime and Criminal Tracking Network and System) of Odisha Police. State Govt. may be requested to grant access to data base of CCTNS by DD/DFOs whenever required.

Imperatives for Success:

The following imperatives ensure the success of wildlife protection and crime risk management:

- Good surveillance
- Timely reporting & networking
- Prompt situation analysis
- Immediate action

There are several elements in wildlife protection and control viz.

- Relative spatial abundance of wild animals
- Identification of risk factors
- Proximity to risk factors, sensitivity categorization, crime Mapping & updating
- Site-specific protection strategy
- Immediate action for apprehending the offenders based on effective networking & communication

Geographic Information System has the ability to manage both spatial & non-spatial data and therefore provides an ideal framework for wildlife protection and risk management. Space technology has shown the interconnectivity of natural and anthropogenic phenomena occurring anywhere on earth. Thus, an integrated approach based on space remote sensing in the GIS domain with relevant biotechnological inputs can play a vital role in wildlife crime risk management.

Methodology/ Functionalities:

The following methodologies / functionalities are proposed to be applied for the protection and crime risk management:

- Creation/ Maintenance of a crime database in the **GIS domain** of the PA included in the zone, using forest cover/ terrain images from NRSA, overlaid with GPS point data from the field and the **Management Information System** (MIS)
- Regular round the clock updating of the crime database from the field (Range HQ of the Tiger Reserve &

other PAs) by establishing communication links, at present with wireless network.

- Regular updating of Range level crime data through **wireless** from **Patrolling Camps**
- Establishing external communication links between STR and other government authorities, viz. **Chief Wildlife Warden, Police HQ, MOEF (NTCA), WWF (Traffic- India), WCCB and the CBI**. This would facilitate tracing the offence to the last stage
- Updating the MIS/ GIS platform with tiger presence using **GPS (Global Positioning System)** and constantly overlaying this information with other data
- Updating the database with surveillance information like: crime-history, criminal dossiers from local police, district and inter-district criminals, criminals operating on railways, wandering gangs, resident gangs.
- Updating the database with **risk factors** leading to proximity, analysis for **'sensitivity charting'** viz. closeness to habitations, roads, railway, bus route, accessibility during monsoon, types of traffic, cattle kill, human kill/ injury by carnivores
- Updating the database with criminal intelligence (from informers & recorded sources)
- The MIS will have an **Internet portal** to be used by authorised persons for uploading relevant data using the **Internet backbone** from anywhere in the world
- **Monitoring** the movement of **'anti-poaching squads' (village patrol, road patrol, forest patrol)** through **GPS**. This would facilitate viewing the location and path taken by the anti-poaching squads apart from planning fresh routes to make a strike
- Use of the database to trace new crime to old offenders and old crime to new offenders to facilitate prosecution and planning fresh site-specific anti-poaching operation
- Using the database to monitor dependency in Courts for expediting conviction of wildlife related cases

7.6.1.14 Law Enforcement:

Considering the ever-increasing biotic pressures on wildlife protected areas, it is very important that the law enforcing officers/ staff of wildlife protected area are well-acquainted with and updated on the various forest and wildlife Acts and maintain a very close working relationship with the police and judiciary to put across the government's point of view more effectively.

The government have empowered the various ranks of field staff of forest department to take organized of offences relating to forest and wildlife. The frontline staff is always required to be kept well - prepared with necessary documents/ proforma prescribed under the Acts for taking appropriate action and registering a forest/ wildlife offence. The Park Management shall also ensure that the staff remains trained and updated on the latest amendments to the concerning Acts, and for this purpose easy Odia translation of the concerning Acts shall be circulated down to the lowest level for a better understanding of the subject. Besides, periodic Legal Workshops and discussions shall also be organized, involving resource persons from the judiciary, police department and WCCB to guide the staff in the proper investigation of forest offences, procedural norms, and to simplify the intricacies of the laws. The staff would be benefited by such arrangements, as these close interactions point out the various shortcomings/ mistakes in the entire procedure which render the cases weak, increasing the possibility of criminals going scot-free.

The management of a Tiger Reserve is a great learning process, and the lesson learnt is that procedural flaws would help the offenders escape prosecution, and even the staff may find themselves facing legal proceedings for improper arrest or seizure.

The staff of the Tiger Reserve requires internal periodic refresher courses, discussions, and high levels of

discipline and motivation. Such discussions and workshops would build the confidence of the staff in the following:

- Arrest or apprehension of persons/ offenders engaged in illegal acts inside the Tiger Reserve
- Proper documentation of illegal activities for court proceedings, including evidence in the form of confiscated wildlife articles, relevant photographs, signed statements, and reports
- Proper seizure of items prohibited under the Laws, or required as evidence to testify to an illegal act
- Simple legal procedures in delivering the arrested offenders to the police/ court, and filing charges

Setting up of Legal Cell -

In present practice, the dealing of the court cases is not much effective and the offenders are mostly acquitted for want of effective follow-up. Due to lack of proper attention, most of the court cases become weak resulting in the acquittal of the accused persons. Therefore, a separate Legal Cell will be formed which will look after criminal profile directory and court liaison unit.

To avoid the repetition of such situations in future, a **Court Liaison Unit** shall be constituted for the Similipal Tiger Reserve.

To ensure the regular attendance on fixed dates in cause-listed cases, a special team of staff along with appointment of panel lawyer shall be identified and earmarked for this purpose. The team shall be entrusted with the job of attending the court regularly and report to the Field Director from time to time. The team would also inform the concerned staff to take necessary actions in such case, required from time to time. The team would also coordinate with APP/PP and maintain the necessary records for every individual case. The **Legal Cell** shall consist of

(i) One Ranger as In-charge

(ii) Forester/ Forest guards, one each for the courts having jurisdiction

(iii) One Lower Division Clerk at Tiger Reserve headquarters to maintain the necessary records.

(iv) Provision to hire/consult subject matter specialist whenever required.

The Legal Cell shall function at the office of the Field Director, Similipal Tiger Reserve-cum-Regional Chief Conservator of Forests, Baripada. The Cell will coordinate with the Division Headquarters.

7.6.1.15 The Strike Force

The leader of the strike force will be the Range Officer, Enforcement; the other members of strike force will be two Foresters and four Forest Guards. The Force will be fully equipped with vehicle, arms/ammunition, communication equipment, funds for intelligence gathering, etc. The Strike Force will be given training on intelligence gathering, identification of wildlife articles, investigation, etc.

Duties and Responsibilities:

- Rapid action and response on receipt of any information related to illegal activities.
- Liaison with the territorial Range Officers and assist inprotection.
- Liaison with EDCs to gather information on intelligence.
- Inspire confidence in people who want to provide secretinformation.
- Liaison with staff of anti-poaching camps.
- Sharing information with the territorial Range Officers on illicit activities.

- Maintain a secret record with the details of informers, information received, etc.
- Inform the Deputy Director, Similipal North WL Division and South WL Division, territorial Range Officers of any illegal activity and red alert to the antipoaching camps.
- The Range Officer, Strike Force will be assigned any other duties related to protection.

7.6.1.16 The Special Tiger Protection Force

This is a centrally Sponsored Scheme of NTCA for deployment of a force with specialised training to be deployed as Tiger Protection Force. For Similipal Tiger Reserve NTCA have approved for a 112 member STPF consisting of 108 Forest Guards, 3 Forest Rangers and one ACF to come on deputation from existing cadre. The STPF was made functional in the year 2016 by bringing 63 Forest Guards on deputation from the core and three buffer Divisions of Similipal TR. At present there are 52 Forest Guards in the STPF. The details have been given in the Chapter 10 on "Protection and Intelligence Gathering".

7.6.1.17 Creation of Dog Squad

One Dog Squad for Similipal consisting of one sniffer dog and one tracker dog (One German Sephard and one labrador) was made functional in the year 2013 with two Forest Guards as their Handlers after their training at BSF Training Academy, Tekanpur. The two dogs died separately in the year 2015 & 2017 due to Tick infestation. In the year 2016 one Belgian Malinois inducted into the dog Squad which died in the year 2021 due to Tick infestation. Later in the year 2021, two German Sephard dogs with their Handlers and Assistant Handlers were inducted after training at the ITBP's National Dog Training Centre in Bhanu, near Chandigarh. The dogs will help in detection of poisoning spots as well as in search operation of wild animal articles. More dog squads may be recruited based on requirement. The breeds which are suitable for climate of Similipal may be given preference. Dog kennel for the Squad may be established at strategic locations under each Range to effectively utilize the services of the dog Squad.

7.6.1.18 THE TIGER CELL

A Tiger cell as detailed below is proposed for Similipal Tiger Reserve

Composition:

1. Field Director, Similipal Tiger Reserve-cum-Regional C.C.F., Baripada	Chairman
2. D.F.O., Baripada Forest Division	Member
3. DFO, Karanjia Forest Division	Member
4. DFO, Rairangpur Forest Division	Member
5. Superintendent of Police, Mayurbhanj	Member
6. Deputy Director, Similipal North WL Division	Member

Duties and Responsibilities:

- Monitoring the investigation of cases relating to tiger and leopards.
- Conduct Surveys on poached animals, identify and document trade routes and Market forces.
- Monitoring the compliance of patrolling in core and buffer.
- Monitoring the implementation of protocol for monitoring Tiger, co-predator, and prey populations in landscape.
- Liaison with crime control bureau and other agencies in respect of tiger/leopard poaching and intelligence sharing.

- Rewards for candid informers, excellent performance, etc
- Identify existing conflicting land use policies affecting Tiger and prey habitat and resolve through Multi-sectorial dialogue.
- Monitoring the cattle lifting cases by Tiger

One staff from each Range will be designated to coordinate between Range Office and Division office regarding any issues related to tiger and leopard management. The Tiger Cell will meet at least once in six months. Tiger Cell can invite experts if needed in any of its meeting. The proceedings of the meeting will be submitted to the Chief Wildlife Warden. Deputy Director Similipal South WL Division – Member Secretary.

7.6.1.19. Joint Task Force

Due to rise in illegal arms & ammunitions in the fringe villages of Similipal TR for illegal hunting & poaching, and subsequent death of two Forest Official of Similipal Tiger Reserve in the line of duty from in the hands of the poachers in the month of May & June, 2023, a Joint Task Force has been formed by the Govt. of Odisha in Forest, Environment and Climate Change Department, vide its notification No. FE-WL-WLF-0022-2023/16064/FE&CC dtd. 01.08.2023 (Annexure-LXXI).

Composition of the Joint Task Force (JTF)

FD, STR-cum-RCCF, Baripada	Chairman
DFO, Baripada Forest Division	Member
DFO, Karanjia Forest Division	Member
DFO, Rairangpur Forest Division	Member
Deputy Director, Similipal North WL Division	Member
Addl. SP/DSP (Operations) Myurbhanj	Member
ACF, Similipal South WL Division (Intelligence)	Member
Deputy Director, Similipal South WL Division	Member Convener

Police Personnel attached to JTF

Designation	No. of Personnel	Remarks
One Company of Armed Constabulary	100	One company (3 Platoons) to be deployed by DGP and to have personnel of different ranks as per standard norms
Total	100 (one company (3 Platoons))	

Forest Personnel to be attached to JTF

Designation	No. of Personnel	Remarks
Range Officer/Dy. RO	3	To be deployed by FD from STR, Baripada
Forester	6	
Forest Guard	81	FGs of existing STPF will work under JTF
Total	90	

Terms of Reference of JTF

To collect intelligenc& identify people holding illegal arms & ammunitions in fringe/buffer villages of Similipal TR & prepare a database.

To take comprehensive action involving Forest & Police Personnel in deweaponing all the illegally acquired weapons in the fringe and buffer villages of Similipal TR.

To effectively deploy the force to counter any armed poacher inside Similipal TR.

To deploy Police & Forest Presonnel at susceptible APCs/Sensitive Areas for regular patrolling.

To provide capacity building to forest personnel in the form of training on the use of firearms as well as in dealing with armed poachers in the forest area.

To take any further measures as may be necessary for protection of Similipal TR & its wildlife.

7.6.1.20 STAFF WELFARE

The following staff welfare measures are being undertaken for the staff working in Similipal Tiger Reserve.

4. Project allowance for all categories of staff.
5. Residential accommodation for the children of frontline staff of core area in nearby towns like Jashipur and Baripada.
6. Supply of medicine kits, mosquito nets, water filters and radio sets to all protection camps.
7. Steps will be taken for providing food allowance or dry ration to all the protection assistants working in side Similipal.
8. Life and health insurance coverage for frontline staff.
9. Pursue for special incentive/allowance for staff those are posted in interior core areas.
10. Periodic health camps.

7.6.1.21 CAPACITY BUILDING FOR PROTECTION OF TIGER, CO- PREDATOR AND PREY SPECIES

The Deputy Director /Field Director will take the following actions for the upgrading the knowledge of Executive and Protective Staff.

- Conduct regular trainings/ workshops on wildlife management, habitat management, Census and monitoring techniques of flora and fauna, wildlife crime and its legal proceedings, human-wildlife conflict management modern tools and techniques etc. and other relevant aspects.
- All the Beats and camps will be supplied with Standard Operating Procedures (SOPs), Guidelines issued by NTCA, MoEF& CC, Govt.of India, Department of Forest, Environment and Climate Change, Govt. of Odisha, Chief Wildlife Warden, Odisha and other Agencies in odia language.
- Relevant books on wildlife management and criminal investigation shall be supplied at Beat level.
- The Beat Information System developed for better management at Beat level shall be regularly updated every three or four years.
- All the Range Officers and Antipoaching camps will be supplied with Toposheet showing the problems areas.
- Every Year after general transfer, the Executive & Protective staff would be placed in the Field after due orientation explaining their responsibility, strategies to be adopted etc.

- The Deputy Director / Field Director will arrange training related to Protection.
- Deputy Director will maintain record of incidents related to poaching, illegal trade, confiscation etc on tiger and other wildlife species, map location and discuss in annual meetings with Executive, Protective staff and Tiger Protection Force to take suitable measures for future.
- Refresher courses for staff on forest & wildlife laws and other laws relating to forest & wildlife offences will be organised in a regular manner. The training and capacity building data base for each frontline staff shall be maintained at Division level for ensuring training to each and every staff.

7.6.1.22 SECURITY AUDITING

The Deputy Director/ Field Director will conduct quarterly security audit and generate report. The audit will include review of offence case detection, fate of prosecution cases up to 5 years back, availability and adequacy of protection infrastructure, equipments etc. The annual report of security audit shall be placed before Steering Committee/ Governing Body of Foundation.

7.6.2 THEME PLAN FOR FIRE PROTECTION

One of the important factor which commands profound impact on forest and wildlife, is fire. Forest fire has beneficial effect under control but has hazardous effect when it is wild. Fires usually do not kill a large number of animals but they do harm micro fauna and flora of the habitat. Fire destroys the organic matter, which contributes to the humus content of the substratum. Fire changes the abundance and composition of wildlife communities drastically, and a general ecological effect of fire is to reverse the natural plants succession. The fire also destroys the eggs of a number of ground-nesting birds and reptiles. The fire compels animal and bird population to abandon the habitat and migrate randomly in various directions, which may disturb the spatio-temporal utilization of a habitat. Many seeds and several plant species are completely destroyed by fire and their regeneration is affected adversely.

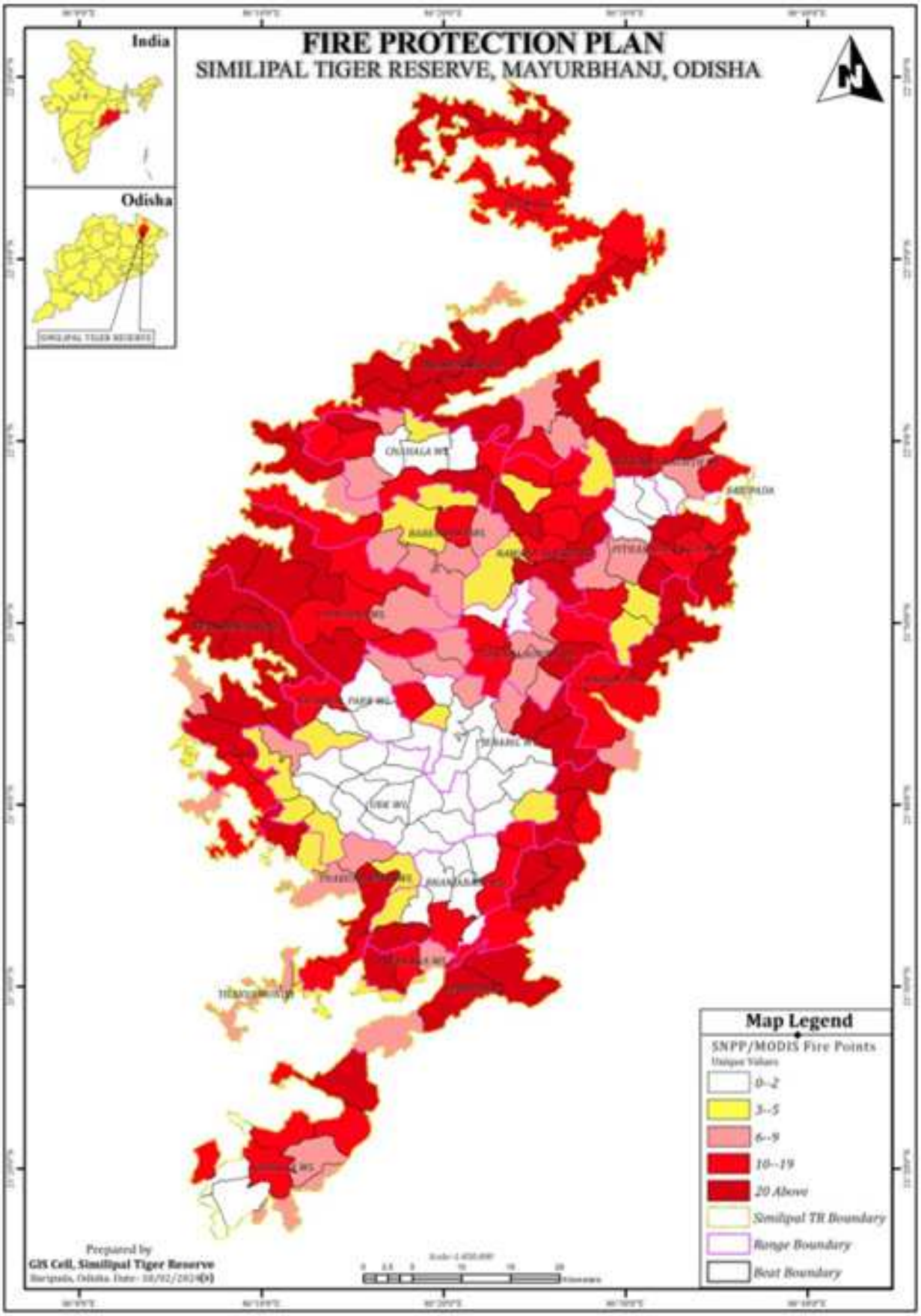
Specific fire protection scheme would certainly check spreading of fire, with a system of immediate detection of fire, speedy communication, quick arrival to the fire site, immediate action to extinguish the fire on war footing scale. One of the most important fire protection measures, is to get reciprocal commitments regarding control of forest fire through regular meetings with local people of the surrounding villages.

7.6.2.1 FUNDAMENTALS OF FOREST FIRE

It is necessary to understand and evaluate the causes of fire, which are many. The factors contributing to fire are heat, fuel and air. In a fire-control operation, one or more of these factors would need to be eliminated. The spread of fire depends upon fuel and weather. Heavy fuel like logs, stumps, and branch wood burn readily but slowly and throw off a large volume of heat, when dry. Light fuel such as dry grass, dead leaves etc, burn quickly, accelerate spread of fire and kindle heavier fuels. So far as weather is concerned, wind, moisture and temperature are important. Strong wind fans rapid spread of fire by augmenting supply of air. Wind is the least generally in the early morning. The moisture content of fuel is also an important consideration for fire-control. Under normal circumstances fire burns slowly in the night, because the damp air and moisture is absorbed by fuel. Air is drier during the day and causes rapid burning. It is thus easier to control fire in the night than during the day. It, however, does not imply that no serious effort should be made during the day to extinguish the fire. In fact, most fires are controlled during the day, due to various other considerations. Air temperature is another important consideration, as it not only affects fuel and air movement, but also the fire-fighters themselves.

7.6.2.2. CAUSES OF FOREST FIRE

Forest fire may be accidental or deliberate. Among accidental, fires may start as a result of carelessness on the part of smokers, picnickers, travellers, forest laborers, and collectors of NTFP. Forest fire are at times intentionally set by graziers, for lush growth of grass, by poachers to drive out wild animals for hunting, by honey collectors to drive away honeybees, by antisocial elements on account of vandalism or to obliterate



Map 7 H: Fire Protection Plan

evidences of the forest offence committed by them. Fires are many a time set unaware by pilgrims along roads. Few others set fire to the forests through a die-hard superstition of propitiating a deity.

7.6.2.3 SOCIO-ECONOMIC IMPACT

Forest fires are recognized not only as a major constraint to production forestry but also as a principal factor causing degradation of the human environment. Some of the impacts of forest fires are tangible but are difficult to evaluate in monetary terms. Studies of dynamics of vegetation reveal, that the original species which propagate readily from seed, or coppice from the stump, would tend to reappear on a site after a forest fire. Thus highly flammable species would immediately re-vegetate and perpetuate a hazardous fuel-type. The other deleterious impact of forest fires is aggravation of surface and gully erosion. The area burnt upstream would tend to reduce the storage capacity of the reservoir downstream. It has been observed that site degradation on account of repeated forest fires causes, soil erosion and floods, which have an adverse effect on streams, lakes and man-made reservoirs.

7.6.2.4 FIRE PRONE AREAS

Based on the vulnerability to forest fire, the areas falling under Similipal Tiger Reserve can be classified into three zones viz., highly fire prone areas, moderately fire prone areas and less prone areas.

Table No- 7-j :Fire Prone Area

Zone	Vegetation Type
Highly Fire Prone	Dry deciduous and moist deciduous forest, grass-lands, scrubs, semi-evergreen patches, and areas falling within the settlements
Moderately Fire Prone	Moist deciduous forests
Less Fire Prone	Evergreen forests, semi evergreen forests and old plantations

7.6.2.5 FIRE CONTROL MEASURES:

The fire season in Similipal Tiger Reserve usually starts from February and continues till May or till receipt of first shower of pre-monsoon. Past experience shows that almost all cases of fire are man-made out of which maximum cases are to facilitate growing of succulent grass/ leaves for the domestic cattle of the villages, a number of cases are for collection of NTFP and few cases for poaching of wild animals. The key factors in controlling the fire will be:

1. Timely and meticulous planning.
2. Effective utilisation of fund.
3. Proper gearing up of available machineries.

Following measures are laid down to guide in combating the situation to make Similipal Tiger Reserve free from fire.

Preparation of Fire Map:

The Range wise fire map in a convenient scale will be prepared with division of entire Range into High, Medium and Low fire prone zones with different colour coding (eg. Vermillion/pink/yellow) to different zones. The parameters for determination of proneness to fire will be nearness to habitation, forest type(microclimatic), passages through the forest and distance from water bodies etc. The Deputy Directors and DFOs will submit a copy of the map to the Field Director latest by 31stJanuary. After fire season is over the Range Officer has to submit a report of success/failure with a map showing the incidents of fire.

Prevention of fire:

The aim shall always be to prevent the forest fire from breaking. Following steps are to be taken to achieve this objective.

Creation of awareness:

The message of the evils of forest fire and the duties of the villagers residing on the fringes and enjoying the usufructs shall be disseminated among the people.

Provision of Award/Reward/incentives :

The motto will be to prevent forest fire by motivating and winning the heart of the people through incentives. EDCs/VSSs will be activated and incentives shall be given to the committees/villages showing active involvement in fire protection in their area. The list of EDCs/VSSs, Organisations, Institutionis and individuals with commendable effort in wildlife and forest protection shall be nominated for Division, District, State and National level awards as provisioned in the Biju Pattnaik Award for Forest and wildlife conservation and NTCA. List of fringe villages of the core area of Similipal Tiger Reserve is given in Annexure L.

Clearance of fire lines:

All the forest roads, boundaries and footpaths passing through or touching the forest shall be taken as fire lines which shall be cleared of leaves and other inflammable materials. In case of forest road at least three meter on either side shall be maintained clean and in case of live footpath a six metre strip shall be cleaned which shall be maintained regularly. New fire line if required will be cleared in three meter width. List of fire lines to be maintained in the core area is given in Annexure XLIX.

Deployment of fire watchers:

Sufficient numbers of fire watchers will be deployed on the fire lines those will patrol over the area to give information on incidences of fire to the nearest camps.

Deployment of informers:

In the villages accustomed to *Akhand Shikar* spies are to be engaged to keep track of the poachers and pass on the information to the concerned forest officials in the field.

Fire fighting:

In order to combat the fire, fire fighting squad at the rate of one or more per Range will be formed depending on availability of fund. The squad will consist of 10 persons on daily wages under control of one regular staff, i.e, Forester or Forest Guard. The squad will be equipped with vehicle, fire fighting tools and VHF. The squad will work round the clock and prevent fire in collaboration with the villagers to whom incentives have been given. They will also extinguish fire on receipt of information on outbreak of fire. In Similipal due to topography, any small outbreak of fire in the lower hill side spreads upward covering extensive areas. Hence the fire fighting staff at the lower hill side has greater responsibility in preventing upward spreading of fire. All the staff and daily wage protection staff shall also be pressed into action.

Detection of Forest Fires

Effective controlling of fire calls for prompt detection and reporting. Detection implies location of the fire and passing on the intelligence to the persons responsible for control. If detection is inefficient, the fire would engulf large areas by the time suppression forces reach the fire scene. No suppression is possible till the fire is detected. The interval of time between origin of fire to arrival of the suppression force would cover operations such as: detection, reporting, preparation and mobilization. It is imperative that fires are detected no sooner than they originate so that they can be controlled with ease, and the damage restricted to the utmost minimum. It is not feasible to keep the entire forest area under observation at all times or

even during the fire season. Parameters such as: the value of the forest to be protected, the frequency of fire occurrence in the area, the nature of the fire and its concomitant adverse effect, facilities for transport and communication, financial resource, the strength of the suppression force and its availability, fire –fighting equipment available, help determine the " priority areas" for observation and the detection-time standards.

The possible means of fire –detection include

i. voluntary detection and reporting by the general public ;

ii. ground patrolling;

iii. Monitoring from Watchtower

iv. Technological intervention.

v. Coordination with Line Departments and District Administration**.**

An efficient detection system should make use of all these methods, according to special needs of the area of risk.

Voluntary Reporting

Where forest area affected by fire has habitation, in and around, it is possible that the local population including right-holders, way fares etc. may report the fires. Such voluntary reporting is dependable through EDC. This is possible only where the EDCs are properly motivated, the EDC needs to be enlightened, motivated about the danger and control of forest fires. Legally the right-holders are duty bound to report about forest fires.

Control Room Contact Number shall be widely publicized for voluntary reporting of forest fire, forest and wildlife crimes by citizens.

Ground Patrolling

In theory, it is a simple arrangement but can be vastly improved if executed methodically. Since the view of the patrolman is often restricted, only limited area can be covered by this method; hence it shall be taken recourse to in regard to the most valuable forest where fire danger may be high, patrol may travel on foot, vehicle etc and shall make use of vantage points. They should be familiar with their designated area including the topography of the area as well as the habits of the local people. They may be required to perform the functions of prevention, law enforcement, fire-suppression etc. The function of a patrolman also includes detection, prevention and suppression. Apart from mobile patrol parties organized by Deputy Director /Field Director mainly for checking theft of forest produce, fire watchmen are engaged during the fire-season for a period of 3 to 5 months. These fire-watchmen assist the forest staff, in detecting and preventing forest fires, as well as in protection of Tiger Reserve. They do not have any training in fire-prevention or fire-detection and are employed seasonally. As a result they are often not able to develop the required expertise in their work. It may be more economical in the long run, to employ specially trained gangs regularly and to use them for other work after the fire season is over. In any case, apart from the fire watchman, forest fires, can also be detected and reported by other officials of the Tiger reserve or other government agencies, in the Tiger Reserve during their normal work in and around forest areas.

Monitoring from Watchtower

Watch Towers at strategic locations will give a bird eye view covering large area for detecting smoke from the forest fires and enable the frontline staff in coordinating fire fighting operations.

Technological intervention.

1. Remote Sensing and GIS Application.

- The GIS Cell shall monitor the Satellite data on forest fire points available on various online platforms like Van Agni Geo portal of Forest Survey of India (FSI), BHUBAN Forest Fire Disaster Services of Indian Geo Platform of Indian Space Research Organisation (ISRO), Fires Information for Resource Management System (FRIMS) of National Aeronautics and Space Administration (NASA) of USA. These Platforms utilize the data obtained from censors on Satellites like Aqua-MODIS, Terra-MODDIS, S-NPP VIIRS, JPSS, NOAA-VIIRS, etc. Monitoring fire points by the GIS Cell of the STR will save the delay in prompt action to combat forest fire. The fire points will be contained before they expand to large scale forest fires.
- To ensure prompt action by frontline staff to combat forest fire and for its effective monitoring, the State Forest Headquarters has developed a GIS based mobile application called OFMS with help of Orissa Space Application Centre (ORSAC). With this applications' the frontline forest staff receives fire points with GPS coordinates on the map under his/her jurisdiction. The fire point received has to be attended within a stipulated period of time and report compliance in the same application.
- Fire vulnerable grids, Beats, villages shall be mapped periodically to prepare fire vulnerability map.
- Mohua flower (Madhuca latifolia) collection is one of the major causes of forest fire. All mahua trees shall be mapped using GIS for control burning operation before onset of fire season.

2. Thermal Scanner

Thermal Scanner may be used to detect the smouldering fire in standing dead trees, fallen logs on the ground and also the fires that are not visible to the naked human eye. This would reduce the repeat fie points by satellite at the same locations.

3. Drones

Drones may be deployed to detect and plan out fire fighting operation on ground especially in difficult inaccessible terrain. It would also be helpful in assessing the area damaged by forest fire.

4. Fire Blowers.

Fire blowers shall be deployed to create fire lines by blowing away the leaf litter on the ground which would prevent further spread of fire in forest.

5. Others

Other advanced state of the art technologies may be deployed to minimise damages caused by forest fire as well as to avoid any casualty during fire fighting operation.

Coordination with Line Departments and District Administration.

From 2022 onwards Comprehensive District Action Plan under the Chairmanship of the Collector and District Magistrate, Mayurbhanj for better coordination in case of combating forest fire. Modern equipments, technological advancement and other resources are being effectively utilized for fire fighting with proper training and mock drills to the frontline staff and fire watchers. Widespread awareness campaigns are also organized with help of various stakeholders to create awareness amongst the villagers in and around the Tiger Reserve.

Post-fire operations

In spite of all the precautions, if fire break out, immediate steps to be taken to extinguish it and the gutted area to be measured and mapped out, the loss to be assessed and the reasons for fire along with responsibility need to be fixed.

Safety

Fire-fighting is a hazardous task. Every precaution shall be taken to prevent injury to the fire-fighting crew.

The fire-fighting crew shall be properly equipped with a first-aid kit. Fire-fighting crew shall be supplied with fire-resistant clothing. Fire resistant cloth is now being made within the country at reasonable price. Fire fighting mock drills shall be organised before the onset of fire season to prevent injury to staff while dousing fire.

Accountability:

The staff will be accountable for the fire in their area and necessary disciplinary action will be taken against them.

Monitoring and evaluation:

In order to monitor the programme, control rooms in the Division and Range Offices will function round the clock. In the STR headquarters a daily monitoring register has been kept where all the cases of fire incidence along with the action taken will be reported. After the fire season is over, the entire area is to be inspected by the concerned Divisional Forest Officer/Deputy Director and evaluate the works of the staff. Outstanding performance of any officer/ staff/ labourer/ village committees will get suitable recognition.

The Deputy Directors will generate fire control Map indicating the fire burnt area every year and submit to the Field Director. The information generated will be utilized while planning fire protection for the ensuing year. Range officers will submit fire occurrence report to DDs/ DFOs in the proforma prescribed below.

Table No- 7-k: Fire control Map indicating the fire burnt area

Sl no & date	Range	Locality	Extent affected by fire in ha	Nature of damage	Loss if any	Whether fire has been put off	Remarks

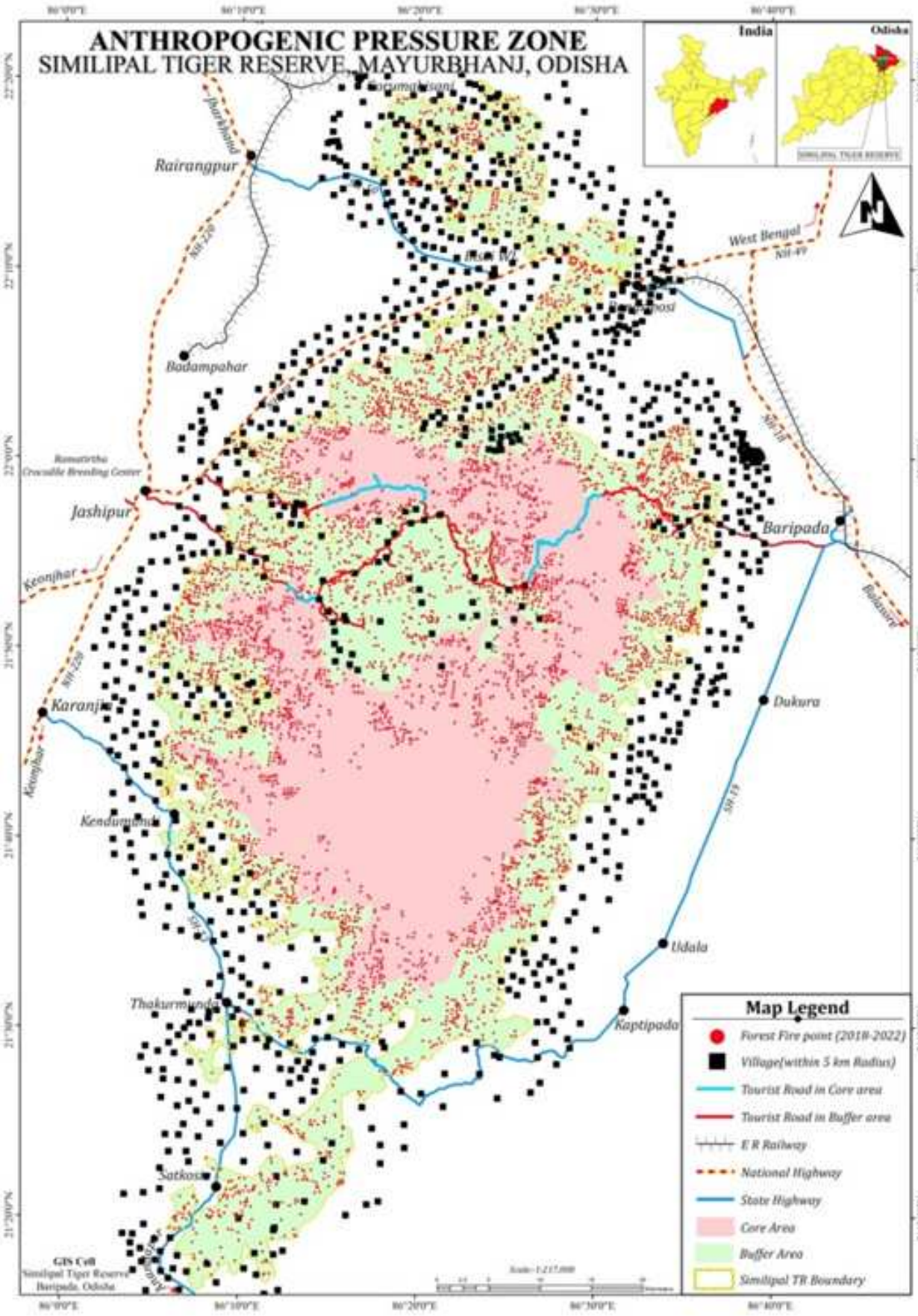
7.6.2.6 PROBLEMS AND TIPS

Fires in a log

If a log is burning first, cool off the parts where it is the hottest. This could be done with damp dirt thrown with a shovel, A fire line should be dug around the burning log, to prevent spread of fire on the ground. The fire-line should be located at a sufficient distance from the log, to provide a safe working areas If the fire is on a steep slope, a trench (like ploughed furrow) should be dug on the lower side, to catch rolling, burning chunk, Wherever possible, the log should be turned around, to lie up and downhill, to prevent it from rolling and scattering fire. If is it not possible, the log should be securely blocked with rocks or rolled into a prepared trench. If the log is too heavy to handle, it is better to have a deep trench below it. After the fire has been cooled down, if water is readily available, it should be sprayed on burning coal or parts. If water is not available, all burning portions should be rubbed well with clean dirt. If there are several burning logs, it would be advisable to clear the area of debris and duff. As a mop-up, all the burnt area and portions of the log should be examined carefully, by looking for smoke and feeling with the hands, to make sure that every spark of the fire has been extinguished. This must be ascertained before leaving the area.

Fire in dead trees

Dead trees that are in various stages of decay are potential fire- hazards. Once such a tree is on fire, it becomes a dangerous fire-spreader, as sparks from a dead burning tree may be carried to far off distances, it usually becomes necessary to fell the dead tree within the fire area. If it is not possible, a safe place should be located for the fall of such a tree, by clearing bushes and other inflammable material from the area.



Map No: 7-I Fire Points detected in Similipal Tiger Reserve during the period from 2018 to 2022.

Falling material shall be watched carefully. Once the dead tree has been felled, same action shall be taken to extinguish all fire according to the instructions given above, for taking care of burning logs. Each piece of burning material must be extinguished. A thorough search for fires that might have been caused by sparks from the dead tree should be made.

As mentioned above, a dead burning tree should normally be cut down. However, if the fire is near the ground and water is available, it may be possible to extinguish it, without felling the dead tree.

Fire in a stump

If a large stump is burning and the fire has spread to the ground, a fire-line should be made immediately, to prevent its further spread. Hotspots should be cooled down, by throwing clear dirt with a shovel. The work of extinguishing fire in the stump should then proceed. The roots should also be checked up and burning roots put out. All the fires should be extinguished to ensure that every spark is out.

Fire in grass/weed/ mixture of fuels, etc.

Grass is very susceptible to changes in weather, it absorbs or dries out moisture rapidly and this character reflects the way grass will burn. Dry and dead grass ignites quickly and is one of the fastest burning fuels particularly where it grows dense. A fire in the grass will cover a large area in no time unless it is controlled immediately. Wind and slope add to the spread of fire. Grass fires, however, do not burn very hot and they soon cool down. A grass fire may be controlled by use of clean dirt, applied with a shovel. A fire-line may also be used by working directly to the fire's edge. Any unburnt material, between the fire-line and the fire –edge should be burnt out. Weeds cover large areas in old burns, cut-overs etc. A fire in weed resembles a grass fire but usually there is a greater amount of flame and smoke. Fire in the weed could be extinguished by working directly on the edge of fire. Clean dirt or water can be used. When there is a fire in the bush burning uphill, start work at the flanks, from the rear and then travel through the burnt area, to the head, as soon as fire reaches the ridge top. Here, action is taken on the rear and flanks to cut the heat and stop lateral spread. Frontal attack becomes possible, when head of the fire reaches the ridge top, but the fire must be controlled before it crosses down the other side. Weeds are flash fuels, which do not burn very long; so fire can be mopped up very quickly but there are usually rotten wood, stumps, logs or other heavy fuels present, which require considerable work. In such cases, it is specially important to quickly size up the fire, to spot the danger points and plan the attack. Each danger points should be taken care of, to stop spread or the threat of spread.

Fire on cliffs.

The cliffs and steep slopes generally have grass cover. When fire reaches such locations it becomes uncontrollable. It is difficult for the frontline staff and fire watchers to carryout fire preventive measures like creation of fire lines and/or post fire fighting operations. Under these circumstances it is advisable for the field staff to keep watch on the spread of fire does not go beyond and reach other areas.

7.6.3 THEME PLAN FOR MAINTENANCE OF BOUNDARY

The core area of Similipal Tiger Reserve, extends over an area of 1194.75 sq km divided into 14 Ranges, 49 Sections and 110 Beats. The boundary of the core area extends over 386.87 km. In Similipal Tiger Reserve, part of Similipal Sanctuary constitutes the entire core area and the other part is under buffer of the Tiger Reserve. Hence due to contiguity of the forest, erection of any kind of pillar is not suggested. The boundary will be demarcated with colour painting on the trees falling on the boundary line at a visible distance. The colour will be two bands of white paint with a band of green paint in between. However at some portions, particularly in Nawana North and Nawana South Range the core boundary coincides with the village boundary and outside area is revenue land. In that portion boundary pillars will be posted after DGPS survey to prevent encroachment. Once the above are done, then the boundaries of the Park would have to be redefined and digitized and shown on GIS map.

Objectives

- Proper record of land.
- Boundaries should be marked on land and map.

Problems

- Land records of area are not computerised.
- The boundaries are not marked in the field.
- Internal boundaries are also not marked.
- Staffs do not know exact external and internal boundaries.
- Geo-coordinates of the core boundary not notified.

Strategy:

- Entire land records of area will be computerized.
- The boundaries of area would be carefully checked and marked clearly on map as well as in the field.
- Beat maps of the area would be prepared showing clearly the boundaries and other important features. These beat maps shall be provided to the Forest Guard, so that he can take care of the boundaries in his control. The beat shall be the basic unit of management and Beat Guard shall be responsible for its maintenance.
- Updating of land records shall be regular process.

Monitoring

- Norms will be fixed for DD/ACF/RO for checking of boundary pillars in the field.

7.6.4 Theme Plan on Tiger Population Estimation and Monitoring

NTCA have issued protocol for monitoring of tigers, co-predators and prey. It comprises of a four stage process involving primary data collection at forest guards beat level, its collation and analysis. All these information are then used to develop relationships for understanding tiger population dynamics in tiger occupied landscape. This process is required to be carried out every year. The four phases are

Phase I: spatial mapping and monitoring of tigers, prey and habitat

Phase II: spatial and attribute data

Phase III: Estimating the population of tigers and its prey

Phase IV: Intensive monitoring of source populations

The following methodology for this monitoring under Phase IV as per the latest protocol of NTCA will be adopted.

- Maintaining daily patrolling log (Form No. 6) in patrolling camp. The staff of all anti-poaching camps after returning from daily foot patrolling will record their observation in the patrolling log.
- Carrying out the eight day protocol of Phase I twice a year for carnivore sign survey and ungulate survey on fixed transects. The data collected will be submitted to NTCA for analysis.
- Recording data from “pressure impression pad”

- Obtaining the minimum number of tigers in the tiger reserve by analysing the sign survey and camera trap data.
- Obtaining the tiger number for the reserve using camera trap in a mark recapture frame work. A camera trap database for the tiger reserve will be created following the standard nomenclature of NTCA and will be supplied to NTCA for the national repository of camera trap photograph of tigers.

The details of tiger population monitoring and habitat assessment have been discussed in Chapter-9.

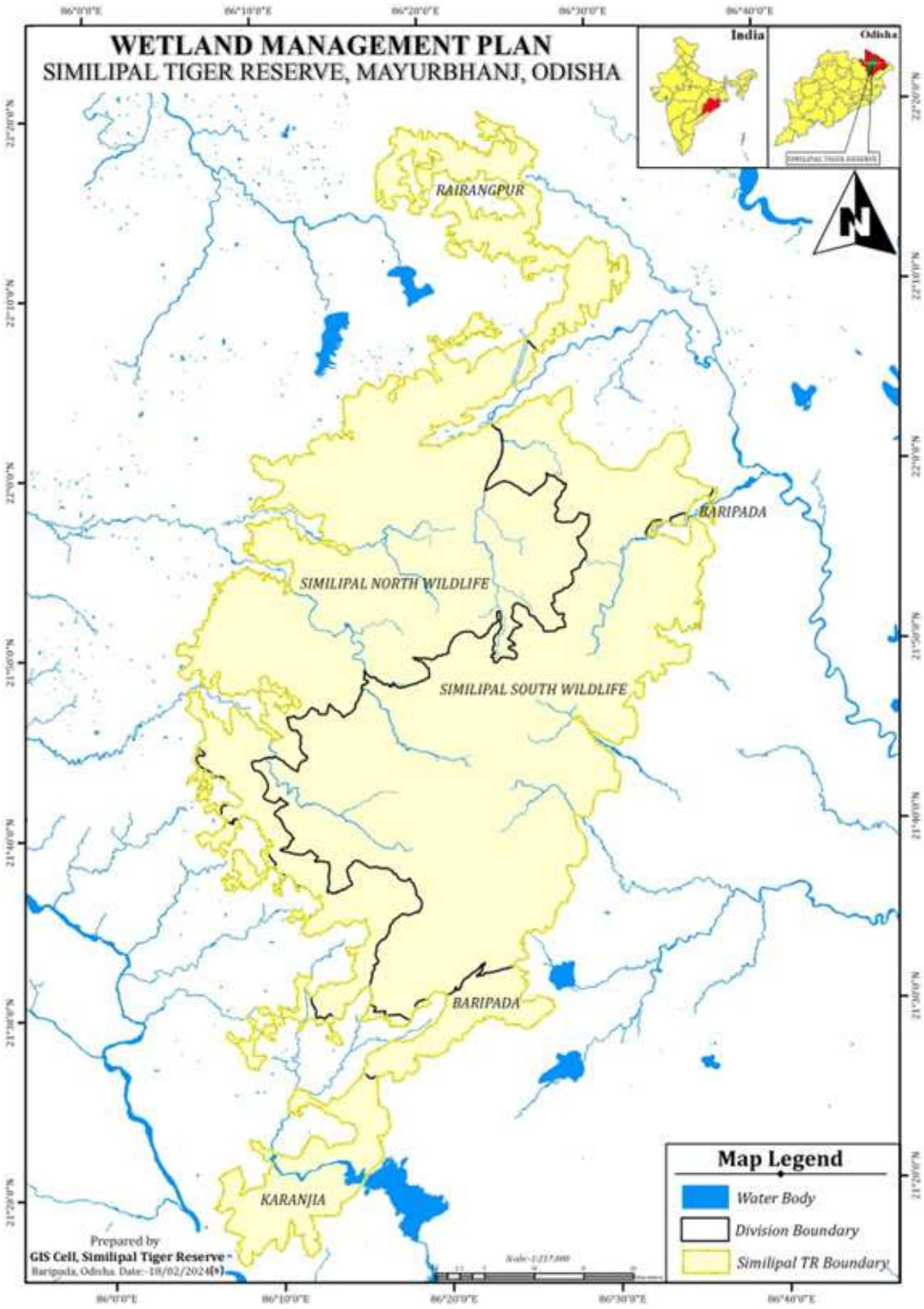
7.6.5 Theme Plan on village relocation

Presently one village namely Bakua is located in Core area of Similipal Tiger Reserve. More than 60 villagers are present inside Similipal Sanctuary. Due to presence of large number of villages meaning forest patches are not being utilised by wild animal due to anthropogenic disturbances. Continuous efforts are going on to convince villagers for voluntary relocation but many villages are not prepared to relocate outside forest area. Relocation of all the villages from Sanctuary area may not be possible due to various limitations. Therefore the village relocation priority should be given to core villages and villages which are nearer to core area and areas of connecting forests like Kolha ridge, Matighati etc. Relocation should start from core to buffer direction so that relocated areas can be converted into grassland and can be protected from poaching and other factors. The villages which are away from core area should be actively involved in joint forest management activities.

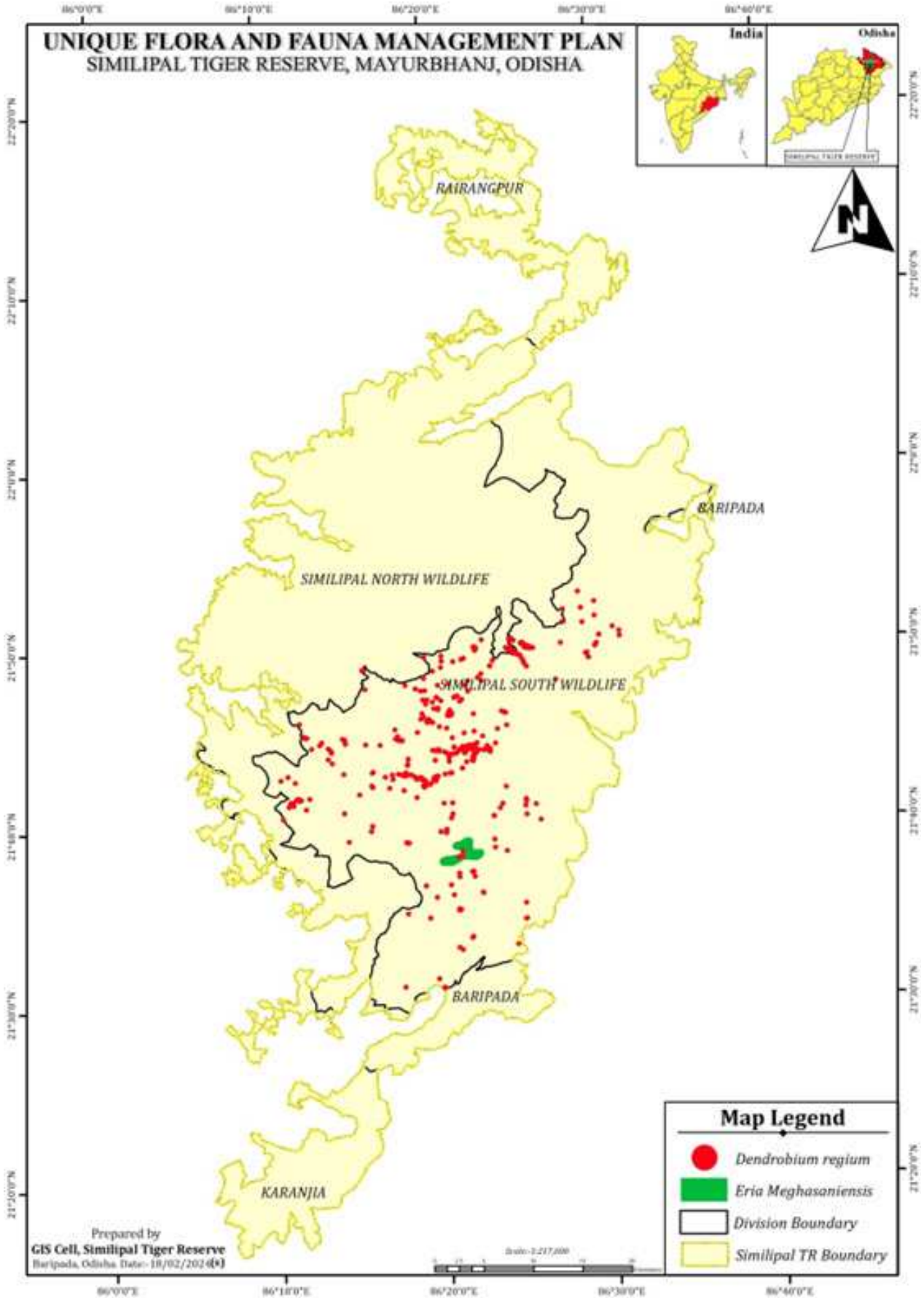
7.6.6 Theme Plan on Genetic Diversity and Species Diversity Management

Similipal Tiger Reserve has limited connectivity with other Tiger Reserves as a results migration of animals from one forest patch to other forest patch is limited. Fragmentation of habitats and migratory paths lead to inbreeding of animals. Inbreeding may lead to inbreeding depression consequences which results in exposing a population to different threats like diseases, reduce fitness etc. The tigers in Similipal Tiger Reserve are increasing from a bottleneck population. During the naxal attack in 2009 the tiger population was drastically reduced due to rampant hunting and poaching of prey base. Later on the protection measures are improved as a result tiger population also started increasing. As population is increasing from a small set of base population there was no scope for enriching gene pool. Similipal is known for its rare pseudo melanistic tigers. The pseudo melanism was a result of mutation happened in colour coding gene which is recessive in nature. Over the years the number of pseudo melanistic tigers is also increasing which indicates frequent expression of recessive genes which may lead to inbreeding depression in future. Although as of now no such inbreeding depression signs are observed in tiger population it is always better to be prepared to enrich gene pool to avoid any unwanted consequences in future. The following steps may be taken to bring new genes to the population and to improve monitoring mechanisms for early detection of any changes in the population.

1. Genetic diversity analysis, studies to be conducted for various wild animals.
2. Collaboration with geneticists to observe any symptoms of inbreeding depression in the population of wild animals especially tigers.
3. Sufficient field studies may be conducted in collaboration with subject matter specialist for successful translocation of tigers from outside the Similipal Tiger Reserve in this plan period. The tiger to be translocated should have sufficient genetic diversity compared with existing tiger population of Similipal. The habitat from which tiger will be selected for translocation should match with habitat of Similipal.
4. There are number of tigers kept in various zoos of different parts of the country. Nandan Kanan Zoo which is located in Odisha also has good number of captive tigers. An experiment may be conducted under the guidance of experts to rewild the tiger cubs which were born in zoos. If tiger cubs successfully learn to survive in the wild they may be released in Tiger Reserve.
5. Similipal had good population of Dhole in the past. Over the years the Dhole population become extinct



Map 7-J :Wetland management Plan.



Map 7-K : Unique Flora and Fauna management Plan.

from Similipal Tiger Reserve. It may be considered to reintroduce Dhole population to Similipal for enriching wildlife diversity.

6. Natural migration of animals from nearby forest to Similipal and vice-versa should be encouraged by proper maintenance of corridors.

7.6.7 Theme Plan on Wetland Management

Similipal Tiger Reserve is blessed with large number of rivers, rivulets, streams etc. Most of the rivers flow all over the year. There are number of marshy patches present in Similipal. An unique set of biodiversity is depending on wetlands of Similipal Tiger Reserve. Therefore wetland management should be given separate focus to safeguard the water resources and also biodiversity which is depending on it. The following steps can be taken to manage wetlands of Tiger Reserve.

1. Continuous monitoring of hydrological regime of Similipal of rivers and rivulets.
2. Soil moisture conservation activities should be undertaken wherever required.
3. Wetland dependant biodiversity inventory should be prepared in collaboration with experts.
4. It may be considered to propose selected rivers of Similipal for Ramsar recognition.

7.6.8 Theme Plan on management of unique flora & fauna.

Similipal Tiger Reserve is the cradle of vast biodiversity. It is home for more than 100 orchids species and many other unique species of flora and fauna. It should be noted that Similipal is the only home for unique pseudo-melanistic tigers. There are many endemic species of flora and fauna are recorded from Similipal Tiger Reserve. The following focus may be given for better management of endemic and RET species of flora and fauna.

Geo tagging of unique species of flora.

Eria meghasaniensis is an orchid species which is endemic to Similipal found only in Meghasani hills of Similipal Tiger Reserve. All the trees where *Eria meghasaniensis* is found should be geo tagged and continuously monitored to observe changes over the year. Attempts may be made to spread the clumps of orchids to other trees by tying with a help of thread.

Proper documentation should be made to record all the unique flora & fauna found in Similipal Tiger Reserve.

Species specific conservation area may be demarcated and monitored periodically.

CHAPTER 8
RESERCH, MONITORING AND TRAINING

CHAPTER

08

RESEARCH, MONITORING AND TRAINING

Research is one of the major issues in the Plan Outline of the Project Tiger document, 1972. The document envisaged that the scientific staff of the reserves would undertake basic research programmes aimed at evaluating systematic factors and influences, for devising pragmatic management practices to cover specific population and the entire ecosystem. Research constitutes a very important aspect of effective management of wildlife protected areas. Research based wildlife management is crucial for the success of any Tiger Reserve. This is a legitimate activity, and must be compatible with the objectives of wildlife management in the protected area. The Tiger Reserve should have a clear wildlife research policy based on the following priorities.

8.1 RESEARCH PRIORITIES

Wildlife management is a mix of field craft and science based on field research. Research in the Tiger Reserve shall focus on the critical information needs, which are by and large common to most of our Protected Areas. Professional researchers working in isolation on topics or species relating to their field of interest can contribute very little for fostering wildlife management. The research shall be "problem solving studies", based on a consultative process involving PA management. Some "pressure points" for PA management are common to most of our PAs, and in addition to the on-going small term projects, wildlife research in Similipal Tiger Reserve should preferably focus on these as given overleaf.

Table No-8-a : Research Priorities

PA Managerial Priorities	Research Areas
A) **Values Relating to PA :** 1. Ecological/ Regional landscape	Regional changes in species abundance, richness &diversity Changes in species occupancy Effect on water table Habitat fragmentation Endangered species: prey base, age/ sex ratio, biomass computation, life table computation, body condition
2. Habitat degradation	Types of exotic/invasive infestation Control/Eradication methods
3. Livestock depredation by carnivores &crop damage by wild ungulates	Reasons for livestock depredation Percentage of livestock in the food-spectrum of carnivores Reasons for crop damage.
4. Habitat management practices	Biodiversity conservation vis-a-vis management practices in-vogue

5. Poaching	Magnitude Modus operandi (variations) Wildlife crime intelligence and networking Wildlife crime prevention Efficacy of various wildlife crime prevention measures
6. Fire	Nature and efficacy of existing preventive and control measures Changes in the habitat due to fire Changes in animal use pattern due to fire
7. Insects as agents of ecological change	Impact (magnitude) Ecological changes Periodicity
8. In-situ conservation	Founder population size Translocation
9. Eco-tourism	Involvement of host-communities Mechanism Impact assessment
10. Jurisprudence	Morphological studies Biochemical studies DNA fingerprinting
11. Wildlife disease	Landscape epidemiology studies Health and monitoring both of wild animals and village livestock
12. Animal monitoring and estimation techniques	Customization of software suited to Similipal setting Estimation procedures, indices for various species Home range studies
Biotic Pressure on PAs: Vision beyond the PA Interface problems	Effect of existing land use Mechanism/ strategy to mitigate ill effects Magnitude of crop damage outside PAs Methods for mitigation Decadal population growth in impact zones outside PAs (human/ cattle) Resource use pattern of indigenous people Impact of PAs on indigenous people Community role in conservation Levels of sustainable use Grazing impact Regeneration status in right burdened forests Impact of rights and concessions on habitat quality Socio-economics of indigenous community Resource requirements of indigenous people & dependencies Traditional knowledge & occupation of indigenous communities Impact assessment of Eco-development woks Impact of Tourism

Apart from the above biological/ ecological researches, the park management shall also encourage the collection of relevant information on the effects of the Tiger Reserve on local economy and communities of the surrounding villages. Such social researches shall also be developed into reports, status papers, micro-plans, and other documents resulting in the formation of effective policies for eco-development of local communities. Although these social projects may sound purely academic or official, and may not have any immediate obvious management significance, they would prove to be of a great value later, as the present scenario of the park - people interface in our country is bound to go a very long way.

8.1.1. FUTURE STRATEGY

Development of Infrastructure

A. Research Labs/Facilities -

The park has no basic facilities for research. One main Research lab will be established at Baripada. Basic equipment like- computers with GIS facility, refrigerator, deep-freezer, microscopes, oven, weighing machine, veterinary instruments etc. for research shall be provided. The additional instruments like- vehicle etc. required for different field research would be procured. There is an urgent need for carrying out systematic and basic research related to habitat, herbivore and carnivore status, population density, habitat use pattern etc. and impact of various works being carried out in and around the Protected Area. To conduct these research activities there shall be a full time research officer, researcher and assistants. Chemical Immobilization equipment and drugs would also be required to capture the diseased or other wild animals in stress requiring help and treatment. Students may be allowed to carry out internship and PhD research work on relevant topics inside Similipal Tiger Reserve.

B. Meteorological Stations

Presently rain gauge is working only at Nawana. Meteorological Stations shall be established at different locations, preferably at Range headquarters so staff can take proper information and collate the data systematically. Automatic weather stations may be installed for long term monitoring of weather parameters.

C. Constitution of Animal Rescue team

As per the guidelines of NTCA an Animal Rescue Team will be constituted by Field Director, which will carry out the rescue and rehabilitation of wild animals. Team shall consist of the followings

In-charge Officer - Veterinary Doctor or ACF

Range Officer - At least one Range officer

Forester - At least 3-4 Dy-Rangers or Foresters

Forest guard - At least 3-4 Forest Guards

Experienced Member - Locally engaged labour or MR labour who have Previous experience.

The team members will be trained in, tranquilizing, trapping the distressed animal and providing it first aid; and in application of various useful instruments.

8.1.2. Constitution of Research Advisory Committee

A Research Advisory Committeeshall be constituted with the following members–

(i) The Chief Wildlife Warden, Odisha	Chairman
(ii) Senior Research Officer, O/o PCCF (WL)	Member
(iii) A representative from WII	Member

(iv) State Wildlife Health Coordinator From Veterinary College, OUAT	Member
(v) Field Director, Similipal Tiger Reserve	Member Secretary
(vi) Any other Scientist / Forest officials, nominated by the CWLW of Odisha	Member/Special invitee

A Park Level Research Committeefor Similipal Tiger Reserve shall be constituted with the following members–

(i) The Field Director, Similipal TR	Chairman
(ii) Faculty, North Odisha University (2 nos)	Member
(iii) Veterinary Surgeon of Similipal TR	Member
(iv) Deputy Director, Similipal North WL Division	Member
(v) Deputy Director, Similipal South WL Division	Member Secretary

The Committee shall have the following main activities: -

a. To finalize the selection/identification of relevant research based studies.

b. To review the progress of research activities carried out for the Similipal Tiger Reserve

c. Provide suggestion/recommendations for improvement and smooth functioning of the research activities.

The meeting shall be arranged as per the requirement, but at least once in six months. The members would be eligible to get TA/DA and other facilities, decided by the Government from time to time.

8.2. RESEARCH PROJECTS

The list of research projects carried out in Similipal Tiger Reserve in 2010-11 to 2022-23 has been given in Annexure XXIV.

The Research activities in the Tiger Reserve were confined to traditional research on forest and wildlife. In the changing scenario it is necessary that the scope of such research should extend to the micro flora and fauna as they are also part and parcel of the biosphere. It also is desired to engulf the socio-economic condition of the people and forest crimes within its sphere. Most of the research works to be spelt out in this chapter will be confined to the flora and fauna of the Reserve. As such the attention is drawn to the following field for research.

- Determination of bio-diversity richness along with the micro flora and micro fauna.
- The carrying capacity of different wild animals, their food habits
- The health of wild animals with special reference to the elephants
- The nutrition content of different edible plant species taken by the wildlife.
- The effect of fire both conducive and adverse to the forests.
- Eradication of weeds like *Eupatorium* from the forests.
- Ground water table
- Ethno-botany i.e. various plants used by the local people, their distribution and status.
- Socio-economic condition of the people inside the PA and its impact on management.
- Forest and wildlife crime, their trend, causes and remedies.

Strategies

The following strategies will be adopted for the purpose of research.

- Establishment a Research Center with GIS laboratory and monitoring cell at Baripada under a Research Officer with one GIS Analyst and Computer Operator with required infrastructure like building, Soil Testing kits, Computer, Cameras, Binoculars, Microscopes and other instruments.
- The help of Sociologist, wildlife expert and Criminologist will be taken.
- A Forest Crime and Prosecution Cell at Baripada in the Office of the Field Director will be established with one Forest Ranger, one Forester and one Junior Clerk. A computer will be purchased for the purpose of keeping the records of Forest Crime. The Cell will monitor the crime up-to-date position of prosecution process and outlining the procedure for preparation of case record for prosecution.
- Maintenance of existing sample plots and preservation plots to study the impact of biotic interference, growth statics of plants and succession.
- Plus trees of different species will be selected, listed and protected for collection of seeds to be distributed among the Divisions for raising plantations.
- All the transects laid to monitor herbivores, their signs; the habitat features will be permanently maintained and observations on signs of wildlife be recorded in a register at frequent intervals.
- Computer data on animal sighting, herd size of each species, movement pattern, plant phenology and fire incidence will be recorded and analysed to give inputs for future management.

Linkage with Academic agencies

The research work will be taken up in collaboration with Regional Plant Resource Centre, Bhubaneswar, Wildlife Institute of India, Dehradun, Anthropological Survey of India, Zoological Survey of India, Botanical Survey of India, Bombay Natural History Society to name a few. The experts in Botany and Zoology Department of Utkal University and North Odisha University will also be entrusted with the research work whenever necessary**.**

8.3 MONITORING FRAMEWORK

As stated in previous chapters, the Reserve has a good network of forest camps covering all vegetation cover types and habitats of wildlife. A photographic album of ground flora covering many species of grasses, herbs and forbs shall be prepared and distributed to all field staff involved in the day to day monitoring to facilitate easy identification of species from the management point of view. The data generated from such continuous monitoring shall later be inferred/ analysed into very interesting trends, and bases for species-specific and habitat specific planning in the Tiger Reserve. Each Forest Guard in-charge of the respective camp must fill in the requisite information derived from the daylong patrolling of his beat. This would lead to the generation of a lot of data on the basic parameters required for managing a wildlife protected area.

8.3.1. Physical- physical monitoring is as important as biological monitoring. By physical monitoring we can monitor following issues:

a. Patrolling camps

b. Park boundary

c. encroachment

d. unauthorized entry of people

e. monitoring of patrolling parties who are engaged for protection and physical monitoring

f. animal health by direct sighting

g. waterhole/salt-licks/grasslands/animal trail etc. monitoring

h. Siltation in water bodies

i. Rate of erosion in the banks of streams

j. Change in rainfall pattern and change in diurnal/ seasonal variation of temperature

8.3.2. Biological

The Park Management will ensure that the monitoring of biological resources form a basic routine activity in protected area management, and it is the principal way in which the management can identify trends or changes, and so gauge the effectiveness of its managerial inputs. The management shall strive to include a number of useful monitoring activities in the routine duties of the staff, as well as regular annual estimation of wildlife, counts and other activities.

8.3.2.1 Tiger, Co-Predators, Prey and its habitat

Monitoring status of tigers, co-predator prey base and important components of the conservation plan. All forest camps within the Tiger Reserve shall be provided with camp registers containing proforma of information/ data collection relating to the broad phenology of the vegetation type, species-wise animal sighting with their age-class and sex-class structures, females with fawns, lactating females, and others etc. The proforma for recording indirect evidence of tiger and panther has also been included. As far as the management is concerned, a useful inventory could be as simple as information on the distribution of important species, whose numbers reflects important ecological processes. Even crude indications of the numbers of these animal species would add to the value of inventory. A coloured photographic guide for identification of animals should be prepared and distributed among all the field staff.

Daily Monitoring and Forecasting

Similipal Tiger Reserve is home to source population which is extremely important for long term conservation of tigers at landscape level. Prescribed format for daily monitoring is enclosed. The park manager will get this data daily by wireless and should monitor daily basis. So he may know the daily activities and tiger movement etc. The analysed information thus generated should be sent to NTCA every month. The format of daily monitoring using in camp level in TRs is given in table next.

Table No-8-b : Research Priorities

Format of Patrolling Camp Register for Routine Ecological Monitoring

Particulars of Patrolling			Phenology			
Date	Place & Compartment No.	Time	Flowering trees/ Plants	Fruiting Trees/ Plants	Leaf fall	New Leaves
1	2	3	4	5	6	7

Formats for Biological monitoring

Herd Structure of Ungulates														
Total No. of Herds (Chital/ Sambar/ Gaur/barking deer/four horned antelope etc.)	All Male Herd				Female-Fawn Herd				Mixed Herd					
	Adult	Sub-Adult	Fawn	Total	Adult	Sub-Adult	Fawn	Total	Male Adult	Male Sub Adult	Female Adult	Female Sub Adult	Fawn	Total
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Various Stages of Antler Development					Birth Frequency of Ungulates (15 days Intervals)		Stages of Gestation	
Males with Fallen Antlers	Males with Developing Antlers	Males with Branched velvet Antlers	Males with Developed Hard Antlers	Total	Date	Total New Borns	No. of Pregnant Female	No. of Lactating Females
23	24	25	26	27	28	29	30	31

Data/ Evidence Relating to the Tiger										
Male/ Female Pugmark (No./ Unit Distance Walked)	Urination (No./ Unit Distance Walked)	Scraping (No./ Unit Distance Walked)	Call (No./ Unit Distance Walked)	Scratches (No./ Unit Distance Walked)	Scat (No./ Unit Distance Walked)	Cattle Kill	Other Kill	Stride Measurement	Straddle Measurement	Signature Inspecting Officer
32	33	34	35	36	37	38	39	40	41	42

Habitat Assessment and Monitoring Framework-

The Tiger Reserve will develop a system of ecological monitoring of flora and fauna. For habitat assessment sampling for Vegetation, Human Disturbance and Ungulate Pellets will be done. To quantify the habitat parameters and determine relative abundance of ungulates sampling will be done along the same line transect on which ungulate encounter rates were estimated. Sampling for vegetation, ungulate dung/pellet and human disturbance will be done only once on a transect.

Spatial Database Development-

Spatial database shall be developed and data taken in different datasheets to be collected for analysis.

Analyses and Reporting Framework-

The data taken from field to be compiled TR/Landscape-wise and send to WII for further analysis and results.

8.3.2.2. Other Species-

Other species which are not direct prey of co-predator of tiger, separate monitoring protocol shall be developed. Not only big mammals or vertebrates but if it is important or indigenous to that site or if it is in red data list or endangered and threatened species, special monitoring protocol shall be developed. In Similipal Tiger Reserve tracking of elephant herds and recording herd size, sex ratio, health, movement pattern, feeding habits etc. shall be recorded daily by patrolling parties and shall be recorded in a proper format. So collected data can be analysed and monitoring by higher level can be done.

8.3.2.3. Vegetational Changes

This may include the status of regeneration of key species, status of grasslands/meadows, successional stages in a community, invasion of woody species into grasslands, productivity of a site and weed infestation. Some example of indicators of vegetation is given below:

Table No-8-c : Vegetational Changes

1	Lichens	Highly susceptible to environmental degradation
2	Mosses	Indicators of moist/dry environment
3	Orchids	Presence of many endemic species
4	*Pterocarpusmarsupium* and *Dalbergi-alatifolia*	Illegally felled for house building and furniture; deficiency shows biotic pressure
5	Invasive species	*Eupatorium* sp. whether invading to core area
6	Vegetation cover vegetation changes will also be monitored by using sat-ellite imageries through FSI and GIS Cells at STR, Wildlife Hqrs	

8.3.2.4. Changes due to fire

Effect on soil, flora and fauna

Effect on regeneration

Cause of fire: Mapping of fire incidence and damage.

Successional changes induced by fire

8.3.2.5. Changes in animals

Change in number population structure age group and sex-ratio.

Distribution of animals

Health Conditions

Prey Preferences

Behavioural Aberration etc.

Distribution of melanistic/black tigers

The following table indicates the indicators in animal species.

Table No-8-c : Vegetational Changes

Sl. No	Animals	Reason of selection
1	Tiger	Charismatic species and apex of the ecological pyramid
2	Elephant	Charismatic species and largest herbivore
3	Prey animals including gaur	Prey base of large cats
4	Giant squirrel	Indicates closeness in canopy
5	Mugger	Master predator and charismatic aquatic herpetofauna
6	Turtle and tortoise	Indicator of ground flora, fauna, soil and water quality
7	Mahaseer fish	Indicator of water quality and intensity of fishing
8	Peafowl	Charismatic avifauna, National bird
9	Predator birds	Presence of plenty of prey base
10	Hornbills	Highly endangered, presence indicates good environment
11	Hill myna	Endangered as captured for pet trade
12	Moths and butterflies	Indicate virginity of environment and free from biotic pressure.

It is very crucial to have access to and use of pertinent literature on forest and wildlife management and periodicals thereon in the library of the PA at Baripada, so that to cater to the need of Researchers and field functionaries to update their level of knowledge in tune with changing scenario in management of PAs, so it is suggested a full-fledged library be established in the PA headquarters.

8.3.3. Effects of management inputs

Utility of Water Impounding Structures. Relocation of enclave villages and its trend of utilization of vacated lands by wild animals, Inputs under eco-development and its role in reducing the dependency on forest.

8.3.4. Socio-economic and management

In Similipal Tiger Reserve there are many tribal settlements. Village boundary, villager's crop-fields and their activities, out-side people who are coming to whom shall be monitored to develop a protocol by park management. Old offenders who are living inside or outside shall be listed and for monitoring of their day-to-day activities, offender-wise duty shall be allotted to staff, who will collect information and send report to higher officers.

8.3.5. Methodology

For monitoring physical changes, different gadgets need to be installed at certain representative sites to quantify the parameters. Data collected will be analyzed in computer installed at Baripada. For monitoring vegetational changes and changes induced by fire, sample-plots are to be laid randomly. For tree species, the plot size should be 10m x 10m or a circular plot of 5metre radius will give best results (Tested in Rajaji National Park having similar forest types). A few larger permanent plots of 1ha area are also recommended. Aerial photographs and satellite imageries of the tract will be indented from National Remote Sensing Authority. The in house GIS Cell is required to be upgraded. For monitoring the impacts of management inputs, radiating transect are suitable for water impounding structures and effectiveness of eco-development measures. For relocated sites, line transect for indirect animal evidences assisted with data on opportunistic encounter will form the base for interpretation. Methods of monitoring animals generally include roadside counts, external body conditions, fat estimation, bone marrow estimation and study of fecal matter. For certain types of more detailed study the use of radio telemetry is suitable. But, its feasibility in Similipal Tiger Reserve needs an assessment along with determination of site- and species-specific design of equipment. However, radio tracking equipment can be used for monitoring the movement of elephants, which sometimes visit Similipal and change places while moving through the states of Odisha, West Bengal and Jharkhand. Impacts of tourism are best monitored through indicators namely; (i) ecological. (ii) Alternate and (iii) diverse. Certain major Ecological Impact Indicators are visible soil erosion, abundance of selected wildlife species (scavengers), frequency of wildlife sightings, exposed plant roots, water ambient quality and amount of trash and litter left behind by visitors. Alternate Indicators include (i) Noise impact of traffic, (ii) Disruptive settlement pattern in tourism villages and (iii) Disruptive construction in recreational areas. Local agriculture serves as the main indicator of diverse impacts and can be quantified as, expansion of agriculture to meet the tourist demand for supply of specific agricultural products and shrinkage of agricultural land to develop infrastructures for wildlife tourism. The monitoring will be done internally at Division level by the Divisional Forest Officer and at Circle level by The Field Director, STR. The evaluation will be done by an outer agency preferably the Indian Institute of Management, Indian Institute of Forest Management and Anthropological Survey of India at an interval of three years

8.4 TRAINING NEEDS ASSESSMENT & HRD PLAN

Though the management of the Similipal ecosystem itself is a learning process for the majority of the frontline staff, the Park Management shall ensure that the newly inducted staffs undergoes wildlife training conducted by various Institutes in the State and outside. Officers shall be encouraged to undergo Diploma as well as Certificate and Capsule courses conducted by the Wildlife Institute of India, Dehradun for officers down to the Forest Ranger. The information about the training and institute providing training is as following –

Table No- 8-d : Training Courses

S. No	Course Name	Course Type	Course Duration	Participant Level	Resource person/ org.	Frequency
1	Improved Wildlife Management	Diploma Course	Nine Months	A.C.F./DCF	WII, Dehradun	Once
2	Eco-development	Module	Three Months	A.C.F./DCF	WII	Once
3	Improved Wildlife Management	Certificate Course	Three Months	F.R.	WII	Once

Besides, Forest Guards and foresters posted in Similipal shall be given specialised training in wildlife apart from basic forestry training. Apart from above basic training, some very important trainings are required to staff/officers for their day to day functioning.

8.4.1. Wildlife Protection

8.4.1.1. Detection and process of wildlife offences

Training will be imparted to improve:

- Understanding of principles and procedures of intelligence gathering.
- Understanding of relevant sections and rules made there under of laws in Odisha Forest Act, Wildlife Protection Act, Criminal Act, Criminal law.
- Knowledge of effecting seizure, booking and investigating offences.
- Methods of hunting/ poaching and modus operandi of poachers.Knowledge of animal traps snares & poisons.
- Executive instructions for safe keeping of seized materials.
- Training the field staff, Range officers and staff working in Strike Force on Intelligence Network.
- Training on identification of Wildlife parts and products for Forest Department, Police, Tourism, Agriculture and Food regulatory Authority and other relevant law Enforcement officers.

8.4.1.2. Maintenance and use of fire arms

Training will be imparted to improve:

- Knowledge of various types of arms, ammunition and their use by forest officials.
- Powers, under State Govt. orders to use fire arms.
- Laws including Arms Act pertaining to use of fire arms.
- Training to the field staff in using and maintenance of fire arms.

8.4.1.3. Use of Wireless sets

Training will be imparted to improve:

- Knowledge of various types of wireless sets being used in the state and their use.
- Knowledge of operative language and wireless use code book.
- Knowledge battery and solar panel's working and maintenance.

8.4.1.4. Carrying out fire protection measures

Training will be imparted to improve:

- Knowledge of fire, firelines, fire behaviour and its effect on habitat.
- Knowledge of season, place and the time of the day for line cutting and burning.
- Knowledge of different types of watch towers, fire towers and their maintenance.
- Knowledge of fire protection plan.
- Method of organising and mobilizing fire fighting teams, managing labour force in fire suppression.

8.4.1.5. Maintenance of checking barriers

Training will be imparted to improve:

- Knowledge of checking barriers and their location.
- Knowledge of transit rules.
- Knowledge of existing govt. rules regarding entry in Protected Areas.
- Knowledge of searching and seizure of vehicles.

8.4.1.6. Personal Safety and First-aid.

Training will be imparted to improve:

- Knowledge of animal behaviour and offender behaviour.
- Knowledge of first-aid, maintenance of first-aid box, improvised stretches, etc.
- Knowledge of tackling offenders in custody.
- Safety of offenders in custody.

8.4.1.7. Establishment and maintenance of boundaries

Training will be imparted to improve:

- Knowledge of forest survey and mapping; alignment of boundary of Forest stations, and its checking with maps. Existing rules and regulations governing boundary cairns. Survey of boundary, Act and Rules.

8.4.1.8. Conducting Patrol in Patrolling Units/Section

Training will be imparted to improve:

- Knowledge of activities permitted regulated and prohibited in Protected Area, Forest Beat, Section and Range.
- Knowledge of patrolling Registers.
- Knowledge of procedures of Section inspections, Govt. Rules/Circulars regarding Inspection Report. Stump and tree measurement techniques.
- Knowledge of Wildlife Activity Calendar.

8.4.2. Dealing with wild animal damage problem and animal in distress.

8.4.2.1. Dealing with Crop damage case

Training will be imparted to improve:

- Knowledge of signs and evidence of wild animals, knowledge about prevailing govt. rules.
- Knowledge of types of physical barriers and their efficacy in relation to various species of wildlife.

8.4.2.2. Dealing with Cattle lifting case

Training will be imparted to improve:

- Knowledge of predator specific signs of killings.
- Reporting and Monitoring Cattle lifting cases.
- Disposal of carcass.

8.4.2.3. Dealing with Human injury and death cases

Training will be imparted to improve

- Knowledge of procedure to deal with human injuries and death caused by wild animals.
- Govt. rules regarding payment of compensation and insurance policy provisions.

8.4.2.4. Dealing with Problem animal

Training will be imparted to improve

- Knowledge of general animal behaviour and crowd behaviour.
- Knowledge of reporting procedures.
- Training to field staff and handling and rescue of Wild animal.

8.4.2.5. Dealing with animal in distress

Training will be imparted to improve

- Knowledge of behaviour of an animal in distress.
- Knowledge of methods and means of transportation.
- Significance of expert veterinary medical help.
- Knowledge of restraint and handling of wild animals.

8.4.3. Field Craft

8.4.3.1 Identifying wildlife evidences, taking measurement, making record

Training will be imparted to improve

- Knowledge of what items constitute wildlife evidence.
- Broad species – habitat equations.
- Species specific characteristic appearance of dropping by their shape, size, pattern of deposition and if relevant, to consider reference to distinctive habitat types.
- Precautions in interpreting wildlife evidences and the possible level of information that can be generated.
- Where to look for tiger pugmark, understanding of morphology of pug marks that lead to tiger identified by sex and age class status. What is a true representative print, the measurement and records to be made.
- What to record in a dead wild animal encountered. How to make standard body measurement.
- For Skeletal remains of animals, anatomical differences between carnivores, herbivores& within these

groups, species identity by specific characters.

- Method of killing of prey by tiger, leopard and wild dog.
- A method for writing observations.
- Method of preparing PIPs (Pug Impression Pads) as per standards, establishing a system, its maintenance and use.
- Methods of identifying Tiger and prey Via Sign Survey, use ofCamera Traps for Wildlife Surveys and methods for making observations andrecording data.

8.4.3.2. Identification of animals and birds by sight and calls

Training will be imparted to identify

- Calls of wild animals and birds and their interpretation.
- How to differentiate the sexes in animals and birds. In case of commonly encountered herbivores and carnivores how to determine an age class by external features.

8.4.3.3. Approaching a wild animal

Training will be imparted to improve knowledge on

- Principles of animalsbehaviour – very broad. How behaviour governs somaticchanges and what are such changes, at least in case of large vertebratespecies – alarm, and aggression are important.
- What constitutes personal safety?
- What actions are least disturbing to wild animals?
- How a dangerous animal should be approached – dos and do not.

8.4.3.4. Identification of common plants

Training will be imparted to improve knowledge on

- Plant morphology and taxonomy.
- Common local/ English (at least few important) names.
- Nature of feeding signs on plants.
- Knowledge of how herbarium specimen is collected preserved mounted andtheir significance.

8.4.3.5. Record basic data (animals, animals activities, plants, habits, attributes, events).

Training will be imparted to improve

- The method of writing simple scientific observations with the essential details.
- How to interpret a sign, evidence, an event or an activity.
- Use of diameter, girth tapes, callipers, Abney"s level, hand held compass,ranging rod, rope and pegs for establishing plots, ready made quadrants, laser range finder.
- Understanding formats and writing observations as per the format structure.

8.4.4 Wildlife Habitat Management

8.4.4.1. Define concepts in habitat management

Training will be imparted to improve

- Rationale for conserving biological diversity in forested landscapes. Linkage with quality of human life and survival.
- In situ and ex situ conservation.
- What are PAs and why they are established?
- Basic wildlife biology: Broad introduction to Animal &PlantKingdom. Wild Animals of Odisha: Mammals; Birds; Reptiles; Amphibians. Their description, social organization, general behavior and habits; habitat, distribution and status. Wild plants of Odisha: Significant species and communities. Identification of common plant species and those which are endangered. Toinclude trees, shrubs, herbs, grasses, epiphytes in general, with use made bylocal communities of people as relevant.
- A broad history of wildlife conservation: India (general), Odisha (in particular).
- Concept of endangered, vulnerable, threatened rare and endemic species. Examples of animal & plant species in these categories from Odisha.
- Ecosystem functions.

8.4.4.2. Creation and maintenance of Waterholes

Training will be imparted to improve

- Significance of water to wild animals and cattle.
- Water as a critical habitat component.
- Construction of various kinds of water storage structure and maintenance.

8.4.4.3. Weed identification and control

Training will be imparted to improve

- Knowledge on definition of weeds, propagation, appropriate time to control and species specific control method.
- Use of tools.

8.4.4.4. Management of grasslands

Training will be imparted to improve

- Value of grassland as a habitat for dependent species of animals and plantsof conservation importance.
- Activities having impact on grasslands.
- Impacts of grazing and fire.
- Fire behavior.

8.4.4.5. Carrying out soil and water conservation measures

Training will be imparted to improve

- Knowledge on Significance of soil conservation treatments.
- Working knowledge of preparing mechanical and vegetative structures.

8.4.4.6. Raising nursery and carrying out plantation.

Training will be imparted to improve

- Nursery and Plantation technique that uses pits, contour trenches, contour bunds.
- Grading and maintaining planting stocks and its transport, planting operation.

8.4.4.7. Monitoring habitat components

Training will be imparted to improve

- Significance of monitoring including protocols and periodicity.
- Knowledge of habitat requirement of common species occurring in the area.
- Definitions of seedling, sapling, pole and tree.

8.4.4.8. Estimating and monitoring wild animal populations

Training will be imparted to improve

- Identification key to major wild animals of Odisha.
- Knowledge of tiger, leopard, tiger cub pug mark attributes.
- Understanding population estimation methodologies.
- Habitat orientation and behavior of common wild animals.

8.4.5. Health Management of Wild Animals

Training will be imparted to improve

- Knowledge of symptoms of death due to anthrax and its disposal.
- The standard procedure followed in the department. Awareness of frontlinestaff's role in accomplishing the operation.
- Knowledge of prevention of infectious diseases.
- Knowledge of collection, preservation and transport of samples.
- Knowledge of zoonotic diseases.

8.4.6. Forest Engineering

8.4.6.1. Developing and maintenance of infrastructure

Training will be imparted to improve

- Knowledge to understand methods of testing good quality bricks, sand, stone, cement etc. with storage system.
- Method of preparing cement mortar, C.C. with appropriate proportions.
- White washing, colour washing, painting, varnishing, methods.
- Consideration for proper site selection.
- Construction involving brick, stone, wood, tiles thatch.
- Ecological consideration in aligning roads.

- Overall supervisor's role and what to supervise.
- Maintenance of store.
- Making measurements, cross checks and maintaining measurements book.
- Blending the construction with Natural environment.

8.4.6.2. Construction of machans, use of watch towers and hides.

Training will be imparted to improve

- Knowledge on Principles of location and use of machans, watch tower andhides, principles of camouflage.
- Observers do's and dont's on machan watch tower, inside a hide.
- Kinds and use of knots, noose, use of pulley and tackle.

8.4.7. Account and service matter.

8.4.7.1. Preparation of voucher and accounts.

Training will be imparted to improve the Knowledge of :

- Conduct rules
- TA rules, financial rules.
- simple volume area calculations.
- Important standing orders.

8.4.7.2. Service Matter.

Training will be imparted to improve

- Synopsis of conducts rules.
- Duties.
- Dress code etc.
- Important standing orders and circulars**.**

8.4.8. Special Training

Training will be imparted for Managers of Tiger Reserve in Management Techniques including leadership skills, decision making, Planning, Protection, Use of Information Technology and Personal Management.

8.4.9. Learning Best Practices.

The frontline and Executive staff will be sent to other important Tiger Reserves/PAs such as Kanha, Bandipur, Nagarhole, Mudumalaietc to learn and share best practices.

8.4.10. Human Resource Development (HRD) Plan

Wildlife management is a specialized branch, which need special orientation, skill and knowledge. Training makes a technocrat and field staffs perfect in his profession. Exposure of good efforts done in the *Par excellence* site develops a feeling of motivation to achieve the goal to the same degree or sometimes higher also. Not only this, tremendous degree of confidence is also developed if the initiative done is appreciated by others. Hence it is nice to initiate effort to impart special training to all level of staff in various relevant fields.

To handle sensitive bio-diversity conservation vis-à-vis eco-development issue, field officer many times in stress due to burden of field work as well as office work. Hence imparting regular refresher courses covering different topics including relaxation programme like Yoga is recommended for the various levels of staff of Similipal Tiger Reserve as following

Table No-8-e : Human Resource Development (HRD) Plan

S. No	Course Name	Course Type	Course Duration	Participant Level	Resource person/ org	Frequency
1	General wildlife management course	Orientation Course	One week	D.C.F./C.F.	WII, Dehradun	Once
1 a	--do--	Orientation Course	10 days	A.C.F./ D.C.F.	WII, Dehradun	Once
1 b	--do--	Orientation Course Module on different modules	One month to Three month	Dy. Ranger Foresters, & Forest Guard	Wildlife training school	Once
2	Soil and moisture Conservation	Orientation Course	One week	Dy. Ranger Foresters, &Forest Guard	WALMI, Bhubaneswar	Once in a year
3	Rural development	Orientation Course Module II	One week	Dy. Ranger Foresters, &Forest Guard	State Institute for Rural Development, Bhubaneswar	Once in a year
4	Enforcement of Law and Enactment's	Refresher Course	Three days	Range officers, Dy. Ranger, Foresters & Forest Guards	STR headquarters	Once in six months
5	Fire protection training	Local training and Orientation course	One week	Dy. Ranger Foresters, & Forest Guard	Should be organized locally at Divisional level	Once in a year
6	EDC account keeping capsule course	Refresher course	Three days	EDC chairmen and associated staff	Divisional Headquarters	Once in Two year
7	Research and Monitoring course	Capsule course	One week	DCF, ACF, Range officers, Foresters and Forest guard.	WII, Dehradun for DCF and ACF; Training schoolsFor lower staff	Once in Two year
8	Education Awareness course	Refresher course	One week	ACF, Range officers, Foresters and Forest guard	WII, Dehradun for DCF and ACF; Training schools for Foresters and Forest guards.	Once in two year

The senior as well as lower field staff shall be exposed to latest trends and developments achieved in different subjects related to wildlife management. Such exposure would help the field staff to carry out various management practices for effective management. A regular short- course requires to be organized from time to time for the ground level field staff to impart technical expertise to carry out various routine works, like; population estimation, water hole management, wildlife habitat management and the like.

To impart training in the above topics and other useful subjects other human resource development activities for the facilities staff who are engaged in field duty. For education of their children forest colony shall be built at Baripada and Jashipur. Regular medical camps shall be arranged for field staff as well as eco-development committee members.

Conducting Study tours at par-excellence sites: -

i. Eco-development study tour for EDC members and associated staff

ii. Wildlife management study tour for Officers & field staff.

iii. International study tours

iv. Working visit for Field Director

Workshops and Field Study: -

Every year workshop and field study shall be organized at Tiger Reserve level to share the experience gained during the field works and dissemination of the new knowledge and practices being used in other PAs. Some of the topic for workshop and field study shall be -

1. Wildlife and its habitat monitoring and understanding the objective of data collection during regular patrolling.
2. Wildlife census and field techniques
3. Anti poaching, Legal proceeding and forensics
4. Micro planning for eco-development in surrounding villages
5. Fire protection training
6. EDC Account keeping
7. Environmental Education and Awareness
8. PA planning workshop
9. Regional planning workshop
10. PA management plan finalization workshop

During these types of workshop and field training regular interactions/ discussions between officers and field staff would also add to the understanding of new perspectives relating to wildlife management.

CHAPTER 9
TIGER POPULATION AND HABITAT ASSESSMENT

CHAPTER

09

TIGER POPULATION AND HABITAT ASSESSMENT

Reliable estimates of status and trends of carnivore population along with their prey base as well as evaluation of habitat quality are highly crucial for effective conservation and management. One of the vital agenda of the Tiger Reserve is monitoring status of tigers, co-predators, prey base and evaluating habitat quality at regular interval. As the core of Similipal Tiger Reserve is a home to the source population of tigers in the landscape, continuous monitoring is extremely important for long term conservation of tigers at landscape level. It is also necessary to intensively monitor prey base and related habitat attributes on regular basis. This chapter proposes strategies for regular monitoring of tigers, co-predators, prey and their habitat in line with the methodologies prescribed by the NTCA to strengthen not only the supervision at field level but also to generate formation on regular basis for evaluating tiger occupancy.

The strategies include:

- Daily monitoring by the patrolling parties
- Collecting information from PIPs on regular basis
- Implementing tiger monitoring protocol as part of national level exercise
- Carnivore sign survey, prey base estimation and camera trapping seasonally by PA management.

Based on the data collected through above exercises, a database on the distribution of tigers, association with co-predators and prey base, potential habitats, threats to the population and habitats for conservation planning will be created. Reports on the monitoring programme will be submitted by the Field Director and Chief Wildlife Warden for onward submission to the NTCA. The results will be used by the management for reframing protection strategies if needed.

9.1 DAILY MONITORING AND FORECASTING

Day to day monitoring of wild life is one of the most important task of the patrolling staff of all camps. All the information is recorded in Camp register daily by patrolling party. The Final Protocol for Phase-IV Tiger Monitoring issued by NTCA provides the format of daily Monitoring register (Form No 6) which will be maintained in every camp. For the impression of Pugmarks of Tiger, Panther and other carnivores, impression pads (PIPs) shall be laid out at a rate of 5 to 10 per Beat covering all Compartment and all types of habitats. At the junction of the road impression pad shall be laid on all roads just few feet away from the junction. All the PIPs shall be serially numbered. The PIPs shall be monitored on the basis of day-to-day patrolling, at least twice in a week for Tiger evidences. The plaster cast, photograph and tracing of pugmark shall be taken along with GPS location. Scats will be analyzed for diet analysis. The data shall be compiled, mapped and maintained monthly to know the trend. Sign survey and individual tiger monitoring shall remain a regular task for every guard.

9.2 TIGER POPULATION ESTIMATION AND MONITORING FRAMEWORK (PHASE I, II, III AND IV)

For designing, implementing and evaluating the success of any conservation program for an endangered species, it is imperative to monitor the status, distribution and trends in the population of the target species. The monitoring program should be transparent in approach and holistic, addressing an array of parameters related to the survival of the species by using the blend of the best available science and technology. The guidelines issued by NTCA will be meticulously followed with minor refinement if required according to field situation. Datasheet formats have been prescribed to be used during monitoring which have not been elaborated in this chapter.

Phase I: Spatial mapping and monitoring of tigers, prey and habitat

For estimating the distribution, extent and relative abundance of tigers, other carnivores, and ungulates, data will be collected in simple formats on carnivore signs and ungulate sightings and on indices of human disturbance and habitat parameters. For this data collection beat will be taken as a unit. All the concern staff shall be trained in the data collection protocol.

The detailed methodological approach for sampling carnivore signs, ungulate encounter rates, pellet/dung counts, habitat and anthropogenic pressures is as follows.

Sampling for Tiger, Leopard, and Other Carnivore Sign Encounter Rate

To obtain data on the presence, absence and intensity of use of a Beat by tigers and other carnivores, we shall quantify the relative abundance of tiger, leopard, and carnivore signs in an area. The following procedure will be followed for data collection:

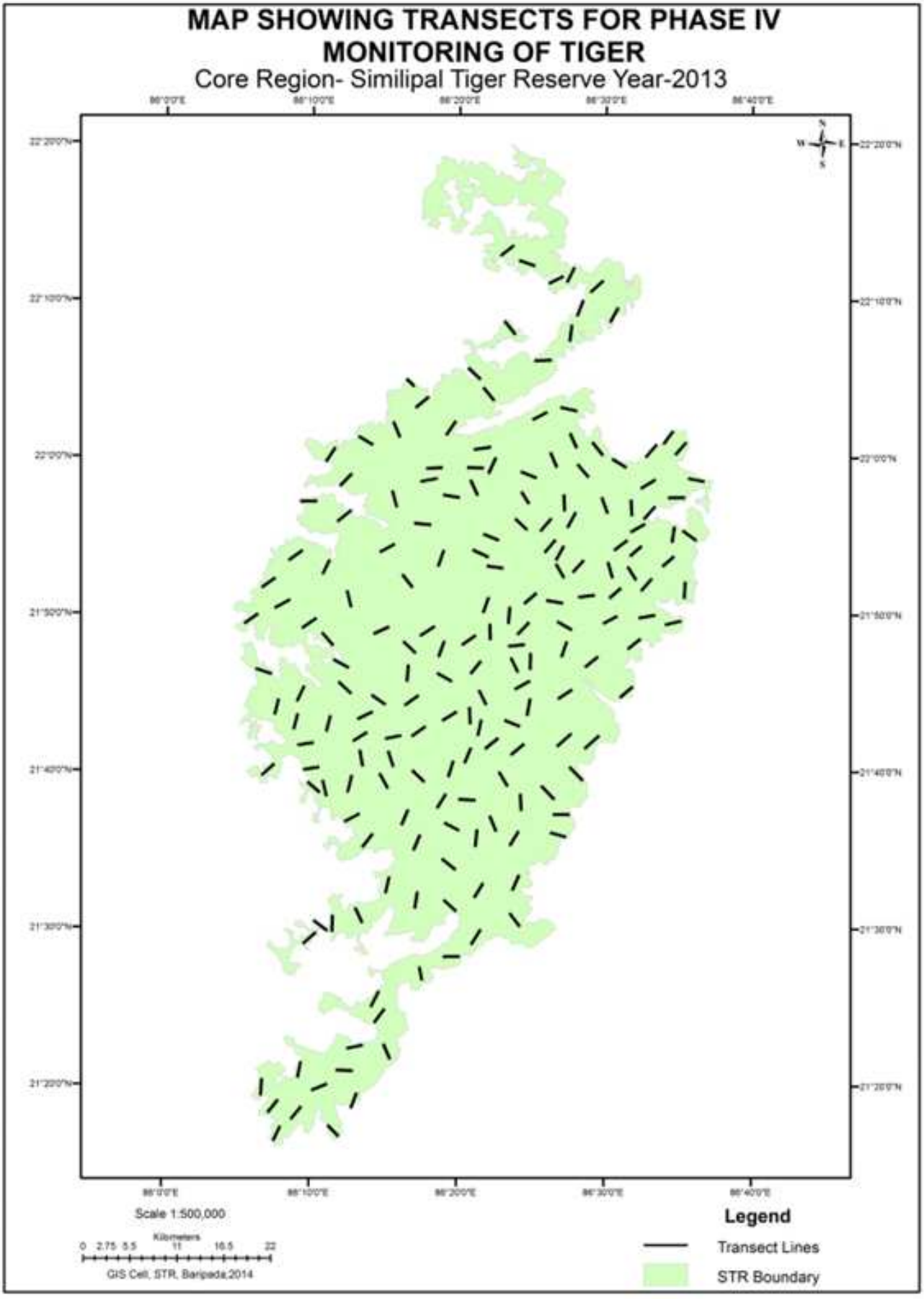
- A beat will be considered as a sampling unit.
- Areas within the beat that have the maximum potential for tiger occupancy will be intensively searched.
- Since tigers & leopards have a tendency of using dirt roads, trails, foot paths, river beds and nalas, these landscape features within the beat need to be searched intensively.
- One to three persons who know the terrain and habitat features of the beat shall conduct the search for tiger sign.
- There shall be 3-5 separate searches (in different compartments within the beat and/or at different times 1-5 days apart) each search covering minimum 5 km distance in areas having the best potential for tiger presence. It is important to record the distance covered and the time spent during each search separately MSTrIPES application will be used for this purpose. (in the data sheet-1) and accurately. If time is spent resting or in other activities while conducting the search, this duration should be reported separately. The GPS coordinate of the beginning point of each search path shall be recorded.
- The total minimum distance covered while searching for tiger and other carnivore sign shall be minimum 15 km per beat.
- Tiger & leopard signs shall be classified into the following categories 1) Pugmark trails, 2) Scats (Very Old: dry, scattered, hair and bones exposed, white Old: dry, white, no mucous, bolus intact; Fresh: black, intact with shiny surface; less smelly Very Fresh: soft, black, mucous present, moist, and smelly, 3) Scrapes, 4) Urine spray, rolling, 5) Rake marks on trunks, 6) Actual sighting, 7) Roaring (vocalization),8) Kills (Predation on wild prey).
- A brief description of the topography and forest type is to be recorded for each sign.
- In case of pugmark trails, each trail set is considered as one sign (not each pugmark as one sign). In case a tiger (or other carnivore) continues to walk along a dirt road for a long distance (say 1 km), then this shall be considered as one sign, and a comment recorded in the remarks section of the data regarding distance covered by a pugmark trail of a single tiger.

- Tiger and leopard signs if encountered outside of the sampling route shall also be recorded with GPS co-ordinates and with appropriate comments.
- Special emphasis shall be given to sign of tigress & leopards with cubs, and any authentic evidence of tiger cubs (sightings of cubs, lactating tigress, tracks, etc.) obtained within the past twelve months shall be mentioned in the data sheet.
- While sampling for tiger and leopard signs, record shall also be kept for signs of any other carnivore that are encountered.
- The number of livestock that are killed by predators within the past three months need to be recorded in the questionnaire following the data sheet.
- It is important to report data sincerely. It is likely that there may be reliable information that tiger/leopard is present in the beat being sampled, but no tiger/leopard signs are recorded during the intensive search survey. In such cases, mention should be made in the remarks column of the data sheets. However, failure in obtaining tiger sign from a beat is equally important as recording tiger/leopard signs and for appropriate analysis of this data the actual data should be reported.

2 - Sampling for Ungulate Encounter Rates

This protocol outlines a simple method for quantifying ungulate abundance in an area based on visual encounters while walking along fixed line transects. The following procedure needs to be followed for data collection. The observer need to carry one GPS set and compass along with other required material.

- After considering the shape, size, vegetation, and terrain type of the beat, a transect line of a minimum of 2 km and not exceeding 4 km will be marked for sampling.
- The transect line should traverse similar habitat (broad vegetation types) as far as possible. If the beat is composed of 2 or 3 distinct vegetation types eg. Mixed Teak Forest comprising 40% of the beat and the remaining 60% comprised of Miscellaneous forest with bamboo, then 2 separate line transects shall be marked for sampling.
- Care shall be taken that a line transect is not located near a busy road nor should it run parallel to a river or other features of the landscape which may bias sighting of ungulates.
- For each transect the point of beginning and end point coordinates (Latitude and Longitude) shall be recorded by a GPS.
- The broad forest type and terrain type that the transect traverses need to be recorded.
- Each transect shall be walked by 1 -2 persons during the early morning hours (6 AM to 8 AM). Preferably one of the persons walking should be a good field person who is able to spot wildlife.
- A record shall be kept of all mammals and peafowl seen during the walk in the prescribed format. For each animal sighting the following needs to be recorded: 1) serial no of the sighting, 2) time of the sighting, 3) species (eg. sambar, chital, wild pig, peafowl, langur, etc.), 4) group size - number of animals of the same species in the group sighted, it is important to try to count the number of animals in the group as accurately as possible. Animals are considered to belong to two different groups if the closest animals from the two groups are separated by a distance of over 30 m, 5) Angle of sighting and 6) Angular distance from the animal to the observer.
- If possible the number of young (fawns/calves less than 1 year of age) seen in the group shall also be recorded.
- A broad habitat category (vegetation and terrain type) needs to be recorded for each sighting eg.S.No. 5, 12 chital (10 adults and 2 young) were seen at 6:40 am, in mixed teak forest, gently undulating terrain.
- Each line transects needs to be walked at least on four different mornings for estimating ungulate encounter rates.



Map No- 9-A: Transects for Phase IV Monitoring of Tiger

In Similipal Tiger Reserve 178 permanent transect lines of 2 km length each have been made as detailed below which will be maintained regularly.

Table No-9-a : Details of Transect lines

Name of Division	No. of transect lines
STR Core	73
Baripada	29
Karanjia	48
Rairangpur	28
Total	178

Sampling for Vegetation, Human Disturbance and Ungulate Pellets

To quantify the habitat parameters and determine relative abundance of ungulates sampling will be done along the same line transect on which ungulate encounter rates were estimated. For economy of time and effort it would be possible to first sample the line transect during early morning hours for ungulate encounter rate and then while returning along the same line, sample for vegetation and ungulate pellets. Sampling for vegetation, ungulate dung and human disturbance will be done only once on a transect.

- Again a beat will be the sampling unit, and sampling will be done along the established line transect.
- The beginning and end point coordinates of the line transect need to be recorded using a GPS unit.
- The same principle of laying line transects as explained in the section on ungulate encounter rates is applicable here.
- Vegetation would need to be sampled every 400 m along the transect.
- The vegetation would need to be quantified visually at the following categories for each plot:

a) 15 m. radius circular plot

1. Broad vegetation type and associated terrain type eg. Mixed teak forest on hilly terrain, sal forest on flat land, etc.
2. Within a distance of approximately 15 m of the observer the five most dominant trees (over-story, all vegetation >6 fit height, including bamboo) need to be listed in the order of dominance (abundance).
3. The observer needs to list the 5 most dominant shrub species (middle story, vegetation >20 cm and <6feet) in order of dominance (abundance) within 15m of the location. He needs to categorize shrub density (under-story vegetation) as absent, very low, low, medium, and dense. Shrubs will be assessed on five point scale (0 to 4 i.e. absent to most abundant) for density estimation.
4. If weeds are present, their abundance need to be scored on 0 to 4 scale (0 being absent and 4 high abundance) and the three most common weeds seen in 15 m need to be listed in order of abundance.
5. Within the same 15 m distance the observer needs to record number of signs of looping, wood cutting and presence/absence of human foot trail. Mention need to be made if people and or livestock are seen from the plot.
6. The observer needs to visually quantify the canopy cover at the location. The observer should subjectively classify the proportion of the sky above him that is covered by canopy foliage and categorize it into <0.1,0.1 -0.2,0.2-0.4,0.4-0.6,0.6-0.8, >0.8 canopy cover (see Figure 5).

7. A mention needs to be made in the data sheet regarding the number of permanent human settlements, human population, and livestock population present in the beat (to the best of his knowledge).

8. A mention needs to be made based on the observers knowledge if any non timber forest product is collected from the beat. If yes, which NTFP and to score the magnitude of collection on a 5 point scale (0- no collection 4-high rate of collection).

If the beat was burnt (natural or management practice), the proportion burnt in the past 3 years need to be mention in the data sheet.

b) 1 m radius circular plot

This plot shall be laid 5m away from the centre of the 15m circular plat. The observer needs to use a 2m long stick to define an imaginary circle around him with the stick as the diameter. Within this circular plot (2m diameter) the observer needs to a) quantify the per cent of ground cover, i.e. the proportion of the ground covered by herbs, grasses, litter, and bare ground, b) List the 3 most dominant grass species, and herb species in order of dominance.

4 - Sampling for Ungulate Pellets

Ungulate abundance will also be indexed by enumerating their faecal pellets. This exercise will be done on the same line transect that has been sampled for ungulate encounter rate. To save time, this exercise can be done after the line transect has been sampled in the early morning for ungulate encounters.

- At every 400 m along the transect (line of walk) the observer needs to sample an area of 2m by 20m, perpendicular to the transect for quantifying ungulate pellets. This is done by using the 2 m long stick held at the centre horizontally in his hand and by walking slowly, 20m right and left of the transect alternately at every 400 m .

- All ungulate pellets encountered need to be recognized to ungulate species and recorded in appropriate columns of the attached data sheet.

- The number of faecal pellets needs to be counted. In cases where the pellets occur in large heaps, then they shall be categorized into the following categories: A (50-100), B (100-200) and C (>200). If number of pellets are more than 1000 they are counted as 999 only

- In areas where small livestock like sheep and goat are known to be grazed, it is possible that faecal pellets of these can be confused with wild ungulates especially those of chital. In such areas, a mention needs to be made that goat or sheep graze the area.

- In the last row of the data sheet the observer needs to report if ungulate/ animal listed in the data sheet occurs in the sampled beat to the best of his knowledge irrespective of whether its pellets/dung were recorded in the plots.

This spatial data generated will be used to model tiger occupancy, detection probability of tiger signs, and relative sign density at high spatial resolution. The data will be analysed in GIS domain and several spatial and attribute data like human density, livestock density, road network, topographical features, forest type and cover, meteorological data, poaching pressures and landscape characteristics will be used as covariates to model tiger occupancy and relative abundance in landscape and individual forest patches. Several corroborating variables like prey encounter rates, pellet group counts and habitat condition will help in ensuring quality data. This system will also monitor the status of other biodiversity resources.

Phase II: Spatial and attribute data

The spatial and attribute data that are likely to influence tiger occupancy of a landscape will be used for modelling in a GIS domain. The vegetation map, terrain model, night light satellite data, drainage, transportation network, forest cover, climate data, Normalised Difference Vegetation Index, livestock abundance, human density, socio-economic parameters, etc will be used for modelling habitat condition and tiger occupancy. Beat-wise vegetation sampling will be done to generate broad vegetation map. Part of this component will be done in collaboration with Forest Survey of India and Survey of India. This modelling helps in determining current spatial distribution of tigers, potential habitats, threats to crucial linkages between occupied landscapes and conservation planning.

Phase III: Estimating the population of tigers and its prey

Phase IIIof the methodology will have the answers the question of how many tigers and ungulates are there.

We use the double sampling approach of Pollock et al (2002) by sampling the entire landscape for occupancy and relative abundance related indices along with other covariates (human disturbance and habitat quality - Phase I & II data) and a sub sample for estimating absolute density. Indices are then calibrated against known absolute densities for extrapolation in that landscape (Conn et al. 2004, Pollock et al 2002, Skalski and Robson, 1992, Williams et al 2002).

1. Tiger numbers

Individual tigers can be identified based on stripe patterns which will be photo-captured by camera traps. Population estimates based on mark-recapture framework will be done using CAPTURE, CARE and Density software (Carbone et al 2001, Chao & Yang 2003, Efford 2007, Karanth 1995 and 1998, Karanth and Nichols 1998, 2000 and 2002, Karanth et al 2004, Pollock et al 1990, Per Wegge et al 2004 and Rextad& Burnham 1991). These densities will then be extrapolated for the areas under various density classes within the landscape to arrive at a tiger population estimate. We do realise that these population estimates have high variances, but since these estimates are not to be used for monitoring trends (which is proposed to be done through the site occupancy and relative abundance data), they should suffice the need for converting a relevant ecological index to a more comprehensible concept of numbers.

2. Tiger Prey density

Phase I of the protocol would be reporting encounter rates on line transects *(Buckland* et al *1993);* these would suffice for monitoring trends in ungulate population and site-specific occupancies as the same transects would be sampled during subsequent surveys. To convert encounter rates to density, an estimate of the effective strip width of these transects would be essential. For this the data on angular distance and angle of sighting will be recorded. The effective strip width of a transect primarily depends on the visibility (vegetation and terrain type), ability to detect ungulates by different observers and animal behaviour response *(Buckland* et al *1993).* Effective strip widths determined from the model and actual sighting of ungulates for different vegetation types. However ungulate response is likely to play an important role in disturbed area in determining effective strip width. The habitat and terrain specific effective stripe width will be determined by actual sampling and by modeling. These estimates of effective stripe width will be used for converting encounter rates of ungulates to density estimate by modeling detection probabilities. Pellet group counts on transects would serve as an index to the presence and relative abundance of ungulates.

Phase IV: Intensive monitoring of source populations

The following methodology for this monitoring as per the latest protocol of NTCA will be adopted.

- Maintaining daily patrolling log in patrolling camp
- Carrying out the 8 day protocol of Phase I twice a year

- Recording data from “pressure impression pad”
- Obtaining the minimum number of tigers in the tiger reserve
- Obtaining the tiger number for the reserve using camera trap in a mark recapture frame work
- Using scats for DNA analysis to obtain the minimum tiger number in reserve where camera trapping is not possible

Photo registration of tigers:

The Tiger Reserve will be divided into grids of size of 2 sq.km. of each grid. Based on the availability of camera traps and existing strength of the Tiger Monitoring Team, the camera traps will be systematically deployed in the field based on carnivore sign survey. The Tiger Monitoring unit will be strengthened with additional manpower and the infrastructure such as additional camera traps with accessories, field gears and transportation facilities. The Tiger Reserve management will ensure that sufficient trap cameras are available for covering the entire Reserve of camera traps/sampling covering approximately 100sq.km). Timely procurement of accessories required for the exercise such as memory cards, batteries and other stationeries will be ensured for each sampling. Sufficient copies of all the above proforma in local language will be provided to the field staff for collecting the data.

Tiger pugmark and other signs:

The tiger pug mark and other signs are recorded and used only for regular monitoring purpose and as a part of sign survey. Whereas for counting purpose only camera trapped photographs will be used.

Monitoring by telemetry in select areas:

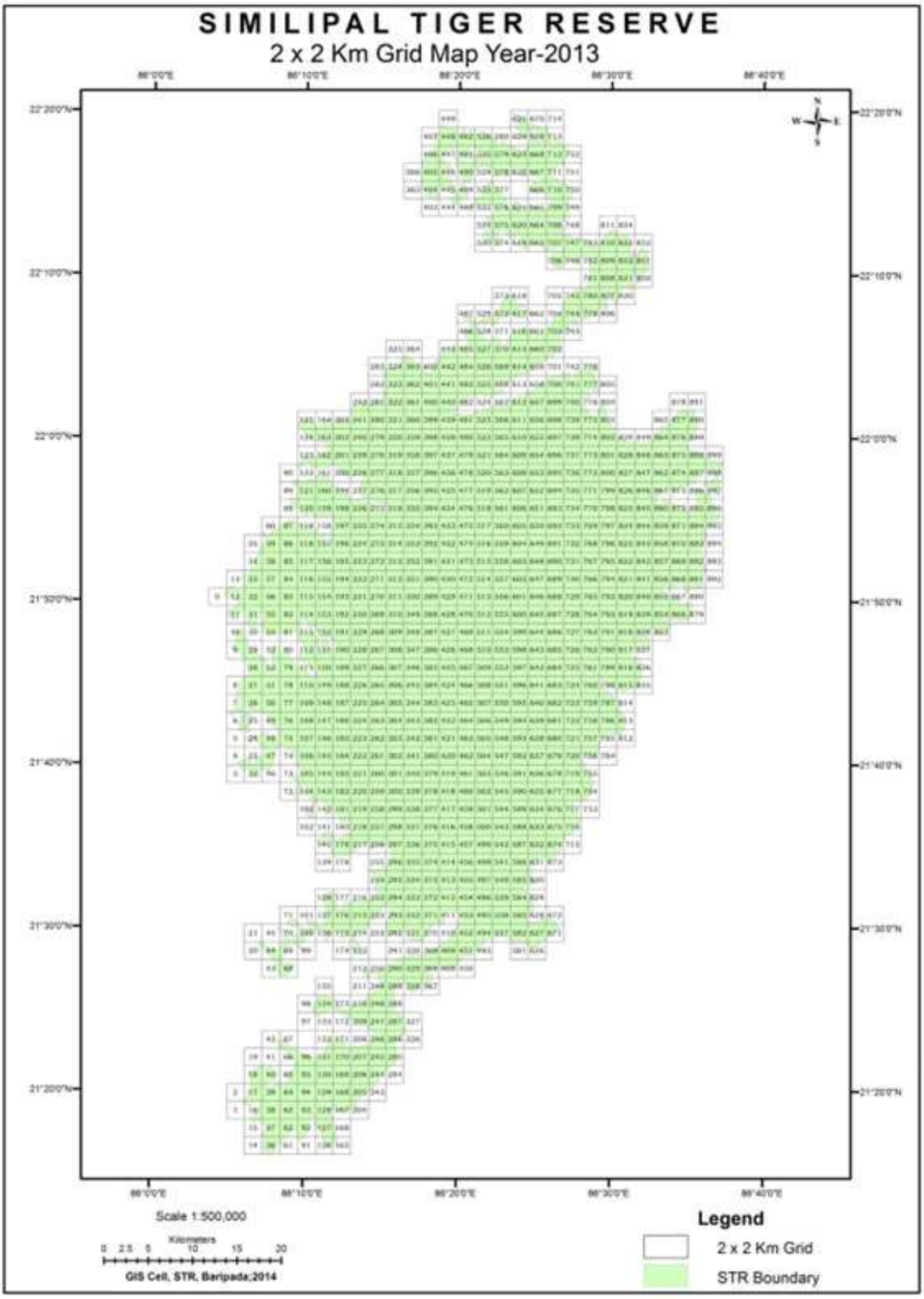
Modern technology of VHF, GPS and satellite telemetry will be used to study and monitor aspects of demography, metapopulation dynamics (dispersal, ranging patterns), mortality, predation, ecology and behaviour. In all source populations, tiger abundance and density shall be estimated using camera traps, digital images of pugmarks and/or DNA profile from non-invasive methods biannually.

9.3 HABITAT ASSESSMENT AND MONITORING FRAMEWORK

The data collected during phase I for sampling for Vegetation, Human disturbance will be collated and put in GIS Domain. This can be correlated with tiger and prey base presence. Any change in the habitat can be monitored by serial data present in GIS Domain.

9.4 SPATIAL DATABASE DEVELOPMENT

The primary data collected from the field on tiger and prey base along with influencing parameters can be used to determine current spatial distribution of tigers, association with co-predators and prey base, potential habitats, threats to the population and habitats for conservation planning. Thus information will be generated on vegetation cover, terrain model, drainage, transportation network, climate data, livestock abundance, human density, socio-economic parameters, etc which will be used for modeling habitat condition, tiger occupancy and potential areas of tiger for conservation planning. The above data generated at Park level will be analysed every year with the help of experienced field biologists. Infrastructure needed for generating such information including formation of a GIS unit and procurement of digital data will be developed in Similipal Tiger Conservation Foundation with funding support from NTCA. The database on territory of individual tigers and their identity will be kept strictly confidential.



Map No-9-B : Grid map of Similipal Tiger Reserve

9.5 ANALYSES AND REPORTING FRAMEWORK

9.5.1. Analysis

The information generated from carnivore sign survey, camera trap method, PIPs, transects and daily monitoring during perambulation will suitably be used for analysis of occupancy of tigers, co-predators and prey in different vegetation and terrain and preparing the tiger occupancy maps. Statistical analysis of information collected from field will be done using software such as 'CAPTURE' and 'DISTANCE' with the expertise of Field Biologist of Similipal Tiger Reserve. Spatial distribution, relative abundance and densities of tigers and its biotope along with the habitat quality will be generated. This information can also be used to develop relationships for understanding tiger population dynamics in the Tiger Reserve and its adjacent areas.

9.5.2. Reporting

The reporting systems for daily monitoring and implementation of tiger monitoring protocol are already explained in the sections concerned. Reporting will be done as per the guidelines of NTCA.

9.5.3. Annual Population Estimation exercise

Annual inventories and annual censuses, species specific as well as general, will be conducted by the park management and reports submitted to the Chief Wildlife Warden.

9.5.4. Dissemination of results

The output of the entire monitoring programme mentioned above will be made available to the management so as to revisit management prescriptions. The information will also be published in widely referred journals and presented in seminars/symposia.

9.6. CAPACITY BUILDING

The following documents will be supplied at Ranges and ant poachingCamps.

- Field guide for monitoring Tigers, co-predators, prey and their habitats issued by National Tiger Conservation Authority and Wildlife Institute of India.
- A field guide to animal signs
- A pocket book for forest guards 'Tracking Tigers' by Dr. L.A.K.Singh, WWF Tiger Conservation Programme
- "M-STRIPES" Monitoring system for Tigers-Intensive Protection & Ecological status: software developed by National Tiger Conservation Authority, Wildlife Institute of India and Zoological Society of London would be introduced.

Officers and staff of Similipal having interest in computer software will be exposed to the use of different analysis software like Distance, Capture, Vortex, MSTrIPEetc so that the entire monitoring can be done in house.

9.7. Carrying capacity of Tiger in Similipal (based on data from AITE, 2018)

Prey	3/4th bodyweight offemale	Density(perKm^2)	PreyBiomass(kg/Km^2)
Chital	30	7.41	222.3
Sambar	136	11.24	1528.64
Barking Deer	20	9.79	195.8
WildBoar	42.75	6.16	263.34
Total			2210.08

Equation from Hayward'set.al.2007:

y=-2.158+0.377x

Where,

y = log 10 of maximum carrying capacity of predator density forthe available prey.

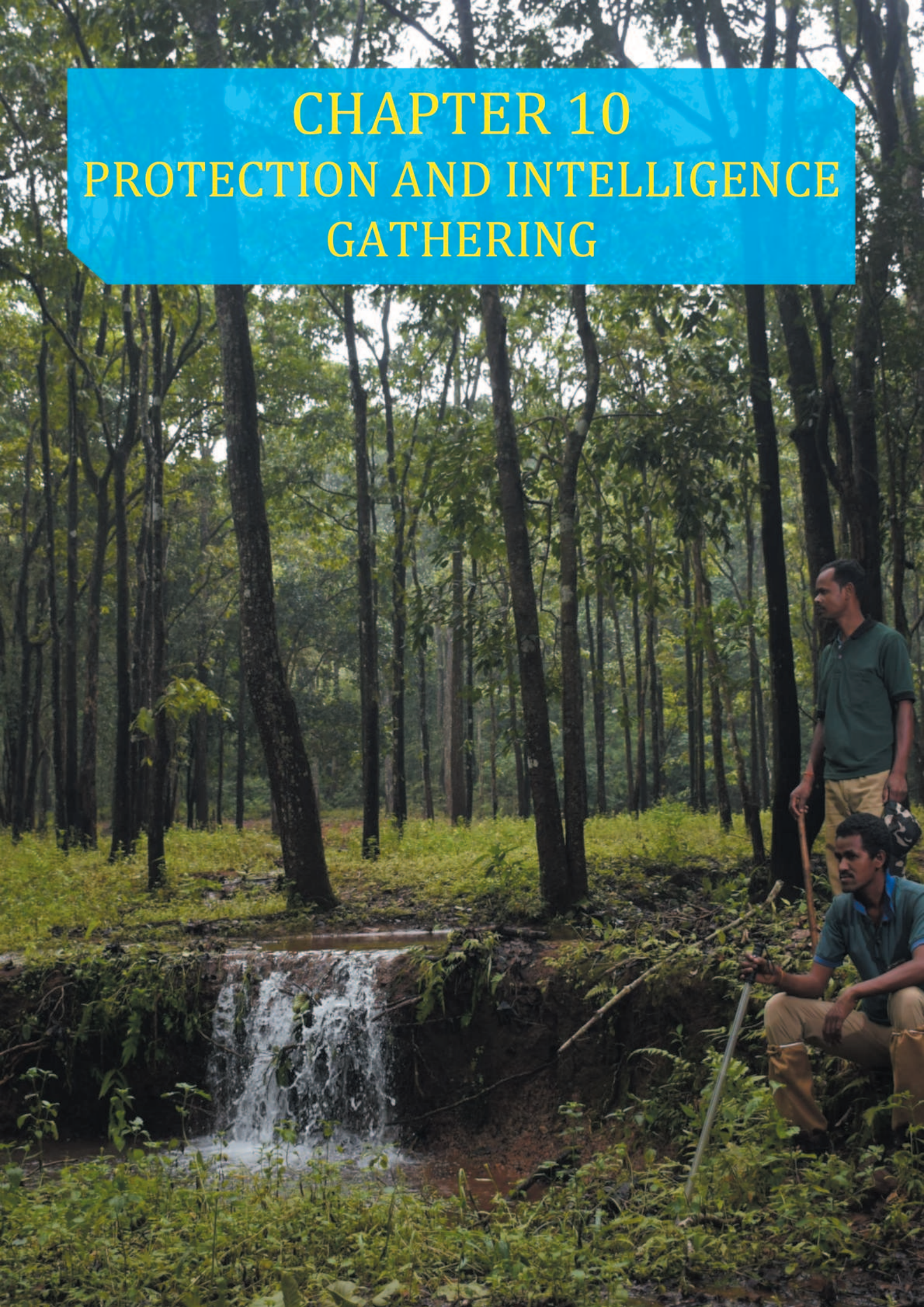
X=log10 of prey biomass per unit area per sq.km.

Putting the values in above equation we get, Y= -2.158 + 0.377 (log 2210.08)

Solving the equation we get; Carrying capacity= 0.128 per square kilometer Carrying capacity per100Sq. Km=12.8=12

The population estimate of tigers in Similipal TR as per AITE, 2022, is 16 with density of 0.91/100Km^2.This is less than the viable tiger population that can exist in the 2750 sq. km. landscape of STR. The present prey biomass may support more Tigers in STR as estimated using Hayward's formula. It must be taken into account that "present Prey Biomass per unit area persq. km. supports not only tigers but also its co-predators.' So, the Tiger has to share its prey biomass with these co-predators. However, there is huge scope for the Tiger Reserve to sustain more tiger as compared to the current population.

CHAPTER 10
PROTECTION AND INTELLIGENCE GATHERING



CHAPTER

10

PROTECTION AND INTELLIGENCE GATHERING

10.1. WILDLIFE MONITORING AND RESEARCH CELL (WMRC).

A Tiger cell as detailed below is proposed for Similipal Tiger Reserve

Composition:

Field Director, Similipal Tiger Reserve cum Chairman

Regional C.C.F., Baripada

2. D.F.O., Baripada Forest Division – Member
3. DFO, Karanjia Forest Division – Member
4. DFO, Rairangpur Forest Division – Member
5. Superintendent of Police, Mayurbhanj – Member
6. Deputy Director Similipal North WL Division- Member
7. Deputy Director Similipal Tiger Reserve – Member Secretary

10.1.1. Duties and Responsibilities:

- Monitoring the investigation of cases relating to tiger, leopards, elephants and other animals.
- Conduct Surveys on poached animals, identify and document trade routes and Market forces.
- Monitoring the compliance of patrolling in core and buffer.
- Monitoring the implementation of protocol for monitoring Tiger, co-predator, and prey populations in landscape.
- Liaison with Wildlife Crime Control Bureau and other agencies in respect of tiger/leopard poaching and intelligence sharing.
- Rewards for candid informers, excellent performance, etc
- Identify existing conflicting land use policies affecting Tiger and prey habitat and resolve through Multi-sectoral dialogue.
- Monitoring the Human Wildlife Conflicts.

The Wildlife Monitoring and Research Cell will meet at least once in six months and may invite experts if needed in any of its meeting. The proceedings of the meeting will be submitted to the Chief Wildlife Warden.

10.2 THE STRIKE FORCE.

The leader of the strike force will be the Range Officer, Enforcement; the other members of strike force will be two Foresters and four Forest Guards. The Force will be fully equipped with vehicle, arms/ammunition, communication equipment, funds for intelligence gathering, etc. The Strike Force will be given rigorous training in intelligence gathering, identification of wildlife articles, investigation, etc.

10.2.1. Duties and Responsibilities:

- Rapid action and response on receipt of any information related to illegal activities.
- Liaison with the territorial Range Officers and assist in protection.
- Liaison with EDCs to gather information on intelligence.
- Inspire confidence in people who want to provide secret information.
- Liaison with staff of anti-poaching camps.
- Sharing information with the territorial Range Officers on illicit activities.
- Maintain a secret record with the details of informers, information received, etc.
- Inform the Deputy Director, Similipal Tiger Reserve, territorial Range Officers of any illegal activity and red alert to the antipoaching camps.
- The Range Officer, Strike Force will be assigned any other duties related to protection.

10.3 SPECIAL TIGER PROTECTION FORCE.

The policy initiative announced by Govt. of India vis-a-vis National Tiger Conservation Authority under Ministry of Environment and Forest for Protection of Flagship Species TIGER- the mascot of India's wilderness, its habitat, Co-predators and of course prey species is the basis for raising, arming and deploying the SPECIAL TIGER PROTECTION FORCE in Similipal Tiger Reserve in the District of Mayurbhanj, Odisha. As of now a unit consisting of 52no. of STPF Forest Guards have been deployed for Similipal protection as against the sanctioned strength of 81nos of Forest Guards and 27 nos. of Forest Watchers.

10.3.1. Description of the STPF.

A. Name of the Force:

Special Tiger Protection Force (STPF).

B. Composition of the Force:

i. The STPF will not be an "Armed Force of the Union/ State", but a modest dedicated Force comprising of forest personnel as suited to Similipal Tiger Reserve.

ii. The STPF would be comprised of one company of Tiger Force with a total strength of 112 personnel and would be a specialized force with its own structure and composition for deploying in Similipal Tiger Reserve.

iii. The Company of the STPF would be headed by a Tiger Force Assistant Conservator of Forests and three Tiger Force Range Officers.

iv. The STPF personnel would serve in the Force till the age of 40 years and would be later absorbed by State Forest Department on posts outside the Tiger Reserve, while ensuring new, suitable substitutes. The STPF personnel would be posted in Similipal Tiger Reserve for a minimum tenure of three years.

v. There would be 81 Special Tiger Guards in STPF who would be equivalent to the rank of a regular Forest

Guard of the state Forest Department and entitled to the same salary and other emoluments as regular Forest Guards.

vi. There would be 27 Tiger Force Watchers to be outsourced from local villages through Service Providers. They will be entitled to the same salary and other emoluments as regular Group D employees.

Structure of the STPF:

The STPF would comprise of 3 platoons with each platoon under a Tiger Force Range Officer, assisted by 27 Special Tiger Guards and 9 Tiger Force Watchers.

Overall Command and Control:

i. The Tiger Force Asst. Conservator of Forests in-charge of the STPF and other personnel would work under the overall control and supervision of the Field Director of Similipal Tiger Reserve. The administrative as well as operational command of the said force would remain with the Field Director/ Deputy Director of Similipal Tiger Reserve who will be appointing / disciplinary authority also. The NTCA would pay the deployment charges to the state Govt. or reimburse such cost relating to STPF on the lines of the Indian Reserve Battalion. The reimbursement and payment would be 60% central assistance from the NTCA and 40% from State Govt..

ii. In case of emergency Ministry of Environment & Forests, Govt. of India will have the authority to transfer the STPF company from one place to another using the first right of call. The Govt. of India will also have the authority to ask the State Govt. to make the STPF available for deployment elsewhere in other tiger reserves within the state or in sensitive interstate borders for tiger protection. It will decide the number of companies to be posted in Similipal Tiger Reserve.

Recruitment:

i. The recruiting authority for the STPF would be the Field Director / Deputy Director, Similipal Tiger Reserve.

ii. Recruitment to the post of Special Tiger Force Guards of the STPF Company would be done from the State while the Tiger Force Asst. Conservator of Forests and Tiger Force Range Officer will be appointed to the Force on deputation from the State Forest Department in consultation with the Field director.

iii. On attainment of the age of 40 years, STPF personnel would be transferred out of the Tiger Reserve to other units of the Forest Department by the Principal Chief Conservator of Forest of the State,

Legal Immunity to STPF for discharging the official mandate:

i. The STPF personnel being Forest Officers will have policing power as conferred to them by law.

ii. The State Govt. would confer power to the STPF personnel under Sub-Section (3) of Section 197 of the Code of Criminal Procedure, 1973 (2 of 1974), and all powers enabling it in that behalf, the power to use firearms to combat tiger poaching and related offence within the tiger habitat, through a notification. In this context, Sub-section (2) of section 197 of the Cr. P.C, 1973 (2 of 1974) shall be made applicable to all personnel of STPF.

iii. Whenever, firing is resorted to by the STPF personnel, each such incidence shall be enquired into by the Executive Magistrate; any proceeding, including instituting a criminal case or arrest can be initiated only if it is held, as a result of the Magisterial Enquiry, that the use of firearms has been unnecessary, unwarranted and excessive, only after such report has been accepted by the Govt. after due examination.

Other features:

The STPF, not being an "Armed Force of the Union/ State", would be used only for Tiger Protection, and under no circumstances would be requisitioned in aid of Civil Authority, for any other district work. A MOU is to be formalized between NTCA and the State Govt. on this account.

i. The funding support for raising, arming, deploying and subsequent expenses of the STPF will be met with by the National Tiger Conservation Authority.

ii. The Field Director, Similipal Tiger Reserve would provide monthly reports on the deployment / initiatives done by STPF to the NTCA.

Financial Implications:

The cost details relating to salary, procurement of vehicles, arms & ammunitions, infrastructure are provided in Annexure- .

i. The total recurring cost (per annum) for the STPF works out to Rs 1,62,38,368/- (Rs.1.62 crore)

ii. The total non-recurring cost for STPF works out to Rs 3,86,19,180 /- (Rs 3.86 crore)

Training:

i. The STPF Foresters and Forest Guards shall receive special training from the State Police Department as well as the Central Paramilitary Forces, based on special syllabus for skill development, combating poaching and enabling intelligence based enforcement in a forest terrain.

ii. The training of the STPF would be on the pattern of a syllabus of basic training which would be prescribed by the Ministry of Environment & Forests, on the basis of the ongoing syllabus prescribed the Ministry of Home Affairs for the India Reserve Battalion.

iii. Arrangement shall be made for regular physical training of the STPF in collaboration with the available resources.

iv. Specialised trainings would be provided in enforcement procedures by noted agencies including international visits if the need arises.

10.4 STRATEGY FOR PROTECTION AND COMMUNICATION.

The strategy for protection and communication is discussed, described and prescriptions related to protection is proposed in theme plan for protection in Chapter 7.

10.5 FIRE PROTECTION.

The strategy for fire protection is discussed, described and prescriptions related to fire protection are proposed in theme plan for fire protection in Chapter 7.

10.6 INTELLIGENCE GATHERING AND COORDINATION.

The strategy for Intelligence Gathering and Coordination is discussed, described and prescriptions related to Intelligence Gathering are proposed in theme plan for protection in Chapter 7.

CHAPTER 11
MISCELLANEOUS ISSUES

CHAPTER

11

MISCELLANEOUS ISSUES

11.1 HOUSEKEEPING OF DEPARTMENTAL ELEPHANTS

Three elephants named Mahendra, Sobha and Bhawani were procured from Karnataka Forest Department in November, 2001 for protection and tourism work in Similipal. Sobha gave birth to Laxmi on 25.04.2002. Laxmi died on 21.09.2006 due to snake bite. Bhawani gave birth to Rajkumar on 20.10.2002. On 11.09.2010 Rajkumar was sent to Chandaka wildlife Division to serve as a kunki elephant in driving operation of wild elephants causing depredation. On the same date Mahendra and Sobha were sent to Berhampur Division to serve as kunki elephants in driving operation of wild elephants causing depredation. Bhawani gave birth to Shibani on 14.12.2008. Later all elephants were returned to Similipal and were staying at Gurguria camp. Later a male elephant calf of three months old was rescued from wild abandoned calf from Dukura Range of Baripada Forest Division during the year 2014. The calf was named as Babloo and kept at Pithabata south Range, to assist Babloo the female elephant Shobha was also shifted to Pithabata. During 2021 both Shobha and Babloo were shifted to Hatighar elephant camp of Jenabil Range. Two male elephants namely Rajkumar and Mahendra were shifted to Satkosia Tiger Reserve during the year 2019 to assist in tiger translocation work. During the year 2022 one male calf of about one year old was rescued from Baripada Territorial Division and shifted to Pithabata South Range. The calf was named as Jagannatha as it was rescued during Ratha Yatra period of 2022. After observation period the calf will be shifted to Jenabil elephant camp. At present four elephants namely Shobha, Bhabani, Sibani, Bobloo are placed at Jenabil elephant camp. The male calf Jagannatha will be shifted to Jenabil after getting fitness certificate from Veterinary officer. Two elephants namely Shobha and Bhabani are retired from service as they have crossed 65 years. Babloo (8years old) and Shibani (13years old) are under training, they will be utilized for protection activities after completion of their training.

Objectives

The objectives of the elephant camp of Similipal Tiger Reserve are:

1. Eco-tourism
2. Patrolling for anti-poaching operations
3. To control Man-Elephant conflict outside the Reserve or other areas (Kunki operations)
4. Other miscellaneous works connected with forestry

As of now camping facility is available at Hatighar under Jenabil Range in core area. Earlier elephants were also kept at Gurguria under Gurguria Range in buffer area. During tourism season from November to June the camp elephants used to be stationed at Gurguria where facility was available for elephant ride for the visitors. During other part of the year the elephants were stationed at Hatighar where better availability of fodder is there.

List of captive elephants in Similipal Tiger Reserve

Table No-11-a : List of captive elephants in Similipal Tiger Reserve

Sl. No	Name of the Elephant	Sex	Age (Years as on March 2022)	Source of procurement
1	Mahendra	Male	61	Procured from Forest Deptt, Karnataka on 31.11.2001
2	Bhavani	Female	66	-Do-
3	Shobha	Female	74	-Do-
4	Rajkumar	Male	20	Captive born on 20.10.2002 from Bhavani
5	Shivani	Female	14	Captive born on 14.12.2008 from Bhavani
6.	Babloo	Male	8	Wild abandoned calf rescued from Baripada Forest Division.
7.	Jagannath	Male	1.5	wild abandoned calf rescued from Baripada Forest Division.

11.1.1 Management

- The elephant camp has water source near to the camping site (Jamunanala near Hatighar) which is used both for bathing and drinking of the elephants. As this is perennial source so no problem is faced during summer.
- All the elephants are provided with stall feeding two times daily and allowed to free range in forest for food. The feeding time is 8-9 AM and 3-4 PM and the stall ration include horse gram, paddy, ragi, jaggery, coconut and salt.
- The female elephants are not showing occurrence of oestrus cycles now. The adult male elephant Mahendra is exhibiting signs of “musth”.
- The health of camp elephants is monitored periodically by veterinary surgeons of Similipal Tiger Reserve.
- The care and management of captive elephants in the Tiger Reserve shall be done in accordance with the Guidelines issued by Project elephant, MOEF & CC, Govt. of India.

11.1.2 Duties and responsibilities of the staff

Duties of Forest Ranger

Forest Ranger under whose jurisdiction the elephant camp is located will be administrative in charge of the camp and is responsible for all the administrative matters, personnel matters, pay and establishment of the camp staff. He is also responsible for the reporting for the camp, estimation and financial budgeting, expenditure and maintenance of the account.

Duties of Forester

Forester in charge of the elephant camp is directly responsible for the care and management of the elephants under his control.

- He shall be made to be wholly in charge of the livestock, their accoutrements, food grains and other miscellaneous stores entrusted in the same and accountable for the same.

- Responsible for day-to-day management of the camp and seasonal work schedule, that is in vogue.
- Responsible for maintenance of discipline among the elephant men.
- Responsible for issue of daily grain rations, supervising the proper looking and feeding of elephants according to the diet schedule.
- Responsible for the proper training of the newly captured elephants and weaned calves.
- He will take adequate health care of elephants as and when elephants fall sick, he must arrange to get proper veterinary care promptly; He must also be conversant with giving first aid both for elephants and elephant man.
- Maintenance of proper hygiene condition in and around campsite.
- Check periodically the fodder resources available around the camp and their abundance.
- Provision of adequate supply of cut fodder to the animals, which need to be tied up for various reasons.
- He will maintain all the records and registers intended to be maintained in an elephant camp and record relevant information.
- He will maintain separate register for logging, day-to-day happenings, and interesting events, such as mating, calving, birth/height and weight of calves, monthly growth rate, incidence of musth, behaviour, sickness and other relevant matters.
- He shall carry out the instructions given by his superiors and veterinary personnel (VAS) and get all instructions recorded in the register.

Duties of the Elephant Man

Each working elephant shall have a Mahout and IInd mahout. Both Mahout and IInd Mahout are responsible for the proper upkeep of the animal and they shall be under the control of the official in charge of the camp.

Duties of Mahout

- Responsible for training of the animal for all purposes.
- Take proper care of the accoutrements provided for the elephants.
- Responsible for taking the animal for work, giving bath and assist the official in charge of the camp in all the activities connected with elephant camp.
- Responsible for the health of animal and report promptly as and when his elephant fall sick or gets injured for proper veterinary care.

Duties of IInd Mahout

- The mahout shall be assisted by 2nd Mahout in training, giving bath to the animal, feed the animal in proper care of the accoutrements provided and also in other activities in managing his word.
- He will assist in cooking rations in the camp.
- He will assist in maintaining the camp hygiene by proper disposal of dung and litter collected around the camp, providing water for cooking, collection of fuel for cooking, etc.

Duties of Veterinary Assistant Surgeon

There are two Veterinary Asst surgeons for the tiger reserve. One Govt. surgeon deputed from Animal Husbandry Department, and other provided by Wildlife Trust of India, NGO. The duties of VAS vis a vis

Elephant camp is as follows.

- Responsible for veterinary care of all the departmental elephants.
- He shall prescribe rations for the departmental elephants as well as work load.
- He shall annually fix and revise the book value of the departmental elephants.
- Responsible for disease prevention work in and around the tiger reserve.
- Organize timely preventive vaccination of departmental elephants against Anthrax and other communicable diseases.
- He shall periodically record the body measurements of all the departmental elephants, such as height, girth and body weight.
- A book shall be maintained at each elephant camp and the VAS should note instruction or his remarks for guidance of the subordinate in charge of the elephants.
- He will check food materials for their quality as well as adequacy.
- He will see that no elephant is over worked and at the first signs of fatigue or loss of conditions should be given rest or light duty.
- He will check the fodder resources available around the campsite.

Day to day function of the camp

Table No-11-b: Day to day function of the camp

Time schedule	Camp routines
6.30 AM-8.00 AM	Bathing and scrubbing
8.00 AM – 8.30 AM	Training session
8.30 AM – 9.00 AM	Application of neem oil on the foot. Morning feeding with grain rations (Cooked)
9.00AM – 4.00 PM	Leave out for grazing
4.00 PM – 5.00 PM	Evening bathing and scrubbing
5.00 PM – 5.30 PM	Training session
5.30 PM – 6.00 PM	Evening feeding with grain ration (Cooked)
6.00PM–6.30 AM (next day)	Leave out for grazing/ stall feeding with fodder leaves in the camp itself

11.1.2 WORK SCHEDULE

The elephants are currently not being used for any heavy energetic work like timber work and other regular forest operation.

11.1.3 WORK OF FOREST CAMP ELEPHANTS

Two elephants namely Shobha and Bhabani have crossed 65 years of age hence they are retired from the service. Other two elephants namely Babloo and Shibani are under training hence they are not been used for Departmental works as of now. Whereas after completion of training they may be utilized for the following purpose.

The following works can be allotted to the elephants in consonance with the objectives of sanctuary management.

Forest protection:

- Used for patrolling in the interior of forest areas.
- Elephant movement itself in the forest for collection of fodder to different areas will increase protection from poaching.

Eco-tourism

Elephants may be used for permitted eco-tourism activities.

Education and publicity:

The Elephant camp may be started at Gurguria which will be open to the general public. The department shall develop an educational package for tourists. Video shows explaining the plight of elephant in the wild, efforts being taken for their conservation can be conducted. Camp serves as platform for research to know more about elephants.

Kunki operations:

- The foremost importance of the camp is our elephants being used to drive wild elephants whenever the conflict happened even in other places of the state as anti-depredation measure.
- Capture and translocation/captivating of problematic wild elephants,
- To assist in rescue operation for rescuing the animal which is in distress like swallowed in the mud, fell down in the well, etc.
- To assist in treating sick wild elephants.
- Breeding programme
- Germ-plasm conservation: As being the both reproductive male and female left free in the wild, a chance of mating between wild and captive elephants, which helps in flow of gene between captive and wild.
- Camp act as a rescue center to rear and adopt the wild abandoned calf.

11.1.4 WORK LOADS

Workloads given to the elephant vary according to age, size and sex. Other regulating parameter would be health and growth of the animal. Training for patrolling and ecotourism safari may be started at the age of 6-7 years depending upon the health and body condition of the animal. The following is the work scale fixed for the camp elephants.

10 -19 yrs Light work

yrs Moderate work

30-50 yrs Heavy work

>65years Retired from work

Over 50 years the working capacity of the animal gradually reduced every year up to the age of retirement at 58 yrs old. Therefore it is always advisable to use the elephants beyond 50 years only for patrolling and ecotourism works. The animals that maintain good health and their teeth have not worn out may be used for a few more years. The elephant is not a good pack animal, is not suited for carrying heavy loads. The elephant is unbeatable to drag and lift the weight, but they cannot carry a load more than 400kgs.

Table No-11-c : Details of Elephant

Height of the Elephant (Mtr)	Weight (Kg) (Allowed to carry on its back)
< 1.50	Not used for carrying load
1.51 ~ 1.80	Not exceeding 150 kg (carry only fodder and trainer)
1.81 ~ 2.25	Not exceeding 200
2.26 ~ 2.55	Not exceeding 300
> 2.50	Not exceeding 400

Load should be reduced to 50% in hilly or difficult terrain.

11.1.4.1 DIET OF ELEPHANTS:

The diet of the elephants consists of following in the camp.

Concentrate feeding: Elephants are bulk feeders, since they are simple stomached, they have to spend at least 18-20 hrs in a day to feed, since elephants in captivity are maintained for various forestry works, the animals have to spend energy performing various types of hard work. In addition about 7-8 hours in a day are spent for work, bath, commuting, etc.. The digestive system of elephant is suited to adapt to their continuous feeding habit. The main reasons for the continuous feeding may be the lower efficiency and the shorter time spent in Gastro intestinal tract about 21 to 24 hrs. The dry matter digestibility in elephants is 45-50%. Whereas, crude protein and crude fiber digestibility about 89% and 18.5% respectively. Hence to compensate the loss of time for grazing and replenish the energy spent, the animals are to be fed with readily available energy in the form of grain ration. Components of grain ration are

Horse gram- For protein supplement

Ragi - For carbohydrate

Coconut – For protein & fat source

Salt - For better assimilation and absorption of ingested nutrients in the intestinal tract; also to reduce intestinal worn burden and palatability.

Molasses - For palatability

11.1.4.2 Diet Schedules

The following considerations are used for planning the diet.

- Selection of ingredients: It is based on the nutritive value, palatability, easy availability throughout the year and economic consideration of food grains. Compared to other food grains, ragi and horse gram are in high nutritive value, cheaper in cost. It is easy to cook them and elephant like these grains.
- Diet formula: It is formulated according to the age, sex, weight and its workload. The quantity of the each grain for different classes/size of animals has been decided after much care and thorough examinations.

Table No.-11-d : Diet chart of camp elephant

Items	Sobha	Bhavani & Shivani
Paddy in Kg/Day	10	14
Ragi in Kg/Day	06	07
Horse gram in Kg/Day	06	07

Paddy straw in bundles/Day	20	25
Molasses in Gms/ Day	250	350
Coconut in nos/Day	0	01
Salt in gms/Day	150	200
Castor Oil (External application) in Gms/ Day	100	150
Neem Oil (External application) in Gms/ Day	20	20

As and when necessity arises, such as for those animals which are in rundown condition, pregnant and lactating cow elephants, growing calves, orphaned calves, etc., prescription of special diets should follow such as coconut, rice, gingly oils, vitamins, and other nutritive tonics, etc.,

Rice is included in the diet of young calves and lactating mothers, sugarcane is prescribed for calves and animals under training. Inclusion of jaggery in the diet is to facilitate administration of oral medicine to the elephants, as they are conditioned to the taste of jaggery. The quality and its adequacy of the rations shall be inspected by Veterinary personnel regularly. The diet prescribed for whole day and the elephants are fed with the rations both in morning and evening *i.e.,* half the prescribed quantity in morning and remaining half in evening.

Elephants in the forest camps are sent out for grazing. This is a desirable practice as they have seasonal preference and choose their own required fodder. This also encourages socializing, resulting in mating and other activities. But under special circumstances, when the elephants are used for providing rides to the tourists, elephants in musth and newly weaned calves and sick or incapacitated animals are tied near the vicinity of the camp and cut fodder is even during night hours. The quantity of cut fodder to be provided should be at least 3% of the body weight, taking into consideration of the wastage. When the elephants are left out for grazing, adequate precautions must be taken to hobble them, and use a trailing chain. Even a hobbled animal can move over a distance of about 1~2 km. The elephant man should take care to leave the animals, where adequate fodder is available. They must also check for the presence of wild tuskers, which tend to be aggressive towards captive elephants.

11.1.4.3 Health Care Management

Captive elephants tend to lose their inherent disease resistance owing to substantial change in their feeding habits. Similarly, they are also exposed to several diseases of domestic animals due to increased interaction with them.

Many diseases like Anthrax, Blue Tongue, Rinderpest, TB, Pasteurellosis, Trypanosomiasis etc. have been reported in captive elephants in many areas though the information regarding susceptibility and prevalence of diseases is meagre in Similipal. Captive elephants are also prone to parasitic infections of alimentary tract. Therefore, the apprehension calls for a strict and regular schedule of vaccination.

For maintenance of health and well being of captive elephants an annual health monitoring programme is essential before each vaccination schedule. The annual health-monitoring schedule must include the following parameters:

- Pulse and respiration rate
- Body weight
- Blood examination for blood parasites, blood chemistry and haematology
- Urine and faecal examination for parasites
- Care of feet
- Management of nutrition

As early recognition of disease is very important for its prevention and control, regular monitoring of faecal and urine samples for colour, quantity, endoparasitic infestations, and food habits apart from observations relating to movements of body parts are essential.

The following health care protocols shall be followed for the elephant camp.

a). Skin care: Two times bath for elephant both morning and evening each last at least 11/2 –2hrs. This helps in following ways.

i. To reduce their body temperature.

ii. To relax the animals; elephant love to spend time in the water

iii. Scrub bath improve their blood circulation and skin condition.

iv. To wash the wounds.

v. Improves bond between animal and mahout.

vi. Better chance to find abscess, cyst, wound and other skin infection in early stage.

vii. To reduce and prevent external parasitic infection like ticks, mites and louse.

b). Foot care: Application Dekamil oil (Neem oil) on the foot over the nails, commissure of tusk and on external genital opening in female elephants, this helps in following ways.(Dekamil oil consist of neem oil 15 kg; Camphor -0.5g; Garlic -0.5g; Dekamil -0.5g)

i. Strengthening of cuticle.

ii. Prevent over growths of cuticle.

iii. Prevent splitting of nails.

iv. It acts as an antiseptic and prevents foot rot and foot abscess.

v. It acts as a fly repellent and prevents egg lying on the foot, commissure of tusk and female external genitalia, thus prevents gastric and valvalmyiasis.

c). Preliminary health checks up: It shall be carried out every day while elephants assemble at the feeding centre by Veterinary personnel. If animal found sick in the preliminary health check up then the animal shall be subjected to special clinical examination.

d). Screening for parasite: The dung samples from all animals are subjected to screening for parasite once in every three months.

e). De-worming: De-worming was carried out once in every three months.

f). Vaccination: The vaccination programme shall be as per the prevalence and previous reports on outbreaks of infectious diseases in the area. It is essential that vaccination should be completed before monsoon. Sometimes, though rarely, vaccine may cause reaction in the form of anaphylaxis. Therefore, it is desirable that the vaccination should be done in the supervision of qualified wildlife vet.

Table No-11-e : Vaccination Schedule

Sl.No.	Vaccine/ Medicine	Month of Vaccination	Periodicity
1.	FMD polyvalent vaccine	May/ June-Nov./ Dec.	Every 6 months
2.	HS Vaccine	April/ May	Annually
3.	BQ Vaccine	April/ May	Annually
4.	Anthrax Vaccine	April/ May	Annually
5.	Deworming schedule	March-Sept.	Every 6 months

g). Tetanus toxoid: The freshly wounded animals are subjected to tetanus toxoid or once in every 6 months it can be given

h). Screening for Tuberculosis: All the animals shall be screened for tuberculosis at least once in a year.

i). Haemogram: Complete haemogram should be done at least once in a year to diagnose disease condition already existing.

j). Screening for blood parasite: Screening for blood parasites especially for trypanasomiasis shall be done at least once in a year.

k). Body weight Measurements: As the elephant being large sized animals it is difficult to find out chronic wasting condition. Hence the body weight and other measurement shall be done at least once in three months to diagnose the chronic wasting diseases and malnutrition. It also helps to now about growth rate, seasonal variation, post musth effect and treatment responded formal nutrition.

l). Health camp to elephant men: Anthropozoonotic disease like Tuberculosis may spread from human to animals or vice versa, hence the healthy animals need healthy mahout. Conduction of regular health camp to mahouts every year is must.

m). Planned, Balanced & Special diet: The quantity of diet for different classes/size of animals has been decided after much care and thorough examination. Special diet has been prescribed as and when necessity arises, such as for those animals, which are in rundown condition, pregnant and lactating cow elephant, growing calves, orphaned calves, etc.,

n). prescribed work load/ Working hours: Workload for different classes/height/size of animals has been prescribed after much care and thorough examination to maintain animals in good condition.

o). Trimming of tusks: The tusk tips of captive bulls become sharp by constant use. The tips have to be trimmed by Veterinary personnel, periodically to avoid breakage while working, to prevent injury to other animals and also unnecessary tusk fracture while animal playing and fighting with other tuskers. The trimming is only to manage mental practice not for show purpose. Hence the Veterinary personnel should take proper precautions in trimming the tusk tips, particularly in young stock to avoid injury in the core.

p). Trimming of nails: Over grown nail may be trimmed regularly to avoid unnecessary injury to the animals, splitting of nails and other foot problems.

q). Rodent Control: The rodent is a carrier for Encepahlomylocarditis virus. Hence the elephants provision stocks store and elephant house should be rodent proof.

r). Care of Musth elephants: Bulls maintained in captivity, particularly in forest department come to musth periodically. Musth is signs of health, as only bulls in normal health will come to musth. As soon as a bull comes to musth it shall be tied upclose to the camp, special musth fetters must be used to fetter the animals. If the animal responds to the mahout, the animal can be taken for watering, withholding horse gram from the diet and giving a reduced quantity of cooked rations will be done. Taking suitable precautions, the temporal glands of the animal must be examined and cleaned and dressed with fly repellent oil. Sometimes, the gland may get infected and hence should be attended regularly. The temporal gland discharge and the urine have break down products of testosterone. Hence it gives a pungent odour. It can attract a wild bull in musth. This has to be prevented. An elephant in musth will show inclination to mate with a cow elephant in oestrous, hence if the bull does not exhibit aggression can be permitted to mate with a receptive cow elephant. Consorting with a cow elephant may reduce the aggression of the elephant in musth and also if mated it would reduce the duration of musth. Never allow the animal for grazing nor allow any other bulls to come in close proximity of the animal in musth. The bull shall never be disturbed by presence of other people, vehicles or other animals.

s). Care of pregnant /Lactating cow elephants: The cow elephants in the forest camps breed regularly, as they have access to bulls both captive and wild. If the animal has conceived, the signs of pregnancy will be observed from 10 to 12 months of pregnancy, the gait of animal shows down, the breasts start filling with the outward tilting the teats. There may be viscous discharge from the mammae. From 12-13 months of pregnancy, the foetal movement can be observed. Once the foetal movements are observed, the animal should be taken off from work and given complete rest until the calf is born and 6 months of age. The quantity of ration or concentration is raised. A special diet consisting of vitamins, mineral, soaked green grams and coconuts are provided, 6-10coconuts/day provided before and 10 coconuts after delivery. Coconut milk contains several nutritious materials and enhances the quality of mother's milk. At the time of delivery one of the non-lactating cow elephant will keep company with animal and after delivery acts as mother. As soon as the calving takes place, the animal must be brought to the camp and observe whether the mother allows the calf to suckle and the calf is active. Fly repellent oil must be applied around the umbilical cord. Veterinary care of the mother should be available. VAS must check whether placenta has been expelled by the mother elephant, whether the mild is adequate for the calf and must also observe feeding frequency.

11.1.5 HANDLING OF ELEPHANTS BY MAHOUTS

The camp elephants are being handled only with ordinary plain stick by the mahout. The use of ankush (Iron hook) has been banned about for past 30 years. The use of Ankush or any other sharp metal found by officials being handled by mahout, he will be given departmental punishment. The elephant being trained and handled by giving positive reinforcement in response followed by rewards like sugar cane, banana, jaggery, etc., the animal being love and affectionate with his mahouts. The mahout must be able to establish his dominance over the elephants to feel that the mahout is smarter at the same time a loving and affectionate partner. Rather mahout is a senior partner, who is firm but not cruel. This type of relationship will lead to a positive response from the elephant like obedience to command, love and affection. The love and affection can simply control the animal and the obedience that comes by the sticks."Elephant never forgets", this saying is true and people who are familiar with elephant know it. Elephants have a remarkable memory for events and people and also believe to be emotional, so elephants naturally remember well as well as had things while in musth, captive male elephants deliberately try to attack their mahouts. The bigger problems of aggressive behaviour by an elephant towards a mahout are the elephant magnitude of the aggressions, resulting in serious injury, permanent disability or even death of mahout. The most of the tuskers are even handlable and controllable to his mahout even in musth. The reason being may be rather than the method of handling and training of elephants moreover the systematic management. The morning bath is followed by training by giving positive enforcement and feeding, this will increase the bond and relationship between elephant and mahout. The planned and prescribed work followed by relax time for grazing and bathing in evening makes the more the elephant imprint with his mahout. The reason for manslaughter and aggression of elephants to his mahout is as follows:

i. Crude method of handling, training and punishing the elephants by using Ankush, putting thorny chain. Mahout who is not very familiar with the elephant mood and psychology looses the patience and tend to punish the elephants. The elephant remains adamant, which makes the situation from bad to worse.

ii. Inexperienced fellow become mahout due to lack of employment and frequent change of mahout: A bad mahout can easily spoil a good elephant also. It is considered that a short-tempered mahout and patient elephant a vice versa may get along well.

iii. Long exhaust walk in the hot climate.

iv. Long exhaust work.

v. Deprivation of food and water

vi. Inexperience to identify the onset of musth, using the elephants for work before completion of musth in post musth stage.

11.1.6 TRAINING PROGRAMMES.

The training programmes need to be conducted every six months for mahouts and assistants, whereby the services of experienced mahouts can also be pressed. All aspects of elephant husbandry, health care, methods of training elephants, kumki training, dealing of problematic rogue elephants and 10 commandments of good mahouts will be covered as part of training programme. Apart from this a special emphasis is also required on motivational aspects of the staff, so that their commitment to the elephants remains high.

It would be informative, worthwhile and interesting if a 'Service Register' of each elephant, is maintained right from its birth/caught in the wild etc, duly mentioning, salient features in the life of the elephant. The register shall mention:

- Date of birth if known, If caught in the wild, found abandoned or procured from elsewhere, the details there of.
- Parentage
- Age & Height at the beginning of each year
- Working capacity and how utilized
- Details of movement & when shifted to different locations
- Diet
- Illness & treatment given from time to time.

The 'Service Register', like that of officials, should move with the elephant when shifted out of the Park. It, would provide necessary information of the past history to the next official or Veterinarian for any treatment to be given.

The Service Register, can be of the size of a measurement book, (10 cm x 20 cm) which is handy to carry around.

11.2. HOUSE KEEPING OF DOG SQUAD

The Dog Squad for the Forest Department operations are being trained through TRAFFIC/ WWF India Sniffer dog programme. The Dog Squad consist of : i. The Sniffer Dogs, ii.The canine, iii. His/her Handler and Asst. Handler of the Forest Department. The guidelines on Standard Operating Procedure for TRAFFIC/ WWF India Sniffer dog programme shall be followed for deployment of the Dog Squad in the Tiger Reserve.

11.2.1. History of Dog Squad in Similipal Tiger Reserve.

One Dog Squad for Similipal consisting of one sniffer dog and one tracker dog (One German Sephard and one labrador) was made functional in the year 2013 with two Forest Guards as their Handlers after their training at BSF Training Academy, Tekanpur. The two dogs died separately in the year 2015 & 2017 due to Tick infestation. In the year 2016 one Belgian Malinois inducted into the dog Squad which died in the year 2021 due to Tick infestation. Later in the year 2021, two German Sephard dogs with their Handlers and Assistant Handlers were inducted after training at the ITBP's National Dog Training Centre in Bhanu, near Chandigarh. The dogs will help in detection of poisoning spots as well as in search operation of wild animal articles. More dog squads may be recruited based on requirement. The breeds which are suitable for climate of Similipal may be given preference. Dog kennel for the Squad may be established at strategic locations under each Range to effectively utilize the services of the dog Squad.

11.2.2. Dog Squad Regime.

a. Anti-poaching and anti-tracking surveillance.

i. The canines should be a part of the anti-poaching unit and only the exclusively trained handler or Asst. Handler should be used for tracking, Sniffing and monitoring.

ii. In order to sustain stamina, especially in case of exigencies, the dog squad should be active and agile, with daily exercise as a part of protocol.

iii. Mock drills should be a active part of the regime, wherein live specimen and/or wildlife contraband seized previously can be used to consistently maintain and improve the canines olfactory functions.

iv. Dog squad should be encourage to routinely conduct surveillance and patrolling at important conduits/ transits points for wildlife items like Railway Stations, Bus Stop, Road check points and post offices, etc. The above will help the dog retain his/her sniffing skills in absence of active cases.

v. The dog squad may also accompany Department officials at the site of any seizure to make the canine familiarized with the scent of different kinds of wild flora and fauna, in addition to those already imparted during the training.

vi. A refresher course will be organized by TRAFFIC India every four years after the dog squad's deployment, which should be attended by the dog squad. The cost of the refresher course will be borne by TRAFFIC India.

vii. There should be a dedicated appropriate vehicle (four wheeler) to facilitate the dog squad's movement.

viii. As far as possible, the handler and Asst. handler should not be over burdened with duties other than the sniffer and tracker dog.

b. Reporting and documenting of Dog Squad Activities.

i. Daily movement of the dog squad should be recorded properly in a log book, by the handler and the assistant handler. The format for the same is appended in Annexure II.

ii. Any seizure conducted by the dog squad has to be documented properly by the handler and the assistant handler and corroborated by the officer in charge (OIC) of the User Agency. The format for which has been appended in Annexure II.

iii. The above mentioned reports need to be shared with TRAFIC India every month in order to strengthen the future of the programme.

iv. A representative of TRAFFIC India shall also visit the field site of the deployed dog squad, periodically to monitor the dog, with prior intimation and approval from the User Agency.

v. A report of above monitoring will be submitted to O/o the Principal Chief Conservator of Forest Wildlife and/or the designated officer.

11.2.3. Welfare of the deployed Dog Squad.

A. Kennels

i. The dog will be kept in a kennel designated exclusively for the canine (s). Requisite dimensions should be according to othe guidelines issued by the training centre. The model map of the kennel has been provided for reference in Annexure I.

ii. The kennel needs to be ready before the completion of the training.

iii. The kennel should be cleaned everyday with phenyl and a small dosage of an ectoparasiticide (such as Deltamethrin or Amitraz). Since ticks and fleas are commonly found on the walls and floors of a dog's dwelling, especially during summer and nmonsoons and areas with a lot of vegetation around, usage of an insecticide with these components will minimize the risk of ecto-parasites, while being safe for the animal as well.

iv. The kennel should at all times have a fresh bowl of water available for the dog.

v. Stagnant water should not be allowed to collect near the quarters, especially during mosquito breeding season, since mosquito borne diseases can be contracted by canines and may be life-threatening.

B. Health Care

a. **Canine Veterinary Care.**

i. The veterinarian (VAS) appointed with the State Forest Department should be appointed as the regular consultant for the Sniffer dog. The VAS on deputation to Similipal Tiger Reserve will be the regular consultant for the dog squad. In absence of such Veterinarian, a local Veterinarian, registered with the Veterinary Council of India should be appointed as the regular consultant.

ii. The dog should be subjected to a full medical checkup, at least twice a year for the first eight years, post which they should be conducted at interval of three months.

iii. All vaccination and administration of de-worming medication should be done as per schedule. Handler card should be maintained for the records all logged in one place for reference on the dog care note which will be provided by the training centre.

iv. The diet should be according to the guidelines issued by the veterinarian at the training centre. The same may be modified in consultation with the local veterianarian.

v. The dog should be bathed only with shampoos/formulations meant for animal use, which may be decided with consultation with the veterinarian, depending on the dog's needs. The bathing scheduled should be dependent on the season/weather, (summer/ monsoon season once every fortnight; winter season once a month). Too much shampooing washes out the natural oils from the dog's coat. An ecto-paraciticide may also be used once in two months/monthly to eliminate any parasite on the body, in consultation with the Vet.

vi. The dog should be groomed daily to stimulate blood flow to the epidermal layer and encourage healthy hair and skin.

vii. Basic hygiene needs to be maintained at all time, with special attention paid to the eyes, gums and ears staying clean. Techniques for the same would have been imparted during the training.

viii. Medical insurance should be made for canine on active duty.

C. **Handler and Asst. Handler and their Medical Care.**

1. Selection

i. The Handler and Asst. Handler should be choosen from the rank of Forester, Forest Guard, or Forest Watcher (Protection Assistant).

ii. At least the Handler should be a permanent staff of the Department.

iii. The Handler and Asst. Handler should be selected from the age group of 25 to 35 years at the time of entry into service.

iv. The Handler and Asst. Handler must be in good mental and physical health and free from any physical disability which will interfere with the discharge with his duties.

2. Medical Care

i. The Handler and Asst. Handler, of every Dog Squad will be provided pre-emptive rabies vaccination prior to the training. The booster shots of the same shall continue, annually, as per protocols.

ii. Medical insurance should be done for the Dog Squad's Handler and Asst. Handler on active duty, in case of injury.

iii. A full annual health check up should be conducted for the Handler and Asst. Handler to make sure that they are in prime of health.

iv. Care should be taken to spray human habitation with ecto- paracidal dosage.

D. Sterilization

1. All dogs of the programme will be sterilized and not to be used for breeding purposes.
2. The dog should be sterilized within three months of being deployed, if he/she already not been nutered/ spayed.
3. In case of male dog a minimum ten days rest period shall be given post operation and in case of female dog minimum 15 days rest period, to facilitate full recovery from the surgery or as recommended by the veterinarian.
4. Veterinary supervision and administration of all post operative anti-biotics should be done by veterinarian in-charge.

11.2.4. Conduct of the Dog Squad

1. The Handler and Asst. Handler will have to adhere to all rules and guidelines.
2. The Handler and Asst. Handler shall at all times treat the dog humanely and avoid mental or physical abuse of the canine.
3. At all times of deployment the Dog Squad shall demonstrate best practices of discipline.

11.3. WILDLIFE HEALTH MONITORING

The health of wild animals inside Similipal is noticed to be good except elephants. They are seen to be suffering from formation of abscess, gastroenteritis and some congenital diseases. The principal prey animals like sambar and wild boar available in good numbers are seen to be very healthy. Monkeys, cheetal, gaur and other animals largely appear healthy free from any diseases. However, regular vaccination of the cattle in the enclave villages needs to be made. The work will be done following plan and schedule. The carcass of the cattle shall be disposed of by burning. Similarly death of any wild animal due to poisoning and suffering from any infectious disease shall also be burnt.

To improve the health of elephants, study shall be made how to provide medicine for de-worming and other diseases though the soil-salt mixture in the saltlicks. At present the local Veterinary Assistant Surgeons look after the health of the captive elephants, rescued animal and carry out the post-mortem inside the PA. State Govt. have sanctioned one post of VAS on deputation from Animal Husbandry Department. Rescue centres will be established at Gurguria/ Nawana with infrastructure like rescue vehicle, medicine etc.

Wildlife Health Management

Protected areas are established with an aim to conserve components of biodiversity to maintain their status in the natural ecosystem to protect the species from premature extinction. Outbreak of fatal diseases among the population of wild animals has lost considerable wild fauna in the past. Large-scale mortality of Bison in South India during (1968 and 1975) and Kajiranga National Park (1981) by Reinderpest and by Foot and Mouth Disease (FMD) in 1952 had been reported in the past. Dissemination of a number of diseases, like Reinderpest, FMD, Anthrax, TB and Rabies are common in wild animals. In order to maintain the good health status of the wild animals, efforts for disease surveillance is extremely important in the Protected Areas.

There is a great competition of survival among wild ungulates and cattle for both forage and water. The domestic animals come in contact with wild animals, particularly ungulates at common grazing fields and at waterholes. Due to this, chances of the transmission of various fatal infectious diseases from livestock, to wild animals, namely Rinderpest (RP), Anthrax, Foot and Mouth Disease (FMD), Hemorrhagic Septicemia (HS)

etc., are extremely high. It is also known that there are few diseases which are communicable to carnivores form diseased ungulates; e.g. Rabies, Anthrax, Hydatidosis and Trypanosomiasis (Arora, 1994).

11.3.1. Handling of injured / sick Schedule I Wild animals

All cases of sick / injured Scheduled I wild animals, as reported by the field staff, shall be subjected to examination by an independent team, to ascertain whether human intervention/treatment is required. Since wild animals in nature are subjected to ongoing, natural intra/inter specific interactions, human interventions for treating such animals may not always be necessary. However, till the arrival of the independent team, the field staff shall continue with the monitoring of sick/ injured wild animal.

The composition of the team is suggested as follows

a) An authorized representative of the National Tiger Conservation Authority.

b) A Non-governmental outside expert nominated by the Chief Wildlife Warden of the State.

c) One Veterinary Asst Surgeon

In case of orphaned/abandoned tiger cubs and old/injured tigers in the wild the SOP issued by NTCA shall be followed. At the outset a committee for technical guidance and monitoring on day to day basis shall be constituted with the following members:

1. A nominee of the Chief Wildlife Warden.
2. A Nominee of the NTCA.
3. A Veterinarian
4. A local NGO representative.
5. A representative of local Panchayat.
6. Field Director as Chairman.

11.3.2. Wildlife Health Monitoring Protocol for staff:

In the present scenario where a Wildlife Manager has to deal with Human-Wildlife Conflict, diseased, sick and injured animals, Stray Wild animals, Post-mortem, domestic livestock and stray dogs etc. the services of Veterinary Officer are highly essential. Presently the service of Veterinary Asst Surgeon, Jashipur is mostly utilized for all the above said purposes. It is noticed that there is considerable delay in tackling the issues for want of expert services. Recently govt. have sanctioned one post of Veterinary surgeon for Similipal TR on deputation from Animal Husbandry Department. The veterinary surgeon will arrange training to all the field staff covering the following aspects including reporting system. The veterinary expert will also monitor the implementation of the protocol and submit report to the Field Director Similipal Tiger Reserve.

- Signs and symptoms of various diseases of Wild Animals.
- Identification of Wild-Animal from bones, skeleton, Hairs etc.
- Immunization Programme for livestock and stray dogs.
- De-worming medicines, vitamins and mineral supplements to wild animals based on necessity.
- Testing the water quality in water holes.
- Collection of samples, preservation, transportation etc.
- Rescue operation for stray Wild Animals and after care and facilities for rescue animals.

- Keeping track of cattle depredation by carnivores through wireless on a daily basis, and ensuring timely compensation to affected people.
- Monitoring movement of wild carnivores near human habitations through “impression pads” created near water points and other sensitive areas, and maintaining a record of such village level monitoring in the Gram Sabha/ Panchayat/EDC.
- Alerting / sensitizing local people appropriately, including safe Disposal of livestock carcass and other garbage, to prevent habituation of wild carnivores like panther from frequenting and subsequently becoming resident in the area.
- Deployment of tracking squads comprising of frontline staff and experienced local people, and plotting day-to-day movement of the aberrant wild carnivore (preferably using GPS in the GIS domain).
- Deployment of a “watch team” for patrolling the affected village area, techniques like crackers, light, etc.
- Using camera traps/impression pads for collecting field evidences relating to the wild carnivore for arriving at an inference.
- Constituting an advisory committee comprising of field staff, experienced trackers and NGOs for obtaining advice relating to identify/sex of the aberrant wild carnivore causing depredation, especially for ascertaining its sex, age, physical deformity and other related parameters.
- In case of recurring human depredation in quick succession, use of dummies with a bent posture inside trap cages for trapping the aberrant animal (such traps, with inbuilt mechanism for automatic closure after animal entry, should be placed at several sensitive areas) in consultation with Chief Wildlife Warden.
- Radio collaring and monitoring the problematic animals in consultation with Chief Wildlife Warden.

The procurement and supply of Drugs/Medicines, Cages, metal detector, vehicle etc to the veterinary expert will be ensured. Sufficient budgetary provision for the establishment of Laboratory and related facilities in a phased manner will be made.

Free-ranging wild animals are as susceptible to diseases as any other living beings. Diseases have been a major cause of local extirpation of a number of wild animal species in India. With the increasing interaction between wild and domestic animals, the chances of disease transmission amongst them are high. Therefore, similar to the attempts made for recording the occurrence of disease outbreaks in wild animals of protected regions, efforts shall also be made to know the occurrence of specific infectious and contagious diseases in domestic animals at the periphery of the protected wildlife areas. Until and unless different epizootiological cycles of various parasitic and infectious diseases are delineated, it will not be possible to plan out measures to eradicate these diseases from free ranging wild animals.

For maintenance of health of wild animals, it is essential to monitor and survey the parasitic and infectious diseases periodically so that necessary actions could be taken to prevent disease outbreaks and control large-scale mortality. Surveillance programmes will be a major aid in the implementation of long-term health management plan on the appropriate measure to maintain healthy population of wild animals and guarding them against the risk of sudden and heavy mortality or morbidity in Protected Areas. This can be best achieved by preventing transmission of diseases between wild and domestic and in-between wild animals by manipulating the factors involved in the transmission. Establishing the database for forecasting the diseases by performing epizootiological studies in and around the Protected Areas round the year is of utmost importance and needs attention.

Preventive medicine in free ranging wild animals is more closely related to wildlife management. In wild life medicine health of population is its highest priority. Individual animal therapy in wild life medicine is difficult, if not impossible in most instances. Preventive medicine will be practiced to ensure the health of wild animals of the reserve.

A large number of cattle pass through the nearby area to Similipal Tiger Reserve. There is a problem of illegal cattle grazing. The common use of water hole by cattle and wild animal is the main cause of introduction of infectious diseases in to wilds. The common diseases that may attack wild animals of the reserve are FMD, Anthrax, Brucellosis, Leptospirosis, Protozoic, Ecto-Endo parasite, Hemorrhagic septicemia, Black quarter, etc.

(A) Prophylactic Immunization:

Some disease which is common to this area and is epidemic in nature and spread by both wild and domestic animals, preventive treatment against these diseases by the means of prophylactic immunization to the domestic animals is given. Domestic cattle, which may transmit the disease among wild fauna, can be vaccinated to prevent the occurrence.

Such immunization is carried out in villages located within a radius of 5 Km from the Park. It is believed that an animal can cover maximum distance of 5 Km. to graze and browse.

Prophylactic immunization shall be regularly carried out with the help of Veterinary Department every year, to reduce the chances of spread of disease from cattle to the wildlife.

(B) Disease Surveillance:

A quick disease reporting, detection and treatment system only can achieve proper disease surveillance. In the case of wild animals, detection of disease is only based on observation on animal behaviour and their day to day activities. Concept of landscape epidemiology that associates the occurrence of a certain disease with the existing landscape shall also be kept in the mind. The knowledge of animal species typical to the given area and particular disease maintained and spread by them will be extremely useful in disease detection and treatment. If such a disease is detected, its prophylactic treatment by immunization, water hole treatment or aerosol immunization can be done. To protect and maintain wildlife in PA with good health, it is necessary to achieve disease surveillance of –

i. Native wild population

ii. Domestic cattle of adjoining villages

Parameters for the monitoring of wild animals health –

1. General examination
- Physical examination
- Clinical observation
2. Laboratory investigations
- Faecal examination
- Haematological examination
- Serological examination
3. Study of kill / Mortality
4. Detailed post-mortem examination
5. Collection of material for laboratory examination

11.4 MORTALITY SURVEY

A survey to be conducted regularly and intensively at section level to find out the mortality of any animals. All such instances are to be recorded and reported on regular basis to the higher office. As per the NTCA guidelines all half eaten kills should be guarded to avoid poisoning of the kill by locals in retaliation. Mortality

means susceptible to death. Mortality in wildlife may be due to environmental stress, disease outbreak, poisoning, accident etc. information about mortality rate for wild animal is very important for population dynamics. Heavy mortality rate for any species can change the survival possibility. So, it is very important to keep the record of mortality of wild animals for the core of Similipal TR. Mortality survey is regular process which can be done in following steps-

- Mortality register shall be maintained at range level on daily basis for each and every type of mortality. Monthly compiled record at range level shall be sent to DD/FD. Separate record shall be maintained for mortality other than that attributable to an offence and mortality attributed to poaching or an act of vandalism. Survey record can be maintained in prescribed Format. All records shall be analyzed at FD office annually and report shall be submitted to CWLW.
- Mortality data shall be collected by the field staff at block.
- Each mortality information shall be immediately reported to range office and if needed, specimen shall be collected and sent for pathological investigation.
- It shall be informed to all the staff through a circular in Odia language that Tiger or any other Carnivore on kill shall not be disturbed for knowing dead animals.

Table No- 11-f : Animal mortality other than that attributable to an offence

SL NO	SPECIES	LOCATION	YEAR	SEX & Age	Number	Discov-ered in what condition	Cause of mortality	remarks
1	2	3	4	5	6	7	8	9

Note: Location: By compartment, landmark etc.

Sex &age: As per parameters for age class. Sex, if possible to identify.

Discovered in what condition: Carcass, complete or partial. Skull or any other recognisable remains collected where only some remains of an animal are found.

Cause of mortality: If known e.g. territorial fight, accident, possible disease (following postmortem results), old age, cause difficult to determine, predation etc.

Remarks: Any other useful information.

*Table No- 11-g :*Animals mortality attributed to poaching or an act of vandalism

Sl No	Species	Location	Cause of mortality	Remark			
			Number	Sex	Age	Class	
1	2	3	4	5	6	7	8

Location: By compartments or landmarks.

Cause of mortality: Whether the animal was intact or remains found, article or trophy to be recorded. Cause if known e.g. animal snared, shot or poisoned etc.

Remarks : Any other useful information, especially matters of illegal trade.

11.4.1 Post Mortem Protocol for Ensuring Transparency Incases Relating to Tiger Mortality.

In this context, the following actions are advised.

- All the tiger carcasses shall be preserved in a deep freeze till an independent team analysed the cause of tiger death.
- Every incident of tiger mortality shall be thoroughly examined by an independent team whose composition is as below:
    - An authorized representative of the NTCA.
    - A Veterinary Officer of the tiger reserve/district.
    - A non-governmental outside expert nominated by the Chief Wildlife Warden of the State.
- Every incident of tiger mortality shall be brought to the notice of the NTCA by telephone/fax, followed by a detailed post-mortem report alongwith the report of the independent team. The death of schedule animals shall also be informed to the Chief Wildlife Warden.
- The Standard Operating Procedure to deal with tiger death issued by NTCA on 17.12.2012 will be strictly followed.

11.4.2 Record of Post Mortem Examination

The Veterinary Experts and others involved will prepare and submit the postmortem examination report in the format prescribed here under

RECORDS OF NECROPSY EXAMINATION

NAME OF TIGER RESERVE:.....

NAME OF SPECIES with scientific name:.....

AGE (approximate).....SEX.....AMBIENT TEMPERATURE in *C (at the time of acquisition).....

DATE OF NECROPSY.....DATE & TIME OF DEATH (estimated).....

TIME OF ACQUISITION OF CARCASS.....TIME OF DISPOSAL OF CARCASS.....

GPS LOCATION AT PLACE OF DEATH & PLACE OF NECROPSY (ifdifferent).....

AREA DESCRIPTION (topography water source, etc) .....

.....

I. HISTORY OF DEATH

1. Brief History

.....

.....

.....

.....

.....

2. Observation of the surroundings

.....

.....

.....

.....

.....

Other relevant information

.....

.....

.....

.....

.....

II. EXTERNAL EXAMINATION

PHYSICAL CONDITION : Normal Fat Thin Emaciated

RIGOR MORTIS .....:.....

SUPERFICIAL LYMPH GLANDS :..... MUCOUS-MEMBRANE:.....

NATURAL ORIFICES :..... BODY WEIGHT in kg (approximate).....

BODY LENGTH in cm :..... TAIL LENGTH in cm:.....

(nose to tip of tail) (base of tail to tip of tail)

HEIGHT AT WITHERS in cm :..... CHEST GIRTH in cm

STATE OF CARCASS : Fresh /Refrigerated /Deep frozen /

Incomplete

STATE OF DECOMPOSITION : Fresh /Bloated /Active decay /Advanced decay

DESCRIPTION OF WOUNDS/INJURIES, ifany.....

.....

.....

.....

OTHER REMARKABLE OBSERVATIONS, if any .....

.....

.....

Vital Measurements (whichever applicable):-

Rt. FORE FOOT-PAD GIRTH & LENGTH X BREADTH in cm (carnivores):.....

LENGTH OF CANINE TEETH in cm (carnivores): Upper Right ....Upper

Left.....Lower Left.....Lower Right.....

Rt. FORE FOOT-PAD CIRCUMFERENCE in cm (elephant)

:.....

LENGTH & CIRCUMFERENCE (at base) OF BOTH TUSK/TUSH IN CM

(elephant):.....

.....

.....

OTHERS (Length of Antler/Horn, Length etc.)

:.....

.....

.....

III. INTERNAL EXAMINATION

Table No- 11-g :Internal Examination

A. Skin, Subcutaneous tissues & Muscles	
B. Body cavities 1. Position of visceral organs 2. Peritoneal cavity 3. Pleural cavity and pleura	
C. Respiratory system 1. Larynx 2. Trachea 3. Bronch and Bronchioles 4. Lungs (Appearance, color & consistency) 5. Lymph Glands 6. Diaphragm	
D. Hepatic system 1. Liver (Appearance, size, color) 2. Liver tissue 3. Gall bladder & Ducts 4. Lymph glands	
E. Circulatory system 1. Pericardial sac 2. Heart muscle 3. Heart chambers 4. Large blood vessels 5. Small blood vessels 6. Spleen (Appearance, size, colour) 7. Splenic tissue	

F. Digestive tract 1. Pharynx 2. Esophagus 3. Stomach (Simple): i) Cardiac zone ii) Fundus iii) Pylorus Stomach (Compound): i) Rumen ii) Reticulum iii) Omasum iv) Abomasum 4. Small Intestine i) Duodenum ii) Jejunum iii) Ileum 5. Large Intestine i) Caecum ii) Colon iii) Rectum 6. Lymph glands (Mesenteric)	
G. Urogenital Organs 1. Kidneys (Colour& appearance) 2. Urinary bladder 3. Reproductive organs i) Testes/Penis/Glands ii) Ovary/Uterus/Vagina	
. H. Adrenals	
I. Head 1. Buccal & Nasal cavities 2. Tongue 3. Brain & spinal cord	
J. Skeleton	

Table No- 11-h :Summary of Major Finding

IV. SUMMARY OF MAJOR FINDINGS ....

Table No- 11-i :Sample details

Sl. No.	Sample	Preservative used	Examination required	Laboratory addressed

*Table No- 11-j :*Provisional diagnosis

V. PROVISIONAL DIAGNOSIS ....

Place :..... 1. Signature:.....

Date :..... Veterinarian's name:.....

Designation:.....

2. Signature :.....

Veterinarian's name:.....

Designation :.....

Note : Attach a rough sketch of the area duly signed by the competent authority.

11.4.3 Instruction for Performing Necropsy And Collection of Samples For Laboratory Test

Many diseases affecting valuable wildlife resources have gone undetected because appropriate samples were not collected for diagnostic testing from animals that died due to the disease. When appropriate samples and accurate written and photographic records are taken, the cause of disease can be determined in most cases. It would be worthwhile to collect complete tissue samples including blood as it would aid in the recognition of disease condition. If only selected samples are taken because a particular disease is suspected and the animal does not have that disease, these samples may be inadequate to test for other disease that might be causing the disease. Furthermore, selective sampling limits the information that could be procured from a wild animal necropsy that aid in future population or eco system management. Before performing a necropsy on an animal two important points need to be considered:

1. ZOONOTIC DISEASES:

Examine whether species have a disease that is transmissible to humans. Disease such as rabies or Echinococcosis (Hydatiddisease) in carnivores, anthrax or rabies in ungulates or psittacosis in birds can cause serious and fatal diseases in humans. Many primate diseases also can cause human illness. Hence it is necessary to take appropriate protective measures before conducting the necropsy. Wearing a mask is particularly important when performing a necropsy on a primate, bird, or a carnivore suspected of rabies. Also, all samples should be handled with care and unfixed samples should be placed in leak proof containers so that dangerous infectious materials do not leak during transport.

2. **REPORTABLE AND INFECTIOUS DISEASES:**

Examine whether animal have a disease that is infectious to livestock or other wild animals. Diseases such as anthrax, foot and mouth disease, or tuberculosis can spread to other animals through contamination of the environment during the necropsy procedure. Anyone conducting necropsy of wild animals should be aware of the typical lesions of these diseases and take extra precautions when decontaminating a necropsy site.

EQUIPMENT

A basic necropsy kit can be assembled in preparation for transport to a field necropsy site on short notice. The kit shall contain the following items:

Necropsy equipment

1. Bone cutter (small), 2. Bone cutter (Large), 3.Butcher knife, 4.Hammer, 5. Knife (Large), 6. Knife (Small), 7. Knife Sharpener, 8.Surgical Blades, 9. BP blade handle, 10. Rat tooth forceps (small and large), 11.Tissue forceps (small and large), 12.Probe, 13. Scissor (both ends sharp) (small and large), 14. Scissor (blunt-sharp) (small and large), 15.Tray, 16.Sharp container, 17.Spirit lamp, 18. Match box, 19. Measuring tape (30 meter length), 20. Nylon thread

Necropsy documentation

21. Marker pen and pencil, 22. Labels, 23. Necropsy forms, Laboratory specimen forms, 24. Notebook, papers

Protective Clothing

25. Apron (disposable or non-disposable), 26. Shoe covers (disposable), 27. Sterilised Gloves (disposable), 28. Non-sterilised Gloves(disposable), 29. Veterinary Gloves(disposable)

30. Face Mask (disposable), 31. Cap (disposable), 32. Full Face Shield (disposable)

Specimen containers and sampling instruments

33. EDTA vacutainer, 34. Serum separator vacutainer, 35. Syringe with needles (20g) 2ml, 5ml, 10ml, 36. Microscope glass slides & slides box, 37. Aluminium foil, 38. Containers 250ml, 500ml, 39. Zip lock bags – medium and large, 40. Sterile swabs, 41. Sterile containers (50ml)

Transport materials

42. Cotton roll (500g), 43. Insulated container, 44.Packaging tapes (1 inch and 2 inch), 45.Ice packs, 46. Ice box – small

Disinfecting materials

47. Chlorhexidine Solution (Savlon®), 48. Isopropyl Alcohol, 49.Liquid soap, 50. Lime

Fixatives and Preservatives

51. Methanol, 52. Silica gel, 53.Buffered formalin 10%, 54.Sterile Buffered glycerin 50%, 55. 70% Ethyl alcohol

Others

56. Global Positioning System, 57. Camera, 58. Weighing scale (upto 400kg), 59. Plastic sheets, 60. Flashlight

11.4.4 Safety Considerations

Personal safety

Some diseases of wildlife can cause serious illness or death in humans, all carcasses should be handled as if they were harbouring potentially dangerous disease and precautions for personal safety should be exercised. Minimal protective clothing is always advised that includes apron, gloves and a mask that covers the nose and mouth, shoe covers.

Handling of carcass

Diseased wild animal should be handled carefully to minimize exposure of other wild and domestic animals. If Anthrax is suspected, a blood smear shall be made by nicking an ear vein or other available vein and checking for *Bacillus anthracis* by microscopy before the carcass is opened. Carcasses with anthrax or other infectious diseases should be buried (preferably covered with a disinfectant and buried at least 2 m deep to prevent scavenging).

Despatching samples

Fresh collected and frozen samples shall be packed and dispatched immediately after necropsy so that no further deterioration occurs. Laboratory must also be telephonically informed about the details of the samples.

Labelling of specimen

All containers, tubes, slides and bags shall be labelled using a waterproof marker. Placing a second label in a plastic bag that is then attached to the container adds further security. For formalin fixed tissues, a paper label with the animal identification written in pencil can be submerged in formalin with the tissues.

The following information should be included on the labels:

Date :

Location :

Species :

Tissue type & preservative used :

11.4.5 General Observations about the Carcass and its Surroundings

Assessment of the Condition

Examine:

- Any recent weather conditions that could have caused animal deaths
- Ambient temperature that might lead to further deterioration of carcass
- Signs of struggle.
- Condition of the animal.
- Any bite wounds, other signs of predation. If wounds are present, look for bruising and bleeding in the tissues near the wounds would indicate that they occurred before the animal died. Look for signs of humans or injuries caused by humans. Otherwise these wound most likely were caused from the carcass being scavenged.
- Broken bones, missing hair, broken or missing teeth or other signs of trauma.
- Deformities (if any).
- External parasites (preserve if any).
- Consideration about Nutritional Status
- Evaluate weight, body length and chest girth (details mentioned in the necropsy form).
- Examine:
- Fat stores under the skin and in body cavities.
- Amount of fat around the heart and kidneys
- Muscle mass.
- Amount of food in the digestive tract.
- Condition of the teeth like deposition of tartar, chipping, fracture, pulpal exposure, etc.

11.4.6 Specimen Collection and Preservation

Most carcass will have some Autolysis, but diagnostic tests can still be performed if tissues are properly handled. Therefore gentle handling of autolysed tissues is recommended. Quickly place in preservative. Freeze or refrigerate samples as soon as possible for infectious disease or toxicology testing. Autolysis can cause many artefacts in tissues that can be confused with a disease process. However, it is always best to take a sample from an area that looks abnormal rather than assume that the change was caused by autolysis. Histopathology will be able to distinguish between true lesions and post-mortem changes.

Histopathology

- Samples shall be taken from all major organs and any abnormal areas as well.
- Samples from GIT can be placed in one container and should not be placed with other organs.
- Samples shall be placed in container of 10% buffered formalin.
- Quickly submerge tissues in 10 times the volume of formalin as the volume of tissue.
- Samples shall not be thicker than 1 cm so that they can fix, but long and wide enough to represent the different areas of a tissue as well as any abnormalities.
- Samples that include abnormal areas and surrounding normal areas are best.
- Samples should be handled carefully by grasping at the edges.
- Crushing, stretching, scraping, or otherwise damaging specimens should be avoided. Gentling handling is required.
- If a tissue needs special labelling, it will be placed it in a different container or a piece of paper attached to the tissue with string or a pin and label the paper or container with pencil or waterproof marking pen.

Microbiology (Bacteriology and Virology)

To take sample without contaminating them, the samples need to be taken before tissues are touched and the instrument need to be sterilized. These samples also should be placed in sterile containers. To sterilize instruments, the tips need to be dipped in alcohol and then flame them or to flame the tips until they are red and then to let them to be cool. Samples also can be taken with a sterile swab, sterile syringe, or by placing a large (3cm X 3cm) section of tissue directly in a sterile container (the centre of the tissue will be uncontaminated). Samples that contain abnormal areas shall be taken. Appropriate samples include: whole blood, pus, areas with abscesses or nodules, or intestinal contents (with a loop of intestines). When taking samples from infected tissues, an area near the edge of the affected tissue where live organism are most likely to be found is to be selected. If no abnormal areas are present, standard tissue samples of lung, liver, kidney, spleen, tonsil, and intestines will be taken. Samples need to be kept moist with sterile transport media, sealed in a sterile container and cold. If refrigeration is not available, samples can be placed in 25% buffered glycerine in sterile containers. Transport swab need to be taken from areas where the presence of pathogens is suspected. Sampling of the pleural surface of the lungs, bronchi, stomach mucosa, and perineal fluid, fluid in the pericardial sac, brain surface, abscesses, or infected areas is recommended for relatively fresh carcasses.

Smears of pus and infected tissues are also useful and can be air-dried and fixed with heat.

Toxicology

After taking samples half of each sample need to be placed in aluminium foil and half in plastic bags or containers (aluminium or plastic interfere with the testing of some toxins). Samples need to be stored frozen (if possible) until shipped to a laboratory.

Parasitology

- Faeces, gastro-intestinal contents and mucosal scraping can be preserved by refrigeration or 10% buffered formalin. If GIT protozoa are suspected, the faecal matter can be stored in normal saline and then refrigerated.
- External parasites are best preserved in 70% ethanol.
- Trematodes (flukes) and cestodes (tape-worms) can be preserved by 10% buffered formalin.
- Nematodes can be preserved in 70% ethanol. A small quantity of glycerine if added prevents shrinkage.
- Thin and thick blood smears on clean glass slides need to be made and air dried and fixed with methanol.
- Preparation of Slides for Cytology
- A clean cut with a scalpel blade be made across the surface of the abnormal area of the tissue which is required to be examined.
- The sample is to be firmly grasped with forceps, placing the cut surface down.
- The cut surface of the sample is to be blotted across a paper towel or other absorbent surface until no blood or fluids are evident.
- Then the blotted surface is to be gently touched in several locations on clean slides.
- Fixing with methanol.

Urine

Urine can be collected from the urinary bladder of relatively fresh carcasses with a sterile syringe. If the bladder is not distended it may be desirable to slit it to remove the urine with a syringe. Urine can be refrigerated but it should be submitted for culturing or clinical pathology as soon as possible after collecting. Samples can otherwise be frozen for later determination of osmolality and other urine values.

11.4.7 General Concerns for Performing the Necropsy

- All the procedures involved during necropsy must be carried out before sunset and proper light is essential.
- Proper history and thorough ante-mortem examination of the carcass to be ensured.
- All carnivores and ungulates are placed on the left side so that the right side of the carcass is opened. All birds, reptiles, and primates are placed on their back.
- After the body cavities are opened, the general nutritional condition of the animal and location of all organs shall be assessed (to determine if any organs are displaced) before organs are removed. At this time, a sterile blood sample for culture can be taken to obtain serum for serological tests. Also sterile samples of other organs shall be taken for culture before organs are handled.
- After the general condition of the animal has been recorded, individual organs can be removed, examined, and sampled in a systematic manner. Any abnormal findings (lesions) need to be described.
- Photographs of abnormal findings provide the best documentation for records.

Description of Abnormalities found at Necropsy

Criteria preferred for describing any abnormality is location, number &distribution, colour, size, shape, consistency, and texture. For example: “The liver contains multiple tan, firm nodules ranging from 1 to 3 cm in diameter that are distributed through out all liver lobes. The nodules are gritty on cut surface”.

11.4.8 Post-necropsy

Disposal of carcass

Open air incineration is best preferred for all predators, small to medium-sized ungulates, primates, birds and reptiles as it allows complete disposal of all body parts (highly priced in wildlife illegal trade). If facility permits, large-sized ungulates can be cut to pieces before incineration. On-site burning is best preferred for elephants after removal of tusks. The Veterinary expert may decide whether the Carcasses to be left to nature for foraging by carnivores, Wildboars, vultures etc. The Standard Operating Procedure issued by NTCA for disposal of carcass will be followed for each case.

Disinfecting the necropsy site

The carcass and all tissues from the carcass including blood soaked dirt shall be buried or incinerated. All contaminated paper or plastic materials shall be either thoroughly disinfected or incinerated. All blood and residual tissues shall be removed from the instruments and tools with soap and water. Then the instruments shall be disinfected. Necropsy boots and apron shall be cleaned and any contaminated clothing thoroughly washed. The external surface of any containers with samples shall also be washed. Lime shall be sprinkled to disinfect the necropsy site.

11.4.9 Storage or submission of samples

All the samples must be packed separately with proper packaging tapes to avoid leakage and cushioned with absorbent materials to avoid spoilage. If necessary, ice packs would be interspersed with specimen to provide uniform refrigeration or freezing effect. Formalin-fixed samples can be kept at a cool room temperature until shipped. Any samples for culture need to be kept refrigerated (for parasitology or bacterial culture) or frozen (for toxicology or virus cultures).It is best to ship frozen and fixed samples separately. If they must be shipped together, then insulate the fixed tissues from freezing by wrapping in newspapers. There should be no spillage of formalin, because fixation of frozen samples will make culturing for bacteria or viruses impossible and will alter cells on blood smearsor cytology slides. Furthermore, formalin will cause undesirable effect on the samples for toxicological investigation.

Fixative and Preserves

Sterile Buffered Glycerine (50%)

For transporting tissue for culture when refrigeration is not available.

To make sterile buffered glycerine with an equal amount of buffer composed of:

A. 21 g citric acid mixed in 1000 distilled water

B. 28.4 g anhydrous sodium phosphate in 1000 distilled water

Mix 9.15 ml of A and 90.85 ml of B

Mix 100 ml of buffer with 100 ml of glycerine.

Then sterilize in small tubes to take into the field

10% Buffered Formalin

For fixation of tissues for histology.

To make one litre mix.

100 ml formalin (38-40% formaldehyde)

900 ml distilled water

4 g sodium chloride (table salt)

70% Ethyl Alcohol

Table No- 11-k : Ethyl Alcohol

To make one litre mix. Add 700 ml of 100% ethanol and 100 ml of distilled water

Tissue	Microbiology	Toxicology
Brain	✓	✓
Fat	✓	✓
Stomach contents		✓
Hair		✓
Liver	✓	✓
White Blood	✓	✓
Lymph	✓	✓
Tonsils	✓	✓
Spleen	✓	✓
Abscesses, granulomas	✓	✓

LABORATORY SPECIMEN FORM

NAME OF TIGERRESERVE:.....

NAME OF Species with scientific name:.....

AGE (approximate):.....SEX:.....AMBIENT TEMPERATURE in C(at the time of acquisition):.....

DATE OF NECROPSY EXAMINATION ATTACHED: YES/NO

BRIEFHISTORY:.....

.....

Table No- 11-l: Details of Sample

Sl. No.	Sample	Preservative used	Examination required	Laboratory addressed

Table No- 11-m: Details of Sample Collection

Date & Time of Collection .....

Mode of dispatch: Post/Rail/Air/Bus/Messenger (messenger's name).....

..... Date & time of dispatch.....

Handed over to.....

Dated..... By: Veterinarians name & signature.....

.....

11.5 RELOCATION OF CORE AREA VILLAGE

Need for relocation

The core area of the Tiger Reserve forms the crucial natal area and a critical tiger habitat. It is imperative that this area is made absolutely sacrosanct and free from any kind of human interference.

Progress of relocation

Village relocation is having immense use when it comes to creation of inviolate space for wildlife. Efforts were made to relocate villages which were residing inside Similipal Sanctuary since the inception of Similipal Tiger Reserve. A total of five villages which were located in the core area of Similipal were successfully relocated. The first village where relocation efforts were started are Jamunagarh with 49 families and Kabatghai with 85 families in the year 1994. Kabatghai relocation was completed in 2016 and Jamunagarh village was completely relocated in 2022. One more village named Jenabil with 84 families was relocated in two phases starting from 1998 and completed in the year 2010. Another two hamlets one at Upper Barakamuda with 22 families and another at Bahaghar with 10 families were completely relocated in the year 2013. At present only one village namely Bakua is located in the core area of Similipal Tiger Reserve.

The details of families relocated from the villages inside core area of Similipal Tiger Reserve during the period from 1994-2022 are given below.

Table No- 11-n: Details of Relocation

Village	Family	Year	Year-wise break up of Families relocated & rehabilitated in the Rehabilitation Colony							Balance family (as per survey)	Remarks
			Kapand	Ambadiha	Asankudar	Nabra	Manada	Anukulpur	Total		
Jamun-agarh	49	1994 2015 2022	11 - -	- - 1 (06 Units)	- - -	35 2 (07 Units)			49	0	Completely relocated & rehabilitated
Jenabil	84	1998 2010	-	23 61	- -				84	0	Completely relocated & rehabilitated
Kabatghai	85	1994 2003 2016	30 - -	- 8 -	- - -	-	40	7	85	0	Completely relocated & rehabilitated

Bakua	61	-	-	-	-				-	61 (1998-Survey)	The village have expressed their un-willingness to vacate their land for which land Acquisition process could not be taken up. Process has been going on for relocation.
Barakamuda	22	2013	0	0	22				22	0	Completely relocated & rehabilitated
Bahagha-ra	10	2013	0	0	10				10	0	Completely relocated & rehabilitated
Total	311		41	93	32	37	40	7	250	61	

The relocation of balance families of Jamunagarh and Kabataghai village has been done successfully. As of now there is only one village named Bakua present in the Core area of Similipal. Continuous efforts are going on to convince villagers for voluntary relocation.

STRATEGY

Process of diversion of forest land proposed to be allocated for rehabilitation of Bakua and other buffer villagers shall be expedited.

Continuous dialogues with the villagers of Bakua to be held with the help of local NGOs to convince them for voluntary relocation.

Till the rights of affected persons are finally settled, alternative arrangement shall be made for making available fuel, fodder and other forest produce to affected persons in terms of their rights as per record.

A retired Revenue Official may be engaged to expedite the relocation process by coordinating with District Administration and/or Tehsils. His services shall be utilised for identification of land for rehabilitation, settling of record of rights and facilitate implementation of various schemes of Govt. to the relocated communities.

11.6 HABITAT IMPROVEMENT

Similipal exhibits multiplicity of habitats for a range of species. Recognizing its status as a Tiger Reserve as well as a part of Elephant Reserve, the forest constitutes major elements of habitat. Within each category of forest, special habitats would be found. Tiger and elephant are manifestation of that sum, which is embedded in the inter-relationship of living and non-living. Good habitats for tiger must contain enough prey base for the tiger to survive on. Long, reasonably undisturbed forests will be required for elephant to continue its signature to appear over generations. As far as possible, the strategy should be to keep the habitats protected; and to manipulate, only after fully understanding the implications of the actions and that too cautiously, and to monitor systematically and scientifically.

With the backdrop of the vastness of the area of the landscape, the diversities of the habitat types and the diffused nature of the wild animal populations, it is necessary to adopt following strategies to improve the habitat congenial for the growth of wild animal population.

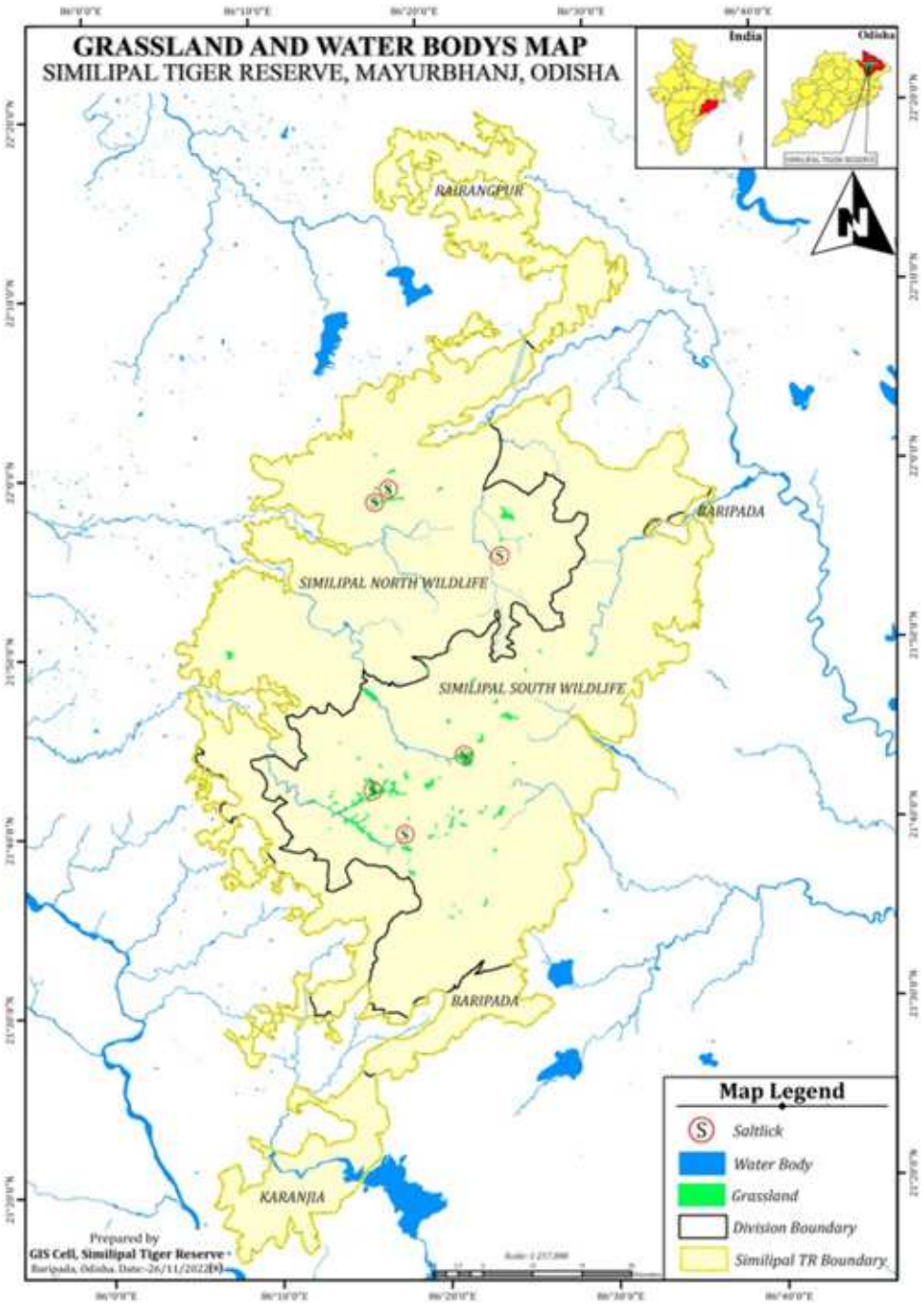
Objectives

To do an overall improvement of habitat in terms of availability of food, cover and water to wild animals by some management interventions or habitat manipulation works.

Strategies:

Improvement of meadows

Carrying Capacity of Tigers in Similipal Tiger Reserve was calculated to be **12/ 100**sqkm following the method prescribed by Hayward (Chapter 9.7). The present density of Tigers in Similipal is less than the predicted Tiger density. According to studies, an area of five to eight percent of the habitat should be retained in the form of grassland in a total area of 1000 km²(Gopal, 2012). But in similipal grassland occupy less than one percent area in the critical tiger habitat. However, no creation of new open area for developing grass land is suggested, but the existing grasslands are proposed to be maintained with arresting succession process and development of grass land in relocated village sites. The location of grasslands in Similipal has been depicted in a map.



Map : 11-A : Grassland and Water Body Map

The grassland and meadows of the PA extending over 1151.762 ha at different places (Annexure XXVII) are now invaded by sal saplings. These need to be uprooted and obnoxious and unpalatable grass and shrub species eradicated by removing manually from the meadows. More palatable and indigenous grass species like *Cynodondactylon* is to be sown in patches by fencing the area.

Restoration of the existing meadows and maintaining their character will be focused in the following areas:

(a) Rajabhadi near Bhanjabasa, Balidara, Bhanjabasa-UBK road, Tarinivilla, Hatisala, Tiktali, Nuagaon-Solamundi, Devasthali-Patabil-Bachhurichara-Sapaghara-UBK road;

(b) Nigirda-Panasia, Pandabandha-Kusumtota; Khadkhai-Baunsakhala;

(c) Gurandia;

(d) Sunpokhari, Sarabasa-Jadapal; Dhudruchampa-Kaniabasa; Badamakabadi.

Efforts will also be made to develop meadows on the relocated village sites in the core area.

Eradication of weeds

All weeds like *Lantana* and *Eupatorium* rich are noticed mainly near settlements and relocated sites need to be uprooted and destroyed during rainy season. Weed invasion is not noticed in large scale in the core area except the village areas.

Development of waterholes

There are 16 water bodies inside the PA constructed in the past as detailed in Annexure XXVI. These get silted and hence required to be renovated once in two years. No new structure within core area is proposed during the plan period.

Management of swamps

The swamps are natural depressions in the valleys, where due to clay pan formation in the sub-surface, water retention ability of soil increases and marshy conditions occur. They constitute significant habitats for wild animals and hence their accounting is very important. All swamps must be mapped and recorded. Their vegetation profile shall be inventoried and weeds closing in from the periphery shall be removed on an annual basis. However, attempts to dig waterhole in *swamps* shall be discouraged as such interference may break the clay pan in the subterranean stratum and we may lose the water retention ability of these marvellous creation of nature. The list of swamps locally known as “Daldali” is given in Annexure XXVIII.

These shall be preserved and maintained as they are an edaphic climax. Due to succession some tree species are found encroaching the grasslands, particularly after a series of years with deficit rainfall. These shall be removed and the succession halted by burning the swamps to suppress woody growth to maintain the grassy vegetation.

The swamp habitat holds the key to maintenance of high ungulate densities (particularly of Chital, gaur, and elephant). These moist grass savannahs appear to be maintained naturally in years of normal rainfall, but after a series of years with a deficit rainfall, they may be invaded by native woody plants and weed. If there is a series of dry years, this could lead to a problem which may need to be addressed by artificial clearing & burning of the swamps to suppress woody plants and to maintain the normal grassy vegetation.

Mapping of all the swamps will be done in a GIS domain to monitor them regularly.

Development of saltlicks

The list of existing saltlicks has been given in Annexure XXIX.

No new artificial salt lick will be created and the existing salt licks near the camps will be maintained.

Regular surveillance will be kept on the natural salt licks.

- Staff will visit the saltlicks on patrolling duty every day morning and evening.
- For elephants, twice a week application of salt on Mondays and Thursdays at the rate of 1:4 rock salt: common salt shall be done.
- Application salt and cleaning of artificial saltlicks will be done in morning time when the saltlick is totally free of any animal.

Miscellaneous

- For dust baths during dry months and wallowing during the rains and winter as many spots as possible will be developed. These spots will be maintained by treating the same with tick repellants.
- Sand banks at suitable spots along West Deo and Budhabalanga in the downstream of Barehipani fall, will be created for the mugger crocodiles to bask and lay eggs.
- Molecules of refuges and shelters will be provided for the tiger and its prey animals in dispersed pockets all over the Reserve wherever possible.
- A survey of dens of tigers be made, marked, GPS reading recorded and strictly protected.

11.7 INFRASTRUCTURAL DEVELOPMENT

The available infrastructure is quite inadequate for accommodation of the staff. The inhospitable climatic condition and absence of social infrastructure inside the PA does not permit the field staff to keep their families with them. It creates bottle necking in management of the Reserve. Hence it is suggested that accommodation for Asst. Conservator of Forests and Range Officers of the core area will be provided outside the PA at Baripada and Jashipur. Similarly the inadequate accommodation for the Forests Guards and Foresters will be fulfilled. The office of the Regional Chief Conservator of Forests and Field Director, Baripada will be constructed with annexes, such as laboratory for the GIS, interpretation centre and data base. Following new constructions are proposed during the plan period.

1. Construction of Residential quarters for ACFs.
2. Renovation of quarters of Field Director.
3. Construction of Residential Quarters for Deputy Director, Similipal South WL Division, Baripada
4. Repair and renovation of staff quarters at Baripada and Jashipur.

In the core area creation of civil infrastructure shall be minimum and only badly essential infrastructure like patrolling camps and communication structures/cross-drainage structures will be made.

The administrative offices are located both inside and outside the TR. The details are furnished below.

Table No- 11-n: Office Administration

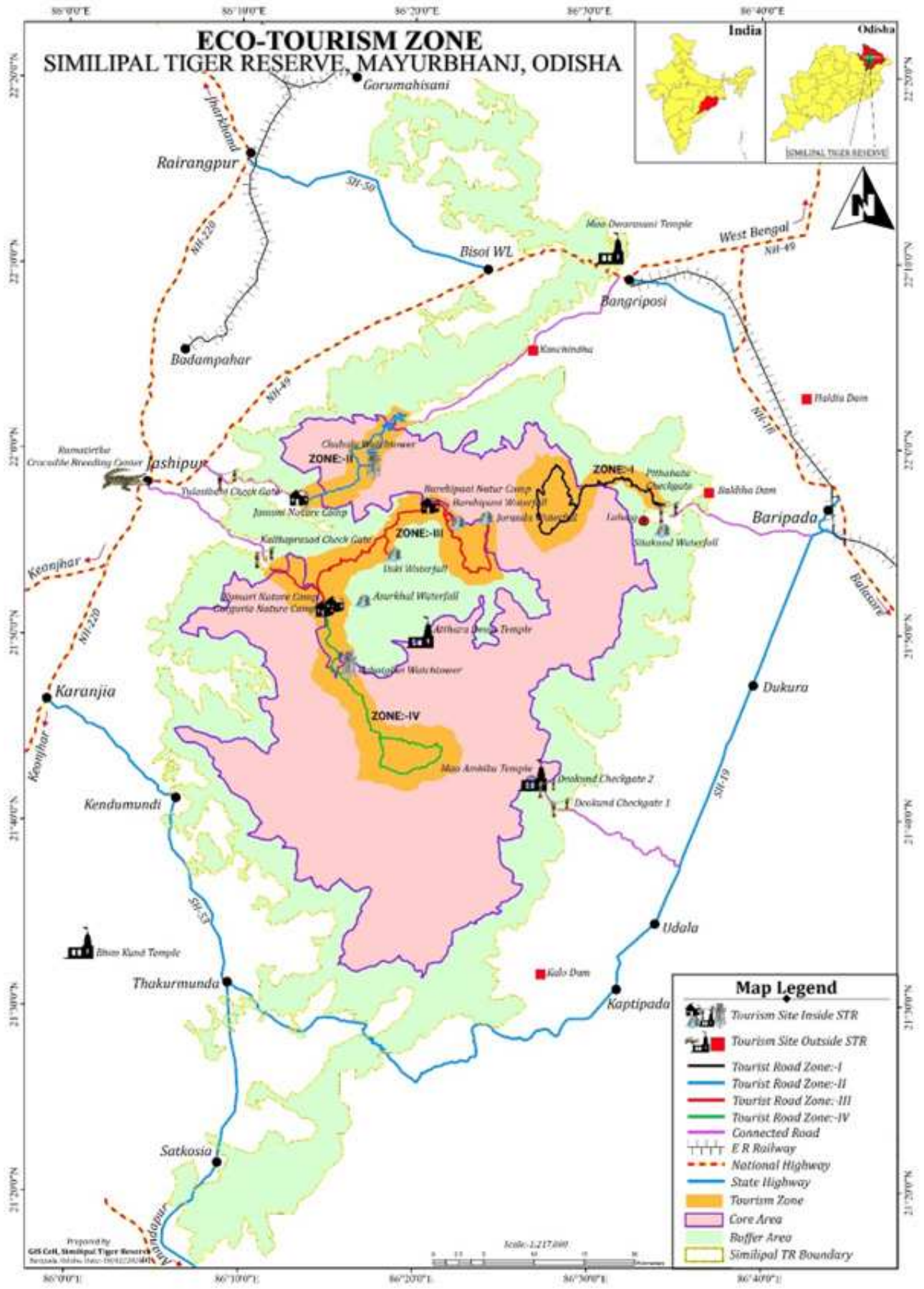
Name of the office	Location	Remarks
Field Director-cum-RCCF	Baripada	Outside but adjacent to TR
Deputy Director, Similipal South WL Divn., Baripada	-do-	-do-
Deputy Director, Similipal North WL Divn., Jashipur	Jashipur	-do-
RO, National Park	Kabatghai	Inside the PA

RO, UBK	Upperbarakamuda	Inside the PA
RO, Jenabil	Jenabil	-do-
RO, Nawana(N)	Nawana	-do-
RO, Nawana(S)	Dhudruchampa	-do-
RO, Chahala	Chahala	-do-
RO, Pithabata South (WL)	Pithabata	Outside the PA
RO, Pithabata North (WL)	Badgaon	Outside the PA
RO, Dukura WL	Dukura	Outside the PA
RO Podadiha WL	Podadiha	Outside the PA
RO Bhanjabasa WL	Bhanjabasa	Inside PA
RO Kendumundi WL	Kendumundi	Outside PA
RO Thakurmunda WL	Thakurmunda	Outside PA
RO Talabandha	Talabandha	Inside PA
RO Barehipani	Barehipani	Inside PA
RO Gudgudia	Gudgudia	Inside PA

Likewise 23 Sections and 75 Beats have separate buildings inside the park the list of which have been given in Annexure XXXI. Annual maintenance of these buildings is required.

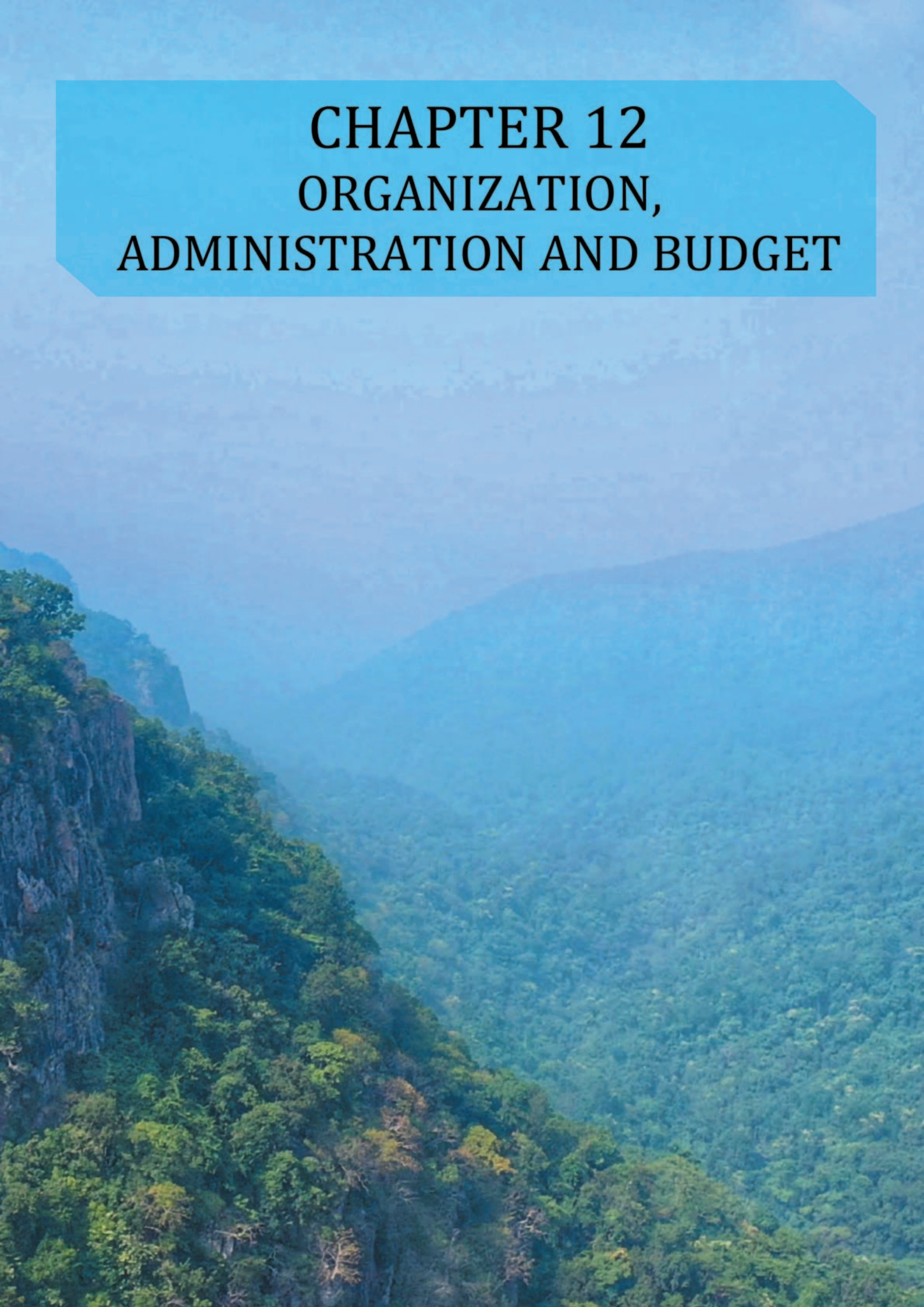
11.8 ECO-TOURISM, INTERPRETATION & NATURE EDUCATION

The ecotourism zone extends over 165 km road length, out of which 103 km road length is in buffer, 62 km is in Core and major attraction areas which is to be used as tourism zone. Amongst the attractions Chahala is completely inside the Core Area. Amongst the religious places in Similipal, Maa Ambika Temple at Deokund attracts many, falls inside the Core Area. The Tourism roads Bhajam to Nigirdha, Barehipani to Chahala, Jamuani to Chahala, Rajpal to Chahala, and a small stretch of road connecting to the Deokund,fall inside the Core Area. In the present plant the road stretch from Talabandh to Chahala and Gurguria to Kabatghai has been opened up for tourism. Major portion of the Chahala-Talaband road falls inside the Core Area whereas a small stretch of Gurguria-Kabatghai road is inside the Core Area. The details of Tourism in Similipal Tiger Reserve have been discussed in Chaper-14 of the TCP for Buffer Area.



Map No.11B: Ecotourism Zone in Similipal Tiger Reserve

CHAPTER 12
ORGANIZATION, ADMINISTRATION AND BUDGET



CHAPTER

12

ORGANIZATION, ADMINISTRATION AND BUDGET

12.1 TIGER STEERING COMMITTEE (STATE LEVEL)

Section 38 U of the Wildlife Protection Act, 1972 (Amended 2006) requires each state Govt. to constitute a State Level Steering Committee for ensuring co-ordination, monitoring, protection and conservation of tiger, co-predators and prey animals. The State Level Committee have been constituted vide Notification No. 565 Dated 08.01.2010 of Forest & Environment Department, Govt. of Odisha which have been given in Annexure XI.

12.2 TIGER CONSERVATION FOUNDATION (PARK LEVEL)

The Wild Life (Protection) Amendment Act, 2006 (Section 38X) provides for establishment of a Tiger Conservation Foundation in each tiger reserve, to facilitate and support management, apart from taking initiatives for involving people in conservation. The Foundation is a new institutional framework which can complement the tiger reserve management and liaison with various Eco development committees and their confederations apart from production sectors in the landscape. The Foundation will be a registered society under the relevant rules of the State, and as prescribed in the guidelines, will have a State level Governing Body, apart from a field level executive committee under the Chairmanship of the Field Director with representatives of the Eco development committees as nominated by the Governing Body. The Foundation would act as a "non profit center" and as a "development agency" by increasing local participation. It can secure the tiger reserve from financial constraints by providing funding support through various sources: recycling of gate receipts, service charges, donations and the like. The Foundation, may undertake various activities related to mainstreaming of conservation: Eco development, staff welfare, visitor regulation, field research, facilitating Eco development committees for market access, conducting capacity building programs, ecotourism and Joint Forest Management.

The Similipal Tiger Conservation Foundation has been constituted as a registered society under Societies Registration Act and has become operational with its 1st Governing Body meeting held on 28th June, 2012. The constitution, bye-laws and operation manual of the Foundation have been given in Annexure XII.

12.3 COORDINATION WITH LINE AGENCIES/ DEPARTMENTS

Co-ordination with line agencies / departments are needed for :-

- Better protection: Police, revenue, railway authorities, Judiciary etc.
- Eco-development: Revenue, Rural development, Agriculture, health, Veterinary, Horticulture, Zilla Panchayat, Women and Child Development, PHD, Education, Tribal Welfare etc.
- Gaps in habitat development: ZJila Panchayat, Rural development, Agriculture etc.
- Conflict resolution: Revenue, Police, Tribal welfare, Judiciary etc.

It is evident from above that co-ordination can be obtained in many ways and in many fields. Better co-ordination will not only ease pressure on limited resources of reserve management but will earn general goodwill among various sectors.

For co-ordination following measures would be adopted:-

- Regular meetings with line department.
- Co-coordinating with District Collector and CEO, Zilla Parishad for organizing special meetings with line departments.
- Knowing various schemes of line departments and identifying schemes suitable for the reserve area.
- Reserve tour of officials of line departments.
- Accreditation and highlighting achievements of other departments in reserve area.

These are few suggestive things, but in practice convergence could be achieved only through good interpersonal relationship with officials of line departments of various levels from district to village. Officer of reserve should interact with their respective counterparts in other departments.

Co-ordination with the district administration, police and other departments like Health and Veterinary is maintained periodically through meetings and organized programmes like awareness camps, health and cattle camps, immunization drives etc. Involvement of experts, faculty and students from The North Orissa University, Regional Plant Resource Centre, ORSAC etc. is also a regular feature.

12.4 STAFF DEPLOYMENT

The organizational set up and the staff position have been given in Chapter 4. The Similipal Tiger Reserve is under the overall control of the Field Director, Similipal Tiger Reserve cum Regional Chief Conservator of Forests, Baripada. Three Divisions are having territorial jurisdiction over the tiger reserve. During 2019 Similipal Tiger Reserve was consolidated and reorganized into two different Divisions namely Deputy Director, Similipal South WL Division and Deputy Director, Similipal North WL Division.

The Abstract of Core, Buffer and Corridor of Similipal Tiger Reserve after re-organisation is given below:

Table No:12-a : Details area of Similipal Tiger Reserve

Division	Similipal Tiger Reserve			
	Total Area in Sqkm	Core area in Sq km	Buffer in Sq km	Corridor Area in Sq km
Similipal South WL	1247.58	841.57	406.01	-
Similipal North WL	1059.03	353.18	705.85	-
Baripada	70.1	-	70.1	40.48
Rairangpur	181.28	-	181.28	18.35
Karanjia	192.01	-	192.01	24.94
Total	2750	1194.75	1555.25	83.77

Responsibility

The duties and responsibilities of each category of Officers have amply been enshrined in the Odisha Forest Department Code, 2020. Hence there is no necessity of repeating the same here. In the light of Wildlife (Protection) Act, 1972, the responsibility as mentioned below will be reposed on the Officers concerned to facilitate smooth administrations. All the Officers from the level of Range Officer and above need to be posted who have been specially trained on Wildlife management.

Four no. of Assistant Conservator of Forests sanctioned in the office of the Deputy Director, Similipal South WL Division and three Asst. Conservator of Forests sanctioned in the office of the Deputy Director, Similipal North WL Division are to be declared as Wildlife Wardens to carry on the provisions of Wildlife (Protection) Act, 1972. Immediate steps are to be taken to delegate the power of Investigation u/s 50 (8) of the Act.

The Forester in charge of a Section inside the Sanctuary will be responsible for detection and preliminary enquiry of all cases.

The Forest Guard will protect the Forest, detect the cases and draw FIR only. He will be responsible for all illicit felling, poaching and encroachment of forest land if not noticed and FIRs drawn.

Staff Amenities

Field Equipment :-

Necessary camp and field equipment for the protection of staff shall be provided. The other necessary equipment helpful in carrying out field work e.g. water bottles, measuring tapes, compass, pedometers, field forms and diaries, small axe, fire arms, tiger tracers, plaster of paris, Camera Trap etc shall be provided as and when needed.

Uniforms and protective gears :-

Timely supply of good quality uniforms as per provisions shall be ensured every year along with other items such as caps, belts, boots, hunter shoes, winter wears, raincoats etc. Protective gears like wooden canes etc shall also be provided.

Incentives and awards :-

At present Project Tiger allowance is paid to various categories of staff. Apart from monetary incentives, incentives or awards for meritorious work shall be given for motivation. Nominations for excellent work to various awards like State Forestry Award, Rajiv Gandhi wildlife award, Amrita Devi Vishnoi, Biju Pattanayak award for wildlife conservation etc shall be made for deserving persons.

Health checkups / Insurance :-

Regular health camps shall be organised for health checkups of staff. Some hospitals could be contacted for complete checkup and treatment of staff and their immediate family. This will ensure better health and will in turn result into better output from staff & will have great value.

Possibilities of Health insurance for staff & protection assistants living in interior areas shall be explored with insurance company.

12.5 FUND RAISING STRATEGIES

At present, the funds are entirely from the Central and State Governments, mainly the following sources.

Table No:12-b : Details funding Agency of Similipal Tiger Reserve

Name of the scheme	Funding Agency
CSP- Project Tiger	Govt. of India, 50% recurring fund by State Govt.
State Plan (Wildlife Protection &Conservation)	State Govt.
State Plan (Elephant Management Project)	State Govt.
Central Plan (Elephant Management Project)	60% fund will be given by Govt. of India, remaining 40% by State Govt.
CAMPA	State CAMPA

With the formation of Similipal Tiger Conservation Foundation more options will be explored to raise funds from national and international donor agencies. As per the Section 38X (2) of Wildlife (Protection) Act, 1972 one of the objective of formation of Tiger Conservation Foundation is to augment and mobilize financial Resources including recycling of entry fee and such other fees received in a Tiger Reserve to Foster Stake-holder development and eco-tourism. At present the revenue realised from tourism entry gates is deposited with the Similipal Tiger Conservation Foundation.

It shall be ensured that activities approved in the Tiger Conservation Plan are only executed. The deviations if any may be done only with the prior approval of Chief Wildlife Warden.

Apart from the above sources, CSR and CER funding to the Similipal Tiger Conservation Foundation is being explored. The details of Funds raised through CSR & CES Funding is as follows:

Financial Year	Organisation	Kind of Funding	Amount
2022-23	ICICI Foundation	CSR	2 Nos. of 4-WD Bolero Campers
2023-24	Odisha Mining Cor-poration	CSR	Fully Patrolling Equipped 14 Nos. 4-WD Bolero Campers
2023-24	NHAI	CER	Rs. 2 Crores

12.6 SCHEDULE OF OPERATIONS (FOR BOTH CORE AND BUFFER)

All the operations in the PA will be completed as per the direction and schedule prevailing in the department. The scheduling for some Operations is given below.

Table No:12-c : Schedule of operations

Operations	Months											
	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Protection												
Monsoon patrolling												
Intelligence gathering												
Line cutting												
Fire Protection												
Road Repairs												
Water conservation work												
Lantana uprooting												
Weed uprooting												
Grass seed collection												
Nature awareness programmes												
Tourism activities												
Vaccination work												
Eco-development work												
Phase IV Tiger Monitoring												

The activity budget is detailed in Annexure LXIII. The schedule of operations shall be derived from Activity Budget and while preparing Annual Plan of Operation the activity budget shall be grouped under following heads.

Antipoaching activities (Non-recurring) – The antipoaching activities may include

- Deployment of antipoaching squads
- Establishing and maintenance of existing patrolling camps and deployment of camp watchers for patrolling.
- Organising vehicular patrolling by constituting squads. comprising of field staff, Special Tiger Protection Force, with wireless handset and paraphernalia for apprehending offenders, apart from prescribing a patrolling calendar for the squad.
- Ensuring special site-specific protection measures, during monsoon as 'Operation Monsoon' – considering the terrain and accessibility of Protected Areas.
- Deployment of Special Tiger Protection Force for patrolling, surveillance of water holes, manning barriers.
- Procurement of arms and ammunition.
- Rewards to informers.
- Legal support for defending court cases.
- Procurement of vehicles, boats.
- Procurement of field gear, night vision device.

Strengthening of Infrastructure in Tiger Reserve (Non Recurring).

The strengthening infrastructure may include.

- Civil works (Staff Quarters, family Hostels, Office Improvement, Patrolling Camp, House keeping Buildings, Museum, Culverts) etc.
- Maintenance/Creation/Up gradation of road network
- Maintenance/Creation of wireless tower
- Maintenance/Creation of Fire Watch tower
- Maintenance/Creation of Bridges, dams/Check dams
- Maintenance/Creation of Fire lines/fire breaks
- Maintenance/Creation of Earthen ponds
- Procurement/ Maintenance of vehicle (Jeep, Truck, Tractor)
- Habitat Improvement works
- Procurement of Hardware, Software/GIS
- Procurement of Compass, Range finder, GPS, Camera traps etc.
- Procurement of Satellite Imagery for management planning
- Map Digitization facility for management planning.

Habitat Improvement and water Development

The habitat improvement may include weed eradication, removal of gregarious plant growth from grassland, grass improvement, water retention structure, swamp maintenance, Maintenance of waterholes, check dams, soil & moisture conservation etc.

Addressing Man-Animal Conflict (Non recurring)

The activities under addressing Man-animal Conflict may include.

- Payment of compensation for cattle lifting, death of human beings and crop depredation due to wild animals.
- Creation of crop protection structures.
- Procurement / deployment of traps, cages to catch problematic animals.
- Procurement of tranquilizing equipment, rescue vehicles and drugs.

Co-existence agenda in Buffer/Fringe area

The activities for co-existence agenda includes.

- Providing ecologically viable livelihood options to local stakeholders for reducing their dependency on forests.
- Conserving the forest area through restorative inputs involving local people for providing habitat supplement to wild animals moving out of core areas.

Rehabilitation package: on voluntary basis from the enclaves in the core for creating inviolate spaces for Wildlife (Non recurring).

Research and Field equipment (Non recurring)

Staff development and capacity buildings – (Non recurring)

- Capacity building / training.
- Providing project allowance and special incentives.
- Specialized training in the use of GIS, antipoaching operations.
- Specialized training in jurisprudence and wildlife forensics.
- Study tours for appraisal of good practices in other reserves.
- Dissemination workshops.
- Specialized training in park interpretation.
- Specialized training in management planning

Mainstreaming Wildlife concerns in Tiger bearing forests and Fostering corridor conservation through restorative strategy involving locals to arrest fragmentation of Habitats.(Non-recurring)

This would involve

- Redressing man-animal conflict
- Capturing problematic/ aberrant wild animals.
- Monitoring of wild animals.
- Antipoaching operations.
- Habitat improvement measures.
- Safe guards/Retrofitting measures in the interest of Wildlife Conservation
- (Non-recurring)
- Project allowance to staff (all categories of Project Tiger (Non-recurring) The project allowance will be limited to the amount approved by NTCA for each category. The present rates of Project allowances are as follows.

(a) Field Director	Rs. 2000 /- per month
(b) Deputy Director	Rs. 1500/-
(c) Assistant Director Research Officer/Veterinary Officer (Equivalent rank)	Rs.1300/-
(d) Forest Ranger and equivalent rank	Rs. 1000/-
(e) Forester and equivalent rank	Rs.900/-
(f) Forest Guard and equivalent rank	Rs. 700/-
Ministerial Staff	
Class II -	Rs. 1000 (per employee per month)
Class III -	Rs.700 (per employee per month)
Class IV -	Rs.400 (per employee per month)

Staff Welfare activities (Non recurring)

Fostering Eco-Tourism in Tiger Reserve (Non-recurring)

Activity Budget

Details of activity budget have been given in Annexure LXIV.

12.7 MISCELLANEOUS REGULATIONS -

1. Record of Deviations & Implemented targets

A book at the reserve level shall be maintained to record deviation & implemented targets. This book shall also include annually deferred targets. It shall be attempted to accomplish tasks in year in which its provisions are made & if some tasks could not be taken up in the prescribed year, they should be taken up in plan period.

There may be some strategies / prescriptions which are not in Tiger Conservation Plan, but at particular time need is felt to include new strategies to be included. These strategies shall be proposed with justifications to competent authority to obtain due approvals. There may be need in future to change certain strategies / prescription, similar procedure shall be adopted for them too. These deviations shall be duly recorded in this book.

Implemented targets both in terms physical & financial achievement shall be recorded with highlights & problems in achieving them.

A similar record shall be maintained at each range level too. These records shall be updated timely and duly inspected from time to time. The book shall always be placed with Tiger Conservation Plan. This book needs to be referred at the time of revision of Tiger Conservation Plan especially on matter which relate to strategies in the field.

2. Maintenance of Compartment Histories

Compartment histories are important document for deciding strategies of management. Compartment histories were not maintained in previous plan period. Revised formats of Compartment Histories will be provided to all range officers for preparation. All compartment histories in due format shall be prepared within six months.

The formats will be simple and all entries shall be made and the required maps shall be prepared and attached with compartment histories. Compartment histories shall be prepared in three copies, one for the range level and two for office of the tiger reserve. One copy at office of tiger reserve level shall be maintained as master copy, along with which old compartment histories shall also be attached.

Range officer shall update compartment histories on annual basis. The updated CHs shall be submitted to office of tiger reserve every year for updating CHs maintained there. After up-dated range copy of CHs shall be duly returned to ranges.

Annual documentation shall include all important operations, events and attributes taken place or observed in the compartment some of them are given below :-

Operations related to habitat management

- Grassland
- Meadow
- Weed eradication
- Soil moisture conservation
- Creation or repair of water sources
- Wetland
- Micro habitat management etc

Events

- Animal mortality
- Fire incidences
- Flood
- Change in river courses
- Siltation of water sources
- Insect/pest infection
- Tree mortality

Protection

- Illegal grazing
- Illegal lopping / felling / girdling of trees
- Legal illegal collection of NTFPs
- Poaching incidences / attempts
- Other illegal activities

Observations

- Animal signs / movements
- New water sources / saltlicks
- New micro habitat locations
- Important change in vegetation
- Any other useful information regarding management

Compartment histories shall be duly checked by senior officers on annual basis. Following minimum checking

by various level of officers is prescribed as below :-

ACFs - 30%

Deputy Director - 10%

Field Director - 05%

3. Pocket Field Guide for Plan implementation

To accomplish effective and informed application of plan prescriptions, a pocket field guide of the size no larger than 10 cm broad by 16 cm long is prescribed. This shall have a 'held' margin at the top along the shorter side so that it can be opened vertically like a forester's conventional field notebook. To subsequently permit insertion of pages of extra material, revised strategies, maps etc in the field guide it may be designed in the fashion of a binder.

The field guide is meant to present the essence of the plan strategy application, complete in all technical details and the regulations concerned with respect to each strategy as might be relevant. It is a field action document meant to be carried by all field or line personnel and therefore must be written with economy to the point.

The field guide must have (i) a permeability to state its purpose and utility (ii) the objectives listed by their priority (iii) the constitution of zones by area (iv) a map of administrative units such as division, range, round, beat superimposed by the zones (v) the all important section on strategy details and application.

The field guide may contain more than one map. Only those maps which are considered essential for smooth functioning shall be included. A map shall not be larger than 20 cm broad by 16 cm long, so that when folded in half it conforms to the size of the guide. The top margin of the left half of the map shall be held within the guide 'binding' allowing the right half of the map to be folded in or out for reference.

The section on strategy shall first deal individually with all zonal strategies, separating each zone for obvious reasons. This shall be followed by the individual zonal strategies. Each strategy must be complete in all its technical details of execution, the standards it must attain and the regulations that need to be observed. Where monitoring is involved, the aspects relating to its execution must be specified. Where necessary, diagrams shall be included.

While dealing with separate zones it might happen that a few action elements might repeat. At such point rather than repeating the action details a reference to the previous set shall be recorded.

To facilitate access to any particular action title, each page of the guide at the bottom, in a central position, shall carry the relevant printed action title in a rectangular box of 2 cm x 1/2 cm. As the pages are held together and riffled, any title can easily be accessed.

The guide shall have an index or a table of contents in its customary place. At any given time if any section is modified or is required to be deleted or added to, it can be done quite easily by disengaging such material or adding pages to the binder. The table of contents must be altered according to the changes taking place in the field guide. Senior managers shall monitor the response of users with the objective of ensuring smooth implementation of plan strategies.

CHAPTER 13
MONITORING AND EVALUATION

CHAPTER

13

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The main focus of monitoring and evaluation in this Plan is to check annually the status of problems, gap in information and the capacity of the frontline staff to tackle management issues identified in the plan and SWOT analysis. The following procedures will be followed for monitoring and evaluation.

13.1 CRITERIA

The criteria for monitoring the plan programmes implemented in the plan will be as follows

1. Monitoring the reduction of threat to wildlife by creating awareness and enforcing the law through network of field functionaries.
2. Monitoring the habitat through reduction of illicit felling of trees and monthly review of the performance of each camp and administrative units.
3. The monitoring work will be taken up by the Deputy Director and Assistant Conservator of Forests while the works are in operation.

The criteria for evaluation of the success of the projects undertaken will be taken up regularly by the Field Director, STR

13.2 PROCESS

Adequate arrangements with elaborate procedure have been laid down about for protection of the forests. For the purpose of intensive supervision the area of each forest beat has been reduced. Besides huge amount of money is being spent for which the accountability for the successive implementation of the scheme rests with the Forest Officials. Proper monitoring at the time of implementation and evaluation at frequent intervals will foretell the success. Hence the modality for monitoring and evaluation is laid down as detailed below;

- The target for each beat Forest Guard along with the concerned Forester in detection of forest cases is fixed at five for each beat in case of the core area and ten in case of the buffer area per months i.e. for 30 days. These cases should spread uniformly over the month. If the required number of cases is detected within a week then it will be presumed that for the next three weeks the staffs have not performed their duties. In case no case is detected the concerned Forest Guard / Forester will give a certificate that no illicit felling of trees and no killing of wild animals has been done in his Beat / Section in the following manner.

a. In case of Forest Guard “certified that with all efforts I could identify ..... cases. Except these there is no case in my Beat area”.

b. In case of Forester “certified that with all efforts I could identify ..... cases. Except these cases in my Section with Beat Forest Guards no other cases occurred.

- Each Forest Guard will move around each Beat area and cover the entire area once in a week. Similarly the Forester and the Range Officer will inspect Beat area of one Beat within a week and within a fortnight respectively on rotation basis, so that all the Beats are covered. The inspection report of the Forest Guard / Forester and Range Officer will be submitted to the concerned Deputy Director / Divisional Forest Officer concerned, who will either check it or get it checked by the Asst. Conservator of Forests attached to Division during tour. Such report will be submitted to this office at the time of Divisional Forest Officers conference. The Deputy Director and Divisional Forest Officer will devise a format of questionnaire for the purpose of inspection and circulate among the staff to be filled in and submitted to him.
- The Deputy Director, Similipal Tiger Reserve along with the Divisional Forest Officers of buffer area will meet once in a month prior to 15th of each month along with the concerned Range Officer and discuss about the problems relating to illicit felling and poaching of animals inside the Sanctuary. The Deputy Director will hold the meeting with neighboring Divisional Forest Officer on rotation basis. The proceedings of the meeting will be submitted to the Field Director. There will be a bi-monthly Core-Buffer meeting chaired by the Field Director in which all aspects related to protection shall be exhaustively reviewed.

13.3 MAINTENANCE OF GEO REFERAL DATA

Deputy Director will open a division journal and will record the following details in the division journal.

Latitude/Longitude of waterholes

Latitude/Longitude of checkdams

Latitude/Longitude of daldalies

Latitude/Longitude of Division headquarter.

Latitude/Longitude of Range headquarters.

Latitude/Longitude of Forest Section headquarters.

Latitude/Longitude of headquarter of beats.

Latitude/Longitude of locations of Antipoaching camp.

Latitude/Longitude of Check posts

Start and end point of each Road.

Start and end point of each Trek paths.

Start and end point of each Fire lines.

Latitude/Longitude of Bridges, Culverts.

Latitude/Longitude of Illegal entry points.

13.4 BIODIVERSITY MONITORING

One ha plot in each vegetation type will be maintained and entered in the division journal the following details.

- Inventory of all species of trees (including seedlings and sapling), shrubs, herbs and weeds The measurement of all the tree species will also be recorded in the journal. Deputy Director should also calculate the biomass of Tree, shrubs, herbs and grass in each vegetation type and arrive at carbon sequestration of each vegetation type in consultation with experts.

- Presents/ absent, abundance, density of Wildlife evidences. This exercise of recording Wildlife evidences and inventory will be repeated every year and the record for the same will be entered in the division journal.

13.5 HABITAT SHIFT OF SPECIES

The annual surveys/census as proposed in chapter 9 will be analysed for habitat shift of species to study the impacts of climate change/global warming.

13.6 DISASTER MANAGEMENT & MONITORING

In the circumstances there is disaster such as fire, epidemic etc. The Deputy Director may take the following actions.

Fire

Adequate preventive measures like clearance of fire lines, awareness of villagers, deployment of fire squad and watchers with vehicles will be taken up in every fire season. In case of uncontrollable fire, help of fire fighting squad will be sought from District Administration.

Epidemic

Expert team may be constituted by involving a panel of veterinary experts. A detailed plan may be drawn by expert team and implemented in order to contain the epidemic.

13.7 ANNUAL REPORT

The annual report will be generated based on the prescriptions in the foregoing chapters and placed before the steering committee and governing body of the foundation.

13.8 MANAGEMENT EFFECTIVENESS EVALUATION (MEE): BY MANAGEMENT ITSELF OR THROUGH EXTERNAL AGENCY

Introduction

Protected Areas (PAs) face many challenges to their integrity which, unless addressed can undermine the very objectives for which they were established. Those responsible for the conservation and management of PAs have the complex task of anticipating and dealing with these challenges, most often in an environment of limited financial and organizational capacity. It is therefore important that we invest in the efforts in the most critical areas to ensure that available resources are applied to their maximum effectiveness.

Management Effectiveness

In recent years there has been a growing concern amongst protected area professionals and the public that many protected areas are failing to achieve their objectives and, in some cases, are actually losing the values for which they were established (Hockings et al 2008). As a result, improving the effectiveness of protected area management has become a priority throughout the conservation community. One important step in this process is the carrying out of an assessment of current status and management of the protected area, to understand better what is and what is not working, and to plan any necessary changes as efficiently as possible. Assessment of management effectiveness has emerged as a key tool for protected area managers and is increasingly being required by governments and international bodies.

What is a Management Effectiveness Assessment?

Protected area management effectiveness evaluation is defined as the assessment of how well protected areas are being managed – primarily, whether they are protecting their values and achieving agreed goals and objectives. The term 'management effectiveness' reflects three main themes of protected area management:

- Design issues relating to both individual sites and protected area systems;
- Adequacy and appropriateness of management systems and processes;
- Delivery of protected area objectives including conservation of values.

The precise methodology used to assess effectiveness differs between protected areas, and depends on factors such as the time and resources available, the importance of the site, data quality and stakeholder pressures. The differing situations and needs for protected areas thus require different methods of assessment. As a result, a number of assessment tools have been developed to guide and record changes in management practices.

A uniform theme to these assessments has been provided by the IUCN World Commission on Protected Areas (WCPA) Framework for Assessing the Management Effectiveness of Protected Areas, which aims both to give overall guidance in the development of assessment systems and to encourage basic standards for assessment and reporting.

The WCPA Framework for Assessing Management Effectiveness

The WCPA Framework sees management as a process or cycle with six distinct stages, or elements:

- it begins with establishing the context of existing values and threats
- progresses through planning
- allocation of resources (inputs)
- as a result of management actions (process)
- eventually produces goods and services (outputs)
- that result in impacts or outcomes.

Of these elements, the outcomes most clearly indicate whether the site is maintaining its core values, but outcomes can also be the most difficult element to measure accurately. However, the other elements of the framework are all also important for helping to identify particular areas where management might need to be adapted or improved.

Chart No-13.1 : WCPA Framework for assessing Management Effectiveness

Figure: The WCPA Framework for assessing Management Effectiveness.

Assessment Process

All the Tiger Reserves (TRs) have been grouped in 5 landscape clusters under the MEE process. In order to ensure credibility of the assessment process, 5 Independent Expert MEE Committees have been constituted. A Wildlife Institute of India (WII) team will provide the technical backstopping to the MEE process.

The Independent Expert MEE teams will visit all 50 TRs for conducting MEE as per the prescribed assessment criteria and complete the MEE Score Card. All efforts will be made to ensure that the 3 member Independent Expert MEE teams visit the tiger reserves together. At the end of the site visit, an interaction will be organized with Site Managers and his representatives to discuss the findings of the evaluation and to seek additional information/ clarifications. The Site Manager may also make a written submission to the team. The Chairman of the respective committees will send the report through email to the Wildlife Institute of India with a copy to the NCTA, once the MEE of a TR in the assigned cluster has been completed. In addition to the site reports the Chairman will also send a 2-page report on each site covering – (a) Management Strengths; (b) Management Weaknesses; and (c) Immediate Actionable Points.

The logistics for the MEE team visits will be handled by NTCA and the respective Field Directors of the Tiger Reserves. Once the site visits have been completed and the results have been compiled, a meeting of the Evaluation Teams, Site Managers and WII representatives will be organized to share the findings of the evaluation.

Assessment Criteria

For assessment of each of the six elements of the MEE Framework, the following 31 criteria have been developed for Fifth Cycle of MEE of Tiger Reserves in India, 2022 :

1. Context

1.1 Are the values of the TR well documented, assessed and monitored?

1.2 Are the threats to TR values well documented and assessed?

1.3 Is the 'Core Area' of TR free from human and biotic interference and the "Buffer Area" under unified Control?

1.4 Has the TR complied with the four Statutory Requirements (SR) along with Tripartite MoU and three Standard Operation Procedures (SOP)?

1.5 Has the Action Points of Previous MEE been Addressed Substantially?

2. Planning

2.1 Status of Tiger Conservation Plan (TCP)?

2.2 Does the TR safeguards the threatened biodiversity values?

2.3 Are stakeholders given an opportunity to participate in planning process?

2.4 Are stakeholders given an opportunity to participate in planning process?

2.5 Does the TR has an effective Protection Strategy (PS) and Security Plan and Security Audit (SA) in place?

2.6 Has the TR been effective in the mitigation of Human-WL Conflicts?

2.7 Is the TR integrated into a wider ecological network/ landscape following the principles of the ecosystem approach?

2.8 Is the TR being consciously managed to prevent carbon loss and to encourage further carbon capture/ climate change mitigation?

Inputs

2.9 Are personnel adequate, well organized and deployed with access to adequate resources in the Tiger Reserve (TR)?

2.10 Are resources (vehicle, equipment, building etc.) adequate, well organized and managed with desired access?

2.11 Are financial resources other than those of the State linked to priority actions and are funds adequate, released timely and utilized?

2.12 Are financial resources from the State linked to priority action and funds adequate, timely released and utilized for the management of Tiger Reserve?

2.13 What level of resources are provided by Donors other than government sources?

3. Process

3.1 Does the TR have manpower resources trained in wildlife conservation for effective TR management?

3.2 Is TR staff management performance linked to achievement of management objectives?

3.4 Is there effective public participation in TR management and does it show in making a difference?

3.5 Is there a responsive system for handling complaints and comments about TR management?

3.6 Does TR management addresses the livelihood issues of resource dependent communities, especially of women?

3.7 Has the TR planned and implemented creation of inviolate zone by means of voluntary Village Relocation and phasing out of tourism from the Core/ Critical Tiger Habitat (CTH)?

4. Output

4.1 Is adequate information on TR management publicly available?

4.2 Are visitor services and facilities appropriate and adequate?

4.3 Are research/ monitoring related trends systematically evaluated and routinely reported and used to improve management?

4.4 Is there a systematic maintenance schedule and funds in place for management of infrastructure/assets?

5. Outcomes

5.1 Are populations of threatened species declining, stable or increasing?

5.2 Is the population of tigers showing a declining, stable or increasing trend?

5.3 Have the threats to the TR being reduced/ minimized? Or is there an increase?

5.4 Are the expectations of visitors generally met or exceeded?

5.5 Are local communities supportive of TR management?

Table No: 13-a :Summary of Assessment Criteria in Fourth Cycle of MEE, 2018.

Element Name	Overall theme	Headline indicators
Context	Status	Identification of values. Assessment of threats. Biotic interference in core area. Compliance of statutory requirements Unified Control under Field Director, Similipal Tiger Reserve.
Planning	Appropriateness	Tiger Conservation Plan Safeguarding of biodiversity values Stakeholders participation. Habitat restoration. Effective protection strategy. Mitigation of human-wildlife conflict. Integration of landscape
Input	Resources	Adequacy of manpower deployment. Adequacy of physical infrastructure. Adequacy of Central Govt. Funding. Adequacy of State Govt. funding. NGO Resource contribution.
Process	Efficiency and appropriate-ness	Adequacy of trained manpower rersources. Frontline staff performance evaluation Effectiveness of public participation. Process of complaint handling. Livelihood support to local communities. Village relocation planning.
Outputs	Effectiveness	Dissemination of information to public Management of visitor facilities Evaluation of research/monitoring trends Adequacy of infrastructure maintenance and funds.
Outcomes	Effectiveness and appropri-ateness	Population trends of endangered species Population trends of tiger Threat abatement Appropriateness of visitor management Local Community support.
Assessment criteria for addressing issues relating to Climate Change and Carbon Capture in the Tiger Reserve.	Is the Tiger Reserve being continuously managed to adapt to Climate Change ? Is the Tiger Reserve being continuously managed to prevent Carbon loss and to encourage further Carbon Capture.	

Table No: 13-b :Actionable points recommended during Fourth Cycle of MEE 2018 and compliance thereof.

<table>
<tr><th>SL No.</th><th>Action Points recommended in 2018
MEE/ in any other report or committee or assessment in absence of MEE report</th><th>Action Taken to address
(Provide supportive documents)</th></tr>
<tr><td>1</td><td>Step need to be taken urgently to completely construction of the Anti-poaching camp and other infrastructures.</td><td>Since the visit of MEE-2018 team during March,2018 the following infrastructure have been created in Similipal Tiger Reserve (Similipal South WL Division & Similipal North WL Division) under various schemes like CSS-PT, CAMPA & State Plan.
<table>
<tr><th>Name of the Infrastructure</th><th>Qnty.</th></tr>
<tr><td>Anti-Poaching Camp</td><td>23</td></tr>
<tr><td>Anti-Poaching Barrack</td><td>9</td></tr>
<tr><td>Anti-Poaching Check Gate</td><td>3</td></tr>
<tr><td>FG Quarter</td><td>44</td></tr>
<tr><td>Forester Quarter</td><td>21</td></tr>
<tr><td>Forest Range Office</td><td>9</td></tr>
<tr><td>Forest Range Officer Quarter</td><td>9</td></tr>
<tr><td>Watch Tower</td><td>9</td></tr>
<tr><td>Captive Elephant Shed</td><td>1</td></tr>
<tr><td>GI Fabricated Watch Tower for Forest Fire Monitoring</td><td>3</td></tr>
<tr><td>Toilet</td><td>8</td></tr>
<tr><td>Kitchen shed</td><td>1</td></tr>
<tr><td>Garage</td><td>1</td></tr>
<tr><td>Elephant Mahout Shed</td><td>1</td></tr>
<tr><td>Orchidarium</td><td>1</td></tr>
<tr><td>Animal Rescue Center</td><td>1</td></tr>
<tr><td>VHF Building</td><td>2</td></tr>
<tr><td>Dog Kennel</td><td>2</td></tr>
<tr><td>Total</td><td>151</td></tr>
</table>
Evidence:
1.5.1 List of Building infrastructure developed in Similipal South & North WL Division (2018-19 to 2021-22) .</td></tr>
</table>

2	All buffer APCs need to be provided adequate facilities and basic amenities such as smokeless chullahs, cots, mosquito nets, tables, chairs, torch, light, field gear, GPS and mobiles for use of patrolling apps like MSTrIPES. Some model anti-poaching camps in other States should be visited in order to replicate them in STR and improve the standards and of the APCs to motivate the field staff.	All the buffer and core APC have been provided with adequate facilities and all basic amenities. The Camp equipment and personal gears available in Similipal.

Name of the item	**Qnty.**
Double tier Cot	480
Mosquito Net	422
Camp Table	177
Camp Chair	690
Rechargeable Torch	507
Hunter Shoes	589
Field Dress	685
Jersey	465
Rain Coat	178
Winter Jacket	465
MSTrIPES Mobiles	215
Laptop for MSTrIPES	33
First Aid box	156
Lathi	479
VHF Base station	154
Walkie talkie	354
Water filter	188
Binocular	70
Trapped Camera	642
Digital camera	14
Laser finder	103
Blanket	236
Power Saw	28
Wind blower	499
Home light system	199
Uniform	685
Almirah	90
Camp tools	35
Leech guard	546
Head light	70
GPS	84
Suunto See through compass	114

Evidence
1.5.2 List of Amenities in the Camp of Similipal North & South WL Division

3	Similipal has a unique forest composition, but no systematic study has been conducted on the vegetation diversity of Similipal. Forest patches have died due to frost. The ground has extensive Phoenix regeneration in patches. The forest diversity, understory, regeneration, Phoenix management, grassland management, frost management, meadow development and cause of the mixed forest complex need to be studied scientifically.	The ongoing scientific research projects in Similipal Landscape *Population status, distribution, conservation of small carnivores in Similipal Biosphere Reserve (North Orissa University) *Current status of Fern & Fern allies on Northern Odisha and its conservation (Odisha Bio-diversity) *Study on Eco-logical implication in Similipal Bio-sphere Reserve using Bio-diversity indices (North Orissa University) *Integrated Micro Water Shed Management plan in Similipal Tiger Reserve using Remote Sensing and GIS (North Orissa University) (2018). *Wild Tiger of Similipal. A study on Spatial distribution abundance and population genetics (WII, Dehradun) (2018). *Studies on distribution, population mapping, Standardization of propagation methods and restoration of some rare, endangered and threatened plants of Similipal Biosphere Reserve (SBR-RPRC, Forest, Env & CC Deptt., Govt. of Odisha) (2019). *Protected Area tourism and host community well being : A study on Similipal Tiger Reserve, Odisha. (TISS, Mumbai) (2021). *High frequency of an otherwise rare phenotype in a small and isolated tiger population, by Vinay Sagar, et.al, NCBS, Bangalore (2021). *Status of Eria meghasaniensis in Similipal Tiger Reserve (2020). *Climate change risk and adaptation of Tribal communities in Similipal Biosphere Reserve, Odisha, India by Ms Monisha Mallik, Ph. D. student, Forest Research Institute, ICFRE, Dehradun (2021). *Study on diversity and ecology of Amphibians of Similipal Tiger Reserve. Dr. Abhijit Das, Scientist D, Wildlife Institute of India, Dehradun (2021). *Study on prevalence of gastrointestinal parasite of wild animals in Similipal Tiger Reserve, Baripada. B. N. Mohanty, Head Department of Veterinary, Parasitology (2021). *Ground and remote sensing based measurement of leaf area index and estimating net primary productivity and tropical deciduous and semi-evergreen forest of Odisha. By Dr. Soumit Kumar Behera, PI and Senior Scientist, Plant ecology and environmental science Division, National Botanical Research Institute(NBRI) Lucknow (2019). *Indigenous health Practices and Forest Conservation by Sh. Tamasa Sarangi, Guest Faculty, Department of Sociology, Vikram deb College, Jeypore, Koraput (2022). * Current population of the male and femal individuals, distribution, geographical area, threats, resolving the name confusion in Indian cycads by applying morphological and molecular markers (2019). *Survey of Birds of Baripada Forest Division as part of the long term study on “Bird species numbers and density in the east and west Himalayas” (2021). **Evidence** List of published Research papers (Ref.1.1.2 of evidence) & SBR plan (Proposal from lead institute -RPRC, Bhubaneswar, Pg-46-66).

<table>
<tr><td>4</td><td>Merely placing a STPF is not helping protection as they lack basic arms training and arms. It is strongly recommended the STPF be deployed for rigorous patrolling after providing good arms training and wildlife training.</td><td>STPF recruited to Similipal Tiger Reserve have undergone various field level training for skill up-gradation prior to their posting to different vulnerable pockets. Few refresher trainings have also been conducted in last few years namely
* Arms training
* DBBL/Rifle maintenance training
* Patrol tasking, planning and camouflage training
* Law enforcement training
* M-Stripes patrol and ecological training
* Wildlife monitoring through Camera trap training
* Avenza map reading
* GPS handling training
* First Aid Training
* NTFP identification
* Botanisation
* Orchid identification
* Fire Management
* Patrolling by STPF/Cases
(The STPF have been instrumental in booking of 59 no of offences in STR during the period 2018-19 to 2022-23)
Evidence
Capacity building Training programmes organised in Similipal TR</td></tr>
<tr><td>5</td><td>Relocation of the village Bakua and Jamunagarh from the Core and Khejuri from the Buffer will provide a large inviolate area for wildlife movement. Hence, the relocation needs to be done at the earliest.</td><td>* Jamunagarh village has been completely relocated fromcore area of the Similipal Tiger Reserve to Kaptipada Block of Mayurbhanj District.
* Buffer villages like Kiajhari has been completely relocated.
* Buffer villages like KhejuriandRamjodi are partially relocated.
* 4 units (families) of Bakua village have given their consent for voluntary relocation. Relocation process is already started.
Evidence
Present status on relocation of villages from Critical Tiger Habitat (CORE)</td></tr>
<tr><td>6</td><td>A large number of human settlements are present in the buffer, i.e. 64 villages The villagers need to be involved in various EDC activities. Currently only 62 EDCs are operational.
The large number of villages is posing threat to protection of STR.</td><td>* All the buffer territorial divisions have been included under long term JICA funded OFSDP Project. This will help in the generation of alternate livelihood, protection of forest & wildlife, habitat improvement, decrease in dependency over Similipal for NTFP collection.
<table>
<tr><th>Name of the Division</th><th>No. of EDC/VSS</th></tr>
<tr><td>Similipal North WL</td><td>78-EDC</td></tr>
<tr><td>Similipal South WL</td><td>02-EDC</td></tr>
<tr><td>Baripada</td><td>47-EDC 407-VSS</td></tr>
<tr><td>Rairangpur</td><td>00-EDC 268 -VSS</td></tr>
<tr><td>Karanjia</td><td>43-EDC 277 -VSS</td></tr>
</table>
* Inside Similipal Tiger Reserve, EDCs are managing Community Based Ecotourism Initiative, engaged in protection of forest & wildlife, habitat and fire management.
Evidence
1.5.6 - Present status on relocation of villages from Similipal Tiger Reserve</td></tr>
</table>

7	There are 18 + 9 TMC in the Core and Buffer that need to be converted to permanent APC for effective protection.	* These machans have already been converted to permanent RCC APCs. **Evidence** Refer 1.5.1.
8	The patrolling efforts need to be enhanced. The half day patrolling being carried out is not adequate to prevent the tribal hunting and poaching activities.	* Similipal Tiger Reserve has implemented MSTrIPES patrol App in all the beats. * MSTrIPES Patrol has been implemented since August,2018. * On an average the monthly patrol for Similipal Tiger Reserve is 69,000 km in last six months. * Out of which vehicular patrol is around 10000km per month. * The daily patrol effort has now increased up-to 12-13 hours per APC in a day. * Similipal Tiger Reserve is the highest patrolled Tiger Reserve among the Central Indian Tiger Reserves since last six months. **Evidence** Patrolling in Similipal wrt TRs in Central India landscape
9	There are 22+27 Forest Guards vacancies under the STPF, and 26% of the posts of the frontline	* After training at CASFOS, Dehradun and Coimbatore and OFRC,Angul, 44 SFS officersand 106Forest Range Officers respectively have-joined cadre. * In the year 2020-21, State of Odisha has recruited 25 SFS officers are under training at CASFOS, Dehradun and 44 Forest Range Officersare under training atOFRC,Angul. * 6 no. of SFS officers and 7 no. of Forest Range Officers of the new recruits have been posted in Similipal Tiger landscape. * All the field level pending promotion cases have been disposed-off for the rank of forester, deputy rangers. * State of Odisha has also notified advertisement for recruitment of 806 Forest Guards. The recruitment process is at final stage, 53 numbers of staffs are been allocated to Similipal Tiger Reserve. *582numbers of watcher working on daily wage basis are assisting STPF in day to day patrolling activities. **Evidence** Allotment of Forest Guard in new recruitment.
10	Improvement in aptitude of field staff is required for wildlife conservation. It will be essential to expose the field staff to basic training in wildlife management to reorient them properly to wildlife conservation and management. It is recommended that short orientation and capacity-building courses with duration ranging from 7 to 15 days be arranged for different level of the field staff of STR	For improvement of aptitude of field staffs, the following training in the field of wildlife conservation are arranged at Range Level and Division Level. * Forest Fire Management * Orchid Identification & Restoration * Botanisation * Habitat Improvement * Meadow Management * Road and infra maintenance * Mugger census * Bird census * Elephant census * All India Tiger Estimation * Animal Rescue & Release * Eco-tourism and visitors zone management * Forest Fire Management * Wildlife Crime Detection **Evidence** Refer 1.5.5

11	The field staffs are frequently struck down with malaria, which is causing difficulties in protecting and managing the tiger Reserve. It is recommended that a medical doctor be placed permanently to look after all malarial cases and the staff be made aware of the precautionary measures required to control malaria Adequate medical facilities and quick reimbursement of medical bills of the staff should be ensured.	* Due to Managerial intervention like construction of RCC-camps, provision of drinking water facilities, LLIN and sanitation there has been drastic reduction in no of malaria cases among staff. *All the field staff of Similipal Tiger Reserve have been provided with First Aid Kits. * Camp First Aid kits are available in APC and personal First Aid Kits are provided to patrol teams. * The frequency of malaria among field staff of Similipal Tiger Reserve has reduced by 95% as compared to pre-2017 data due to mass distribution of LLIN (Long Lasting Insecticidal Nets) and use of rapid diagnostic test. * There is NO mortality among field staff in last four years due to Malaria. * Necessary steps have been taken to reimburse medical bills of the staff. Higher officials are monitoring the issue on weekly basis. **Evidence** Requisition to District Malaria Officer for Long Lasting insecticidal Net (LLIN) in Camps
12	The complexity and variety of the animals and plants found in the Tiger Reserve call for thoughtful planning for the future. It would be appropriate to consider appointing a task force in order to divide the entire ecosystem into two smaller Tiger Reserves for more efficient long-term management. It is considered imperative to have more scientific input. The protection of the unique flora and fauna will get boost while the future threats of climate change will be safeguarded against, with the anthropogenic pressure growing day by day.	For the purpose of administrative convenience and better human resource management, State of Odisha has reorganized the vast Similipal Tiger Reserve into two Wildlife Division in February,2019. The two WL Divisions namely Similipal South WL Division & Similipal North WL Division came into force with effect from 01.10.2019. There is increase in DCF, ACF, FRO, Dy. Ranger, Forester, Forest Guard sanctioned posts and decrease in average Range and Beat area after this reorganization. **Evidence** Notification of Reorganisation of Baripada Circle

Management Effectiveness Evaluation score and rating of Similipal Tiger Reserve.

Management Effectiveness evaluation of the Tiger Reserves of the country began in the year 2006. Five repeat cycles of evaluation of Tiger Reserves have been made after every four years from 2006 to 2022. Similipal has shown progressive improvement in each of the MEE Cycles. In the 5th Cycle of MEE is has been placed in excellent category along with other 12 Tiger Reserves of the Country. The MEE score percentage of Similipal TR is given below.

Table No: 13-c :Management Effectiveness Evaluation of Similipal Tiger Reserve

Management Effectiveness Evaluation of Similipal Tiger Reserve					
MEE Cycle & Year	1st MEE Cycle 2006	2nd MEE Cycle 2010	3rd MEE Cycle 2014	4th MEE Cycle 2018	5th MEE Cycle 2022
MEE Score %	75.68	47.50	58.06	72.66	90.15
MEE Rating	Very Good	Fair	Fair	Good	Excellent

Table No: 13-d :Element wise MEE score of Similipal TR in Fourth Cycle, 2018.

Sl. No.	Criteria	Score %
01.	Context	90.00
02.	Planning	82.14
03.	Inputs	65.00
04.	Process	58.33
05.	Outputs	68.75
06.	Outcomes	70.00
	Total	72.66

13.9. CONSERVATION ASSURED | TIGER STANDARDS (CA|TS)

Conservation Assured (CA) is a new conservation tool to set best practice standards for effective management of target species. CA fulfils the requirement for protected area management effectiveness in international agreements such as the Convention on Biological Diversity's (CBD) Programme of Work on Protected Areas and will help national governments, and their partners in conservation, to meet the CBD's Strategic Plan for Biodiversity. CA is also linked to and partnered in the development of IUCN's Green List of Protected and Conserved Areas, an initiative to encourage, measure and share the success of conservation management. The first species-specific CA standards are for the tiger (Panthera tigris). Few tiger conservation areas are truly effective refuges for tigers and this has contributed to a catastrophic decline in their numbers. Tigers have already disappeared from several protected areas where they were until recently regarded as secure. The globally accepted goal of doubling the number of wild tigers by 2022 will not be achieved without a significant increase in the effectiveness of the tiger conservation areas across the remaining tiger range countries. The Conservation Assured | Tiger Standards (CA|TS) scheme provides an incentive to those responsible for tiger conservation areas in the 13 tiger range countries to improve the effectiveness of management. The approach is based on long-term experience of both environmental certification schemes (e.g. the Forest Stewardship Council (FSC)) and protected area management effectiveness assessments (e.g. the IUCN World Commission on Protected Areas (WCPA) Management Effectiveness Framework and associated systems) as well as a wide range of conservation management tools and expert knowledge. CA|TS is a set of 17 minimum elements with associated standards and criteria for effective management of tiger conservation areas. It is not a new management effectiveness system or a ranking of tiger conservation areas; but rather provides the means to tell if a particular area attains the best practice standards needed to conserve tigers. Tiger conservation areas taking part in the system will be recorded as either Registered (but standard not yet attained) or as Approved (achieving the standards as verified through an auditing and independent review process); excellence would be expressed in terms of highlighting specific best practices. Whether tiger conservation areas meet the criteria is based on a process which starts with self-assessment, progresses through a system of national audit and is finally approved by an international executive committee, which ensures equivalence across tiger range countries. CA|TS provides an opportunity for individual tiger conservation areas or networks of areas to demonstrate their commitment to, and success in, protecting tigers. It is a voluntary, independent scheme for any area involved in tiger conservation. CA|TS has been extensively field-tested and subjected to expert peer review.

The Self Assessment for CA|TS under Second phase of National Level Audit of Tiger Reserve shall be completed in the initial years of the current plan period.

13.10. NATIONAL PARK STATUS

The National Park final Notification will be made after the completion of relocation of Bakua from the core of the Tiger Reserve. The management shall strive to achieve the final National Park Notification in the current plan period.

13.11 VETERINARY ASSISTANT SURGEON (VAS)

The VAS on deputation to the Tiger Reserve shall have the following duties and responsibilities:

- Management of captive elephants (Refer 11.1.).
- Management of Dog Squad (Refer 11.2.).
- Regular monitoring of wildlife health condition through direct observation and analysis of faecal matter samples (Refer 11.3.).
- Post mortem of wildlife deaths.
- Rescue and rehabilitation of injured, stressed, disoriented, and diseased wildlife.
- Train and assist the frontline staff for collection of samples for forensic analysis in case of criminal investigation as well as pathogenic examination.
- Organise and monitor prophylactic vaccination drive for domestic animals as well as post monsoon sanitation of water bodies in and around the Tiger Reserve.
- Coordinate with Chief District Veterinary Officer and Block level Veterinary Officials for treatment of rescued wildlife.

Wild carrying out the above duties the VAS shall strictly adhere to the Standard Operating Procedure (SOP) issued by NTCA. Especially while dealing with tigers and leopards and other schedule 1 animals.

The VAS shall submit a monthly report on above activities to the Field Director-cum-RCCF, Baripada with a copy to the Deputy Directors.

13.12. TECHNICAL PERSONNEL

At present there is a Wireless Technician post in the office of the Deputy Director, Similipal South WL Division, Baripada for looking after management and maintenance of VHF network coverage and its accessories in the Tiger Reserve.

Duties and Responsibilities.

1. He shall ensure proper functioning of VHF network coverage for effective communication with all the anti-poaching camps, Range Head Quarters with the Division Headquarter and office of the Field Director.
2. He shall make regular visits to all VHF Stations of the Tiger Reserve to provide technical assistance to the field functionaries in managing the VHF network system.
3. He shall look after the repair and maintenance and replacement of all equipments and accessories of the VHF network system.

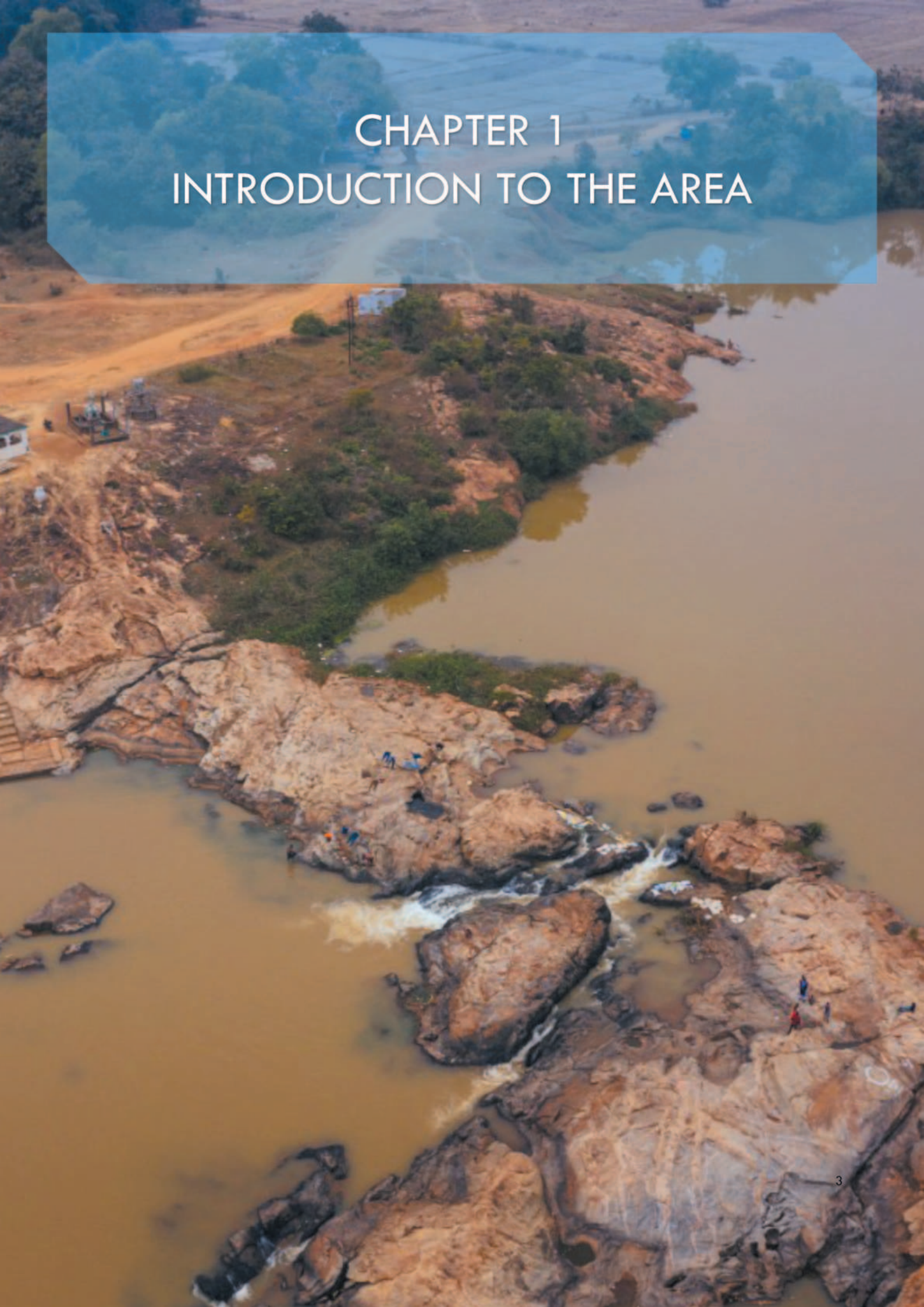
The Wireless Technician shall submit a monthly report on above activities to the Deputy Director, Similipal South WL Division.

All camps of the Tiger Reserve are now equipped with solar home light system, mobile smart phones, drinking water filters, etc. all Ranges have been supplied with four wheeler vehicles for smooth management. These require periodic management and maintenance. The necessary technical personnel may be arranged for periodic maintenance of solar home light system, mobile smart phones, drinking water facilities as well as vehicles based on availability of funds. The arms in the Tiger Reserve also require periodic maintenance. This may be done in coordination with the Police Armoury located at the District Police Headquarters.

13.13. TCP TO BE PLACED IN PUBLIC DOMAIN

The Tiger Conservation Plan after its approval will be placed in the public domain by displaying the plan on official website of Similipal Tiger Reserve www.similipal.org.

BUFFER AREA



CHAPTER 1
INTRODUCTION TO THE AREA

CHAPTER

01

INTRODUCTION OF THE AREA

1.1 NAME, LOCATION, CONSTITUTION & EXTENT:

1.1.1 Name

Similipal Tiger Reserve, Buffer Area-The Buffer area of the tiger reserve comes under the jurisdictions of Baripada (T) Division, Karanjia (T) Division, Rairangpur (T) Division, Similipal North (WL) Division and Similipal South (WL) Division.

1.1.2 Location

Similipal Tiger Reserve is located between $22^0$20' 02.2" N, 86^0 37' 03.3" E at North-east corner, 22^0 19' 54.1" N, 86^0 04' 20.4" E at North-west corner, 21^0 16' 07.1" N, 86^0 04' 44.8" E at South-west corner and 21^0 16' 15.4" N, 86^0 37' 11.2" E at South-east corner. It is situated in the middle of Mayurbhanj district of Odisha state. The buffer area of the STR is the peripheral regions of the Similipal sanctuary apart from two elongated patches of forests along Northern and Southern part of Sanctuary. Bufffer area also contains a part of Hadgarh sanctuary at its Southern end apart from a part of Similipal Sanctuary. The area from Pithabata and Digdiga to Podadiha in the eastern side of the STR comes under Similipal South WL Division. The western side of Buffer begins from Bhandan 1 compartment of Similipal R.F. near Tulsibani of Similipal North WL Division extends up to Salandi 14 compartment near Thakurmunda of Similipal North WL Division. In the North, a strip of area extends up to Sarali R.F., Tungru R.F. and Mankadbeda R.F. of Rairangpur Division bordering Jharkhand. Similarly, a strip of forest area covering Satkosia R.F and Nada R.F. of Karanjia Division runs up to extreme south of the Tiger Reserve adjoining Hadagarh Sanctuary in neighbouring Keonjhar District.

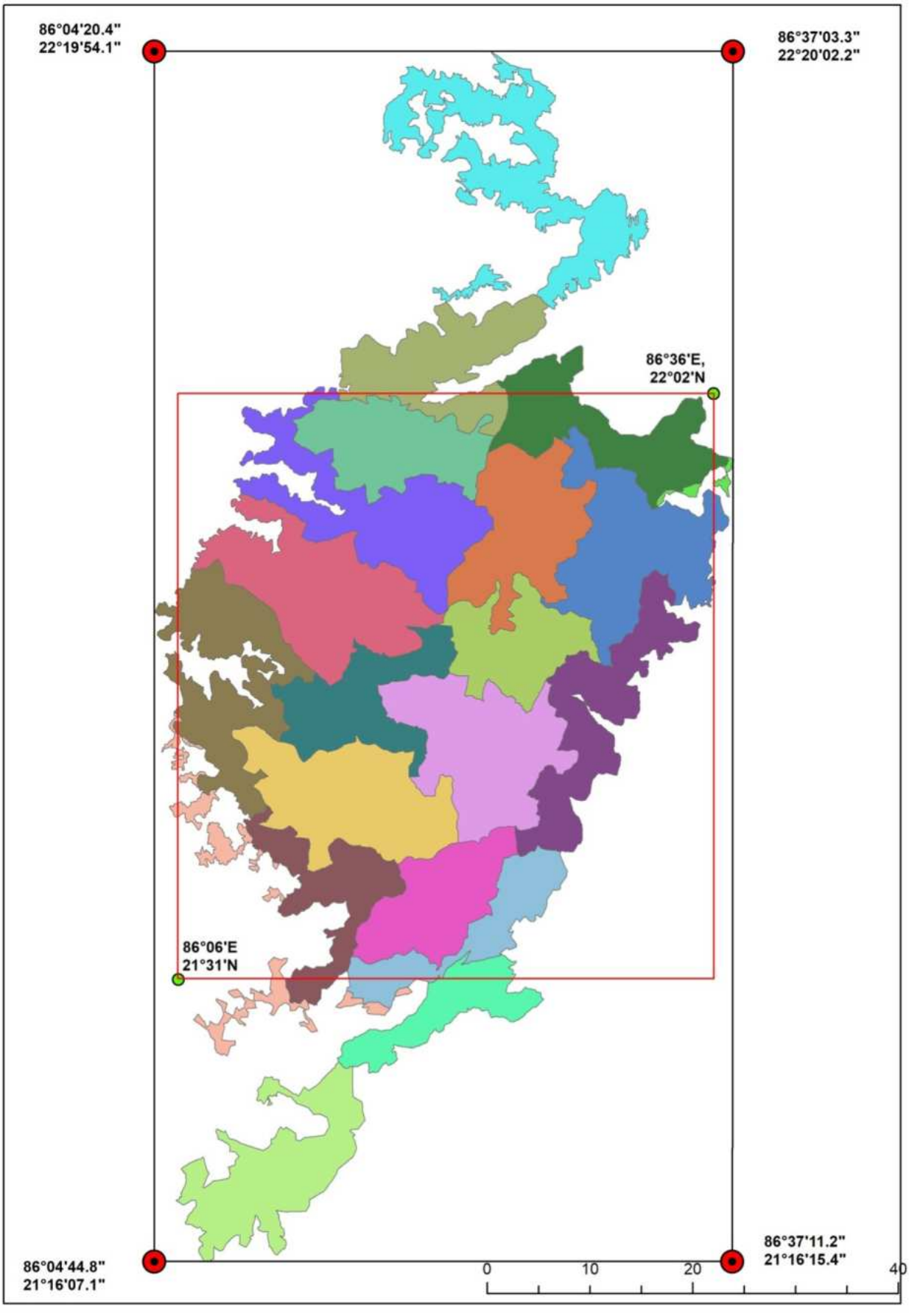
1.1.3. Constitution

The Buffer zone of Similipal Tiger Reserve was initially constituted on 4th December 1973 under Project Tiger covering an area of 1904.30 km^2 as one of the first nine tiger reserve of India. Thereafter the area was decreased to 1555.25 km^{2}as recommended by an expert committee and subsequently notified by Govt of Odisha vide their notification during December-2007 in accordance with provisions of amended WLPA, 2006.

1.1.4 Extent

The Buffer area of Similipal Tiger Reserve extends over 1555.25 km^2 which includes part of Similipal RF and the surrounding contiguous area of Reserved Forests, proposed Reserved Forests, 56 villages inside Similipal RF, 5 villages inside Satkosia RF and 3 villages inside Tungru RF. The details of Reserved Forests and other forests are furnished in the Annexure V.

1.1.4.1 Division wise buffer area and area under Sanctuary.



Map 1A: Geo-coordinate of Similipal Tiger Reserve.

Table No.1A: Division wise buffer area and area under Sanctuary.

Division	STR Buffer area in sqkm				
	Sanctuary area			Non-Sanctuary area	Total
	Similipal	Hadagarh	Total		
Similipal North WL	620.20	0	620.20		620.20
Similipal South WL	399.83	0	399.83		399.83
Baripada	0	0	0	70.10	70.10
Karanjia	0	33.99	33.99	158.02	192.01
Rairangpur	0	0	0	181.28	181.28
Villages inside Sanctuary					91.83
Total	1020.03	33.99	1054.02		1555.25

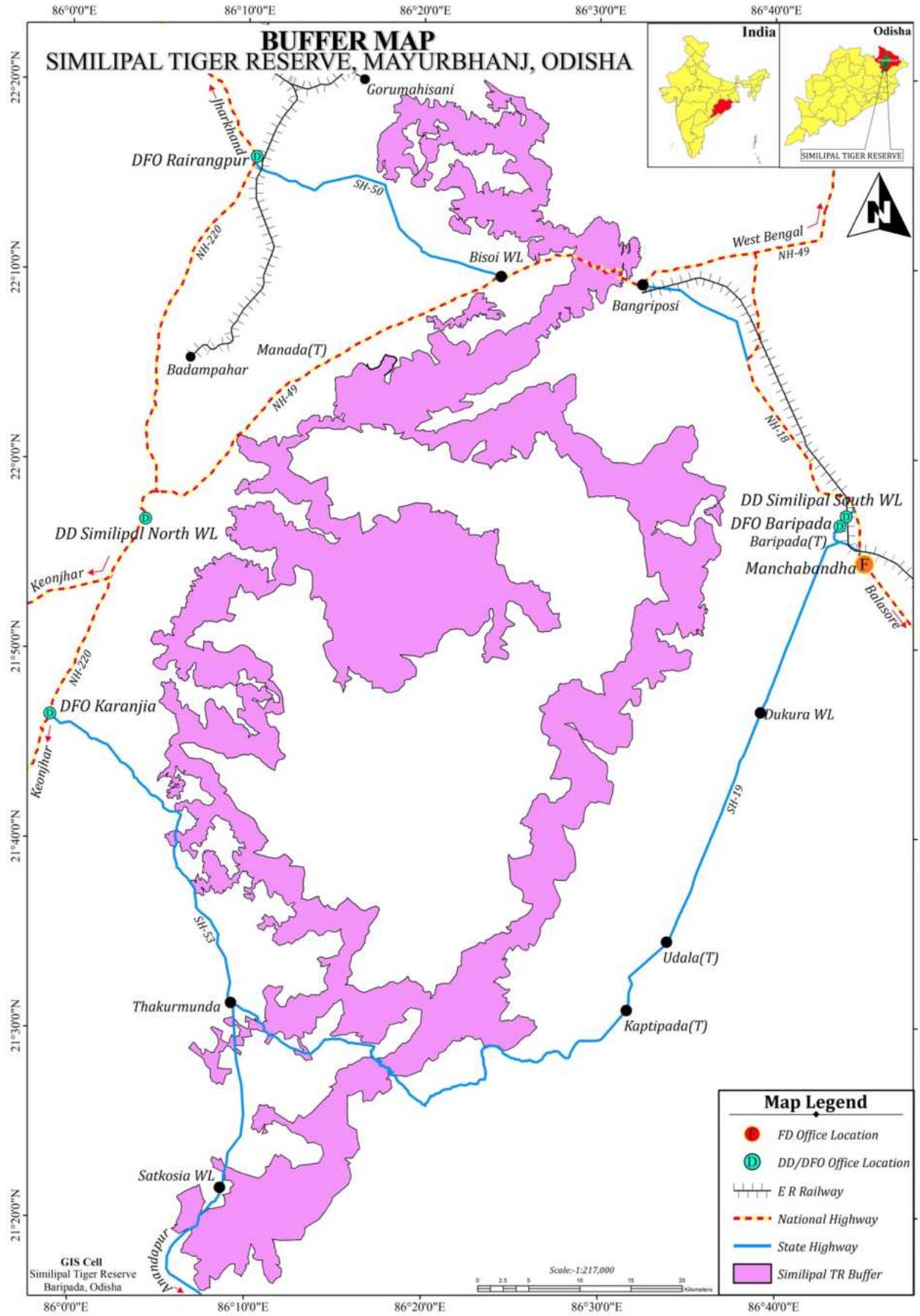
1.2 APPROACH AND ACCESS:

There are two main entrances to Similipal Tiger Reserve, one through Jashipur and the other through Pithabata.

NH-16 (Howrah-Chennai) runs close to STR in North-East directions and NH-49 (Howrah-Mumbai) runs very close to the landscape in North-West direction. NH 18 connecting Balsore to Baripada runs very close to Similipal in the North-East direction. NH 220 (Jamshedpur-Dhenkikote) also runs close to the western boundary of Similipalparallely. During dry season the area is accessible through Baniabasa on Baripada-Udala PWD road.

Table No.1b: The road distances of both the entrances.

To	From					
Entrance at	Bhubaneswar	Balasore	Kolkata	Jamshedpur	Ranchi	Kharagpur
Pithabata	275km.	78 km.	240 km.	157 km.	275 km.	116.5 km.
Jashipur	245 km.	152 km.	277 km.	112 km.	235 km.	153 km.
Baripada	255 km.	58 km.	220 km.	137 km.	255 km.	96.5 km.



Map No.1B: Buffer Map of Similipal Tiger Reserve.

1.3 STATEMENT OF SIGNIFICANCE

Similipal forests are quite significant from flora and fauna point of view. According to bio-geographic classification by Roger and Panwar (1980), Similipal has been classified as follows:

Bio-geographic Zone	:	Decan Peninsula
Bio-geographic province	:	Chhotnagpur
Bio-geographic Region	:	Mahanadian

However, Odisha is the junction of all the four Biotic Provinces and Similipal represents features of all of them. These provinces are Eastern plateau Chhotnagpur, Lower Gangetic plain and Coastline. In fact, geological studies, fossil and subsequent studies indicate that Similipal is a biological link between the Western Ghats in South and the Eastern Himalayas in North.

Environmentalists and intellectuals also look Similipal in very high esteem and pride. They treat it as 'Himalaya' of Odisha, they believe the way 'Himalayas' regulate the monsoon for Indian sub-continent, similarly 'Similipal' influences the rain pattern of Odisha, Bihar and West Bengal. Similipal is also the origin of a large number of perennial rivers which are the life lines for the people of Mayurbhanj, Keonjhar, Balasore and Bhadrak. A large number of people living within and outside Similipal attain their livelihood from Similipal forests through collection of firewood, timber and large number of minor forest products. It is a source of huge number of medicinal plants having ethnobotanical importance. 'Khadia Tribes', who are landless, mostly depend on Similipal forests for their survival. In addition, with the benefits to the common man, it imparts teaching and knowledge to a large number of researchers, scholars, academician and intellectuals. It is blessed with numerous peaks, valleys, waterfalls and beautiful flora and fauna which attract a large number of tourists from within and outside the country.

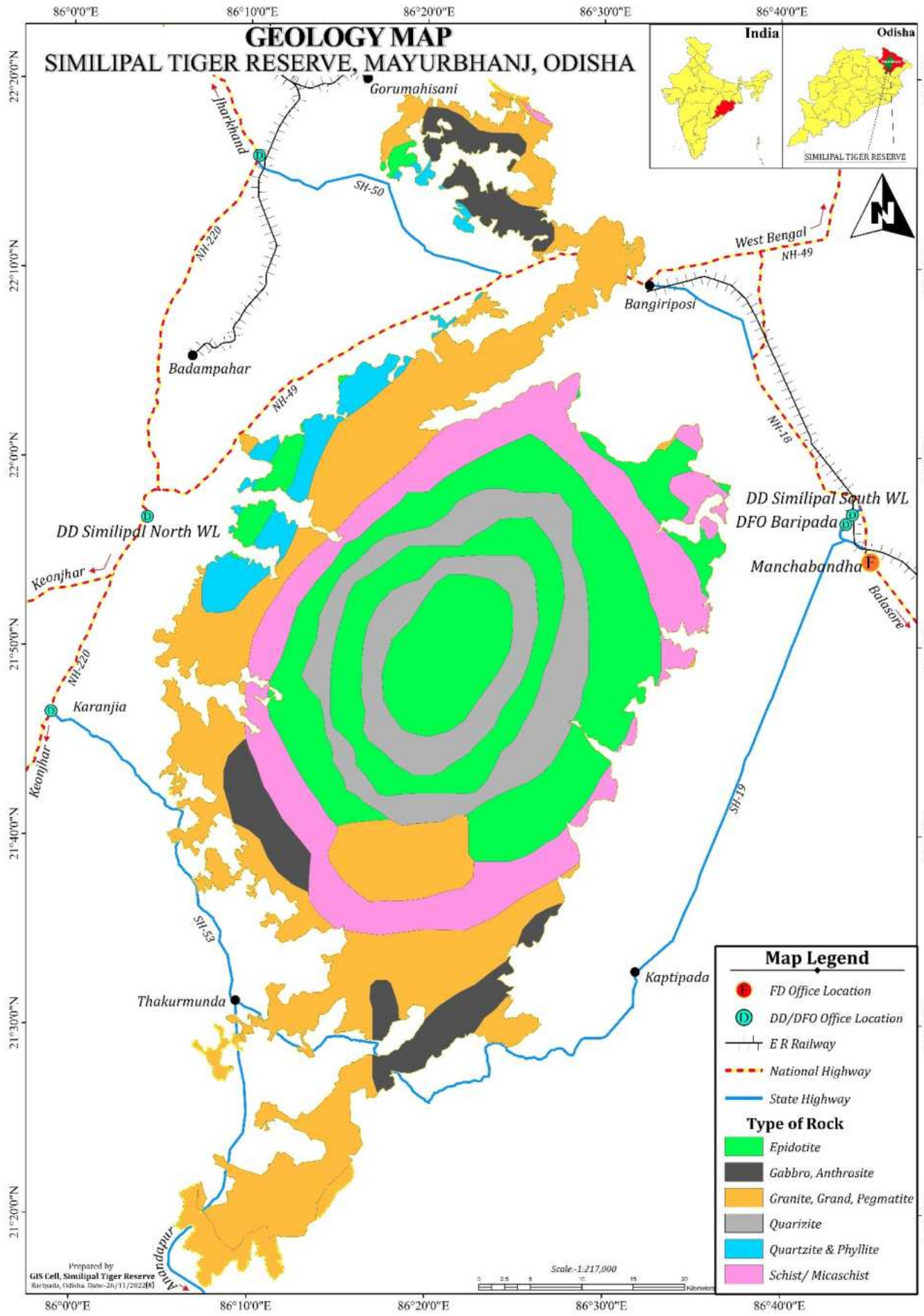
However, Similipal is also having some issues related to its biodiversity and sustainability. The growing populations of 64 villages located within the buffer area are posing challenges to its existence. Flora and fauna near the habitations are shrinking. People residing in and around the Sanctuary are very much dependent on its resources and thus affecting the ability of self-sustenance of forest by removing firewood, timber and minor forest products. Biotic interferences like forest fires, grazing, and illegal felling of timber are also affecting the biodiversity. Traditional hunting ritual is causing destruction to both flora and fauna. However, in the recent past, traditional hunting ritual practice is almost none due to various initiatives taken by the department. The Buffer area of Similipal Tiger Reserve extends over 1555.25 sq kms which includes part of Similipal RF and the surrounding contiguous area of Reserved Forests, proposed Reserved Forests, 56 villages inside Similipal RF, 5 villages inside Satkosia RF and 3 villages inside Tungru RF. As such, the buffer zone has an important role to play *vis-à-vis* the tiger land tenure dynamics. It surrounds the critical tiger habitat of 1194.75 km^2 which forms the core of STR, the natal habitat for tigers in the reserve. This acts as a cushion and a protective layer for the core of the tiger reserve.

1.4 GEOLOGY, ROCK, SOIL

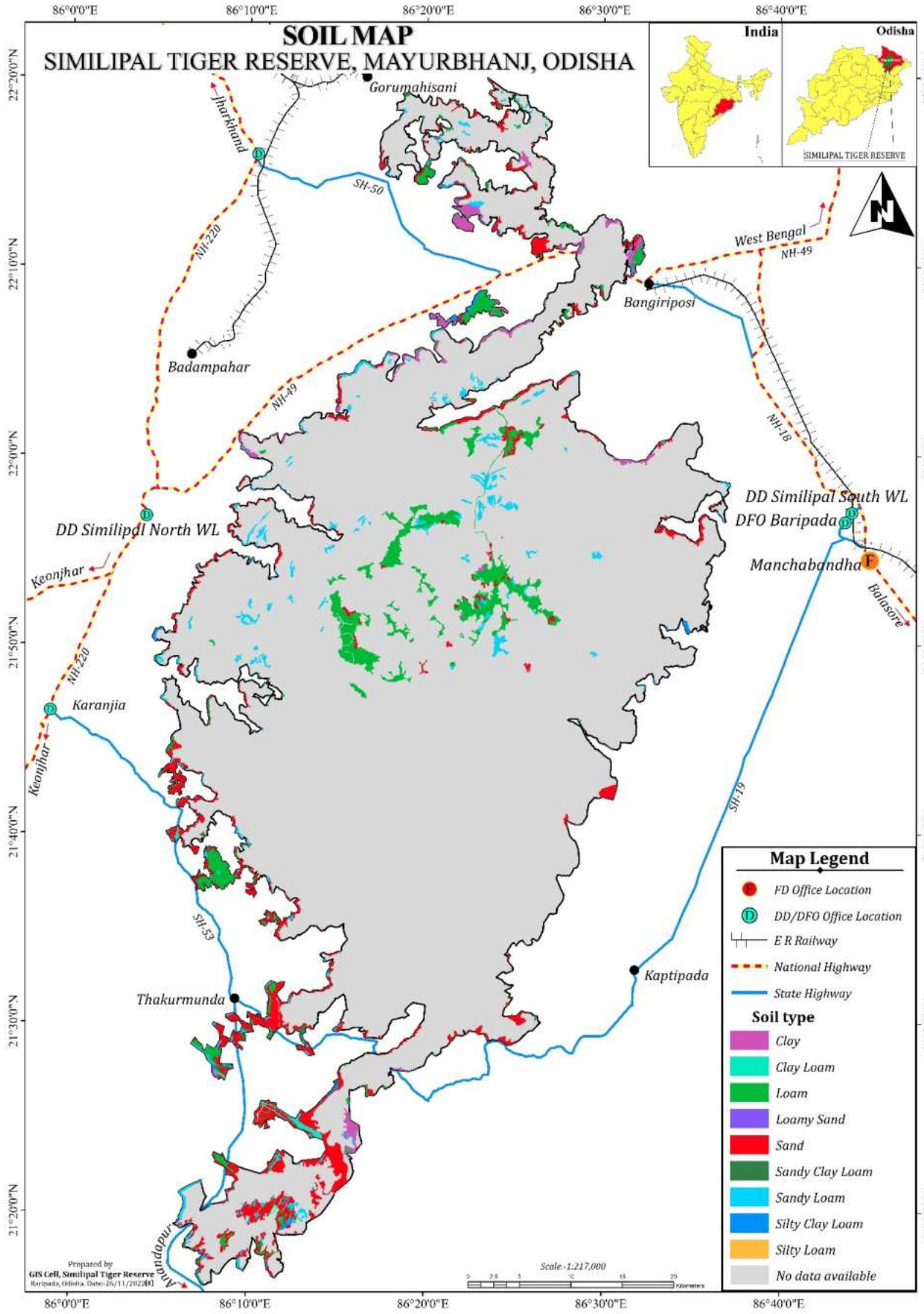
Similipal was a part of Gondwanaland in the Palaeozoic era. The main layout of the formation layers is of three concentric cups of metamorphic rocks inter-bedded with sub-metamorphic layers i.e. volcanic with outer inter-space and igneous with inner inter-space. The metamorphic rocks are granitoid gneiss, true gneiss and mica schists with pegmatite. The gneissic rocks are much interspaced by dykes of basic and intermediate rocks. The sub metamorphic rocks are shale, haematitic rock laterites, limestone, calcareous deposits, quartzites, phyllites and micaceous schists. Haematitic rocks, laterite and shale occur in extensive formations in central and south Similipal. Outcrops of sub-metamorphic and quartzite haematite occur all over Similipal hills.

The soils of Similipal are acidic in nature having a pH range of 4.8 to 6.8 in most areas. The main soil types are as follows:

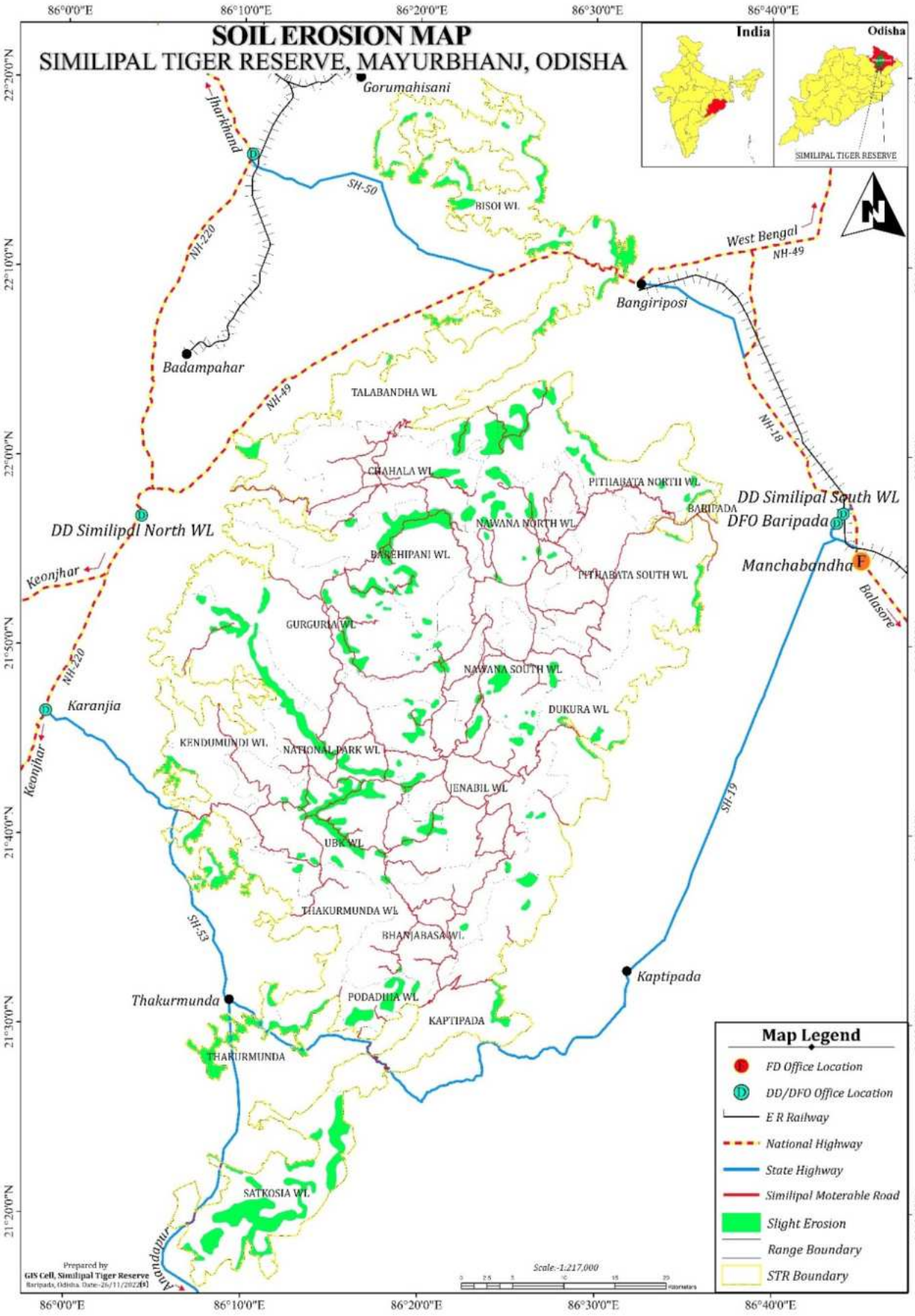
- From haematitic rocks, rich red loam soil is derived having intense biotic activity and dense tall wood lots.
- Laterites produce deep soils, reddish in colour having the capability to support good tree growth. Where the depth of the soil is less, it supports poor tree growth but good grass growth for animals.
- Shale on weathering produces substantial deposits of clay and clayey loam soils good for biotic growth.
- Outcrops of sub-metamorphic sand stone and quartzite haematite on disintegration produce sandy soil. In deep layers, it supports good growth of plants and animals. Where the depth of soil is thin it favours the growth of grasses. Presently, soil erosion does not pose any serious threat except for Budhabalanga valley. Integrated complex of rock, soil and vegetation held in a stable formation provide little scope for degradation. However, sporadic denudation in small pockets remains but it is not recognizable. But the forest roads are getting affected due to continuos rain in monsoon and are prone to erosion. Maintenance of forest roads becomes a necessity for the management aspect of TR as it holds the way to move inside the TR for any kind of interventions. Erratic rainfall due to climate change is also causing unexpected problem as unusual rains during non-monsoon season erode the roads making it difficult to move inside the TR.



Map 1C: Geology Map of Similipal Tiger Reserve



Map 1D: Soil Map of Similipal Tiger Reserve



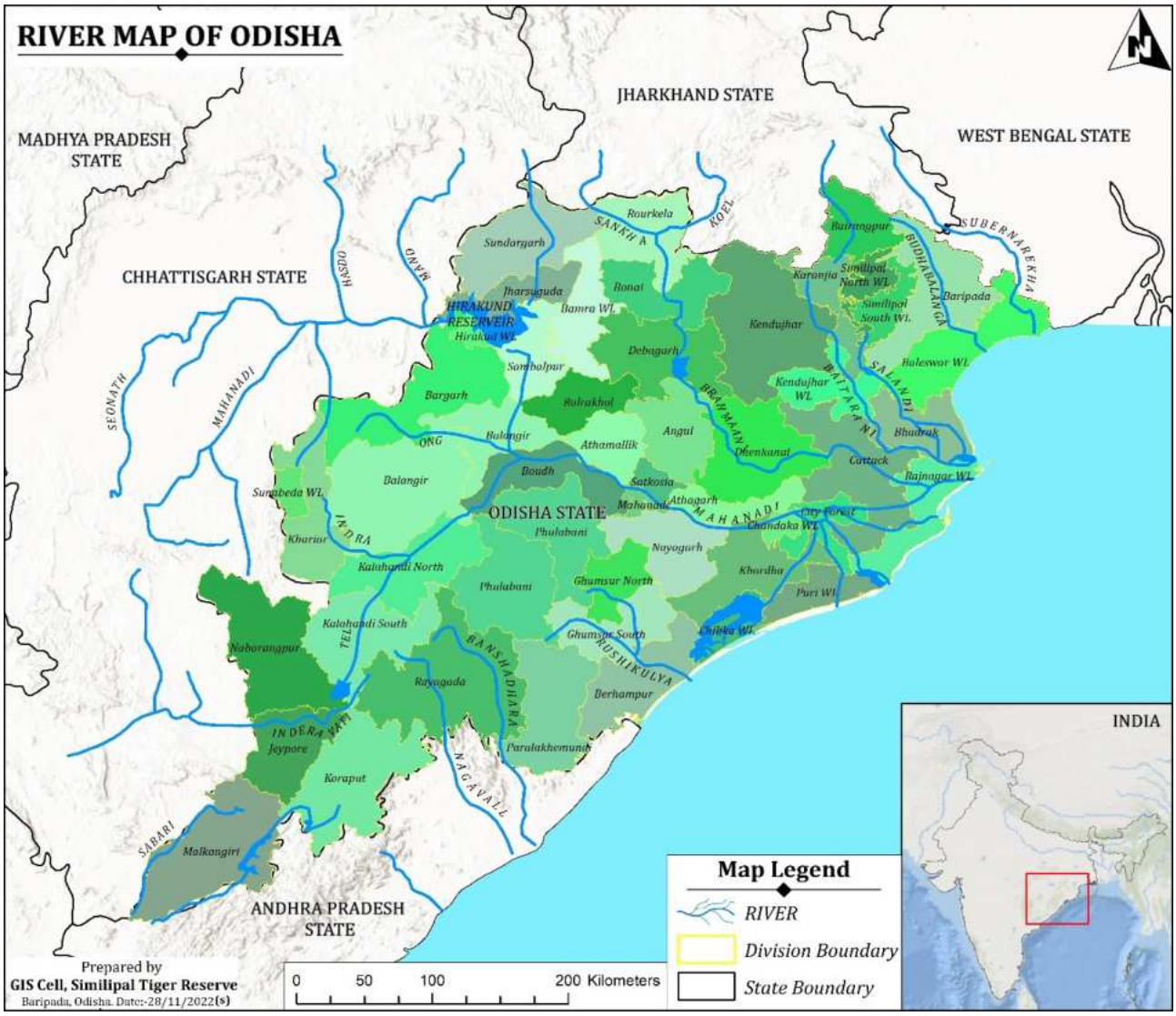
Map 1E: Soil Erosion Map of Similipal Tiger Reserve

1.5 HYDROLOGY AND WATER RESOURCES

Nine major perennial rivers such as the Budhabalanga, Deo, Sunei, Gangahaar, Jambhira, Khadkhai, Khairibhandan, Bankabal and Katra and their tributaries that originate mostly from Similipal Hills provide very good potential for water resources to be harnessed for several areas of development. These rivers provide enough opportunities for expansion of irrigation. Six Medium Irrigation Projects, 202 Minor Irrigation Projects and thousands of ponds and tanks available in the district offer tremendous scope for reservoir fishery and development of pisciculture. The major water bodies are at the foot hills and outer skirts of the Tiger reserve. These meet the water requirement of wildlife round the year. The riverine system is divided into two. These are:

East Flowing River system:

The East flowing water Drainage system called Budhabalanga water drainage system is enriched with water resources in the northern and eastern part of the buffer area of the tiger reserve. The Budhabalanga river emerges from Core area of the tiger reserve and Northern part of Similipal Reserved Forest. The catchment areas of the river fall in compartment numbers Balanga East 1 to 24. This river flow through districts of Mayurbhanj and Balasore and serves as life-line for the districts and finally winds its way to the Bay of Bengal. The perrenial tributaries of the river Budhabalanga are Palpala, Kafra, Sanjo, East Deo, Kalo, Sono and along with many rivulets and nullahs. An analysis of water availability in the area has shown that more



Map 1F: River Map of Odisha

than 50% of the streams carry water during the driest period of the year although the rest get totally dry. This influences the wild animals to congregate around the water available areas during summer. There is a small irrigation dam raised on river Kalo near Udala outside the Tiger Reserve.

West Flowing River system:

The second river system of the buffer zone is drained by Baitarani drainage system with a number of perennial streams joining the main river Baitarini which emerge from Gonasika of Keonjhar District. The major tributaries are Salandi, Bhandan, Khairi, West Deo, Tel, Sim and Kantamauli. There is an irrigation project namely Deo irrigation project going to be established outside the Tiger Reserve near Tato of Karanjia Division. The above tributaries are perennial and most of them emerge from core and buffer area of the Tiger Reserve in the western and southern parts.

1.6 VEGETATION TYPES:

The vegetation types are same as that of the core area. However, occurrence of dry deciduous forest type is more conspicuous in the north-western edges of the reserve; the percentage of moist deciduous and semi-evergreen forests is correspondingly lower in the buffer area. The canopy is also more open here subject to increased biotic pressure mainly illicit felling and grazing. The common plant species found in Similipal and adjoining areas have been listed in Annexure XX.

- Northern Tropical Semi-Evergreen Forests. (Type: 2b/c3)

This type spreads over an area of about 30 km^2. The species found under this forest type depending upon the soil and micro climatic conditions are as follows: -

Salix terasperma, Trewianudiflora, Macaranga peltata, Aphanamixispolystachya, Symplocoslaurina, Glochidion spp., Bischofiajavanica, Syzygiumcumini, Millettia pinnata, Diospyros peregrina, Saraca indica and at places *Terminalia arjuna. Bombax ceiba, Alstoniascholaris, Ficus spp., Polyalthiacerasioides, Neolamarckiacadamba, Dilleniapentagyna, Litsea spp., and Citrus spp. and Micheliachampaca, Artocarpus lakoocha, Toona ciliata, Mangifera indica, Ailanthus excelsa, Mesua ferrea, Stereospermumsuaveolens, Xyliaxylocarpa and Bridelia retusa* are at higher altitudes.

- Northern Tropical Moist Deciduous Forests (Type: 3C/C2e)

It covers an area of about 1400 km^2. It is found all over Similipal buffer area except the moist valleys and on the southern and the eastern aspects of the hills. Sal forms 50% to 90% of the standing crop. Quality of sal being 'IV' on the steep drier aspects and 'II' on gentler slopes with deep soil and cooler aspects The common species of trees found in this type of forests are *Terminalia spp., Pterocarpus marsupium, Anogeissus latifolia, Schleicheraoleosa, Adina cordifolia, Toona ciliata (rare), Micheliachampaca, Mangifera indica, Bombax ceiba, Careya arborea, Dilleniapentagyna, Gmelina arborea, Garuga pinnata, Lanneacoromandelica, Syzygiumcumini, Ougeiniadalbergioides, Xyliaxylocarpa, Kydiacalycina, Lagerstroemia parviflora, Bridelia retusa, Mitragynaparvifolia, Trema orientalis, Phyllanthus emblica, Zizyphus spp., Cassia fistula, Buchnanialanzan, Sterculia villosa, Miliusavelutina, Helicteresisora, Indigofera pulchella, Croton oblongifolius, Colebrookiaoppositifolia, Flemingiachappar, Strobilanthes spp., Wendlandiaexserta, Imperata cylindrical, Themedacaudata, Cymbopogon martini, Eulaliopsisbinata, Thysanolaena maxima, Curcuma aromatica, Bauhinia vahlii, Millettia auriculata, Smilax macrophylla, Combretum decandrum, Dioscorea spp., Asparagus racemosus.* Ferns and orchids are found in moist places. *Ferns- Adiantum spp., Doryopteris spp., Cyathea gigantean, Spinulosa spp., Cyclosorus spp. and Holtt Tree Fern.*

- Dry Deciduous Hill Forests (Type: 5B/C1c and 3C/C3)

It is spread over an area of 50 km^2 (approx) mostly in the eastern and the southern Similipal with steep and exposed slopes, this type of forest has sal as major species covering upto 30% of the crop. Other associates are *Anogeissus latifolia, Sterculia urens, Boswellia serrata, Dalbergia latifolia, Cleistanthuscollinus, Gardenia gummifera, G. latifolia, G. turgide, Erythrina suberosa, Cochlospermumgossypium, Helicteresisora, Nyctanthesarbortristis*with an abundance of herbs, shrubs and grasses as ground cover.

- High Level Sal Forest. (Type: 3C/C 2e(i))

This type of forest occurs on the plateaus above an elevation of 850m and extends over about 50 km^2. Pure stands of poor quality sal are found with *Dilleniapentagyna, Syzygiumcerasoides, Pterocarpus marsupium and grasses like Imperata cylindrica* and *Themedacaudata.* Large patches of *Phoenix acaulis* occur.

- Grassland and Savannah. (Type: 3C/DS-I)

The area of grasslands in Similipal buffer is less than 1 km^2 spread all over in small and large patches. Like the grasslands of core area, grasslands are found on hill tops over 900 metres high as well as in the frosty valleys and nallah banks. In the former it is perhaps a climax type where as in the later, it seems to be of seral origin, a stable "Pre-climax" under the combined influence of edaphic and climatic factors, mode of origin and intensity of biotic effects. In the frosty open valleys, sal and other frost tender woody plants are annually bitten back to whippy growth. The species include *Syzygiumcerasoides, Symplocosracemosa,* and *Dilleniapentagyna*. The common members of Poaceae are *Imperata cylindrica, Themeda gigantea* and *Saccharum spontaneum.*

Small Grasslands-

Bothriochloabladhii, Cymbopogon fresuosus, Cynodondactylon, Heteropogoncontortus, Imperata cylindrica, and Themeda spp.

A meadow has been developed at Kiajhari in Kiajhari Beat of Ranipat Section of Kendumundi WL Range of Similipal North WL Division.

Cover:

The term cover means vegetation, cliffs, overhangs, caves and dens or other shelters which provide shelter for wildlife. Cover is also required for breeding, resting, roosting, refuge, loafing and ambushing and escaping. Types of cover and cover value of vegetation or other features differ from species to species. It also permits the formation of "travel lance" within a habitat. Snags provide excellent home for birds and small mammals. Forests provide both refuse and ambush cover. Meadows provide escape cover and borrows provide breeding cover to tiger as well as other subterranean dwellers. Giant Fig trees provide food and roosting cover to many birds. Cover is not a limiting factor in Similipal but prominent features serving as cover need to be listed.

Table No.1c: The special habitats of buffer area of the tiger reserve

Similipal South WL Division		
Name of Range	Name of habitat	Special features
Pithabata North WL	Sanachandri	Mouse deer habitat
	Badachandri	Mouse deer habitat
	Badgaon	Chapadihi (Natural salt lick)
Dukura WL	Beldunguri	Red jungle fowl habitat
Dukura WL	Devkund	Cliff, habitat for residential birds
	Sarabasa, Garudabasa	Habitat for hill Myna and raptors
Podadiha WL	Machakandana	Cliff, habitat for residential birds
Baripada Division		
Name of Range	Name of habitat	Special features
Kaptipada	Haridachua of Notto RF	Peacock habitat
	Notto RF forest near Bhegidiha	Common langur

KaranjiaDivision		
Name of Range	Name of habitat	Special features
Karanjia	Paudia	Grass land, Barking deer habitat
Thakurmunda	Bisipur RF-II	Grass land, Barking deer habitat
Satkosia	Satkosia RF Comptt.no.2	Mouse deer, wild pig habitat
RairangpurDivision		
Name of Range	Name of habitat	Special features
Bisoi WL	Duarsuni	Ghat area, Rhesus monkey habitat
Similipal North WL Division		
Name of Range	Name of habitat	Special features
Nawan North WL	Joranda	Habitat for Shaheen Falcon
Gurguria WL	Along Khairi River	Habitat for Vernal Hanging Parrot

1.7 WILD FAUNA AND HABITATS

The wild fauna and the habitats in the buffer area is largely same as that of the core area except the density and abundance which is lower than the core area. There exists a scanty population of tigers in the buffer area with movement of what are probably transient individuals noticed. Leopards are regularly recorded from the buffer area. As the habitat is prone to biotic interference, due to existence of villages inside and on the fringe, open forest species like Wolf, Hyena, Indian Fox etc. are found confined to these areas. The buffer area is well habited with leopards and they are the prime food competitor of tigers. Thus, management of such wildlife habitats is needed.

Similipal being the home of highest number of elephants in Central India is another species of conservation importance. Mugger Crocodiles and Orchids are also found native in Similipal. Riparian zones having Arjuna, Mango and Jamun communities and grasslands are important conservation areas which provide resting, roosting, breeding cover and food material to many animals. Ficus, Madhua and Arjuna trees having a lot of bee hives serve as favourite for sloth bears, honey badgers and other species. Caves, dens and snags are key area for tigers, sloth bear, wild dog, owl, many other bird and reptiles. Examples -Mahubhandar and Champajhar area (SL14), of Gurguria WL and Thakurmunda WL Range of Similipal North WL Division respectively.

Many wild animals including some endangered ones like tiger, panther, elephant, gaur etc. are found in different levels of abundance. Ratel, pangoline, giant squirrel, flying squirrel, sambar and chital are among the other few worth mentioning. The status of avi-fauna is very rich. Nayak and Naik (2013) have enlisted 361 species of birds within Similipal Biosphere Reserve. Similarly, there is a report published by RPRC in 2009 indicating presence of 81 species of amphibians and reptiles in Similipal. However, estimation of population density of different animals gives an indication about their status. The major census figures are given in appendices. The details of flora and fauna have been dealt in detail in core plan. Special attention is needed to enhance the productivity in such a way that the livelihoods of locals are enhanced along with growth of wildlife in an ascending trend.

DISTRIBUTION OF ANIMALS AND HABITATS

The estimation of tiger and leopard reveals distribution patterns of big cats;accordingly, territories are mapped. Similipal mapping cannot be attempted for elephants as there is always internal migration throughout under normal condition.

A distribution factor has been assigned for some major mammal and distribution maps are being prepared for four-horned antelope, bison and giant squirrel. Based upon sighting and other evidence, it is quite clear

that South Similipal possess more herbivores over areas created by juxtaposition of grassland, riparian zones and woodlots. However, the extent of such favoured habitats is highly restricted inside Similipal. The valley meadows are prone to invasion by woody species.

1.8 MAJOR CONSPICUOUS CHANGES IN THE HABITAT SINCE INCEPTION

Invasion of Plant Weeds

In recent years the deciduous forest of Similipal Tiger Reserve and in adjoining buffer zone have been invaded by several exotic plant species such as *Lantana camara, Eupatorium odoratum, Parthenium hysterophorus, Ageratum conyzoides*. This is a big problem in Gurguria, Kendumundi, Thakurmunda, Talabandha and Barehipani of Similipal North WL Division and Satkosia Range of Karanjia Division and in Bisoi Range of Rairangpur Division and in Pithabata North and South, Dukura, Podadiha of Similipal South WL Division and Kaptipada of Baripada Division. These weeds which have invaded almost all habitats pose a threat to the growth of grass diversity, richness and fodder plants, hindering free movement of animals.However, many weeds found sporadically inside meadows of Similipal which are being eradicated on regular basis in order to foster the growth of the palatable grasses. Such weeds are *Chromolaena odorata*, *Ageratum conyzoides*, *Bidens ternate*, *B. biternata*, *B. pilosa*, *Stachytarphara indica*, *S. jamaicensis*, *Scoparia dulcis*, *Elephantopusscaber*, *Colebrookeaoppositifolia*, *Gomphosyemmaniveum*, *Spermacoce latifolia*, *Plectranthuspolinus*, *Pheonix acaulis*, *Mimosa pudica*, *Pogostemonbenhgalensis* etc.

Loss of Perennial Water Bodies

Many of the local perennial water sources have disappeared and pose a concern for the managers. These perennial water sources need to be recharged through a variety of conservation measure for the safeguarding of key flagship species. Construction of checkdams on nallahs cause silting along the dams and block natural waterflow which needs to be regulated in future. Massive planting of species such as *Pongamia spp.*or *Syzigium spp.*along the degraded banks of nallahs should be carried out to protect the nallahs from the harsh sun, keeping them cool and protecting the natural spring and water flow as it is.

Invasion of Sal and its associates trees in Grasslands

Saplings of tree cover especially Sal and its associates species invade in to the grasslands of Similipal Tiger Reserve reducing the herbivore habitats. This is a huge problem, which needs to be tackled by eradication of saplings by uprooting and controlled burning of the grasslands.

CHAPTER 2
STATUS OF TIGER, CO-PREDATORS AND THEIR PREY

CHAPTER

02

STATUS OF TIGER AND CO-PREDATORS

2.1 DISTRIBUTION

Tiger is the symbol of power, beauty and ferocity. Believed to have evolved in China over a million years ago, the Tiger spread to Siberia to reach to Caspian Sea and eastern Turkey. A few moved into south east Asia and crossed to Sumatra, Java and Bali and a few others to Myanmar and the Indian sub-continent. Despite heavyhunting, tiger survived with eight sub species, three of which got extinct (Caspian, Java and Bali tigers) after 1940s. The Indian or Bengal tigers *Panthera tigris* (Linnaeus 1758) are currently distributed over Bangladesh, Bhutan, China, India, Western Myanmar and Nepal. India has the highest number of tigers in the wild.

Loss, fragmentation and degradation of forests have been the major factor in decline of the tiger population in the wild. The illegal killing for the stripped pelt and for the bones and other parts for medicinal purposes added to the problem. At the turn of the 20th century one estimate of the tiger population in India placed the figure at 40,000. The first ever all-India tiger census was conducted in 1972 which revealed the existence of only 1827 tigers. The project Tiger was launched in 1973 and various tiger reserves were created in the country.

Initially, 9(nine) tiger reserves were established in different States during the period 1973-74, by pooling the resources available with the Central and State Governments. These nine reserves covered an area of about 13,017 km^2, viz Manas (Assam), Palamau (Bihar), Similipal (Odisha), Corbett (U.P.), Kanha (M.P.), Melghat (Maharashtra), Bandipur (Karnataka), Ranthambhore (Rajasthan) and Sunderbans (West Bengal). At present, there are more than 42 tiger reserves in India. Tigers, being at the apex of the food chain, can be considered as the indicator of the stability of the ecosystem. Thus, 'Project Tiger' is basically the conservation of the entire ecosystem and apart from tigers, all other wild animals' population have also increased in the project areas.

Tiger is not only a flag bearer of conservation but also an umbrella species for important eco regions of the state. Its role as a top predator is vital in regulating and perpetuating ecological processes and systems (Terborgh J. 1991, Sunquist*et al* 1999). Tiger needs large undisturbed landscapes with ample prey to raise young and to maintain long term genetic and demographic viability (Seidensticker and McDougal 1993, Karanth and Sunquist 1995, Carbone *et al* 1999). In the past 50 years, humans have changed ecosystems largely to meet growing demands for food, fresh water, timber, fibre, and fuel (Millennium Ecosystem Assessment, 2005) more rapidly and extensively than in any comparable period of time in human history.

According to the report published by the NTCA (National Tiger Conservation Authority) and Wildlife Institute of India 2008, **Similipal Landscape comprising of 3824 km^2 patch of forest has recorded tiger presence in 2 units having a total tiger occupancy of 2297 km^2 with an estimated tiger population of 20 (17-34) tigers.** This report also mentioned that the state has a total forest cover of 27,427 km^2 with mapable tiger occupancy reported in 9,144 km^2. Odisha reported mapable leopard presence in 25,516 km^2, dhole presence in 8,215 km^2

and Sloth Bear presence in 43,236 km^2 of forested habitat. Amongst prey species wild pig were reported from 21,525 km^2, nilgai 711 km^2, chital from 6,040 km^2, gaur from 2,772 km^2 and sambar from 6,112 km^2 of forested habitat. Tigers were distributed in four larger occupied units, three smaller units and sporadic occurrences largely in Southern and Central part of the State. The larger occupied units comprise of a population of 20 (17-34) tigers in Similipal Tiger Reserve area.

Sunabeda-Udanti-Indravati Landscape is part of a contiguous forest patch of 34,000 sqkm having a tiger occupancy in Orissa of 570 km^2 of about 9 (7-11) tigers in proposed Sunabeda Tiger Reserve.

Tiger population in the tehsil of Malakangiri in the district of Koraput comprising the sanctuary of Balimela and Kondakamberu comprises a part of the forested patch of 6254 km^2 that extends from East Godavari, Khammam and Vishakapatnam of Andhra Pradesh.Tiger occupancy in this forest patch in Orissa was reported in 879 km^2. Sporadic tiger presence is recorded in several places within Koraput district.

Satkosia Landscape is part of a forest patch of 13,459 km^2 and has tiger occupancy in 787 km^2 with several smaller pockets reporting tiger presence. The low density population was estimated to about 6 tigers. The area covers the districts of Phulbani, Ganjam, and Kalahandi.**The total tiger population in Odisha was estimated to be 45 (37 to 53) tigers.**

Connecting population of Tigers in Buffer zone of Similipal:

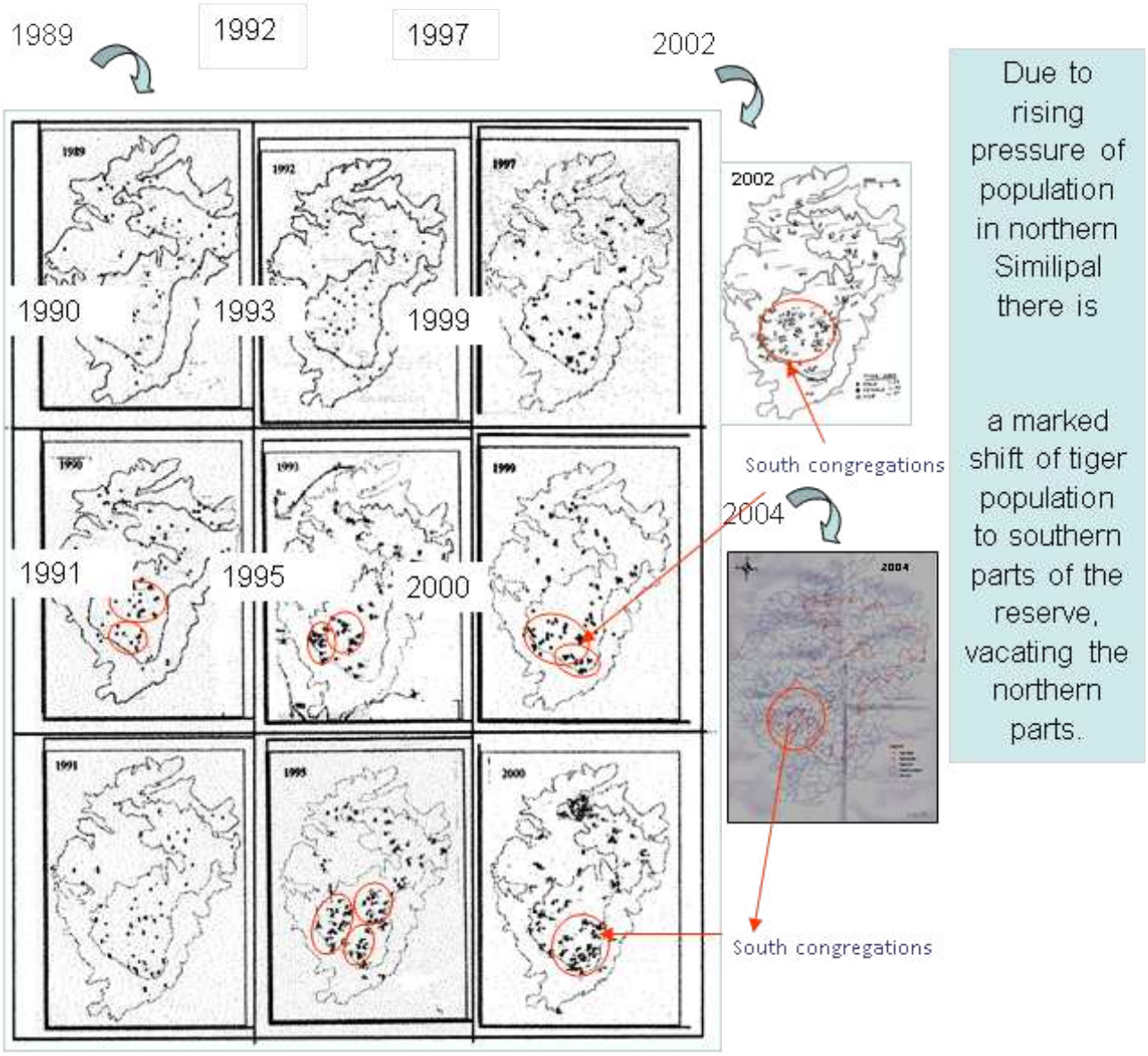
The Buffer area of the territorial divisions – Karanjia, Baripada and Rairangpur act as thick forest coverage to the STR core, hence has great conservation significance. This area has potentiality of having moderate density tiger habitats if problems such as poaching and grazing in these areas are effectively addressed. The forest ranges namely Dudhiani, Gurguria, Kendumundi, Satkosia of Karanjia Division, similarly Bangiriposhi, Kaptipada, Udala and Pithabata of Baripada Division and Manada,Bisoi range of Rairangpur Division have such potential habitats of both prey species and the tigers. These forest ranges were selected for initial survey for tigers and their prey and also to identify the problems they have. The previous year tiger estimate reports that the there was increasing population of tigers after inception of project Tiger from 1972 up to 1990. In this period protection to the wild animal from Akhand Shikar were given priority. Thus the population of prey animals were stable. This resulted in gradual increase in the tiger population up to 1990. From 1990 onwards the growth in tiger population is almost stagnant. When individual tiger territories were mapped on Beats on topo-sheets, the tiger population and their territories were visible and constantly monitored. On observations to the maps, it was found that there has been a southward shift of the tiger population in Similipal, as the northern population of tigers gradually disappeared although the total number has remained almost constant after 1986.Thus it is apprehended that the tiger population is forced towards the south due to rising human and biotic pressure in the northern and the surrounding buffer area.

Trend of tiger area occupancy shows gradual shifting of tiger habitats from Northern Similipal towards Southern side due to biotic pressure and lesser prey availability.

POPULATION OF TIGER IN SIMILIPAL SINCE 1972
(Pugmark method census)

YEAR	MALE	FEMALE	CUB	TOTAL
1972			17*	
1975			30*	
1976			46	
1977	23	29	4	56
1979	22	39	4	65
1984	31	43	7	81
1986	32	51	6	89
1989	21	51	21	93
1990	22	52	20	94
1991	24	50	22	96
1992	24	49	22	95
1993	24	49	22	95
1995	25	47	25	97
1997	26	48	24	98
1999	28	44	26	98
2000	29	39	29	99**
2002	29	43	27	99
2004	28	41	32	101

* Entire area was not covered.
Hence, incomplete data.
**includes 2 of unknown sex



(Source- Report of Dr. L.A.K.Singh on Pug Impression Pad method of tiger estimation in Similipal TR)

The Reasons of shifting of Tigers from Northern Part of Similipal to Southern Part:

A. Number villages in the Northern part of the Tiger Reserve Core area are more than the Southern cores of the Tiger Reserve.38 villages are in a condensed area holding about 10000 people.

B. Human Population of Northern Similipal Villages in the buffer part increasing to almost double from 1971 to 2001 (Annexure XXXIX)

C. Tourism activities, vehicle movements and traffic of human movement is more in the Northern part than the Southern part.

D. Biotic interference such as cattle grazing, NTFP collection,Fuel wood collection etc are more in the Northern Part.

The Division wise tiger and leopard census report have been given in Annexure XXXVIII.

The leopards are found towards the buffer area and near periphery to the human habitations and many were

found competitors of the tigers. If we analyze the figures,it was evident that where as 26 and 27 leopards were present in 2002 and 2004respectively, the corresponding figures for tigers were 4 and 7 only in these years in the buffer regions.

2.2 ABUNDANCE STATUS:

Report from the 2006 **sign survey, conducted in Similipal Tiger Reserve, the Tiger/Leopards reported in the buffer area are mentioned below:**

Divisions	No of tran-sects	Tracks	Range where tiger/Leopard signs found	Name of Beats where tiger/leopard signs noticed	Signs-Srape/ Scats/ Pugmark Vocals/ Rakes/ Sight
Karanjia	48	24	Kendumundi	Baghalata	Pug
				Bisipur	Pug
				Edelbeda	Scat
				Khaparkhai	Scrape, Scat and Pug
			Dudhiani	Ranipat	Scrape
				Dudhiani	Scat and scrape
			Gurguria	Gurguria	Pug, Scat and scrape
				Utras	Pug
				Barigaon	Scrape and Scat
Baripada	48	24	Bangiriposhi	Rangamatia	Scrape and scat
			Kaptipada	Podadiha	Scrape
				Dangadiha-I	Scat
				Dangadiha-II	Pug and scat
			Udala	Dengam	Pug
Rairangpur	38	19	Bisoi	Bankidihi	Pug and scat
				Talabandha	Scat
			Manada	Jamuani	Pug, scrape
				Phulbadia	Pug, scrape and scat
				Nawana	Pug, scrape and scat

Hence at least in 19 beats in three divisions, Tiger/Leopard signs were available in the buffer area of Similipal Tiger reserve. Tiger signs were present in all three division areas but their abundance varied. Details of tracks and scats seen on the transects in the six beats out of the above 19 beats areas.

Tiger signs seen in the survey area

Divisions	No of transects	Tracks	Signs seen in Tracks	% of tiger occupancy
Karanjia	48	24	9	37.5
Baripada	48	24	5	20.8
Rairangpur	38	19	5	26.3

Nine beats inGurguria and Kendumundi ranges, which indicated presence of tigers almost close to core area and there is a possibility of overlapping of tiger territories in to these beat areas.Similarly the Kaptipada

Range of Baripada division is very close to southern portion of the Core area of the TR with abundant herbivore population due to less biotic interference and more food availability.

2.2.1. Abundance Status in 2012

Report from the 2012 **sign survey, conducted in Similipal Tiger Reserve, the Tigers reported in the buffer area are mentioned below:**

Divisions	No of tran-sects	Tracks (km)	Range where tiger signs found	Name of Beats where tiger signs noticed	Signs-Srape/ Scats/ Pugmark Vocals/ Rakes/ Sight
Karanjia	44	220	Dudhiani	B-Kamuda	Scat
			Gurguria	Barigaon	Scat
Baripada	27	135	Nil	Nil	Nil
Rairangpur	25	125	Bisoi	Kanachinda	Pug mark
			Manada	Allhapani	Scat
				Sanasialinai	Scat
				Mohanpur	Pug mark, scat
				Jamuani	Pug mark, scat

The tiger presence was found in seven beats in two divisions in buffer area of Similipal tiger reserve. No tiger evidence was found in Baripada division.

Table-Status of distributional range of tiger and their co-predators in Karanjia division in Similipal TR, 2012.

Species	Site occupancy (psi)	Detection Probability (p)	AIC value
Tiger	0.06	0.05	27.4
Leopard	0.31	0.26	62.7
Bear	0.37	0.08	156.5
Hyena	0.61	0.06	86.5
Jackal	0.02	0.01	77.2

The estimated occupancy of tiger in the overall Karanjia division was 0.06. Detection probability was 0.05. The average estimated occupancy and detection probability of other co-predators of tiger was 0.32 and 0.10. The leopard, bear, hyena and jackal were found to be other co-predators in this landscape.

Table-Status of distributional range of tiger and their co-predators in Baripada division in Similipal TR, 2012

Species	Site occupancy (psi)	Detection Probability (p)	AIC value
Tiger	Nil	Nil	Nil
Leopard	0.23	0.06	22.7
Bear	0.4	0.03	75.3
Hyena	0.20	0.04	14.7
Jackal	0.23	0.01	64.5
Wolf	0.26	0.02	46.7

The estimated occupancy and detection probability of tiger in the overall Baripada division was nil. The

average estimated occupancy and detection probability of other co-predators was 0.26 and 0.06 . The leopard, bear, hyena, jackal and wolfs were found to be other co-predators in this landscape.

Table-Status of distributional range of tiger and their co-predators in Rairangpur division in Similipal TR, 2012

Species	Site occupancy (psi)	Detection Probability (p)	AIC value
Tiger	0.2	0.01	45.1
Leopard	0.1	0.01	33
Bear	1	0.22	101
Hyena	0.24	0.9	52.8
Jackal	0.2	0.02	48.3
Wolf	0.03	0.01	16.1
Fox	0.01	0.0	14.6

The estimated occupancy of tiger in the overall Rairangpur division was 0.2. Detection probability was 0.01. The average estimated overall occupancy and detection probability of other co-predators of tiger was 0.26 and 0.19 . The leopard, bear, hyena, jackal, wolf and fox were found to be other co-predators in this landscape.

Tiger signs were present in two division areas but their abundance varied. Details of tracks and scats seen along the transects in the seven beats.

Tiger signs seen in the survey area

Divisions	No of transects	Tracks (km)	Signs seen in Tracks
Karanjia	44	220	2
Baripada	27	135	Nil
Rairangpur	25	125	7

Prey species

Although tigers feed on a range of species, the bulk (96%) of their diet in Similipal TR comes from Sambar, Chital and Wild pigs. However they are likely to take other prey species both, small and large, when the main prey species (Chital, Sambar and Wild pig) are not available. Kendumundi, Satkosia and Gurguria Range of Karanjia Division have the best assemblage of prey species than the other ranges of this division. Chital is the most abundant prey species while other species make up much smaller numbers. Podadiha, Dangadiha areas of Kaptipada Range of Baripada Division and is rich in Chital but poor in other prey species. Wild pigs are the only prey species that appear to be equally abundant in all the three areas.

As in the case of tigers, the data on prey species gives a coarse indication of the status of the habitat for tigers. It is clear that the Manada portion of Rairangpur Division is the poorest and needs significant management inputs to revive.

Prey Abundance in 2012

Species	Observation	Model	ESW (m)	D ± SE	%CV	AIC
Barking Deer	25	HH	53	1 ± 2.8	45	75.1
Wild Pig	46	UP	45.1	1.8 ± 2.1	26.8	105
Hare	16	HH	18	0.9 ± 1.4	30.2	25.2

Common Langur	98	HC	33.5	2.5 ± 3.2	22.4	263.4
Pea Fowl	22	HH	32.6	0.8 ± 1.5	24.4	64.5
Overall Prey	207	UC	37.8	1.3 ± 2.3	15.1	527.1

The available prey density is quite minimal in buffer area of tiger reserve, except Common langur and Wild pig. Both of these prey items encountered abundantly along the transect line.

Biotic pressures

The major pressure on the habitat comes in the form of cattle grazing, fuel wood removal, minor timber removal, NTFP collection, competition for water sources (with domestic livestock and people), public road running across the habitat to villages and poaching (minor and major species). The Rairangpur portion of the buffer part is more disturbed area than the other two.

Poaching and hunting by local villagers have been reported in this area for species ranging from smaller ones to large herbivores. Most of the killing is for bush meat purpose. However elephant poaching have been observed in and around these areas in the recent past and are therefore not free from this threat. Tiger poaching has not been reported for a long time. Still there is a need for a more detailed assessment.

Activities now undertaken in Buffer Portion of the TR:

a. EDC being revived in all the forest settlement villages in Karanjia, Baripada and Rairangpur Division for an effective co-ordination with local communities to safe guard the landscape through alternative livelihood improvement programme to the people who depend on the forest.

b. Conservation and Awareness programmes are organized for various stakeholders with regard to tiger conservation policies and management on a long term basis

c. A strong protection measures is augmented to prevent poaching incidences of tigers and its prey base. Additional networking of anti poaching camps need to be established in Anandpur Wildlife Division, Balasore wildlife Division and Keonjhar Division to stop complete stoppage of illegal forest produce smuggling.

d. Massive ecotourism programmes being launched on revenue lands, private lands in the outer/ periphery of the TR by PPP mode where income generation activities for the forest dependent villagers could be ensured.

High encounter rates of carnivores along with the availability of prey species in the area clearly indicate good health of the habitat for sustaining a considerable population of carnivores. If proper management and protection can be given to this area, it will certainly increase the chances of distribution of tigers and co predators over a larger landscape.

2.3 PREY PREDATOR RELATIONSHIPS

To support a good population of predators and reduce the competition amongst different carnivore species, a healthy prey population is a prior necessity. The prey species diversity and population of the adjoining areas in Baripada and Karanjia forest divisions indicate a very potent foundation for conservation of large and small carnivores in the area. Presence of a moderate population of spotted deer, sambar and gaur in the area suggest a good habitat for tigers and co predators in terms of prey availability and will certainly ensure a better chance of survival.

The prime habitats which undoubtedly are the area with better canopy cover, less disturbance and low human presence are better occupied by herbivores like sambar, chital, wild pig and gaur. Body size of predators normally determines the preffered size and species of prey. Large bodied predators go for large sized prey species. Tiger prefers sambar, while Leopard prefers chital precisely for that reason.Leopards and wild dogs

are sometime found to predate upon sambar and chital because of high prey availability and co-existence. Their diet also constitutes variety of other lesser prey. Leopards being extremely adaptive animals can virtually sustain on any available prey and are found frequently feeding on animals like the hanuman langur thanks to its charismatic ability to climb trees. Hyena and leopards with characteristics of smaller body sizes are often found feeding on smaller prey while tiger mostly prefer prey with considerable body size.

Protection and controlled disturbance therefore will allow the adjoining areas of the tiger reserve to nurture more predators. Scientific management of the habitats will help in supporting more prey and provide better survival chances for the predators.

Poachers and illegal timber wood smugglers are mostly residing in this plateau. Awareness and Eco-development activities for those tribes who are all involved in poaching activities directly or indirectly will considerably reduce poaching in the whole landscape.

Properly developed scientific management plan will be implemented along with species specific approach. The management input for the Baripada Division. Karanjia and Rairangpur Divisions need to focus on identification of poachers, timber smugglers, conservation education, eco-development programmes, medical camps, nature clubs, informers, shows of strength through use of Special Tiger Force.

2.4 ASSESSMENT OF THREATS

Threats from ritual hunting of wild animals (Akhand Shikar):

Akhand shikar is the year old tribal practices of massive wild animal hunting perpetrated by local tribes. During the months of January to June thousands of tribal males from buffer and adjoining villages gather together in the buffer areas carrying traditional arms and country made guns. They offer prayers before the local deity and offer rice, flowers and domestic birds before going for hunting. They move from place to place and on the way kill herbivore species like Sambar, Chital, fowls, Wild boars, Gaurs, Mouse deer etc whatever they encounter on their way. They share the meat of these wild animals and bring it to their village and consume these as a sacred food in their families.The hunting of wild herbivores put huge pressure on the prey base for the big cats during summer. Thus it is the major threat to the wildlife in Similipal.

Threats from poaching by wildlife smugglers:

There is little evidence of organised smuggling of wildlife derivatives in Similipal. But poaching for tusks/ ivory of elephants by local tribal has been reported. Sometimes poisons in the form of insecticides kept by villagers to kill herbivores for bush meat are eaten by elephants resulting in their death. The settlements within the buffer area are often used by poachers from outside particularly Jharkhand as a conduit for carrying out illegal activities with the support of local tribes. Similarly, small animals like Civet, Chamelions, Pangoline and its body parts, snakes and many other small vertibrates/ invertibrates are also under threat from local poachers.

Threats to Swampy Grasslands (Daldali):

Swampy grasslands are important habitats for herbivores like sambar and chital. They provide moisture as well as minerals to the herbivores and are significant part of their habitat. Presently, these swampy grasslands are under threat from encroachment for agriculture and are also getting infested with thick lantana covers which in turn suppress the growth of grass. Management of Lantana and Eupatoriums in these areas is important. The swampy marsh lands need to be enumerated and marked as major habitat for herbivores apart from protecting them from encroachment is a priority for their restoration. Cool season burning of the Daldali will keep them productive. Cutting and fire will keep away the wood land encroachment from the Daldali. Clearing of wood growth in the grasslands will help in reestablishment of grass and other swampy eco-system. Vigilant watch on the swamps and undertaking proper protection measures may also reduce animal poaching as these swamps are prone to become preferred shooting grounds of wild animals.

Threats to Water holes

Scarcity of water during the dry seasons of the year poses a major threat to wildlife populations mostly in fringe areas. Competition for water compel animals to congregate or move towards disturbed areas as a result of which they become vulnerable towards poaching as well as communicable diseases from domestic livestock or other anthropogenic sources. Constructions of check dams and maintaining water holes in the dry season are therefore, important aspects to be taken care of.

Poisoning of Carnivore kills by local people:

There are stray cases of cattle kill by tigers. Sometime leopards kill the domestic cattle and that builds animosity amongst the villager. As a revenge, they put poison in the kill and leopards die consuming the poisoned animal. One such case has been noticed in Bisoi range in Rairangpur Division, in which a leopard was killed during November, 2011. Quick payment on compassionate ground and strong protection measures will help in taking care of this problem.

Illicit Felling of valuable trees and degradation of the wildlife habitat:

In the past, timbers were extracted from the Similipal Forests by the British Government and subsequently by the Mayurbhanj Governance by keeping timber extractors inside Similipal. Timber was the source of revenue for them.But after the ban on green felling in 1988, the timber suppliers of the tiger reserve could not get alternative livelihood option. They continued to extract the timber illicitly and supplied to the outside mafia clandestinely. This resulted in loss of valuable trees such as Sal. Bija, Adina, etc However,anti-smuggling programmes such as foot patrolling,monsoon patrolling, Joint combing operation have yielded good results and the timber cutting activities have been curbed in recent years. But rehabilitation of the timber extracting tribes and locals is the need of the hour by provision of alternative livelihood generation and through motivation.

National Highway/State Highway

N.H.6 passes through the northern part of Tiger reserve at Bangriposi over a length of 7 km in Bisoi Range in Rairangpur Division. Similarly, State high way passes through Notto Reserve Forests in buffer areas of STR in the south in Kaptipada Range in Baripada Forest Division.These often restrict free movement of wildlife and is a source of numerous other nuisances for the park. Road kills, mainly of amphibians and reptiles are noticed.Sometimes large mammals like Sloth Bears and Rhesus Monkeys have been reportedly killed. A detailed survey needs to be made on the number of vehicles plying through these stretches and their frequency to arrive at the exact nature of disturbances to the wildlife and their habitat. Till such time, laying of speed breakers at proper intervals and signage would reduce such incidents. Effective roadside patrolling and heavy penalty will help reduce nuisances like feeding of wild animals.

Biotic Pressure

The primary threat to this area comes from the huge biotic pressure (cattle grazing, fuel wood collection, NTFP collection, poaching for bush meat etc.) exerted by the ever expanding human population. 100% of the population is dependent entirely on forest for firewood; taking out an estimated 22000 tons of firewood from the Buffer regions annually. Today with a population of nearly 12000 residing inside buffer areas, assuming an average consumption of 5kg per day for 100% maintenance of the families and an average of 4 people per family, it would work out to over 22000 tons of firewood annually.

Overgrazing and Habitat Degradation

Out of 65 buffer villages in 57 villages in the buffer area, livestock of a remarkable population reside and depend upon the Similipal Tiger Reserve for fodder. The cattle population was 8811 during 2003 survey by the Animal Husbandry department of Govt. of Odisha These live stocks frequently enter in to the tiger reserve and graze and browse the vegetation. Livestock population in buffer area have been given in Annexure XL.

In addition, the study shows that 30% of the families own cattle where dung is the main produce resulting in 4000-5000 tons of dry cattle dung being transported out of this area to the cropfields. Overgrazing that compacts the soil, eliminates grass layer and coupled with fires (for grazing) severely reduces the fertility of the soil.

This impact along with removal of trees and shrubs for fuel wood and small timber reduce the areas' ability to function as a watershed. This increases erosion (silting downstream checkdams and canals), flooding and reduces water retention in the forest area. The BudhabalangaRiver and Baitarini river are thus adversely affected.

Habitat degradation, disturbances from human as well as cattle presence in the forests, competition for scarce resources (water, grass, tree, shelter, etc.) is threatening the habitat for wildlife and key corridors. Such hindrance to free movement of elephants and other wildlife would increase human-wildlife conflict.

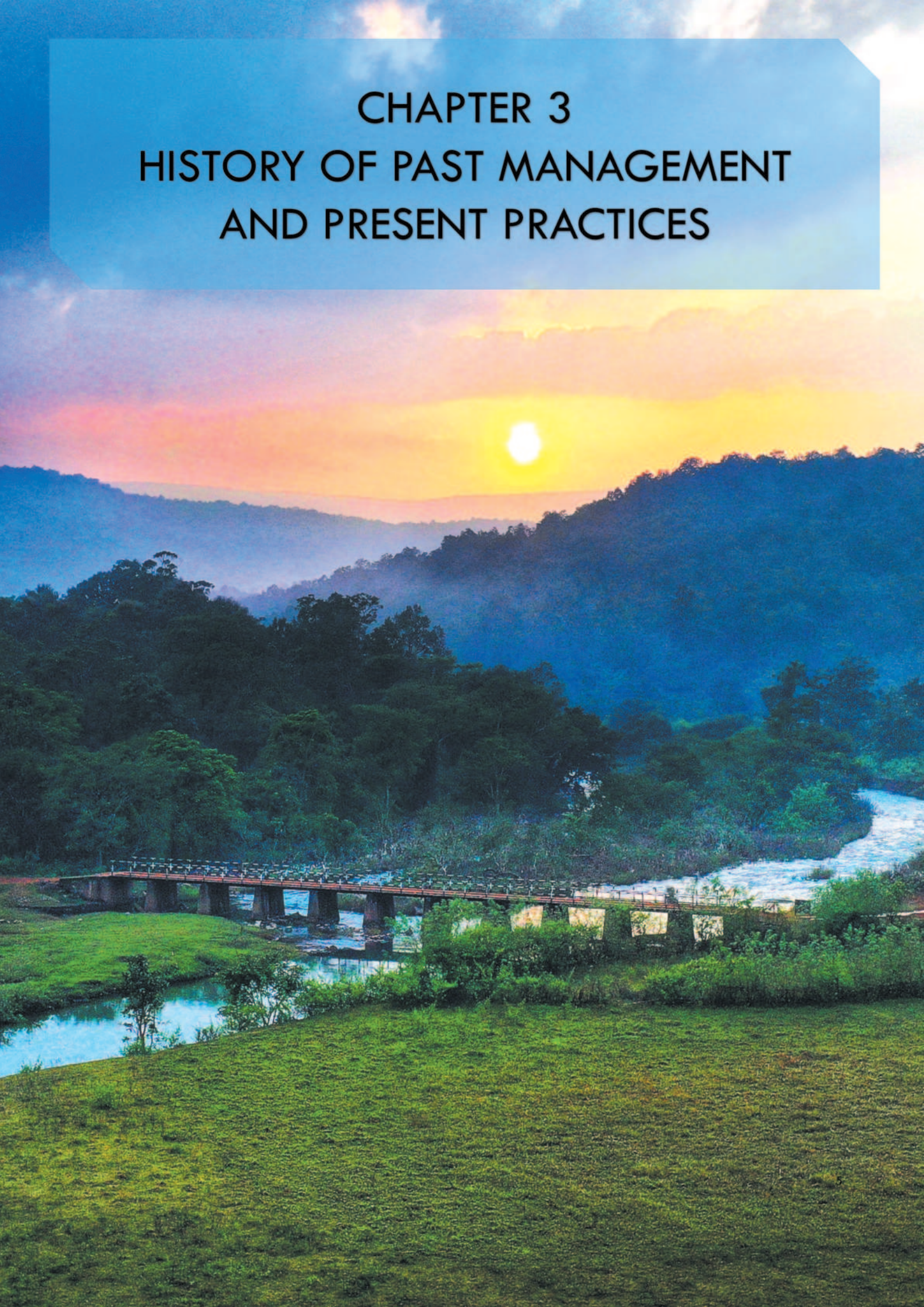
Tourism

The last few years has seen an exponential rise in the number of tourists coming into the area for picnic especially to Sitakund, Lullung, and Deokund on the periphery of the TR. This is a good sign as tourists are distributed over a large area in different locations outside the main tourist route within the STR. However, these destinations need attractive infrastructures to meet the growing number of tourists. The sight of these places stewn with garbage after the visit of tourists is very disturbing. Efforts are on to involve the local Eco-Development Committees for management of these sites.

Fire Threats:

Fire occurrence during early summer causes degradation of the habitat. Since the buffer forests are of a dry deciduous and moist deciduous types, the leaf shedding during early March to April make thick leaf coverage on the forest floor. The villagers are in habit of setting fire to make forest floor clean to collect Mahua flowers, Sal seeds, other NTFP falling on the forest floor as well as for poaching. Thus recurrence of fire incidents noticed during early summer from every part of the buffer forest that occasionally spreads to core area. This is a major cause of habitat degradation. A comprehensive fire management plan has been developed for each of the three divisions in buffer area.

CHAPTER 3
HISTORY OF PAST MANAGEMENT AND PRESENT PRACTICES



CHAPTER

03

HISTORY OF PAST MANAGEMENT AND PRESENT PRACTICES

3.1 CONSERVATION & FOREST MANAGEMENT HISTORY

Nothing found relevant to management of Similipal Forest prior to 1885. A forest policy was declared before 1885 by the then Maharaja of Mayurbhanj. In the year 1888 one Forest Ranger and a Peon were appointed for management of forests. The Reserve Forests of Mayurbhanj were under the management and control of the forest department whereas other protected forests were under the charge of revenue department. The Reserve Forests were more or less stable and permanent in nature but protected forests were maintained to meet the requirement of the royats and residents and also subject to clearance for cultivation. The forest area was being given under 'Amal-Nama' lease by the revenue authorities and leases for reclamation of reserve forests were given under the special sanction of the Ruling Chief. Thus, the extent of reserve forests and protected forests decreased. Up to 1904 Departmental exploitation had been practiced in a small scale.

In 1907 a State Forest Department was created with Mr. J. A. Martin, State Engineer as head of the Department. As the forest management intensified, the protective staff came under the jurisdiction of Mayurbhanj. In 1906 a survey party demarcated the boundary line from Talabandha to Similipalgarh to form a working circle. This was meant for giving lease to M/S B. Borooah& Co. in the year 1916.The Barooah and Company took the lease for 30 years to work the western Similipal.

In 1904 the Mayurbhanj narrow gauge railway line was built up to Baripada. This line was of immense use in transportation of timber. Huge quantity of timber used to be extracted from plain forest mainly Reserve Forests. The 30 years lease of BholanathBorooah& Co expired during 1946. There was no systematic working of the forests for which Similipal Reserve Forests during the lease was worked twice and north Similipal three times. East Similipal, which was withdrawn from the lease in the year 1922, was worked like the rest of the Similipal Reserve Forests through several contractors.

The first working plan was prepared by Mr. C. C. Hart in 1896-97. This was revised by Mr. B. M. Dasgupta in 1946. B. M. Dasgupta prepared the first working plan for whole of Similipal reserve forests for working under selection cum-improvement system. But after about 6 years Dasgupta's plan was replaced by the working

plan of reserve forests of Mayurbhanj state by Mr. SripalJee during 1953-54 after integration of Mayurbhanj state to the Union of India on 6th November 1948, which became part of Orissa as a district on 1st January 1949 only. This plan was revised separately for Karanjia and Baripada Divisions by Sri R. Mishra and Sri S. Bose respectively during 1973-74.

Despite practicing commercial forestry, supplying railway sleepers and other utility timber outside Mayurbhanj, the Ruler was very rigid in his forest protection measures and employed large number of forest staff, much higher in number in comparison to other princely states and even the directly British administered areas with good network of forest roads and communication facilities.

Protection suffered a lot after independence in 1947 when forests were drastically reduced. Mayurbhanj state merged with Orissa state in 1949. Mr. Saroj Raj Chaudhury, an eminent wildlifer of the country took charge as first Field Director of Similipal Tiger Reserve. The first Notification to declare 2200 km^2 as Sanctuary under Wildlife (Protection) Act, 1972 was issued on 3rd December, 1979 in notification No. 30467/FFAH of Govt. of Orissa. This was followed in quick succession by notification no.18703/FFAH dated 6th august, 1980 which notified the intention of the Govt. to declare 303 km^2 of the northern portion of Similipal as National Park. This constituted the core of Tiger Reserve. As this area was not considered sufficient as core, 542.70 km^2 was added to this by notification no.19525/FFAH dated 11th June, 1986 bringing the total area of core to 845.70 km^2 which came fully under the control of the Project Tiger. Rest of the sanctuary area is under the control of Baripada and Karanjia divisions. Similipal Forest Development Corporation was formed in the year 1979 to work the timber and N.W.F.P. operations in Similipal besides taking up other developmental works within the forest. After complete moratorium in the tree felling was imposed in 1988, Similipal Forest Development Corporation (S.F.D.C.) was not working in Similipal.

Timber Operations:

As described in the previous paragraph, regular timber operational activities were well documented from 1885-86. The forests were dominated by Sal with scattered sporadic patches of mixed miscellaneous species. The bamboo is conspicuous by its absence.

Silvicultural Systems and Tending Operations

The system first followed was Selection cum improvement as prescribed in Hart's working plan which prescribed to remove trees of 6 feet girth and above to avoid development of hollowness during 1904-1905. Subsequently, during the period of 10 years lease (1906-1916), the lessee was entitled to all trees of 6 feet and above girth except the following.

1. Allkusum (*Schleichera oleosa*), Kasafala (*Terminaliachebula*), Kochila (*Strychonsnuxvomica*), Bahara (*Terminaliabellirica*), Simili (*Bombax ceiba*), Bara (Ficus*benghalensis) and Asan (Terminalia tomentosa),*
2. All edible fruit bearing species, viz. Mohua (*Madhuca indica*), Charo (*Buchananialanzan*),Kendu(*Diospyros melanoxylon*) etc,
3. All bamboo clumps.
4. All tree on or along the bank of streams and nullahs.
5. All other trees which are 6' in girth with bark expect those which are marked by the State Forest Department for felling. During the thirty year lease period, the above mentioned "Selection System" was in practice only for one species of tree viz. Sal with 5' and above girth. Annual target of converted Sal was kept between 3,00,000 cft to 5,00,000 cft. The maximum permissible conversion was raised from 5,00,000cft to 8,00,000cft. By 1939, exploitation was as per schedule in north and west Similipalwhere as in south Similipal inaccessibility compelled the lessee to exploit less than the stipulated amount. To compensate the lessee, the exploitable girth of Sal was brought down to 4'-6" from earlier 5'. There was no marking rule based on silvicultural considerations expect the observance of girth limit and excluding the trees on the bank of nullahs.

After the expiry of 30 years lease, in 1946 Dasgupta's Plan was strictly adhered to. The forests were put under a selection cum improvement system of working. Exploitable girth for sal was fixed at 5'-6" at breast height, for Champa*(Micheliachampaca*) 7'; Koim (*Haldina cordifolia*) and Asan (Terminalia *tomentosa*) 6'-6";Piasal(*Pterocarpus marsupium*), Simul (Bombax *ceiba*),GudiKoim(*Mitragyna parviflora*), Bankhira (*Xyliaxylocarpa*) 6': jamu (*Syzygiumcumini*), Dhan (*Anogeissus latifolia*) and Charla (*Holoptelea integrifolia*) 5'-6" and other 5'. The area was divided into four felling series with a felling cycle of 20 years. The main fellings were followed up with cleanings.

Prescription of Dasgupta's plan was abandoned midway during 1953-54 and Jee's plan was followed. The high forest of Similipal was worked under Selection system with a felling series. The felling cycle was fixed at 20 years with a provision to retain one third of Selection trees (sal).

The exploitable girth for different species was as follows.

1. Sal	5,- 0"
2. Champa	7' – 0"
3. Piasal, Gamhari, Godikoim, Bankhira,	
Chhachina, Charla, Bhurkunda	6' – 0"
4. Asan	5' – 6"
5. Sissoo	4' – 0"
6. Panjan(Bhandhan)	3" – 0"

The marking rules adhered to is narrated below :-

(A) :

No regular Marking was to be done in grassy savannahs, open forests bordering savannahs, and areas subjected to frost damage expect that only dead and dying trees were marked.

(B):

All trees, whether normal or defective, which have attained their respective exploitable girth were marked for felling expect the following.

(B.1):

Sal, in which case normally for every two sound Sal trees marked, one sound and healthy sal tree, upto one foot bigger in girth than the exploitable girth, were reserved.

(B.2):

Unmarketable species of exploitable girths, if not interfering with any growth of the principal species or with growth of very promising stems of the useful species.

(B.3):

Trees standing in blanks inside the forests with no established regeneration of any kind of species to take their place.

(C) and (C.1):

All dead, dying, defective and diseased trees of under exploitable girths down to 3 feet GBH were also to be marked for felling expect for sal, in which case only the dead, dying and such the defective and diseased trees, which will doubtlessly deteriorate in value, if retained further, will be marked for felling. Secondly, they

can also be marked for felling if their removal is beneficial to the established regeneration or older growth of the principal species that are already there, and but for their removal would not get the chance to grow up well. In no circumstance however, normal or healthy sal trees or nearly such trees of under exploitable girth were marked for felling.

(C.2):

All trees of the inferior species of 3' GBH and over which are interfering with the growth of established regeneration or older growth of the principal or useful species were marked for felling.

(C.3):

If after marking under the rules, stems of 3 feet and above girth are left too congested, a further marking with a view to thin the crop were made so that the most promising stems of the principal and useful species are left favoured.

(D):

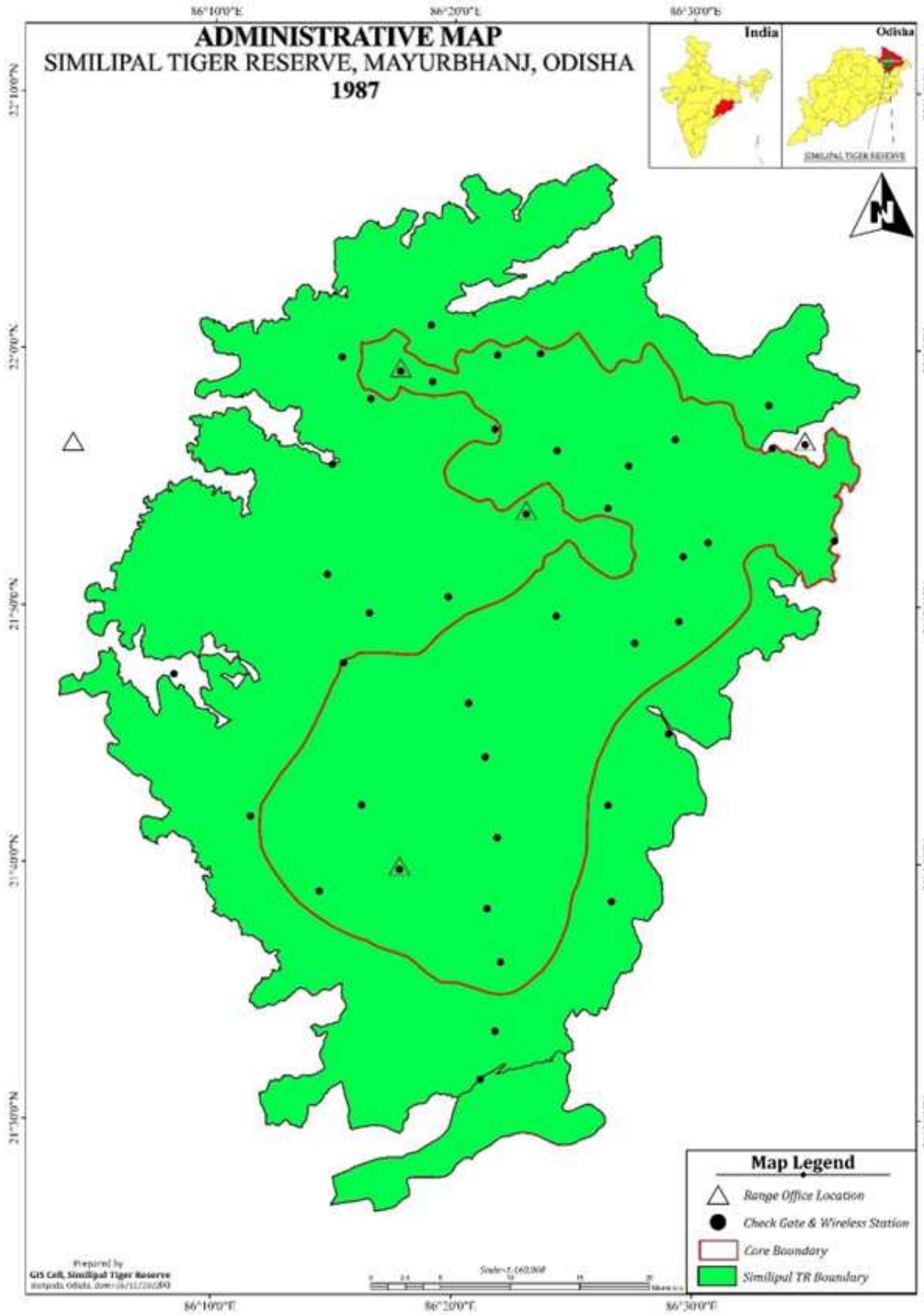
All marketable dead trees of all species and of all sizes were also marked for felling. In spite of this well laid out marking rules, revenue oriented marking were carried out. Cultural operation was not carried out due to paucity of funds. Lack of market for cleaning produce constituted a fire hazard. Silvicultural considerations and principle had no priority, largely because the staff was overburdened and their technical calibre not very high.

Even the prescription for retention of one third of exploitable sal trees was not followed rigidly.

From 1972- 73, separate working plans were written for Baripada and Karanjia division in which the areas covered by Similipal Tiger Reserve were excluded i.e., 25 compartments of Baripada Division and 07 compartments of Karanjia Division.

Table 3a: The details of the stated compartments.

Sl No.	Name of the Division	Name of the excluded compartments	Total area of the compartments
1	KARANJIA	BALANG WEST II TO 15, KHADKEI II & BHANDAN-11	3.91 km^2
2	BARIPADA	PALPALA – 1, 2, 6, 7, 8, 9, 10, 11, 12, 13	230.06 km^2
		BALANG-14, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18, 19.	
		SANJO - 1, 2, 3.	



Map3A: Administrative Map of Similipal Tiger Reserve

Hence the remaining portion of the core area i.e., 542 sq.km, proposed to be declared as a National park vide Government's Notification No. 8f (T) 8/85- 19525/FFAH dated 11-06-1986 was worked as per the prescription of Mishra's working plan for BaripadaDivision. However, all commercial forestry operation was discontinued after May, 1982 as a result of government's notification dated 03-12-1979 declaring the tract as a sanctuary. The marking rules followed was somewhat similar to earlier one with a few cosmetic changes here and there mainly in the exploitable girth fixed for different species.

Even –aged systems and Uneven-aged systems:

The practice of selection system followed by natural regeneration resulted in an uneven aged crop. Certain patches of forest in South Similipal (in frost prone valleys) look like an even aged crop due to repeated dying back effect. Similarly, forest areas on both the sides of Jenabil-Nuagaon Forest road looked like an even aged crop probably because of over exploitation (a near total clear felling type) in the past.

Bamboo Working:

Bamboo do not occur naturally in the SimilipalHiHHhhhuhhuhh

Hills. Sporadic clumps are seen in certain patches which are of artificial planting origin. As such, there is no bamboo operation in the tiger project area.

Firewood harvest and Collection:

No firewood coupes were laid in the Similipal Hills now constituted as tiger reserve. Hence, the concept of firewood harvest and collection in a specific manner is non-existent. However, from the regular selection coupes, the lops and tops of the felled trees were converted to billets of firewood and sold outside by the contractors executing the exploitation. The neighbouring district Balasore has a comparative higher demand of firewood than the Mayurbhanj district.

Non-wood Forest Produce:

After declaration of sanctuary and subsequent intention to declare the core of the sanctuary a national park, officially collection of timber and NTFP has been stopped. However, Similipal Hills is a giant reservoir of such products and this is also evident from the collection figure of Baripada Forest Division and Karanjia Forest Division mentioned in Appendix. Clandestine collection from the sanctuary by the ecosystem people cannot be ruled out. Besides the canning centre at Jashipurmanaged by the Orissa Forest Development Corporation collected, processed and marked the following quantities of Non-wood Forest produce in Quintals.

Table 3b: Collection of NTFP

YEAR	HONEY	AR-ROW-ROOTS	SAL-RESIN	WAXPICKLES	
1981-82	78.98	02.47	02.41	01.00	-
1982-83	107.91	09.75	11.00	02.39	14.84
1983-84	100.96	12.47	44.04	02.39	19.86
1984-85	148.43	02.02	18.22	03.23	24.55
1985-86	111.66	02.79	182.92	03.36	16.20
1986-87	97.86	12.58	64.14	0.13	11.20
1987-88	126.27	03.83	220.62	-	15.12
1988-89					
1989-90	44.33	11.16	121.12	-	04.36

1990-91	06.97	-	-	-	02.39
1991-92 05.55	-	-	-	05.76	
1992-93	123.03	9.94	25.75	-	09.37
1993-94	202.26	7.18	0.84	-	06.19
1994-95	09.06	1.37	-	-	12.96
1995-96	13.05	0.39	-	-	11.16
1996-97	5.00	-	-	-	-

There is no doubt regarding damage to the habitat due to collection of such non-wood forest produce. Forest areas are deliberately burnt; big trees are felled, certain species of plants are debarked for the purpose. Collection of edible fruits and other plant parts deprive wild animals of a secured source of a food. Inside the sanctuary having 65 villages it is a Herculean task to stop illegal collection of such non-wood forest produce. Hence the leases granted in other area in the district of Mayurbhanj require stricter regulation, supervision and control.

Leases

No part within the Similipal Tiger Reserve is under lease. There is no proposal to divert any land for that purpose.

3.2 PROTECTION OF TIGER, ITS PREY AND HABITAT:

There are specific strategies to combat the traditional hunting ritual, poaching and illicit felling during Monsoon and fire in the TR. In the recent past STR suffered a series of naxal attack from 28.03.2009 to 15.04.2009 when large scale damage to infrastructures, tourism facilities, ransacking of tourists and robbing of valuables including seized materials etc. took place. All core staff of the TR vacated their headquarters apprehending danger to their lives. They didn't return to their headquarters for a substantial period. This resulted in large scale destruction of forest and killing of wild animals in the Reserve.

During 2010-11 the protection camps were gradually re-established and but started functioning in the true spirit only during 2011-12. At present, 214 protection camps are functioning with deployment of 718 protection assistants from all schemes on daily wage basis apart from regular staff. Following additional measures are in place inside the TR to strengthen protection aspects.

- 32 four-wheeler vehicles have been engaged in buffer for patrolling duty and provision of hiring of vehicles has been made whenever required.
- 170 Eco-Development Committees are at work in and around Similipal and they are one of the main awareness sources against forest offence.
- The Special Tiger Protection Force for Similipal has been in place which is exclusively for protection of Similipal.
- Recruitment process for filling up of vacancies in base level posts is under progress and in recent past the State Govt. has recruited 96 Range Officers and 44 ACFs who are posted throughout Odisha and 6 ACFs and 8 Range Officers were posted in Similipal in the year 2019-20. Further, 42 Range Officers and 25 ACFs are under training during 2022-24 who will be posted throughout the state in the existing vacancies and may also in Similipal.
- During the last five years, on an average, about 12 cases have been booked annually in poaching as well as smuggling of wildlife cases.

Besides above, each buffer divisions have taken specific protection strategies since 2011-12 by identifying sensitive villages and routes used for poaching /smuggling of forest produce.

The details of area and protection measures are described below:

Similipal South WL Division:

In general, wildlife is moderately represented in the buffer part of Similipal South WL Division. Moreover, the forests of the division are contiguous and part of the Similipal Sanctuary and therefore the movements of animals are very common in the buffer area of the Similipal South WL Division. Repeated annual forest fire scare away wildlife to the adjoining forests of the core area. Common langur, Rhesus monkeys, Chital, Wild pigs, Barking deer, Giant squirrel, Flying squirrel, are seen at times in the well-wooded natural forests. In deciduous forests and along the watercourses, wild elephants from Similipal roam in small herds especially in Anantapur and Dangadiha under Podadiha WL Range, Patsanipuur, Phulbadia and Deokund under Podadiha WL Range, Digdiga, Pithabata of Pithabata South WL Range, Jhinei, Haldibani, Gendapokhari, Chakidi, Phuljhari of Pithabata North WL Range. Bamboos, Sal barks, Siali leaves (*Bauhinia vahlii*) are their favourite food, but often they visit crop field and cause considerable damage. Carnivores are moderately represented. Sloth Bears, Jungle cat and jackal are often seen. Numerous snakes, both poisonous and non-poisonous are common. Birds of different kinds are seen of which Hornbills, Red Jungle fowl, Pea fowl, Pigeons, Patridge, Bulbul, Koels, Barbets, Parakeets, Woodpeckers, Owls etc. are very common. Sensitive villages around Similipal were identified and strict patrolling measures adopted since 2011-12 to protect the tiger and its'prey base and the wildlife habitats. The details are given in Annexure XLVIII.

Anti-poaching camps have been established at strategic locations to counter illegal poaching and hunting activities. Many camps are also located near human settlement adjoining the Tiger Reserve. Regular and intensive patrolling schedule has been followed in this Division. Camp to camp patrolling, Monsoon patrolling, Night patrolling, Joint patrolling, combing operations etc. are going on. Sensitive areas are identified and given special focus regarding protection.

Similipal North WL Division:

The forest of Similipal North WL Division is rich in wildlife. Elephants are common in both the ranges. They are from either Similipal or Jharkhand. Sambar, spotted deer, civets, jackal, gaur, wildpig, sloth bear and common langur, etc are the common ones. Tiger, panther, mouse deer are rare. Common birds are Jungle fowl, Pea fowl, Pigeon, Partridge, Bulbul, Koels, Barbets, Parakeets, and Woodpeckers. In West Deo and Khairi rivers, Mugger crocodiles are abundant. Tiger signs are found in few adjoining beats to the core. Similarly, since the area is used by the villager in lesser frequency the prey base are well established. Sensitive villages were identified and strict patrolling measures adopted since 2019-20 to protect the tiger and its'prey base and the wildlife habitats. The details are in Annexure XLVIII. After reorganization, now, the total number of Anti-poaching Camps have been increased to 80 in number with a minimum of 3 Protection Assistants on daily wage basis are stationed in each camp. Regular and intensive patrolling schedule has been followed in this Division. Camp to camp patrolling, Monsoon patrolling, Night patrolling, Joint patrolling, combing operations etc. are going on. Sensitive areas are identified and given special focus regarding protection.

Rairangpur Forest Division:

As in the case of tigers, the data on prey species gives a coarse indication of the status of the habitat for tigers. The forest of Bisoi WL Range is well enriched with sambar, common langur, wild pig, chital, omnivores like sloth bear and carnivores like leopards and jackals. Sensitive villages are identified in this division and strict patrolling measures adopted since 2011-12 for protection of the tiger and its'prey base and the wildlife habitats. The details are in Annexure XLVIII. Now, 10 Protection camps are there in STR portion of Rairangpur Division. Joint patrolling, Higway patrolling, Falgmarches, Awareness campaigns are being taken up in coordination with district administration along with Similipal North WL Division.

Baripada Forest Division:

The forest in Baripada Forest Division as the buffer os STR contains less frequency of tiger sighting. But Leopards have been seen frequently along with herbivores like chital, wild pig, common langur etc. Sensitive villages around the forest were identified and strict patrolling measures adopted since 2011-12 for protection of the tiger and its'prey base and the wildlife habitats. The details are in Annexure XLVIII.About 5 protection camps are in place in the Notto, Sarat, Sandei and Lulung parts of Baripada Division. Joint patrolling, Higway patrolling, Falgmarches, Awareness campaigns and involvement of VSSs is being taken up. As Baripada Division is the headquarter Division of the District, Coordination with District Administration is being taken up by this Division.

Karanjia Forest Division:

The forest in Satkosia WL Range of Karanjia Division is very rich in wildlife habitatas for herbivores like common langur, wild pig, chital, barking deer, sambar, omnivores like sloth bear and carnivores like leopards, jackals etc. it is very rich in bird diversity and the forest is the connecting link between Similipal Sanctuary to Hadgarh Sanctuary of Keonjhar WL Division in the south. This also is a part of the traditional elephant corridor used by elephants to move from Notto RF of Baripada Division to Hadgarh Sanctuary via Satkosia RF of Satkosia WL Range. The forests of Thakurmunda Range of Karanjia Division are connected to Similipal RF but are very small and narrow patches surriounded by villages. Hence, wildlife presence is affected. But it is well used by the elephants, deer and birds. Sensitive villages around the forest were identified and strict patrolling measures adopted since 2011-12 for protection of the tiger and its'prey base and the wildlife habitats. The details are in Annexure XLVIII. Nine Protection camps are located in Satkosia WL and Thakurmunda Ranges of Karanjia Division. Joint patrolling, Highway patrolling, Falgmarches, Awareness campaigns and involvement of VSSs is being taken up. Joint raids are also organized in many sensitive locations in the fringe villages of STR.

3.3 OTHER LAND USE – VILLAGES, AGRICULTURE, DEVELOPMENTAL PROGRAMS, TOURISM ETC.

There are 64 villages within the buffer area, which include 56 villages in Similipal Sanctuary, 5 villages inside Satkosia RF of Karanjia Division & 3 inside Tungru RF of Rairangpur Division.

As per 2011 census the population of 64 villagesis given in Annexure XXXIX and awaiting for latest census data from District Administration.

Agriculture:

Agriculture is the leading occupation of Santals, Kolhas, Bathudis and Mundas. The Mahalis are mainly bamboo artisans. The Khadias and Mankdias fully depend on forest for food, shelter and day to day maintenance to their lives. They collect honey, sal resin and arrowroot from the forest and sell in the weekly markets. Collection of forest produces is the next important occupation. The other occupational fields are (i) mat making, (ii) sawing, (iii) basket making, (iv) working as black-smith, (v) tailoring, (vi) distillery (vii) livestock farming. Sometimes men and women earn wages as agricultural labour or in forest and roadwork. 'Weekly markets' or 'Hata' play a very major role in the economy. Because of the distance of the market places, they use to sell their collected forest produces in the weekly organised markets or 'hata'. Sal leaves, honey, arrowroot, gums, wax and medicinal herbs are regularly collected and sold in the 'hata'.

The cropping pattern in a few villages is practiced 3 times in a year. i.e. Summer crop, Khariff crop and Winter crop. Most of the villages are deprived from irrigation system.Some of the villages are having small irrigation dams which are found dry during summer months and Kharif crops could not be cultivated.The details of the crop raised during the overall area of the buffer is shown below:

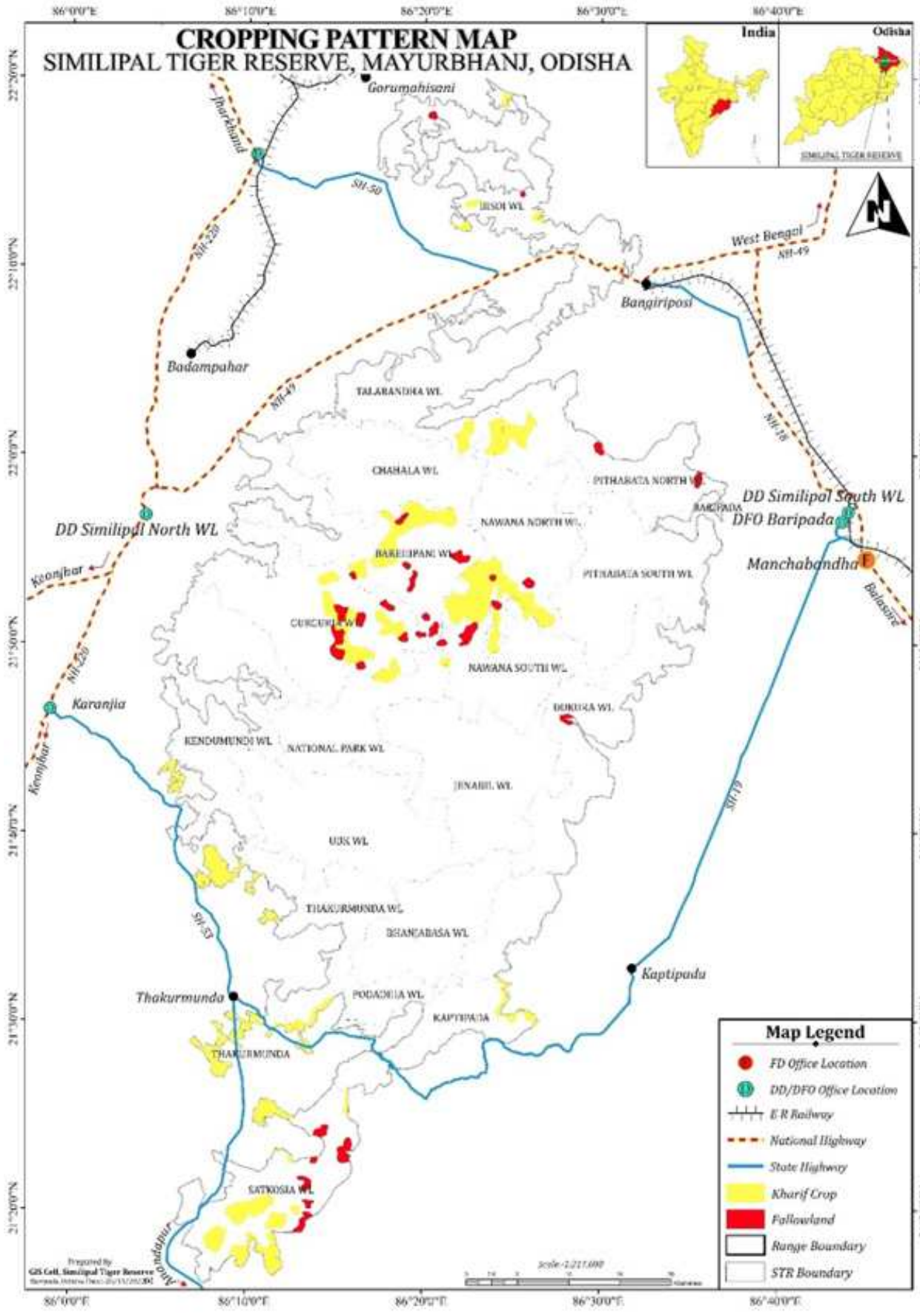
Agricultural practices in buffer area of the Tiger Reserve.

The most vulnerable crop was paddy. Banana, vegetables, jack-fruit, wheat, bamboo, mango, maize, mandia (ragi), biri (black gram), kultha (horse gram) were also affected.

Table No.3c: Cropping Season in buffer area of Similipal Tiger Reserve

SL. NO	MONTH	CROPS
1	JANUARY	Sowing of Maize /Groundnut Transplantation of Paddy
2	FEBRUARY	Transplantation of Vegetable Seedlings Sowing of Vegetables Planting of Sugarcane
3	MARCH	Harvesting of Wheat Sowing of Pulses
4	APRIL	Harvesting of Pulses
5	MAY	Harvesting of Summer Paddy
6	JUNE	Cultivation of Paddy/Maize/Arhar/ Mesta
7	JULY	-Do-
8	AUGUST	-Do-
9	SEPTEMBER	Harvesting of early Paddy started
10	OCTOBER	Harvesting of early Paddy
11	NOVEMBER	Harvesting of winter paddy started Sowing of Wheat /Mustard/ Spices
12	DECEMBER	Harvesting of winter paddy

(Source: - Office of the Deputy Director of Agriculture, Baripada,Mayurbhanj)



Map 3B: Cropping pattern of Similipal Tiger Reserve

Ecotourism

The landscape is studded with places of tourist interest carved by the nature. The promotion and development of eco-tourism is being attended to by Similipal Eco-tourism Society and now to be managed by the Similipal Tiger Conservation Foundation. The places are well connected with motorable roads with provisions of trekking on forest trails. Earlier, tourists were allowed to stay at Bareipani, Joranda, Nawana, Gurguria and Chahala within the Tiger Reserve. Most of the infrastructures at these places were destroyed in naxal attack during 2009. Since then, there is no provision for night halt anywhere in STR except at four places i.e.,Gurguria, Nawana (Proposed), Kumari, Barehipani. The other places of accommodation are located outside the TR on the periphery like Ramtirtha (Eco-cottage) &Jamuani. Tourists are allowed to visit STR only during day time. The reservations for accommodation in tourist cottages are made through website www.ecotourodisha.com.

Now day tourism can also be booked in online mode through www.similipal.org and visitors can book their day visit to Similipal 15 days before. They can also cancel their visit 3 days before the date of the visit in such cases. The two entry gates such as Pithabata gate from Baripada side and Kalikaprasad gate from Jashipur are functional with Khairi booking counter at Jashipur is the place of document verification of the tourists entering from Jashipur side. Tourists entering from Jashipur side must come to Khairi booking counter to take a nature guide with them which is mandatory. The booking counter may be shifted to Kalikaprasad Check gate to enable tourists to come directly to the entry gate for document verification, vehicle checking and entry.

Tourist numbers:

During the last seasons the tourist inflow in to the Similipal Tiger Reserve has been shown in the Annexure LIV which may be referred here. The number of foreign tourists visiting STR has been very low in the previous years as is evident from the tourist figure. There is a scope for attracting more number of foreign tourists to STR with the improvement of infrastructure in future.

Apart from the above tourist flow, the data-base maintained in the office of Similipal South WL Division shows quite a large number of picnickers and eco-tourists visit the Deokund water fall which lies just on the border of the Tiger Reserve in the eastern side.

Table 3 d: Visitors to Deokund:

Year	No. of Vehicles (in No.)				Total tourists
	LMV	Two wheelers	Auto (3 wheeler)	Total vehicles	
2020-21 (Nov-Oct)	4619	2325	129	7073	44594
2021-22 (Nov-Aug)	4292	7530	786	12608	53686

There are many picnickers who visit Sitakund, Ramtirtha, Bhimkund, Kalo Dam, Haldia Dam, Jambhira dam, Suleipat Dam, Olkudar, Kanchhinda etc. and there is no record available on such visitors except at Ramtirtha. It is estimated that more than 2 lakh tourists visit these places and much more revenue can be generated if the tourist management done through local EDC/VSS with the guidance of Forest Department.

Firewood:-

For the average villager firewood requirements are met from the forests of buffer area. With the rapid extension of cultivation, the sources of fuel supply from private lands have fallen very low. There is demand for firewood from the adjoining Balasore districts also. The increase on the price of petroleum Gas, curtail on the quantity of Kerosine oil to the rural folk force the villagers to use more and more firewood as fuel for running their family life.Thus, pressure on the forest for firewood has been increasing day by day.

Grazing:-

The number of cattle grazed in the buffer area is very large. The purpose of villagers maintaining such large herds is for their dairy products and manure. Grazing facility is an important requirement of the local people and this is provided at very nominal rates. Grazing is banned in many places and now it is being regulated by issuing nominal permits subject to the usual condition noted in the government permit.

Fodder and Sabai grass-

The villagers living close to forests collect fodder grass, leaves of Char, *Ficus spp.* from forest for their livestock for stall feeding. But the stall feeding practices are less common since the villagers drive their cattle away in to forest for grazing.The high milk yielding cattle need to be introduced with periodic vaccination in the buffer villages to lessen the stray cattle stock and minimize the pressure and risk to forest and wild herbivores from diseases.

The Sabai grass (*Eulaliopsisbinata*) is the rope grass grown by the tribals in the wastelands in buffer area especially in Kaptipada and Khunta blocks of Mayurbhanj.The grass is grazed by domestic buffalo/cattle and used as alternative forage by the wild elephants.Thus, the grass has supportive value towards the wildlife.

3.4 RESEARCH, MONITORING AND WILDLIFE HEALTH

Research in buffer areas

The research works in Similipal Tiger reserve for both core and buffer areas has been discussed in Chapter 4 of core plan. Research works undertaken in Similipal Biosphere Reserve up to 2021-22 has been given in Annexure XXIV.

Findings of a study conducted by Field Director, STR during 2011-12 on "Impact of domestic dog on wild herbivore population in multiple use area of Similipal Tiger Reserve, Odisha, India."

A study was conducted to estimate the herbivore abundance in multiple use area of Similipal Tiger Reserve and to know the Impact of domestic dog on herbivore population. Two villages of core area and two villages of buffer area were randomly selected for the study. The major outcome is that it reveals the negative impact of dogs on wild herbivores. Each household is keeping dog. Though the villagers during the survey stated to have kept dogs for safeguarding their life, livestock, property and crop against wild animal, the fact they did not reveal is use of dogs for hunting of wild herbivores. Mainly the small sized herbivores are mostly affected by domestic dog presence. Apart from domestic dogs, there are also stray dogs in every village whose number would be more than that of the domestic dogs. The presence and movement of dogs in the vicinity of the forest reduces the space of wild herbivores. The present study does indicate the adverse effects of use of dog by villagers of fringe villages on ungulate populations due to which there is a restriction in their distribution within the tiger reserve. From management point of view it is necessary to monitor the use of domestic dogs and to vaccinate them to reduce the risk of disease spread.

3.5 NATURE EDUCATION AND INTERPRETATION

An interpretation Centre has been established at Ramatirtha through CEE, Ahmedabad to create awareness about the Similipal Tiger Reserve, forests, wildlife and the ecosystem among the locals and the visitors.

Efforts are on to set up a mini Interpretation centre at entry gate at Pithabata. Already souvenir shops have started functioning at Jashipur and Pithabata since 2012-13 tourist seasons. Souvenir items made by local artisans consisting of sabai grass products and bamboo products are sold in these shops, which is gradually gaining popularity.

Efforts have been taken to create awareness among the locals about the approach of vulnerable periods, such as fire and crop raiding seasons. They are also educated to take precautions to safeguard their lives and property.

An innovative programme was launched in Similipal Tiger reserve namely **'Friends of Similipal Tigers'** since July, 2012**.** In this program, the school and college students having interest in tigers in villages and townships around the Similipal were invited to join as volunteers through an application forwarded by their respective principals. Initially, applications from 300 students from institutions around Baripada were received. Then the students along with their teachers were called for an introductory meeting on 2nd September, 2012 in which a thorough interactive discussion was held on food, biology, home range, and threats to Similipal Tigers. Subsequently, a selected 43 students were taken for a field trip inside the TR for an on the spot realization of problems of encroachment, habitat and prey base of tigers. The basic objective of having a cadre of volunteers of young students is to support the conservation efforts of TR authority in future. They in turn are to act as nuclei for educating the villagers, parents and colleagues in their own villages and homes about the need to protect the charismatic animals which abound in plenty in Similipal but are facing threats. This programme has evoked very positive response from students and teachers as well. Efforts are on to involve as many students and teachers as possible from the educational institutions in and around a radius of 5 km from the boundary of STR within next one year.

Debates, quiz, poetry, essay writing and painting activities based on wildlife and forest of Similipal are being organized on the occasion of wildlife week and the winners rewarded.

3.6 ADMINISTRATION AND ORGANIZATION

Prior to creation of Similipal Tiger Reserve during 1973, entire area was partly under administrative control of Baripada Territorial Division and Karanjia Territorial Division with following Reserved Forest areas.

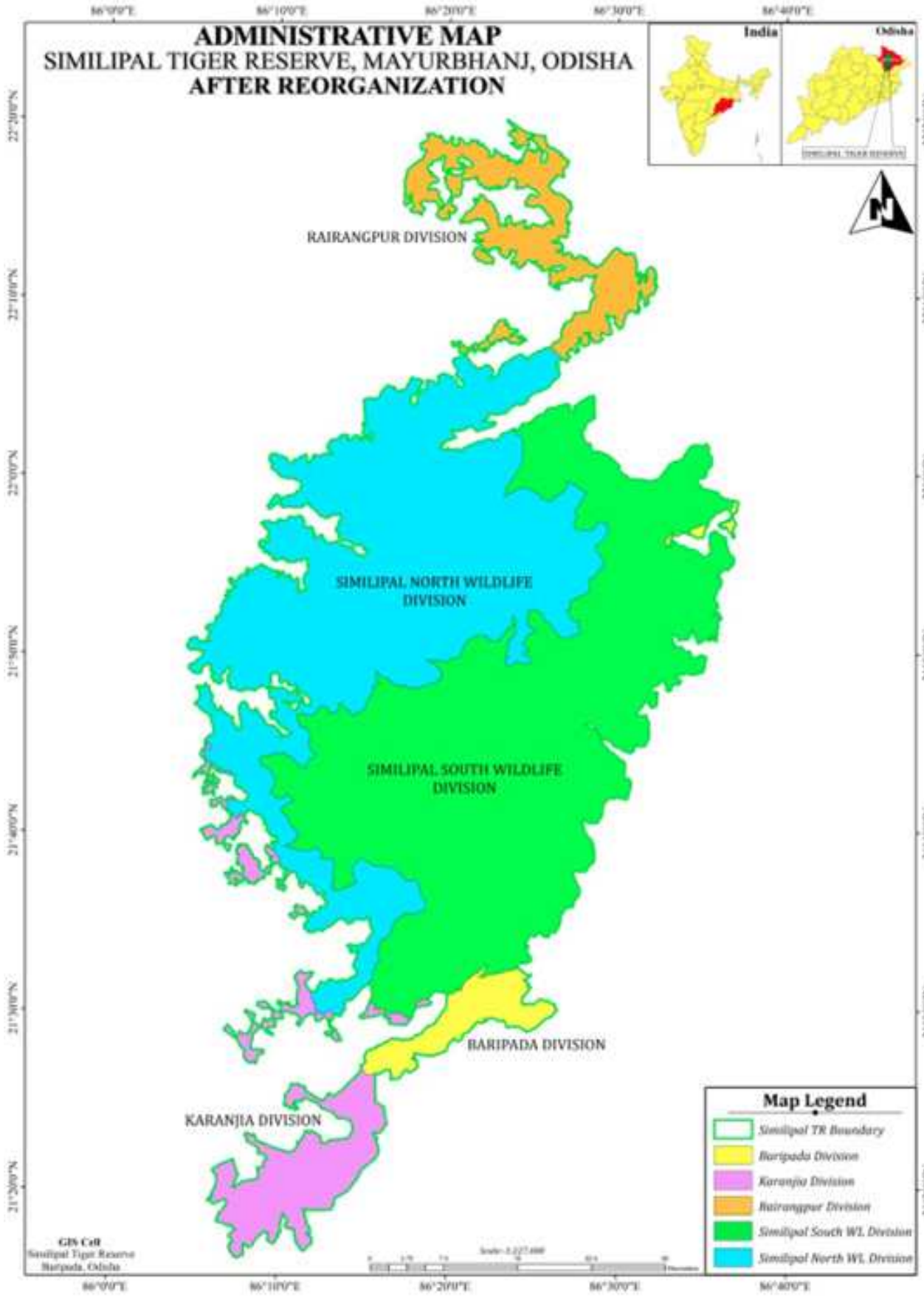
a. Baripada Division: 979.41 km^2

b. Karanjia Division: 1174.34 km^2

Similipal Sanctuary came into existence on 3rd December 1979. The core remained under administrative control of the Field Director and the area beyond core was being looked after by Divisional Forest Officer, Baripada and Karanjia Divisions under the administrative control of Conservator of Forests, Angul Circle till 1993. During 1994, both the divisions were also brought under the administrative control of Field Director who was working as Conservator of Forests for the said divisions vide Notification No.8F (T) 2/94-1669 dt.25.01.1994 of Forest and Environment Department, Government of Orissa. Thereafter a new Division named as Rairangpur Forest Division was carved out from existing Karanjia Division during re-organization of Forest Department in 2003 vide Notification No 1F(A)-100/2003/13228/F&E dt.08.08.2003 of Forest and Environment Department, Government of Orissa. Field Director, STR cum Regional Chief Conservator of Forests, Baripada now heads the administration of both core and buffer part of the Tiger Reserve since August, 2011, who is under the control of PCCF & CWLW Orissa. The Forest, Environment & Climate Change Department, Govt. of Odisha vide its Notification No. 1F-(A)-71/2018-3913/F&E dtd. 21.02.2019 has reorganized Similipal Sanctuary covering 2306.61 SqKm of Similipal Tiger Reserve into two Wildlife Divisions namely Similipal South WL Division with headquarters at Baripada and Similipal North WL Division with headquarters at Jashipur in the larger interest of Wildlife management.

Table 3e: The Administrative Units of Similipal Tiger Reserve Core & Buffer.

Division	Range	Section	Beat
Similipal South WL	9	41	103
Similipal North WL	8	34	74
Baripada	2	3	5
Karanjia	2	9	20
Rairangpur	1	5	11
Total	22	92	213



Map 3C: Administrative Map of Similipal Tiger Reserve

The co-operation of sister departments such as Health, Veterinary, Irrigation, Police and Revenue Departments are inevitable in smooth management of the buffer areas. The officers of such department extend their hands ungrudgingly as and when necessary.

Staff

The staff of buffer area of Similipal North and South WL divisions are having whole jurisdiction over Similipal Tiger Reserve. The staff of buffer area of territorial divisions are having part jurisdiction over Similipal Tiger Reserve. They have area outside the reserve under their jurisdiction for which they have to perform the activities of territorial Division along with protection of Similipal.

Housing

The TR does not have the amenities to cater to the need of all staff barely necessary for stay. The housing facility is quite inadequate and there are no facilities like communication, electricity, telephone and other electronic devices. The question of providing education to the scions of the staff working inside is also an issue. Regular coordination with District administration is in place to get the required facilities thorugh line departments.

Check posts

There are 34 nos. of check posts as detailed below inside the sanctuary and at outlets as detailed in Annexure XXXII.

COMMUNICATION

Roads

There is an arterial type of distribution of road inside the Sanctuary. The detailed length of the forest roads are given in Annexure XXXIII.

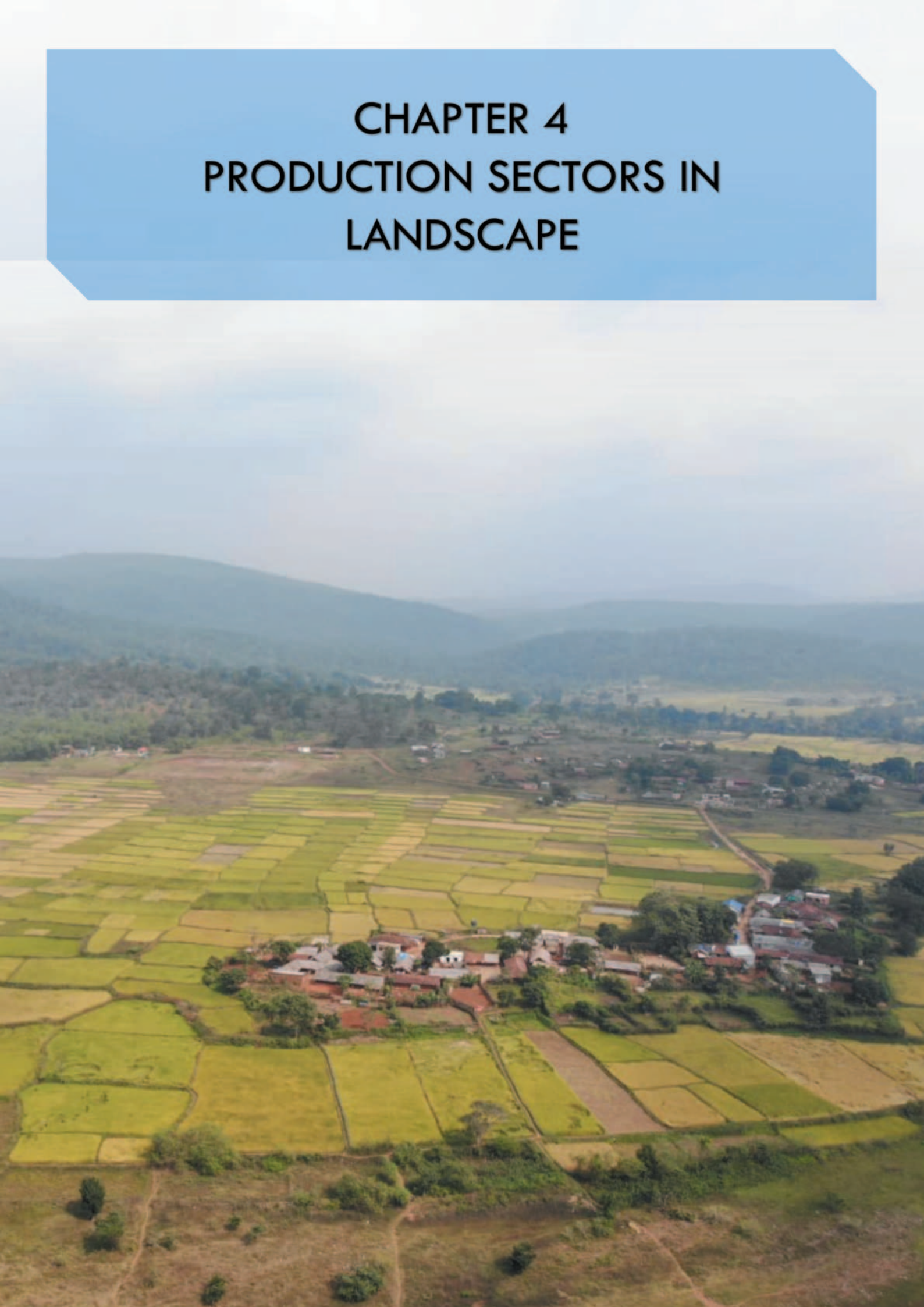
VHF Communication Facilities

In the buffer area of STR, at present there are 101 VHF stations available in all the APCs, Beat, Section and Range offices as given in Annexure XXXVI.

Vehicles available with Buffer D.F.O.s/DDs for STR

The details have been given in Annexure XXXV.

CHAPTER 4
PRODUCTION SECTORS IN LANDSCAPE



CHAPTER

04

PRODUCTION SECTORS IN THE LANDSCAPE

4.1 FORESTRY (AFFECTS DIRECTLY) (D*)

No forestry operation like harvest of timber and collection of NTFP, plantation activities are taken up inside Similipal and part of Hadgarh sanctuary which is embedded within the Tiger Reserve. Most of the buffer areas come within the sanctuary area. Only timber coupes are worked out by OFDC Ltd in Satkosia RF and Notto RF of the buffer area as per the valid working plan. The last three years figure is furnished in Annexure LV.

4.2 AGRICULTURE (D)

The people residing inside the buffer area are agrarian. The Soil is generally acidic in reaction. The soil types noticed are sandy loam and lateritic, light textured with low water retentive capacity.

In this area paddy is the major cultivated crop, followed by pulses and oil seeds.While there has been decrease in the coverage of Kharif paddy in high lands, the area under pulses, oil seeds and other cereals has been showing an increasing trend due to diversifications of cropping pattern in such land as important dry land farming strategy against the erratic rainfall. They harvest two crops in a year in the crop fields where irrigation facility is available. The main crop is paddy, ragi, maize etc. They also raise vegetables for own consumptions.

Agricultural Marketing

With Agriculture as the mainstay of the economy of buffer area of the Similipal Tiger Reserve, most of the farmers take up agriculture as subsistence enterprise. Due to poor socio-economic condition of the tribal farmers, marketed surplus often exceeds marketable surplus. Exploitation of moneylenders and middlemen and exchange of commodities in the barter system are discernible in the district. Basically, agricultural produce, Minor Forest Produce, Livestock and Fish etc. are sold in the primary market. Unregulated weight and measures lack of grading and standardization, poor storage facilities and lack of farm organization are key feature of existing market system of the district.

Rice, pulses, oil seeds, vegetable, maize, fruits, milk, fish, groundnut and MFPs like Tamarind, Harida, Bahada, Amla, Mohua, Kusum, Neem, Karanj Seed, Char Seed, Mohua seed are marketable surplus commodities/ produces available in the district. But due to want of agro-processing and value addition, the farmers are selling these commodities in the primary market at whatever price is offered to them. For development of agriculture and allied sector in the Vulnerable, Remote & Bordering GPs, basic agricultural inputs such as seed, fertilizer, pesticide and machineries may contribute for the development of agriculture and allied sector. The pattern of use of such basic in-puts could be taken as indicators for agricultural development. Cattle feed, medicines, fingerlings, fish feed are essential inputs for livestock and fishery development. Efforts will be made for supply of such basic inputs and service facilities to the farmers. MFP based processing units

for processing of Tamarind, Neem seed, Karanj seed, Kusum seed and value addition of the product can be thought of. The less remunerative enterprises need diversification and existing farming system require further intensification to increase production level.

Various groups such as SHGs, User groups, Common interest group or Farmers interest group will be formed in villages for protection of common interest. Empowerment and management of natural resources for ensuring equity in distribution of benefit in rain fed area, management of water resources, community organization is considered vital. Farm women contribute significantly to agricultural production and household food security in the district. The skills can be improved to reduce their physical strain, labour, time and to improve the quality of work. They can be involved in special production activities including post-production activities to avoid wastage and value. Formation of women group in the concept of SHG or FIG is also considered essential for farm women. The scheme would involve identification of existing market infrastructure facilities, critical gaps thereon and scope for strengthening present facilities plus creation of new infrastructure in the cluster of GPs having necessary growth potential within the project time frame. Farm based key activities will be selected for agricultural development in general and improvement of vegetable cultivation and horticulture in particular. Depending upon the climate and land compatibility, floriculture can also be taken up as an economic activity.

As per recent survey, there are about 526694 fair price shops and 525283 mandis or regular markets available in Mayurbhanj. Most of the Haats and weekly market has agriculture produce in sell along with other NTFPs and Livestock.

Horticulture

District plan on Horticulture development has been formulated basing on *MACRO MANAGEMENT MODE* of Horticulture activities. This envisages integrated development of horticulture through area expansion, transfer technology (training, exposure visit and demonstrations), input supply and management, in-house production of new improved and hybrid varieties of fruit plants, root & tuber crops, spices and vegetable, optimum utilization of water resources farm mechanization, seed and planting materials production in government and private sector. Dissemination of latest technology is the recent advancement in the field of Horticulture through organizing training, workshop and exhibitions. Post-harvest management of the Horticultural produce has also taken place in this plan.

Mission for Integrated Development of Horticulture (MIDH) is a Centrally Sponsored Scheme for the holistic growth of the horticulture sector covering fruits, vegetables, root & tuber crops, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo. Under MIDH, Government of India (GOI) contributes 60%, of total outlay for developmental programmes in Odisha, 40% share is contributed by State Governments.

Objectives

The general objective is providing sustainable livelihood to poor scheduled tribe rural families through proper utilization of land and water resources. Specific objectives are as follows.

- General self-employment through tree-based farming system.
- Ensure food security.
- Enhance income of normal families.
- Proper utilization of land & water resources.
- CapacityBuilding of rural poor through training and exposure visits.

Strategy

- Basing on the Agro climatic and soil condition different Horticulture crops has been suggested for different areas.

- Fruit plants will be planted both in irrigated and non-irrigated condition.
- Horticulture Nurseries in private sector will be encouraged including strengthening of govt. nurseries and farms.
- Root & tuber crops, vegetable & spices will come up either as pure crop or inter corp. in orchards.
- Dissemination of latest technology through demonstration, training, workshop and exhibition.
- Emphasis will be given on integrated pest management & Organic farming.
- For post harvest management, preservation activities of fruits & vegetables will be taken care of.
- Promotion of private entrepreneur for sale of Horticultural inputs, garden tools and implements etc.
- Use of bio-fertilizer with aim for organic farming will be encouraged.

Programme Activities:

1. The various activities chosen under Horticulture are:
2. Area expansion of fruit crops like Mango, Lime, and Custard Apple.
3. Development of private nursery and construction of Market yard.
4. Demonstration of root & tuber crops.
5. Organization of training and capacity building programs.
6. Market linkage and value addition training programs.
7. Rubber Plantation in tribal area (Rubber Board).

Sericulture

Tassar culture is practiced in Mayurbhanj district since the erstwhile dynasty of Mayurbhanj. In this district tribals do tassar culture traditionally. It has been an important subsidiary occupation of large number of tribals and people of other backward community by rearing tassar Silkworms on its food plants like Asan, Arjun, and Sal etc., which are available in plenty. In Mayurbhanj, tassar culture has been declining due to uncertain climatic condition, indiscriminate cuttings of tassar food plants in the forest, inadequate seed supply, lack of post cocoon facilities and inadequate market support due to insufficient funds.

The most important pre-requisite of Silk Industry is production & supply of quality seeds. It is estimated that the annual demand of tassar seeds in this district is around 6 lakhs D.F.Ls. The existing Govt. agencies and Primary tassarrearers Co-operative Societies and other seed rearers are not equipped to meet the same in time. Therefore, stress is to be given to maintain better plantation of tassar food plants for quality seeds & smooth rearing activities with proper marketing facilities. Considering the above aspects, the following schemes are implemented during 3 years period i.e., from 2003 – 04 to 2005 – 06. At present, Forest Department is promoting “Vanyasilk Plantation” module in Mayurbhanj District under ANR mode which aims at creation of Planted Forestconsisting of Asan, Arjun etc. trees suitable for Tassar culture. Nurseries have been raised for the above species and seedlings have been planted and distributed to local people to promote the Tassar culture.

PRE-COCOON ACTIVITY

1. Assistance to Tassar seed rearers for maintenance of tassar food plants.
2. Assistance to Tassarrearers for development of chawkie garden
3. Rearing equipment support to Tassarrearers

4. Support for setting up of tassargrainage by pvt. Graineurs.

5. Support to tassarrearers for integrated disease pest management.

POST COCOON ACTIVITY

1. Support to tassar silk spinners

2. Processing of cocoons in Hot air drier to harvest high quality tassar silk

The sericulture has improved the economic condition of the rural mass in the buffer and adjacent areas.

4.3 INTEGRATED DEVELOPMENT (ECO-DEVELOPMENT, DEVELOPMENT THROUGH DIST. ADMINISTRATION) (D)

Integrated approach through eco-development along with amelioration of the livelihood option of the people is resorted to through the forest deptt. Other developmental works like communication, health and live-stocks are being taken up through the District Administration. The livelihood generation activities are taken up in the buffer villages of the Tiger Reserve by the Integrated Tribal Development Agency (ITDA) which are enlisted below

Tribal Handicrafts Design Development Programme of ITDA, Baripada

Many SHGs have taken initiatives to market under the tribal handicraft Centre which has promoted and developed design of different tribal handicrafts such as Tribal Jewellery and household articles in Dhokra casting trade, improvement in utility articles, Statues, Murals in stone carving trade, artistic as well as live models in terracotta and bronze casting, Artistic bamboo crafts items etc. These models are prepared during the course of design development training for tribal artisans and marketed in the Pallishri Fairs. All Nature Camps under Similipal Tiger Reserve are proposed to provide Eco-development area/Akhada to encourage handicrafts and local produces in convergence with ITDA and District Administration.

Sal/Siali leaf Khalli

Sal/Siali leaf are plentily available in the forest in buffer area outside the sanctuary and Mankidias are well acquainted with the Siali leaf Khalli. Financial assistance is being provided as seed money to establish the business and procurement of raw materials. Forest department under OFSDP (Odisha Forestry Sector Development Project) funded by JICA (Japan International Cooperative Agency) has established Cluster buildings for production of Sal and Siali Leaf plates at 3 places in Mayurbhanj District. Local SHGs have been selected for supply of raw materials to the central SHG for stitching and pressing of Leaf plates. Necessary market linkage has been established and there is increase in demand of the leaf plates at national level.

Sabai rope making

The tribals make ropes with the locally available Sabai grass for an additional income. The technique for sabai rope making is very simple. Sabai rope has also good market in the area. Sabai grass is grown in a wide part of Mayurbhanj district which is mainly used for making Sabai Rope. Sabai Ropes are mostly sold outside the state for use in weaving Charpai (Cots) and in paper manufacturing concerns. Sabai rope is also used in making Sofa sets, Chairs, Tea Poy etc. The main body frames of the Chairs and sofas are made in Bamboo and wood and Sabai rope is woven and coiled over the frame to give a finishing shape, which attains exceptional excellence. The civil Jail of Baripada is pioneer in introducing such Sofa and some other items namely Car mats, Screens, Carpets etc.

In recent years utility articles like Dining mat; Fruit Basket/Tray; Flower vess etc. are produced by using jute twine along with Sabai rope with intervention of National Council of Jute Development. With growing demand for Sabai grass furniture and sabai products, one training centres have been opened at Baripada by Director Handicraft and Cottage industry Odisha to train local boys and girls particularly from Scheduled Caste and Scheduled Tribe groups.

4.4 TOURISM (D)

Eco-tourism has been promoted over a limited area confined to 130 kms road length in Similipal sanctuary only. The local people are engaged as guides to the tourists and on services rendered to the tourists at eco-tourism spots located at Gurguria, Jamuani, Chahala, Barehipani, Uski, Nawana and Joranda only.

Looking in to the huge tourist flow in to the tourist places inside the buffer regions, action is being taken to uplift the economic growth of the locals of buffer area of Similipal Tiger reserve area on promotion of the eco-resorts, refreshment centres, trekking, vehicle ride, machan/watch tower ride, canopy walk, tree walk, cycling, adventure sports, wild sighting walk, cultural programs, souvenir shop promotion etc. These services are to be provided to the tourists by the EDC members constituted within buffer villages at the active guidance of the Forest department, tourism and other line departments.

4.5 FISHERIES (D)

The buffer area has rich potential for Aquaculture Development through adoption of intensive pisciculture practices and exploitation of enriched Reservoir Fisheries. The Fisheries resources comprise of tanks owned by Gram Panchayats, Revenue Department and ponds in private holdings. The total water area covered under pisciculture is 5338.85 hectares excluding 5525 hectares under Reservoir and Minor Irrigation Projects most of which are in buffer or peripheral area. The present level of fish production of the Mayurbhanj District is about 9600 M.T. and the per capita consumption of fish in the District is about 5.28 Kg per annum as against 11.0 Kg per annum of World Health Organization (WHO) standard.

Among various avocations proposed for sustainable income generation for the rural population of this District, Fisheries Development Programme through scientific aquaculture and exploitation of captive fisheries resources has been initiated by the Fishery department as narrated below:

Objectives

- To provide income generating assets in the form of pisciculture tanks on own land of selected beneficiaries.
- To induct skill training to the BPL fish farmers in scientific pisciculture and fish seed rearing.
- To provide input assistance in the form of fish seed, fertilizers, feed and medicines etc. towards operational expenditure.
- To organize pisciculture Women Self Help Groups (SHGs) and arrange lease of G.P. tanks / MIPs on long-term basis for adoption of scientific pisciculture.
- To provide captive nurseries for backyard Fish seed rearing as a source of profitable income.
- To provide input assistance for fish seed rearing at minimum cost.
- Overall increase of fish production and per capita consumption of fish to reach the level of WHO standard of 11.0 Kg per annum for combating malnutrition.
- Sustainable increase of income of the members of the SHGs to cross the poverty line.

Keeping the aforesaid objectives in view the following three schemes under fisheries sector are proposed for overall economic growth of the rural population of the district.

I. Establishment of fish seed rearing units by the women self-help groups through development of defunct/ derelict gram panchayat tanks (SGSY pattern)

The present demand for fish seed in the district has been estimated to be around 400 lakh of which the Govt. fish seed production units existing in the District have potential of producing 120 lakhs of fish seed. Besides 100 lakhs seeds can be arranged for stocking in the District from the hatcheries of the Orissa Pisciculture Development Corporation Ltd. Thus, there is a sizeable gap of 180 lakhs, which is to be met through private

producers and traders. Keeping this in view, it is contemplated to mobilize fish seed production by the Women Self Help Groups under this proposed scheme by which the members of the Groups can earn sustainable income besides ensuring supply of quality fish seed to the needy fish farmers. They can also raise fish fingerling for stocking in the pisciculture tanks adopted by them. It is proposed to implement the scheme in Baripada, Betnoti, Jashipur, Kuliana, Kaptipada and Rairangpur blocks of the District. Skill training for the members of the Women SHGs in the technology of fish seed rearing will be taken up under ongoing schemes like SGSY, ITDA etc. Defunct / derelict G.P. tanks available in the G.Ps will be developed through renovation and made available as seed rearing units which will be leased out in favour of the women self help groups on long term basis. The SHGs will avail bank loan and subsidy as per SGSY norm @ Rs. 1.25 lakh provided as Rashtriya Sam Vikash Yojana subsidy to each group and the rest 1.25 lakh availed as bank loan.

4.6 TEA / COFFEE ESTATES (AFFECTS INCIDENTALLY) (I)**

Tea/Coffee cultivation is not practiced in this area.

4.7 ROAD / RAIL TRANSPORT (D)

The transport by road is restricted and rely on permission from the Tiger Reserve Authority.But the bonafide residents of the buffer villages after producing AdhaarCard/voter ID Card are allowed to enter freely on the roads passing through the Similipal Tiger reserve but they have been advised to use Government public transport buses (Biju Gaon Gadi). As per present scenario in 2022-23, five Biju Gaon Gadi have been allowed to enter Similipal for transport of the Similipal Natives. The number to be kept as 5 as the ceiling limit for the plying of Biju Gaon Gadi with all restrictions placed. Any other vehicle willing to ply inside Similipal Tiger Reserve needs to get vehicle entry permission from the Field Director. Any relative staying outside of Similipal wishing to visit their relative inside Similipal needs to produce necessary documents like ID proof, Vehicle related documents and an undertaking before entering into Similipal.

There is no rail transport system.

4.8 INDUSTRY (D)

There is no industry in the area. Eco-friendly cottage industry may be allowed as per the guidelines from NTCA.

4.9 MINING (D)

There is no mining anywhere in the reserve.

4.10 THERMAL POWER PLANTS (I)

There are no thermal power plants in the area.

4.11 IRRIGATION PROJECTS (D)

There is no big/medium irrigation project within the area except few water harvesting structures and diversion weir on perennial nallah made in Khejuri, Barigaon, Dudhiani villages to facilitate irrigation to the cultivation land under micro-irrigation project.

There is another proposal for Diversion of 316.63 Ha of forest land in Karanjia Division adjacent to the Similipal Sanctuary Boundary on West Deo river for construction of Deo Irrigation Project as per the rules and regulations of Forest Conservation Act, 1980. There is a condition mentioned in the letter No. 8-85/89-FC Dt. 04.04.1991 from Assistant Inspector General of Forest, Govt. of India which is as follows:

The reservoir created and the seven villages between the reservoir and the sanctuary should be declared as a wildlife sanctuary to enable the wildlife staff to exercise control. However, the irrigation deptt. staff will have the facility to access for inspection, maintenance and management of Dam and reservoir.

As the said area is at the boundary of Similipal Wildlife Sanctuary, the reservoir and the relocated area of

those seven villages may be included in Similipal Wildife Sanctuary for better management and maintaining contiguity of the forest patch and wildlife habitat.

4.12 TEMPLE TOURISM (D)

Deokund and Atharadeuli are places of pilgrimages for the local people.

Deokund situated inside the TR is a place of pilgrimage for the Hindus and is famous for the deity of Goddess Ambica. Sacred Deokund was established by the royal dynasty of Mayurbhanj.

There are two checkgates on the way to Deokund. Heavy vehicles are not allowed through these gates. Only light motor vehicles are allowed to pass through the first checkgate which is located five kilometres from the temple. No vehicle is allowed beyond the second checkgate which is located one kilometre from the temple. During the monsoon when the Tiger Reserve closed for visitors, no vehicle is allowed to enter the gates. Devotees are allowed to visit the temple on foot during this closure period.

During Dushera festivals, devotees may carryout puja by obtaining special permission from the Field Director each year during the closure period.

Athardeuli is situated on the transitional zone of core and buffer area and is a place of worship by tribes belonging to Bathudi community. They visit the place once in a year during March-April and thousands of devotees offer obeisance to the tribal deity. The worship of the Deity of Bathudi community usually happens in the month of March (last week) to April (first week). Pilgrims needto take permission from the Field Director and enter Smilipal with Vehicles. Vehicle usually go up to Lembugoda/ Kuanribil Village and then devotees reach the worship place on foot. The vehicle restriction should be enforced to minimize the impact of footfall in that area as the place of worship is located in the core boundary area of Gurguria WL Range. A maximum of 20 vehicles may be allowed by the Field Director annually as per prevailing situation. Management may provide basic amenities to devotees in convergence with Dept of Tourism & Culture in the worship area. During said period of pilgrimage temporary watchers may be selected from nearby villages and engaged with Similipal Tiger Conservation Foundation/ Forest dept support and deployment of staff from other beats to be arranged.

Dwarsuni Temple located in Bisoi WL Range of Rairangpur Division which is part of the Buffer of STR. The temple is situated at the Ghat road from Bangiriposi to Bisoi on NH 49. People used to stop their vehicle near the temple and visit which may cause traffic problem as the ghat is very much prone to accidents. District administration should deploy traffic staff to control the traffic throughout day and night. During Makar Sankranti, mela is being organized by local people that also results in gathering of crowd near the temple. This can be regulated by deploying few police personnel during the festival. Feeding to monkeys has been observed as a major issue near the temple as people use to feed the wild monkeys which may result in increase of monkey menace in the area. Proper signages and awareness to people is required.

4.13 COMMUNICATION PROJECTS (D)

All communication projects shall be scrutinized as per the existing guidelines of NTCA from time to time. At present only V.H.F. communication system has been functioning by the buffer divisions. No mobile communication tower has been established in the buffer area.No telephone system is functioning in the buffer area. However, there are few network points in particular areas in which telecommunication can be possible.

4.14 STUDIES ON NTFP IN BUFFER AREA OF SIMILIPAL

The territorial Divisions having jurisdiction in buffer of Similipal have NTFP overlapping working circle as per the latest approved working plan of their respective Divisions. The NTFP overlapping working circle of Karanjia, Rairangpur and Baripada Divisions are having the following objectives:

- To build up the capacity of the VSS on enhancement of the production sustainable harvesting of the NTFP from the forest and their processing technique, value addition and storage.
- To encourage the VSS either to create and or to adopt the plantations of Medicinal and Aromatic Plants (MAPs) as an Income Generating Activity (IGA).
- To facilitate the marketing of the NTFP by creating conducive systems like opening the depots for the cluster of VSS.
- To establish linkages with the buyers to facilitate marketing.
- To plant site specific NTFP species for the benefits of the wild herbivores especially in the diffused wildlife habitat including the migratory paths identified.

The following NTFPs are collected from the buffer areas of STR:

Honey: Collected form Rock bee (*Apisdorsata*), Hive bee (*Apis mellifera*) and Little bee (*Apis florae*).

Resins: As the area is predominant of Sal, Sal resins are being collected.

Tanins: Bark tans are collected from *Terminalia tomentosa*, *Acacia indica* species. Fruit tans are collected from *Terminalia bellerica*, *T. chebula*. Leaf tans are obtained from *Anogeissus latifolia*.

Dyes: The major species from which dyes are collected from the STR buffer are, *Bauhinia variegata*, *Butea monosperma*, *Cassia tora*, *Lanneacoromandelica*, *Mallotusphillippensis*, *Morinda tinctoria*, *Pterocarpus marsupium*, *Symplococusracemosa*, *Wrightia tinctoria*, *Terminalia tomentosa* etc.

Flosses: Obtained from *Bombax ceiba* and *Ceiba petandra*

Medicinal and Aromatic plants: The species from which it is collected are, *Phyllanthus emblica*, *Terminalia chebula*, *T. bellerica*, *Azadirachta indica*, *Asparagus racemosus*, *Terminalia arjuna*, *Pongamia pinnata*, *Symplococusracemosa* etc.

Food and Leaves: Collected from species like *Aegle marmelos*, *Annona squamosa*, *Artocarpus heterophyllus*, *Bauhinia vahlii*, *B. variegate*, *Borassus flabellifer*, *Diospyros melanoxylon*, *Careya arborea*, *Phoenix sylvestris*, *Semicarpus anacardium*, *Sterculia urens*, *Syzygiumcumini*, *Ziziphus mauritiana*, *Grewia asiatica*, *Tamarindus indica*, *Buchnanialanzan*, *Mangifera indica*, *Madhuca indica*, *Schleicheraoleosa*, *Shorearobusta* (seeds) etc.

Grasses: Grasses for fodder are *Andropogon*, *Cenchrus ciliaris*, *Cynodon species*, *Bothriochloaischaemum*, *B. persuata*, *Bromus spp.*, *Heteropogoncontortus* etc. Grasses for matting are *Phragmites spp.*, *Arundo spp.*, *Saccharum munja*, *Typha elephantina*, *Cyperus corymbusus* etc. Grasses for rope making are *Desmostachyabipinnata*, *Saccharaummunja*, *S. spontaneum*, *Themedaarundinacea* etc. Thatching grasses are *Imperata cylindrica*, *Saccharaummunja*, *S. spontaneum*, *Heteropogoncontortus* etc. For miscellaneous use *Saccharum munja*, *Veteveriazizanoides*, *Thysanolaena maxima* are used.

Marketing:

The current NTFP market in Odisha is fluctuating from time to time. Government of Odisha has fixed a Minimum Support Price (MSP) for NTFPs in Odisha which changes from time to time. But due to presence of middleman and traders plays a foul role and never pay the exact amount to the poor collectors. This issue can be addressed by proper coordination with Panchayati Raj Department and Forest Department. The Executive Committee of VSS should be entrusted and given responsibility for decision making regarding marketing of NTFPs. Involvement of SHGs and women in the decision making and collection process should be enhanced.

Table No.4a: Calendar showing months of collection of some major NTFPs.

Sl.	Name of NTFP	Months of collection											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Mango (*Mangifera indica*)												
2	Amla (*Phyllanthus emblica*)												
3	Bakhar (*Homaliumnepalense*)												
4	Eksira (*Schreberaswietenoides*)												
5	Sal Resin (*Shorearobusta*)												
6	Karanj (*Pongamia pinnata*)												
7	Kusum (*Schleicheraoleosa*)												
8	Sal leaves(*Shorearobusta*)												
9	Sal seeds(*Shorearobusta*)												
10	Siali leaves (*Bauhinia vahlii*)												
11	Laba gum (*Bauhinia semla*)												
12	Honey												
13	Mahua seed (*Madhuca indica*)												
14	Mahua flower(*Madhuca indica*)												
15	Methi leaves (*Rungiapectinata*)												
16	Mulika root (*Cesampelospariera*)												
17	Mushroom (ornamental)												
18	Mushroom (edible) (*Termitomyce-* ssp.)												
19	Pala broom (*Phoenix acaulis*)												
20	Arrowroot (*Curcuma aromatica*												
21	Pita alu												
22	Pojo bark (*Litseaglutinosa*)												

CHAPTER 5
LANDUSE PATTERN CONSERVATION AND MANAGEMENT ISSUES

CHAPTER

05

LAND USE PATTERNS AND CONSERVATION MANAGEMENT ISSUES

5.1 LAND USE CLASSIFICATION

The Buffer villages of Similipal Tiger Reserve have 64 villages and hamlets. Among them 56 villages are inside the sanctuary and almost at centre of the Tiger Reserve. These 64 villages have an area of 110.5sq. Kms. Beside these, most of the Rayati Lands of more than 250 villages are situated close to the boundary of the Tiger reserve. The cropping pattern and the type of crops raised influence the wild fauna to a greater extent. However, the lands of the buffer villages are classified as per landuse pattern which symbolizes the human dependency on the agriculture and other land in the Similipal (Annexure XLI).

So, out of the total 110.5 Sq. Kms, irrigated lands are 0.22 Sq. Kms and unirrigated single crop giving area is 35.14 Sq. Kms whichis about 32% of the total land available with the villagers. Another 2.15 Sq.K.m area have been settled under Forest Right Act 2006 till date totaling to 37.29 Sq. Kms which will raise the agriculture land to 34% of the total. The crops are raised in the rainy season and chiefly paddy. During winter, little moisture available during October/November allow the farmers to cultivate mustard, gram, maize, vegetables like tomato, radish, pumpkin etc.

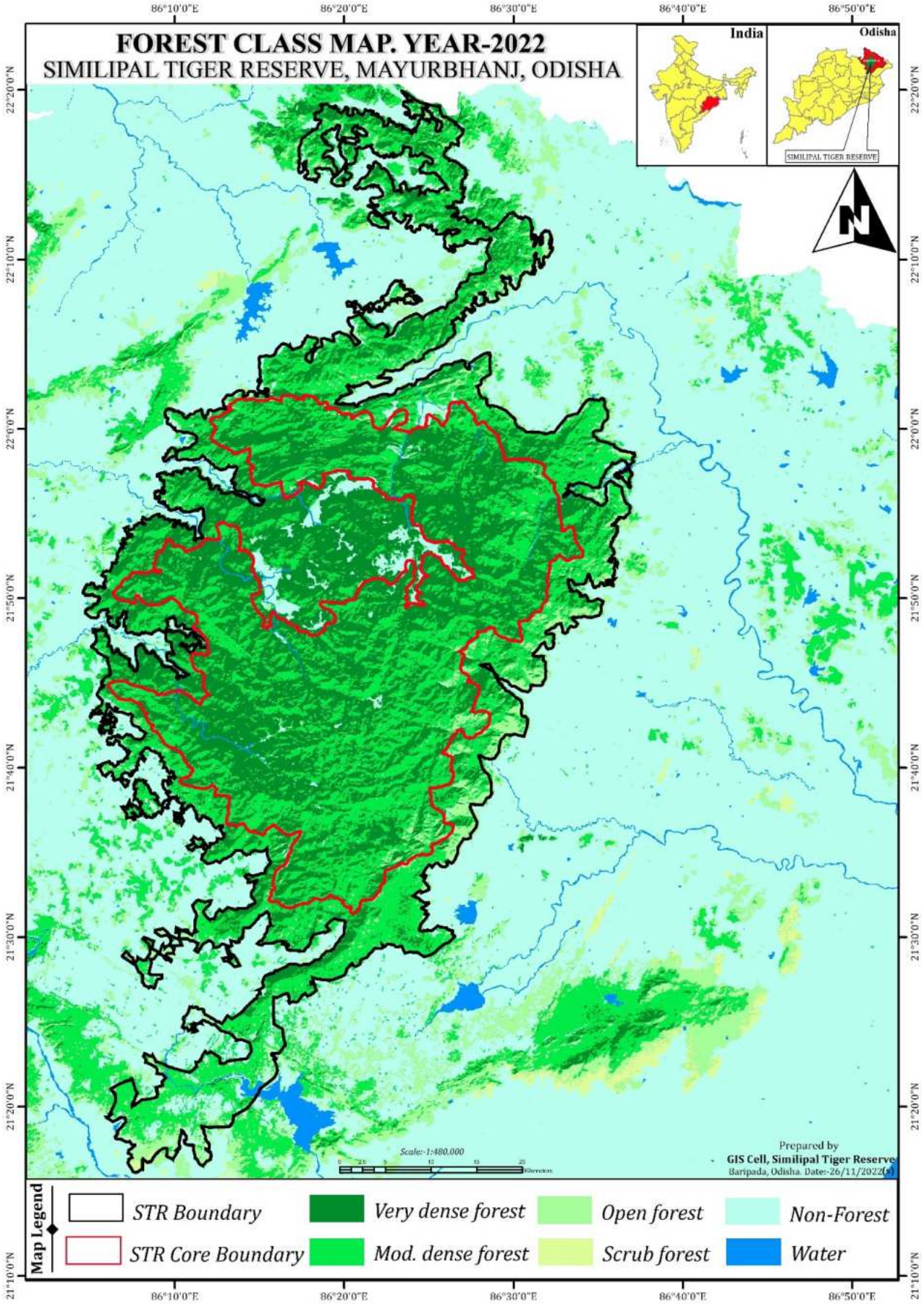
Forest Rights Settlement:

The Forest Rights claims as per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 in Similipal Tiger Reserve- Buffer area.

Community Rights: The following community right claims have been settled in Similipal Tiger Reserve buffer area as on 2012.

Table 5a: Community Rights in Similipal Tiger Reserve till 2022.

SL. No.	Name of the Forest Division	Villages in STR (CFR given)	No of FRC constituted	No. of community Rights approved by DLC	Area in Acres	Purpose
1	Similipal North WL	36	36	36	44908.21	NTFP Collection
2	Similipal SouthWL	01	01	01	1562.70	
	Total	37	37	37	46470.91	



Map 5A: Forest Class Map of Similipal Tiger Reserve

Individual Rights: The following individual right claims have been settled in Similipal Tiger Reserve buffer area as on 2012.

A total of 5.93 ha and 215.42 ha of forest land have been settled as individual rights for homestead and agricultural purposes respectively under Forest Right Act 2006 as per the table given below:

Table 5b: Individual Rights in Similipal Tiger Reserve till 2022.

SL. No.	Name of the Forest Division	Villages in STR (IFR given)	No of FRC constituted	Individual Rights- Titles issued after approval from DLC		Area in Acres	
				Homestead	Agriculture	Homestead	Agriculture
1	Similipal North WL	25	482	458	24	33.82	9.53
2	Similipal SouthWL	09	123	118	05	7.59	1.50
	Total	34	605	576	29	41.41	11.03

This area has been a source of numerous products including timber, fuel wood, pulp wood and a variety of NTFP such as bee wax, Amla, Honey, marking nuts, Tamarind, Mango, soap nut, Char seeds, Mahua flower, Mahua Seeds, Chebula, Lemon grass, Sabai Grass

5.2 SOCIO – ECONOMIC PROFILE OF THE VILLAGERS

Outside the Tiger Reserve area, townships namely Baripada, Udala, Sharat, Thakurmunda, Karanjia, Jashipur, Bangiriposhi are located in the plains. Besides these, 64 villages are found within the buffer area. The Tiger Reserve is surrounded by about 1433 villages all around within 10 K.m. from the periphery of the Tiger Reserve. As per 2011 census around 9 lakh people reside in these villages. They more or less influence the tiger reserve.

Table No.5c: Area under different Land Utilization in Mayurbhanj District

District	ANAC in Ha	LMU in Ha	PPOGL in Ha	CWL in Ha	CF in Ha
Mayurbhanj	89813.12	25342.8	38144.94	52662.57	56056.91

Source: Basic statistics for local level development, Mayurbhanj, July-2020

ANAC: Area not Available for Cultivation

LMU: Land under Miscellaneous Use

PPOGL: Permanent Pasture and Other Grazing Land

CWL: Cultivable Waste Land

CF: Current Fallow

The number of households of various communities residing in Mayurbhanj areas as follows:

i. Tribals : 59.67%

ii. Scheduled Caste : 9.35%

iii. Other Caste : 30.98%

But in Similipal the population of Tribals is 73.44%, Schedule Caste is 5.25% and other caste is 21.35%. Common tribes are Bhumija, Bathudi, Kolha, Gond, Santhal, Khadia, Mankidias. Bathudis was the earliest settlers of Similipal and in course of time they were allowed to be the chiefs of four main forts of the adjoining areas. Khadias were originally living in Panchpir and were making out their livelihood by collecting forest produce from Similipal. Later on they migrated into deep dense forests of Similipal. Gonds were old settlers in certain parts of Similipal. Depredation of tigers and elephants, constant attack of fever and forced labour compelled some of the original settlers in Similipal to migrate to the plains. Depopulation due to the reasons stated above, happened as many as seven times in Similipal and fresh migration took place. In the course of migration Santhals, Kolha, Munda, Mahalis and Khadias came and settled there. Among all the tribes the Santals and Mahalis are 'Sarna' by religion who also worships Hindu Gods. They speak in Santhali language and use Alchiki dialect. The Kolhas are Hindus. They speak in their own language and their dialect is Orangichiki. The Bathudis are Hindus and use Oriya language. The Mundas are Hindus and many of them inside the TR have been converted to Christianity. The Khadia and Mankidias are nomads. As regards the social custom of the people the Santals &Mahalis worship their deities under a Sal tree at the place of worship called Jahira and during April they perform Phubhanguni Puja. The priest is called Naeke and for other tribes the priest is locally known as Dehuri. The Bathudis, Khadias and Mankdias worship their Gods in forest. The village priest acts as the guide of the people influencing their day-to-day activities. The people are very poor and live in hutments made of brushwood and soil. They cook their food with the help of firewood collected from the forest. They depend upon the forest for repair of their houses and preparation of agricultural implements. The agriculture being practiced is not a main factor for soil erosion. Occasionally they girdle the trees and clear the bushes for use of the land for the purpose of cultivation. The natural water channels are blocked and diverted during the summer season for the purpose of cultivation, which reduces the flow of water in the water channels emerging from the sanctuary. They are not habituated with the other utilities of cattle other than cultivation. Hence during lean season, they leave the cattle inside the forest for grazing. The people in general take handia (a type of country liquor). As a tribal community they enjoy the folk dances on festive occasion. The plan prescriptions as narrated in Chapter-8 have been aimed to reduce the dependency of the people on the forest resources and amelioration of their economic condition. Agriculture is the leading occupation of Santals, Kolhas, Bathudis and Mundas. The Mahalis are mainly bamboo artisans. The Khadias and Mankdias fully depend on forest for food, shelter and day to day maintenance to their lives. They collect honey, sal resin and arrowroot from the forest and sell in the weekly markets. Collection of forest produces is the next important occupation. The other occupational fields are (i) mat making, (ii) sawing, (iii) basket making, (iv) working as black-smith (v) tailoring, (vi) distillery (vii) livestock raising. Sometimes men and women earn wages as agricultural labour or in forest and roadwork. 'Weekly markets' or 'Hata' play a very major role in the economy. Because of the distance of the market places, they use to sell their collected forest produces in the weekly organized markets or 'hata'. Sal leaves, honey, arrowroot, gums, wax and medicinal herbs are regularly collected and sold in the 'hata'.

The relationship with forest of these people is established since ages. They derive all types of NTFP, firewood, timber for their own consumption as well as for sale in the nearby market. The tribals, particularly from the villages in the periphery used to indulge in traditional hunting ritual called *Akhand Shikar*. Hundreds of people in group used to enter into the Similipal during 'Pana Shankranti' in mid-April every year with country made guns, Bow-arrows, Axe, Knife of varied sizes and kill herbivores like deer, wild pigs, hares, wild buffalos and many others. They have a belief that the traditional hunting brings prosperity to them. But now a days the traditional hunting has been completely stopped due to intensive patrolling and other protection measures. Awareness campaigns, Flag marches, Cultural and Sports activities, alternate livelihood options deter tribals for following that mass hunting practice.

The poorest people are the ones who influence the forest most. They have very low level of income and the agriculture lands owned by them are less and underdeveloped. Employment opportunities are very less. The primitive group of tribes are the Khadia and Mankidia who are one of the weakest class of people having no agriculture land. They depend upon honey collection, hunting and selling of bush meats, firewood and timber for their livelihood

The residents of the buffer area of the tiger reserve resort to traditional agriculture practice. Their crops are usually rain fed. Thus, their yield is less than the normal and insufficient to maintain their family throughout the year. To support their family, they collect NTFP, firewood and timber. The employment opportunity is very less. Some of them do not hesitate to collect various wildlife products from the floor of the forest in TR for some quick money.

Soil types and landuse practices:

Soils of Similipal Tiger Reserve are mainly developed by the relief, parent material and climate. The biotic features, mainly the natural vegetation follows the climatic pattern. Soils of STR have been divided into 8 broad soil groups which are given in detail in previous chapter 1. However, the land use pattern basing on the soil types is discussed here.

1. Red soils

There are three types of red soils found in Similipal. These are Red Gravelly soil, Red Sandy soil, and red loamy soil. The main features are coarse texture, single grained to weakly granular structured surface soil, highly porous with low available water holding capacity. These put severe limitations for rainfed farming. These soils are non-saline and do not contain any lime kankar or free carbonate. The red colour is due to presence of iron oxides. These soils are moderately acidic and are generally deficient in nitrogen, organic matter and molybdenum. Boron deficiency symptoms have been observed in vegetable crops. The added phosphorus is generally fixed in these soils due to presence of free iron and aluminium oxides. The distribution of the Red Gravelly soil found in the chicken neck part of the STR buffer in Northern region and come within jurisdiction of Similipal North WL Division. Red Sandy loam covers entire buffer area encapsulating the Core region. Only a part of Budhabalanga valley in the Talabandha WL Range of Similipal North WL and Pithabata North and South WL Ranges of Similipal South WL Division has red gravelly soil.

2. Hematitic rock, Laterite and lateritic soils

The Central and South Similipal Major area of the Core of STR soil contains lateritic mass within control section of the profile. The lateritic mass is characterized by compact to vesicular sometimes honey-combed structure, composed essentially of a mixture of hydrated oxides of iron and aluminium with small amount of manganese and titanium oxides and quartz as a necessary diluent. These soils are highly permeable and are poor in nitrogen, phosphorus, potassium and calcium. They are generally acidic in nature and found in the eastern part of the buffer region of the Tiger Reserve especially in Similipal South WL Division.

3. Red and yellow soils

They occur as a catenary association in undulating and rolling terrains and found at the extreme boundary of the buffer area and the transition zones of the STR encircling the Red loam areas. Major part of Jashipur, Dudhiani of Karanjia Division, and Kendumundi of Similipal North WL Division and Pithabata, Udala, Kaptipada Range covers the Red-Yellow soil profile which differ in depth, texture, colour and cropping systems. Soils of uplands are comparatively coarser in texture having red and yellowish red colour, shallow in depth and are well drained. Ferruginous nodules are invariably met within these soils. Soils are comparatively more acidic than those of lower reaches. The soils of low lying areas, especially of bottom land situation are formed on colluvial, and alluvial deposits. These are of fine texture, deep and show pale yellow greyish and olive shade of colour. They occasionally show effect of mottling due to submergence in monsoon and drying thereafter.

The cropping systems followed in yellow soils is rice followed by pulses/oilseeds with residual soil moisture or supplementary irrigation and that followed in upland red soils is monocrop of pulses/oilseed/millets.

4. Brown Forest soils

These are mainly brown coloured, formed in association with forest growth. The organic matter is moderate to high in these soils. These are fertile, slightly acidic and are suited for horticultural crops in higher elevations.

The brown forest soil is found in the crop fields settled in Forest Right Act 2006 and the crop fields found in the villages found close proximity to the forests and found in the almost all buffer villages.

Problem Soils and their Management

More area can be brought into cultivation if the problematic soils are properly reclaimed and managed.

A. Problem soils

The problem soils of STR can be grouped into three, classes, viz., 1. Up land, low fertile, low water retentive acidic soils, 2. Low land soils posing iron toxicity problems.

1. Low fertile acidic soils

The red and laterite and lateritic group of soils generally belong to this category which constitute about two-third of the total areas in the STR. These soils have been developed due to intensively weathered parent material of varying composition of sandstone, quartzite, granite gneiss, khondalities either in situ or over transported material. Soils developed due to ferrugenous sandstone are acidic in nature and medium in organic carbon content. The texture of these soils varies from sandy loam to sandy clay loam with depth. The available water holding capacity of these soils is low.

Soils are highly permeable and susceptible to droughts during frequent dry spell in the rainy season emergence of seedling is obstructed due to a shallow crusting developed after beating action of a rain because of cementation of colloidal iron oxides.

Soils have low nutrient retention capacity and are strongly acidic. Soils contain low available nitrogen, phosphorus and potassium. Legumes suffer from calcium deficiency. A mixed cropping of groundnut, redgram or finger millet-red gram is more remunerative than single rice crop. Productivity is low under the farming system, followed by local farmers.

2. Low land soils posing iron-toxicity problems

In the landscape of rolling topography, soils located on valley slope, toe-slope lands receive washing of lateritic constituents rich in iron due to seepage. Rice crops grown on such soils show bronzing due to iron toxicity which gets accentuated under waterlogged situations developed due to underlying clay substratum that restricts vertical drainage.

B. Management

General measures that are followed in the reclamation of these soils are mentioned here.

1. Acidic soils can be managed by the application of organic manures and liming material.
2. Improving drainage facilities by constructing deep drains around the field, checking lateral seepage water by constructing check embankments across the slope reduces the iron toxicity.
3. The sodium content of saline soils can be removed by flooding and by growing resistant varieties.

Soil Fertility Status

The major and micro nutrient content of the soils generally indicate the fertility status.

1. Nitrogen, phosphorous & potassium status

Soils of STR are generally low to medium in these nutrients.

2. Secondary and micro nutrients

About 2/3rd of the cultivated area in the state is highly to mildly acidic in reaction and deficiency of calcium

and magnesium has not been reported so far. In highly leached sandy lateritic soils, zinc deficiency is occurred, which is corrected by application of 40-50 kg zinc sulphate per hectare.

Red and laterite soils are deficient in molybdenum. Boron deficiency is found in highly porous upland lateritic soils particularly in the surface due to heavy leaching. Application of 10 kg borax/ha or spray application of 0.1 to 0.2 per cent solution helped in correcting the deficiency. Bronzing in rice which is associated with higher iron concentration in the soil is observed mainly in the kharif season. It occurs in poorly drained acid soils especially those situated adjacent to ferrugenous lateritic highlands. Bronzing is manifested due to presence of high amount of easily decomposable organic matter, application of sulphur containing fertilizers, insufficient supply of phosphorus and potassium excess iron and low manganese in the soils.

Fertilizer Recommendation

Table No.5d: Fertilizer Recommendations of Different Crops in Similipal Tiger Reserve Buffer Area

Sl.No	Crops	Nitrogen (kg/ ha)	Phosphorus (kg/ ha)	Potassium (kg/ ha)
1	Rice	60	30	30
2	Wheat (irrigated)	80	50	25
3	Wheat (rainfed)	30-40	50	25
4	Finger millet (Ragi)			
	a. kharif	30	15	15
	b. rabi & summer	50	25	25
5	Maize	100	50	50
6	Sugarcane	200	100	60
7	Potato	80-120	75	100
8	Jute	50-60	20-30	30-40
9	Groundnut	20	40	40
10	Pulses	20	30	20

Techniques for Efficient Fertilizer Use

The acceptability of a fertilizer source depends on agronomic efficiency and cost per unit of nutrient. The farmers are adopting the split application of nitrogen in order to improve its efficiency. In kharif season, it is applied in 2 or 3 splits to avoid the risk of rain uncertainty. This not only improves the yield but also provides certain flexibility to the farmers in matching nitrogen application with weather conditions. Urea super granules or briquettes has been found to be very useful in improving the nitrogen efficiency however commercial production and marketing of super granules have not yet been there, and so farmers have not started using it. Incubation of dry soil with urea (4:1) for about 48 hours has been found to be highly beneficial. A rabi crop grown under stored moisture is unable to fully utilize the native soil nutrient and, therefore, it does well when fertilizer is placed deep. In rabi season NPI NPK are preferable for better efficiency. Granulated sources perform better than the powdered forms.

Under submergence condition the solubility of native phosphorus is higher. Completely water soluble sources are less efficient for upland red and lateritic soils due to high phosphorus fixation.

By the experiment results, legume particularly in neutral and alkaline soils show that nitrogen and phosphorus fertilizers (water soluble sources) mixed together give better result than applied separately, as phosphorus is required for efficient functioning of rhizobia. Therefore, under such condition Di-ammonium phosphate

(DAP) should be preferred. The phosphorus application should be done in the furrows for better efficiency as by this a higher concentration of phosphorus in solution is developed in the rhizosphere of the plant root.

The native soil potassium is not sufficient to take care of the crop unless soil has medium to high level of available potassium. Non exchangeable soil potassium also contributes to availability. Rice straw and panicles have high concentration of potassium. If straw is incorporated into the field, only 5 percent of the total amount of potassium is removed. In coarse sandy soils, split application of potassic fertilizer has yielded good results.

Among the micronutrients, uses of boron and molybdenum have been beneficial in many situations for upland cereals, pulses, and vegetables like tomato, cabbage and cauliflower.

The villagers inside the Similipal Tiger Reserve have been insisted to go for Organic farming and use of traditional manuring in the form of Cow dung manure, goat manure etc. instead of chemical fertilizers to reduce the risk of Eutrophication of the water bodies and wiping out the possibility of mixing of chemicals in the food chain of the wild animals. The feasibility of installing Vermicompost units in the villages can also be explored which will definitely discourage the use of chemical fertilizer as well as generate an alternate livelihood for the people.

5.3 RESOURCE DEPENDENCE OF VILLAGERS

Agriculture is the main occupation of the people residing inside the Reserve Forests and on the fringe. The total land under irrigation is 70664.29 Ha in Mayurbhanj. The population is increasing rapidly as discussed in the previous paragraphs. Forest is the main victim of the population pressure. People depend on forest for shelter, firewood, and food. Raw materials for erecting houses for shelter are obtained from forest. Their cattle graze in forest. Roots, leaves, tubers, herbs, and insects of the forest constitute their main item of food at the time of scarcity. Diseases are cured by application of forest herbs. Hunting and fishing in forests and rivers are their common pastime. With the increasing population, the above all activities are also increasing. Sometimes people from inside and outside Similipal over exploit the forest resource commercially for their gain. In fact, the traditional methods of collection of forest produce never harm the forest to a big extent. The timber traders, poachers and smugglers are more harmful for the existence of forest. These people always exploit the simplicity of tribal people and use them for their benefits. Traditional and simple tribals are not so harmful for the forest because their resource consumption is very less and they are very nature-friendly.

Table 5e: The utilization of land in Mayurbhanj District

District	Fallow land other than current fallows in Ha	Net Area Sown in Ha	Area sown more than Once in Ha	Total Cropped Area in Ha	Land under still water in Ha	Social Forestry in Ha	Marshy land in Ha
Mayurbhanj	67400.49	335429.34	18181.65	327866.09	7614.88	6146	406.3

Source: Basic statistics for local level development, Mayurbhanj, July-2020

5.4 HUMAN – WILDLIFE CONFLICT

Since the time immemorial, Human wildlife conflict has been going on in and around the Similipal Tiger Reserve. But no incident of tiger attack or uplift of human beings by Leopard has been ever reported. Cases of cattle lifting by big cats are occasional in buffer area. Other wildlife cases such as Bear attack as well as Hyena attacks are known to occur but these are very accidental and causalities have been reported on this count in buffer area. But the most conflicting situations arise during the migration of the Pachyderms every year. The tables in Annexure- LVI show the man-elephant conflicts and the compassionate grants paid during the last few years.

Man- Elephant interface in Buffer area of the Tiger Reserve

The detail of crop raiding and human kill by elephants has been given in Annexure LVI. Crop raiding and other depredation by Similipal elephants is confined to limited pockets of Baripada, Kaptipada, Kendumundi, Thakurmunda, Bangriposi and Bisoi Range.

Protection measures – STR Buffer Area:

There are 101 No. of Antipoaching camps in buffer divisions equipped with V.H.F. sets and staff both regular and daily wagers to stop the anti-smuggling/anti poaching activities. The list of these has been reflected in the tabular form in Annexure XXX.

Wildlife poaching cases detected in the buffer area in the last 3 years has been given in Annexure LII.

Loss of Human Life & Property by wild animals

Loss of life and injury caused by elephants in the last 5 years in Similipal area has been analysed below. A total of 7 people were killed and 34 injured during the period due to wild animal attack in the buffer area of STR. This is relatively high (>1 death/year) and as such it increases the fear and worry about wild animals. It affects the farmers for crop protection and people dependent on the forest for minor forest produce (MFP) and fuel wood. This constant worry and fear make them susceptible to stress and this leads to frustration and anger against elephants and other wildlife. People become hostile towards the Forest Department whenever there is a death or injury caused by wild animals.

Crop Protection

Due to the intensity of crop raiding in the periphery of Similipal tiger Reserve the practice of watching the crop in the night in the machans near the crop field is adopted.

Compassionate grant:

The payment made on compassionate ground in last 6 years have increased many fold as frequency of elephant damage is increasing. The newly developed compassionate payment portal which is very much helpful for the people to apply for their lost property or loss to life or injury. The web based mobile application can be used by the normal citizen and apply for the damage which can be centrally monitored in State Wildlife Headquarter for which delay in payment of compassionate amount is reduced. The compassionate amount paid to the victims is the rate fixed from time-to-time as per the amendment of Wildlife (Protection) (Odisha) Rules, 1974. The latest amenedement was done and published vide Notification no. 9128, dated 03.05.2023 of Forest, Environment & Climate Change Department, Government of Odisha which is as follows:

The present rate (as on July, 2023) for such payment is given below-

- Human Deaths- Rs 600000/- per victim.
- Permanent Injury-Rs 1.5 laks (in case of disability less than 60%)/- per victim.
- Permanent Injury-Rs 2.5 laks (in case of disability more than 60%)/- per victim.
- Minor injury- Rs 10000/- per victim with free treatment in Govt. hospital if the duration of hospitalization is more than a week.
- Minor injury- Rs 5000/- per victim with free treatment in Govt. hospital if the duration of hospitalization is less than a week.
- Death of Cattle (Bullock/Cow) - Rs 37,500/- per cattle.
- Death of Cattle (Buffallo) - Rs 32,000/- per Bufallo.

- Death of calf- Rs 5000/- per calf.
- Death of Sheep/Goat - Rs 4000/- per Sheep/Goat.
- Death of calf (Lamb) - Rs 1500/- per lamb.
- Crop Damage (Paddy/Cereal crop) - Rs 20000/ Acre
- Vegetable/Cash Crop Damage - Rs 25000/ Acre
- Permanent Damage to House - Rs 20,000/- per house along with Biju Pucca Ghar or cash equivalent in lieu Biju Pucca Ghar by the Department
- Minor damage to house - Rs- Rs 10000/- per house

Elephant Deaths due to Conflict

The increase in pressure in the buffer part of the STR coupled with development in the corridor area has resulted in retaliatory action by some of the villagers against elephants. Elephants normally raid crops in the periphery villages coming under territorial Divisions like Karanjia, Rairangpur and Baripada. They usually do not go very far from the forest for crop raid.

At present Human Elephant Conflict (HEC) cannot be considered as being serious but the sentiment among some people that it is more serious now than what it was in the past. Such a feeling could originate from the fact that people have greater aspirations for a better life and cannot accept losses they took as normal in the past. Cropping patterns have changed and a lot more cash or commercial crops are being grown and this possibly makes people less tolerant to conflict with elephant. The presence of some crops year-round also increases the potential for raiding and this increases the efforts needed to stop HEC.

While Human Elephant Conflict mitigation has improved, this is largely because of increased private investment in crop protection. Government based efforts, mainly electric fences have largely failed because of poor planning and implementation and also because communities have not taken responsibility for maintaining fences. The failure of such fences results in a blame game and further disgruntles people although they are equally to blame. There is a clear need to improve capacity (of government agencies and communities) for HEC mitigation, to bring about better coordination between government agencies and communities and also within communities. We also need to develop the ability to apply conflict mitigation measures on a sustained basis and lastly seek long-term solutions that resolve HEC on a more lasting basis.

The last would take into account land use, agricultural practices, provide/develop mechanisms to improve livelihoods, develop crop protection mechanisms that cover elephants and other animals also (especially wild pigs), develop the ability to deal with habitual raiders, and manage elephant populations in a sustainable way.

However, such killings and attacks can be reduced by increasing the knowledge and capacity of local people in dealing/interacting with elephants when they encounter them or move in areas where they are less likely to encounter them.

There is a need to review HEC mitigation inputs by government agencies and NGOs so that problems can be identified and better methods implemented. Capacity and motivation need to be developed within the department so that the Forest Department can develop better partnerships with local communities and implement HEC mitigation strategies in an effective and sustained manner. Capacity, cohesiveness and commitment need to be developed within local communities.

There is a need to bring about an integrated approach in the various government departments that deal with various aspects of development of local communities in the area. At present some departments work

at cross-purposes and that does little to improve the livelihoods of the locals. These developmental efforts also need to stay in tune with the conservation goals of the PA and the landscape through coordination with the Forest Department.

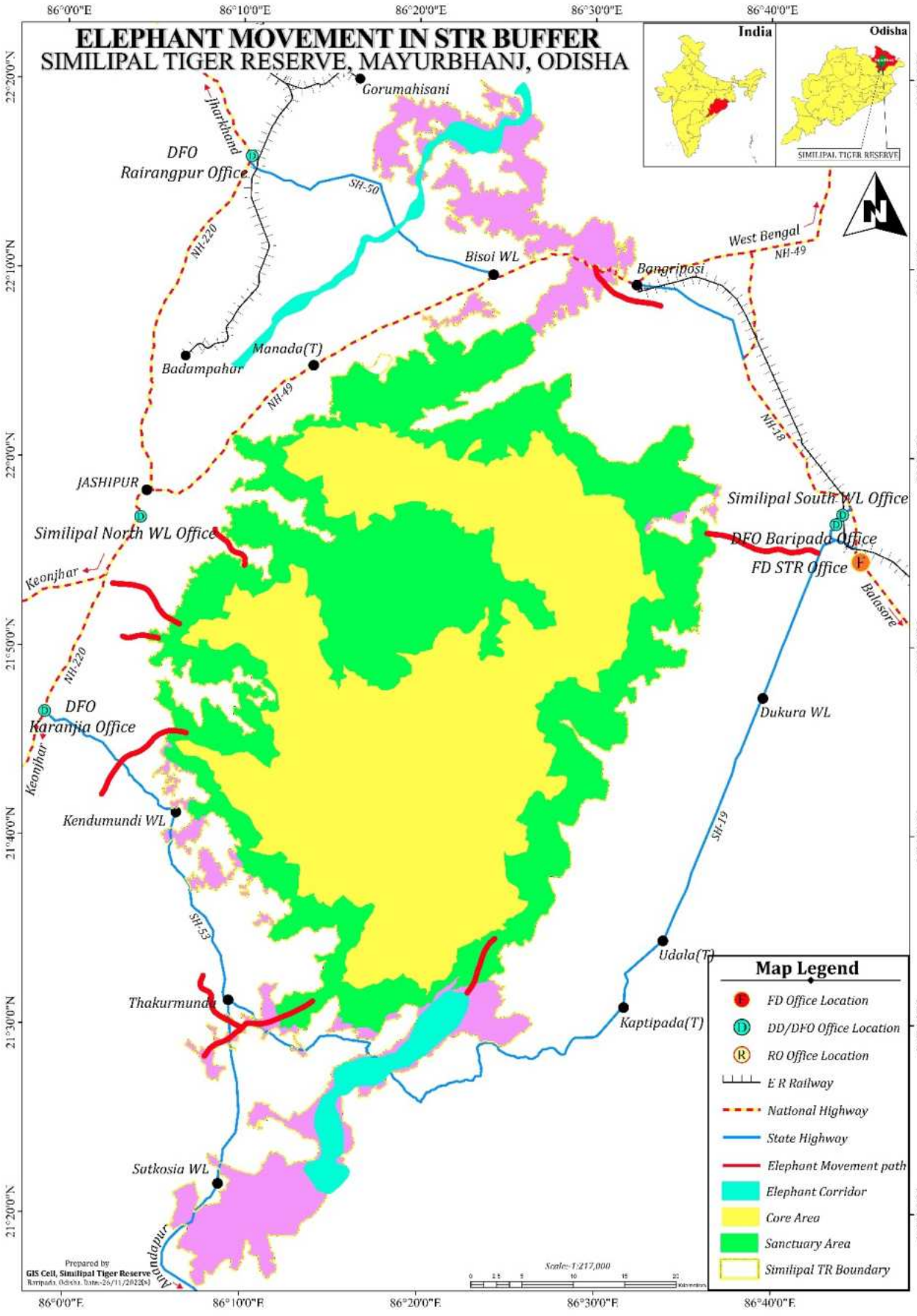
“i-WLMS” web based mobile application is in use to monitor and report the movement of elephants and is monitored at Division, Circle and State level. This also ensures regular elephant monitoring and necessary guiding of elephants from villages to the forest areas.

GajaSathi concept is also in use where villagers are employed as GajaSathi (Friends of Elephants) to monitor the movement of elephant, creatin of awareness among people, informing people about elephant presence in the vicinity etc.

“Jana surakhya Gaja Rakhya” is a scheme where people install Solar power fences with subsidy amount from the Governemnt to check the crop raids by wild elephants. Territorial divisions in the buffer of Similipal can implement the project to reduce Human-Wildlife conflict in the fringe villages.

A Site Specific Elephant Management Plan to control Human Elephant conflict has been prepared in Baripada Circle and the Territorial Divisions sharing the buffer and surrounding area of Similipal under a significant landscape are implementing the action plan and the best practices to reduce the conflict have been followed.

Every year an Annual Plan of Operation for the Site Specific Wildlife management is being submitted to the headquarters by the concerned Divisions under Similipal Landscape and fund is being provided to utilize the issues on priority basis and holistically to reduce Human Wildlife Conflict.



Map 5B: Elephant movement in Similipal Tiger Reserve Buffer and adjoining Areas.

5.5 ASSESSMENT OF INPUTS OF LINE AGENCIES/ OTHER

DEPARTMENTS:

Developmental programmes are taken up by the Forest department as well as other government departments in the zone of influence. These developmental activities are taken up Gram panchayat and Sub-division wise. Four Subdivisions are found in this buffer zone namely Karanjia, Rairangpur, Baripada and Udala. There are several Gram panchayats coming under the subdivisions for all the developmental activities. Some of them are beneficial to the villagers; some are detrimental to the wildlife. ITDA, Agriculture, Horticulture, Soil conservation Department, Animal husbandry department, fisheries, Khadia-Mankidia Development Agency and various government and non-government agencies working in the area. Huge numbers of developmental works are taken up in the buffer zone through DRDA for the upliftment of local tribal as well as non tribal people. There are certain works like construction of group houses under Pradhan Mantri GraminAwas Yojana, foot paths, and construction of water tanks, check dams, community hall, and TV rooms taken up by village panchayat union which never threaten the integrity of reserve.

The inputs of the Development Agencies are categorised under the following heads in STR buffer Areas:

- LIVELIHOOD SECTOR – Horticulture, Fisheries, Sericulture, Industry, Tourism, Agricultural marketing, Agriculture, Forest and Soil Conservation, Veterinary, GIS Cell & Help Desk.
- SOCIAL SECTOR - Health, Special Interventions for the Differently Abled, Education, Sports and Women & Child Welfare.
- INFRASTRUCTURE SECTOR – Communication with emphasis on Rural Connectivity and connectivity in Vulnerable, Remote and Bordering Areas done by Rural Development department, Similipal Tiger Reserve authorities (FD, and DFOs).

In the LIVELIHOOD SECTOR, an effort has been made to integrate agriculture and allied activities with industry and tourism with an aim to enhance the quality of life of the tribal people and people staying in remote areas of the district.

About 53.92% of the total villages of Mayurbhanj (3950 in number) are located within 5km vicinity of the forest area of Mayurbhanj. The objective is to provide sustainable livelihood to poor scheduled tribe rural families through proper utilization of land and water and also to ensure food security, promote self-employment enhance income and capacity building through training and exposure visits.

Horticulture – Based on agro climatic and soil conditions, different horticulture crops have been suggested for different areas. Development of private nurseries, dissemination of latest technology and information through demonstration, training, workshops and exhibition will be encouraged. The average annual production of horticulture products in Mayurbhanj is 134627 Quintals. With rubber already having been proved as eco-friendly and an excellent crop for rehabilitation / settlement of socially and economically backward classes of people, an emphasis on rubber plantation has been made.

Fisheries – With the district's rich potential for pisciculture development, emphasis has been put on providing income generating assets in the form of fish seed rearing units by women SHGs, providing technical training to 600 fish farmers on scientific pisciculture management to make their activity economically viable and sustainable and information discrimination through IEC activities. The total area under water body in Mayurbhanj is 20180.86 Ha and area under still water is 7614.88 Ha. These areas can be targeted for improving the fisheries for sustainable livelihood.

Sericulture - Tassar culture has been practiced in this district since the time of the erstwhile royal dynasties. The most important pre-requisite of the silk industry is production and supply of quality seeds. Therefore, stress is to be given to maintain better plantation of tassar food plants for quality seeds subject to Forest Conservation Act and smooth rearing activities with proper marketing facilities. The schemes will be encouraged with the above objective in sight. "Vanyasilk" plantation should be taken up in territorial

divisions where Arjun, Asan trees will be planted for sericulture purpose.

Industry – Blessed with naturally grown forest bamboo, the project logically aims at providing a special package to the traditional bamboo workers for augmentation of their earning. With a substantial tribal population in the district, a center for development of tribal handicraft design has been proposed apart from providing for income generating schemes (like sabai rope making and siali leaf khalli& rope making) for the Khadia and Mankadia Primitive Tribal Groups, self employment through honey collection and providing vocational training (preferably technical) to youths in the remote GPs of the district.

Tourism – Venturing into and enjoying nature in a way as to assure that the negative impacts on the cultural and natural environment are minimized and negated, forms the basic of eco-tourism. Development of Eco-tourism at Similipal Hills along with improvement of orchidarium, residing infrastructure and trekking routes in Similipal, have been proposed. Mayurbhanj has many locations which though are irresistible destinations are not attracting enough tourists and for this, development of tourism sites at Khiching, Devkund, Bhimkund etc. have been proposed. Heritage tourism can be promoted at the historic Jubilee Museum and Archives. Research for development of Chhau dance (which is a part of the tribal way of life of Mayurbhanj) is aimed to be promoted at the proposed Chhau Research Centre & Museum. Similarly, the proposed improvement of acoustics and development of Tribal Cultural Centre in SaheedSmruti Bhawan is also extremely essential in the light of the Bhawan being the only cultural centre at the district headquarters.

Agricultural Marketing- With agriculture as the mainstay of the people, efforts are being done to establish rural markets in 25 remote and bordering GPs. This will not only help to promote forward and backward linkages to the farmers of the area, but also help in ensuring a better quality of life for the tribal poor which is extremely important especially in the light of these areas being remote, vulnerable and bordering areas.

Agriculture – Presently, the percentage of irrigated land in the district is only 21% in Kharif season and 9% in Rabi season. The land holding size in Mayurbhanj is very much dominant as marginal land holding as it covers about 77.7% of total land holdings followed by small (16.6%), Medium (4.4%) and Large (1.3%). To increase the cropping intensity and productivity, more area is to be brought under irrigation as only 70664.29 Ha area is under irrigation.

Green Agriculture Project funded by Global Environment Facility (GEF) aims to catalyze transformative changes to India's agriculture sector for National and global environmental benefits without compromising the country's food security and farmers' income. its objective of catalysing sustainable transformation of the agricultural sector whereby providing economic upliftment to the people of the targeted area with awareness on conservation of IUCN endangered species and critically vulnerable flora and fauna. The priority villages of Similipal Landscape of Mayurbhanj District of Odisha will be identified for global environmental benefits and livelihood enhancement of targeted communities.

Forest – The improvement of irrigation system in the forest areas is very important especially with a large population of tribal of the district residing in the forest areas whose mainstay is agriculture and allied activities.

Soil Conservation - It has been proposed to construct W.H.S., farm ponds, percolation tanks, cross bundhs, diversion weir, etc, in the non-irrigated rain-fed patches under the RSVY scheme which will provide life saving irrigation, check the soil erosion, recharge the ground water and generate employment opportunity. These projects would be implemented in identified watershed area. The ground water availability is very good in Mayurbhanj and Similipal is acting as a watershed to improve the ground water recharge in the sedimentary rocks which flows through perennial rivers arising from Similipal. The ground water recharge of Mayurbhanj is 0.371 BCM (Billion Cubic Meter)/annum and draft is 0.17455 BCM/annum. This shows the amount of water stored due to recharge is higher than the amount of water utilized by drafting through borewell/tube wells.

Veterinary – The following table shows the population of different livestock available in Mayurbhanj District:

Table No.5f: Population of different livestock in Mayurbhanj District

Species	Cattle	Buffalo	Sheep	Goat	Horse	Pigs	Poultry
Population	757908	85978	198238	1041513	669	79552	2126159

Source: Basic statistics for local level development, Mayurbhanj, July-2020

Livestock will be used as alternate livelihood option for people by supplying milch breed cattle and buffalos for producing quality milk for own consumption and sell. Provision of free vaccination and subsidy for poor people should be provided to keep the livestock healthy and disease free. Periodic vaccinations being provided in Mayurbhanj are for FMD, Brucella, HS, BQ, ENT, ASV and RD. The average annual dung production of villages in Mayurbhanj is about 6864.97 MT which can be utilized for organic farming. Many villages use cattle dung to make dung cakes which is used as fuel for cooking in domestic purpose. This provides fuel for cooking in free of cost but produces huge amount of smoke which can cause many health problems.

The total area required for grazing of the livestock mentioned in the above table is about 13729.94 Ha whereas, only 10% area i.e., 1372.69 Ha is available for grazing. This forces the villagers to graze their livestock inside forest areas.

Social Sector:

Women & Child Development Department:

The department has been looking up the overall health, family management, social bonding and preliminary education of the people in each and every village of Odisha. The role and responsibility of the Anganwadi workers and Supervisors must be fixed by the District Administration through District Social Welfare Officer to monitor the activity related to health of pregnant women, optimum nutrition to new born child, preliminary education, mid-day meal, quality of food provided, etc. They also play pivotal role in organizing village level meetings and awareness campaigns. As this department under Government of Odisha is having almost 99% women employees and supervising authorities, women empowerment can be scaled up and the stand of women in the society in STR can be strengthened.

Mission Shakti:

Mission Shakti is an integrated women empowerment programme is an umbrella scheme for the safety, security and empowerment of women for implementation launched during the 15th Finance Commission period 2021-22 to 2025-26. It has two components with specified objectives such as:

Sambal: It is for Safety and Security of Women. It consists of schemes of One Stop Centre (OSC), Women Helpline (WHL), Beti Bachao Beti Padhao (BBBP), with a new component of Nari Adalats - women's collectives to promote and facilitate alternative dispute resolution and gender justice in society and within families.

Samarthya: It is for Empowerment of Women. It consists of erstwhile schemes of Ujjwala, Swadhar Greh and Working Women Hostel have been included with modifications. In addition, the existing schemes of National Creche Scheme for children of working mothers and Pradhan Mantri Matru Vandana Yojana (PMMVY) under umbrella Integrated Child Development Services ICDS have now been included in Samarthya. A new component of Gap Funding for Economic Empowerment has also been added in the Samarthya Scheme.

The mission Shakti projects and programs may be linked with Forest Department for livelihood interventions of the fringe villages in of Similipal. Women SHGs can be strengthened with the project with many options for livelihood improvement.

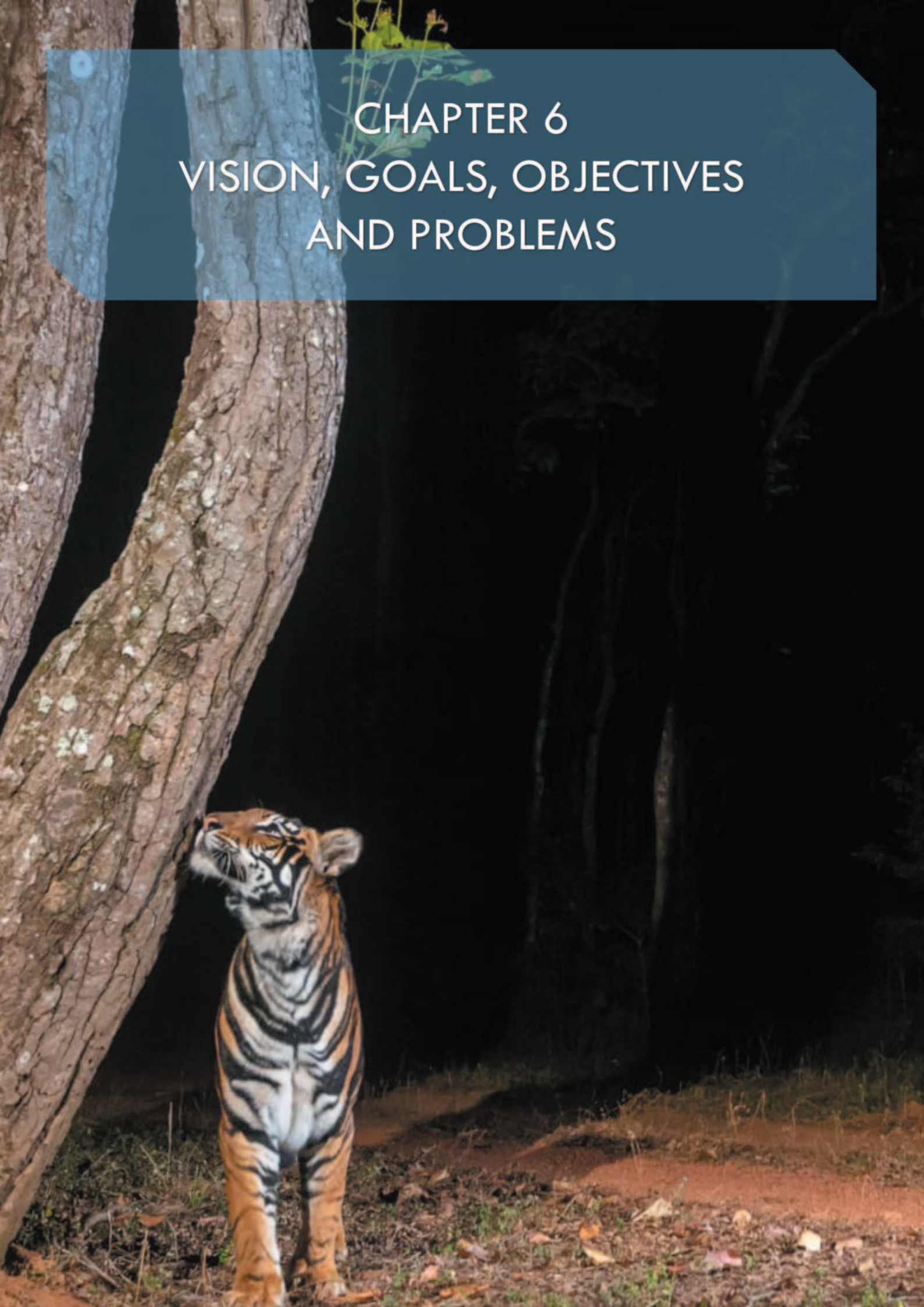
Conservation Management Issues in the Buffer Zone:

Felling for fire woods, grazing, man-made fire, NTFP collection is a threat if not collected on a sustainable method. This kind of issues caused degradation of the forest by over exploitation of critical micro habitats used by various wild animals.

- Encroachment of forest lands and poaching for meat is the common problem in buffer zones.
- Stone quarries, Murrum quarries, Crusher units operating in the adjoining areas hinder free movements of wild elephants in to nearby forest areas.
- Man-made Forest fire in summer season to get rid of ticks and mites as well as to burn the unwanted bushes around the villages to facilitate easy movement into the forest for NTFP collection as well as to protect themselves from venomous snakes and insects. Villagers also use fire to burn the fallen leaves over forest floor around their villages to have fresh flush of grasses for their livestock. Mahua fruit collection is also a traditional practice of the villagers as they burn the undergrowth so as to enable them for easy collection of the fruits from the ground. The fire thus getting uncontrolled spreading into the forest.
- Felling of pole size trees for making of their houses, thus causing removal of new crops and it hampers the forest to become a Normal forest.
- Presence of stray dogs in the buffer villages posing a threat to the wild animals as they are being used as hunting dogs which guide the herbivores towards the hunters with bows and arrows for easy target.
- There is always a threat of spreading of disease from the livestock in the buffer areas to the wild animals. Many vaccination programs are going on, but still there is an element of risk of transfer of zoonotic disease.
- Use of common water source like rivers and reservoirs for both buffer villages and wild animals in the buffer areas.
- The amount of pollution exerted by the villages inside the TR is also an issue for which proper waste management strategy must be framed. The district administration through NAC or BDO should work towards making those revenue villages clean under Swachha Bharat Mission. People are seen defecating in open fields and river banks which not only causing soil, water pollution but also risking their lives to wild animals. The mission for creating toilet facility in every household in STR should be taken care of by the District Administration and they should be awared about using the toilets and not going outside for the same.
- The spread of disease and very less life span of the villagers inside STR may be due to lack of proper medical attentions and facilities. A mobile medical van along with ambulance service with dedicatedmedical team may be provided to the villagers for emergency medical attention.
- With increase in tourism in the buffer, there is always a risk of nonbiodegradable waste pollution. Although peopleare being awaredabout the ban of plastic inside the TR to make it plastic free zone, but still people are using plastic bottles, polythenes, thermocoul plates etc. During the year 2022, the tourists entering into Similipal for day tourism have been advised to replace their thermocoul plates with Sal leaf plates with nominal charges. Tag system for plastic bottles can be adopted with a nominal security deposit that can be submitted in exchange of a tag for each plastic water bottle entering the park and the same money can be returned with exchange of the tags while exiting the park.
- Over-exploitation of *Homaliumnepalense* (Dahanimari), a tree known to be having medicinal property in its bark. People from buffer use to extract the bark to sell it in the market to get some revenue and in the process they over-exploit the bark causing death of the tree due to excess removal of vascular tissues. Sustainable harvesting is not being followed which is resulting in vanishing of the tree species from the buffer of STR.

PART B

THE PROPOSED MANAGEMENT



CHAPTER 6
VISION, GOALS, OBJECTIVES AND PROBLEMS

CHAPTER

06

VISIONS, GOALS, OBJECTIVES AND PROBLEMS

6.1 THE VISION:

The importance of STR has been spelt out in the previous chapter on statement of significance and its role on shaping the economy of North Orissa which is mostly agrarian has also been mentioned. Besides, the people living inside and on the fringes are mostly Adivasis (PVTGs) and inextricably associated with the forest. The present enactment of Govt. of India to confer on the tribal the rights of forests play a vital role in visualizing the future shape of the TR. The management aims at preservation of the natural heritage through a process of ameliorating the socio-economic condition of the people gradually, simultaneously interpolating the management principles congenial to the forests and its denizens as well as acceptable to the people. In short, the vision is to have an ecologically viable buffer area which will suitably safeguard and supplement the core area, the critical core natal habitat for the Tiger, its co-predators and prey base and which shall be managed intensively both for the betterment of wildlife and local communities based on sound principles of sustainability.

6.2 MANAGEMENT GOALS

Ecological security for the forests with sustainable livelihoods for the local people.

To complement the core area by maintaining the buffer area as a viable wildlife habitat.

6.3 MANAGEMENT OBJECTIVES

In pursuance of the above goals, the following specific objectives have been set for the Management of Similipal Buffer Zone Areas

1. To protect and conserve the flora and fauna by maintaining and protecting biodiversity-rich patches.
2. To mainstream tiger conservation concerns in the activities of the production sectors.
3. To restore the habitat with appropriate soil and moisture conservation measures.
4. To ensure the maintenance of viable wildlife populations for Ecological, Scientific, Aesthetic and Cultural values.
5. To ensure peaceful co-existence of wildlife and man.
6. To foster and monitor the populations of Tiger and co-predators by creating appropriate habitat conditions supporting good prey base.
7. To create management capabilities amongst the staff and to develop capacity building.

8. To encourage scientific research studies on topics, that will be management oriented and for improvement of the wildlife interest.

9. To protect the habitat from traditional hunting ritual and timber smuggling activities.

10. To achieve reduction in resource dependency on forests of the Buffer Zone by providing alternative livelihoods and conservation through Eco development activities.

11. To maximize recreational experience of the people through various activities while minimizing the adverse impact of tourism on wildlife and its crucial habitat.

6.4 PROBLEMS IN ACHIEVING OBJECTIVES

Objective-To protect and conserve the flora and fauna by maintaining and protecting biodiversity-rich patches.

Problems-

i. Number of human settlements is more and these are near the biodiversity-rich areas. The forest dependency by these people causes high degree of destruction of flora and fauna.

ii. The settlers are the kins of nearby Jharkhand and West Bengal tribes and many migrate from the outside the Tiger Reserve and settle here by marriage and by adoptions. This increases human population in the buffer area and more threats to wildlife and their habitats.

iii. iMan generated fire incidences are more near forest fringe village areas of buffer that result in destruction of ground vegetation and ground fauna.

Objectives-To mainstreaming tiger conservation concerns in the activities of the production sectors.

Problems:

i. Lack of awareness among the production sector managers.

ii. Lack of co-ordination among the line departments.

iii. Inadequate data on impacts of developmental activities undertaken in STR

Objective-To restore the habitat with appropriate soil and moisture conservation measures.

Problems:

i. Inadequate database on the area of land degradation, cause of degradation, effect of degradation.

ii. Inadequate fund for carrying out appropriate soil and moisture conservation measures in the degraded sites.

Objectives-To ensure the maintenance of viable wildlife populations for Ecological, Scientific, Aesthetic and Cultural values.

Problems:

i. Inadequate data on the population structure and their ecology

ii. Heavy biotic pressure on the resources

iii. Increase in Population of Forest fringe villages

Objectives-To ensure peaceful co-existence of wildlife and man.

Problem:

i) Multiple human settlements in buffer area as well as in Fringe villages of Similipal.

ii) Frequent crop raid by elephants and small herbivores in the buffer villages

iii) Traditional hunting ritual performed by the villagers in buffer

Objective-To foster and monitor the populations of Tiger and co-predators by creating appropriate habitat conditions supporting good prey base.

Problems-

i) Less scientific data available on the tiger habitat and on its prey base.

ii) Heavy biotic interference in the buffer area.

Objective-To create management capabilities amongst the staff and to develop capacity building.

Problem:

i) Inadequate trained staff on wildlife management in buffer divisions.

ii) Lack of motivation amongst the staff in buffer

iii) Ground level illiterate daily wage staff

iv) Lack of proper training module to the staff in buffer

Objective-To encourage scientific research studies on topics, that will be management oriented and for improvement of the wildlife interest.

Problem:

i) Inadequate scientific data on the flora and fauna of Buffer area.

ii) Inadequate funding for research activities.

Objective-To protect the habitat from traditional hunting ritual and timber smuggling activities.

Problem:

i) Age old traditional customary hunting practices by local people.

ii) Lack of awareness for wildlife conservation among the local people in buffer area.

iii) Ill-equipped, demoralized staff is unable to counter thousands of armed tribal mass.

iv) Poor socio-economic conditions of the local tribes.

Objective-To achieve reduction in resource dependency on forests of the Buffer Zone by providing alternative livelihoods and conservation through Eco development activities.

Problems:

i) Poor socio –economic condition of the buffer villagers.

ii) Lack of awareness among the villagers on ongoing developmental activities.

iii) Lack of co-ordination between the line departments.

Objective-To maximize recreational experience of the people through various activities while minimizing the adverse impact of tourism on wildlife and its crucial habitat.

Problems:

i. Lack of awareness among the tourists.

ii. Lack of infrastructures for tourism.

iii. Lack of efficient tourist guides and lack of ability to motivate and aware people

6.5 STRENGTHS–WEAKNESSES–OPPORTUNITIES-LIMITATIONS (SWOT) ANALYSIS

Strength:

Similipal buffer part has very large tract of intact forests rich in biodiversity and forestry resources. The buffer zone supports assemblage of prey species in different size classes which in turn support the large carnivores. An organized patrolling system is in place for the past decade. An equal importance is also being given by the present administration of the buffer zone i.e., the concerned territorial and wildlife divisions. Further, no mining or large industry exists which would have been detrimental to ecological security. Buffer areas are under management control of Field Director since August, 2011.

Weakness:

a. There are as many as 64 villages and hamlets with more than 15000 human population living within the buffer zone of Similipal Tiger Reserve with ever increasing demand for modern facilities

b. Poor socio-economic condition of the inhabitants

c. High population of unproductive cattle and livestock in buffer area.

d. Inadequate professionally trained staff

Opportunity:

a. To maintain a viable breeding population of Tigers and its co-predators along with the elephants in this large landscape with connectivity to other biodiversity rich areas.

b. To tap immense potential for sustainable eco-tourism

c. To develop a sustainable model of NTFP harvesting and marketing

d. To develop a multi-pronged strategy for rural development based on agro-horticulture.

Limitations (Threat):

a. Gradual fragmentation of Tiger reserve in the form of footpaths and roads used by increased population of villagers

b. Increasing demand on dwindling forest resources by ever increasing human Population around the Reserve.

c. Very low levels of literacy and complacent tribal population with limited aspirations.

d. Increasing population of domesticated hunter dogs in the area.

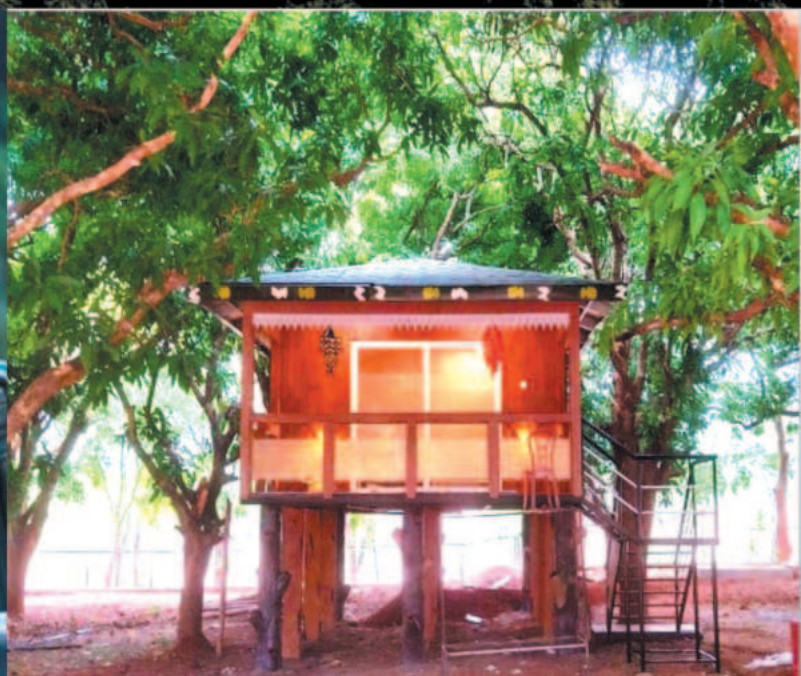
e. Human and cattle presence in every part is disturbing inviolate areas.

f. Right of passage to the villagers living inside Similipal buffer through the tourist road restricting movement of wild animals causing very less animal sighting to tourists.

After analyzing the **SWOT** strengths, weaknesses (internal), opportunities and threats (outside) in the park management, it is interpreted and arrived at the following possible strategies as it contains more strengths and opportunities for better and able management of the Buffer zone of Tiger Reserve.

- Increase the protection activities, understanding abilities, habitat improvement, activities of education research and monitoring, data collection, and utilizing all these for the management purpose.
- Effective utilisation of existing resources to tackle multi-dimensional protection problems. Convergence and coordination with other line departments to be well established.
- Patrolling of sensitive and vulnerable areas prone for poachingand illicit fellingto be intensified at frequent intervals in all the vulnerable areas of buffer zone in coordination with territorial forest divisions and police department.
- Expand the activities and to provide vital corridors connections and forage grounds for elephant and other animals.
- Focus on acquiring basics and advanced techniques in the field of wildlife biology, ecology surveillance for better wildlife management. It is also required to acquire essential sophisticated weapons, communications equipment, GIS remote sensing, camera-traps, binoculars, digital cameras, and web-based Information Technology for scientific management and guarding against illicit activities.
- AI technology can be used in effective management of the Tiger Reserve to detect the climatic variations, rainfall pattern, seasonal changes in the phoenology of the forest, water availability, space utilization of animals etc.

CHAPTER 7
MANAGEMENT STATEGIES



CHAPTER

07

MANAGEMENT STRATEGIES

INTRODUCTION

The need for ensuring ecologically compatible land uses in tiger reserves (buffer / peripheral areas) and corridors have been provided in sections 38O (g) and 38V (3)(b) of the Wildlife (Protection) Act, 1972. Further, under section 38V (3)(c) of the said Act, a provision has also been made to ensure that 'the forestry operations of regular forest divisions and those adjoining tiger reserves are not incompatible with the needs of tiger conservation'. In general, the managerial approach of buffer is applicable to tiger corridor areas as well. Intensive form of land uses like commercial mining, setting up of industries causing pollution and establishment of major hydro electric projects, and discharge of effluence / solid wastes in natural water bodies etc. needs to be avoided in such areas.

GENERAL PRINCIPLES OF MANAGEMENT

- Co-occurrence agenda (Wildlife and People).
- A 'no-go area' for industrial development (but retrofitting safeguards required if such infrastructure already exists).
- The wildlife status of buffer should not be elevated to that of the core and managerial interventions should be restricted to allow tiger / wildlife gene permeability and low density occupancy while facilitating the meta-population dynamics of tiger in productive patches.
- Factoring in the landscape context and reducing resource dependency of local people on forests through sectoral integration resulting in ecologically sustainable livelihood option.
- Using the impact of natural / managerial interventions in the core area as a guide for dealing with forestry practices and wildlife management in the buffer.
- Identifying zones of influence vis-à-vis the various land uses operating in the area.
- Overarching focus on habitat restoration/productivity, reduction of forest resource dependency, providing ecologically sustainable livelihood options to local people, permitting ecologically sustainable land uses, avoiding intensive forms of land uses like mining or heavily used infrastructure and actively addressing human-wildlife interface. In case such land uses are present or permitted appropriate mitigation measures need to be enforced so as not to compromise on the conservation objectives of the buffer.
- Convergence of ongoing district level schemes is important to provide ecologically sustainable livelihood options for local people. This would reduce their dependency on forest resources while eliciting the much needed public support. A sizeable portion of tourism gate receipts should be recycled and earmarked to ecodevelopment committees for village specific interventions as per the participatory micro plan, with reciprocal commitments to protect wildlife and their habitat on quid-pro-quo basis.

7.1 DELINEATION OF BUFFER AREAS AND OTHER ZONES WITHIN THE BUFFER AREA (E.G. ECO-DEVELOPMENT ZONE, FORESTRY ZONE, PRODUCTION SECTOR ZONE, ETC.)

7.1.1 Delineation of Buffer area

The Similipal Tiger Reserve was notified by the Government of Odisha, Forest and Environment Department vide Notification No. 8F(T)-9/2007/20801/F&E, Dt. 31.12.2007 in which buffer area was demarcated as 1555.25 sq.km. (Annexure V).

Table 7a: Administrative Jurisdiction of Similipal Tiger Reserve Buffer

Circle	Division	Range	Extent KM^2	Part of WLS
Baripada Circle	Similipal North WL	Barehipani WL	179.20	Similipal WLS
		Talabandha WL	143.92	
		Thakurmunda WL	55.84	
		Nawana North WL	59.92	
		Kendumundi WL	146.30	
		Gurguria WL	129.67	
		Sub total	705.85	
	Similipal South WL	Pithabata North	124.11	Similipal WLS
		Pithabata South WL	50.69	
		Podadiha WL	80.09	
		Dukura WL	149.22	
		National Park WL	1.9	
		Sub total	406.01	
	Baripada	Kaptipada	65.32	Non Sanctuary area
		Baripada	4.78	
		Sub total	70.10	
	Rairangpur	Bisoi WL	181.28	Non Sanctuary area
	Karanjia	Satkosia WL	146.79	33.99 sq.km area under Hadgarh WLS
		Thakurmunda	45.22	Non Sanctuary area
		Sub total	192.01	
		Grand Total	1555.25	

Buffer inside WLS

Similipal Sanctuary was divided in to two forest divisions such as Similipal North WL Division and Similipal South WL Division. The buffer portion which is inside Similipal WL Sanctuary is about 1111.86 sq.km covering both the Divisins. Apart from this an area of 33.99 sq. km of STR in Satkosia WL Range of Karanjia Division is overlapping with Hadgarh WL Sanctuary in the Southern side of STR.

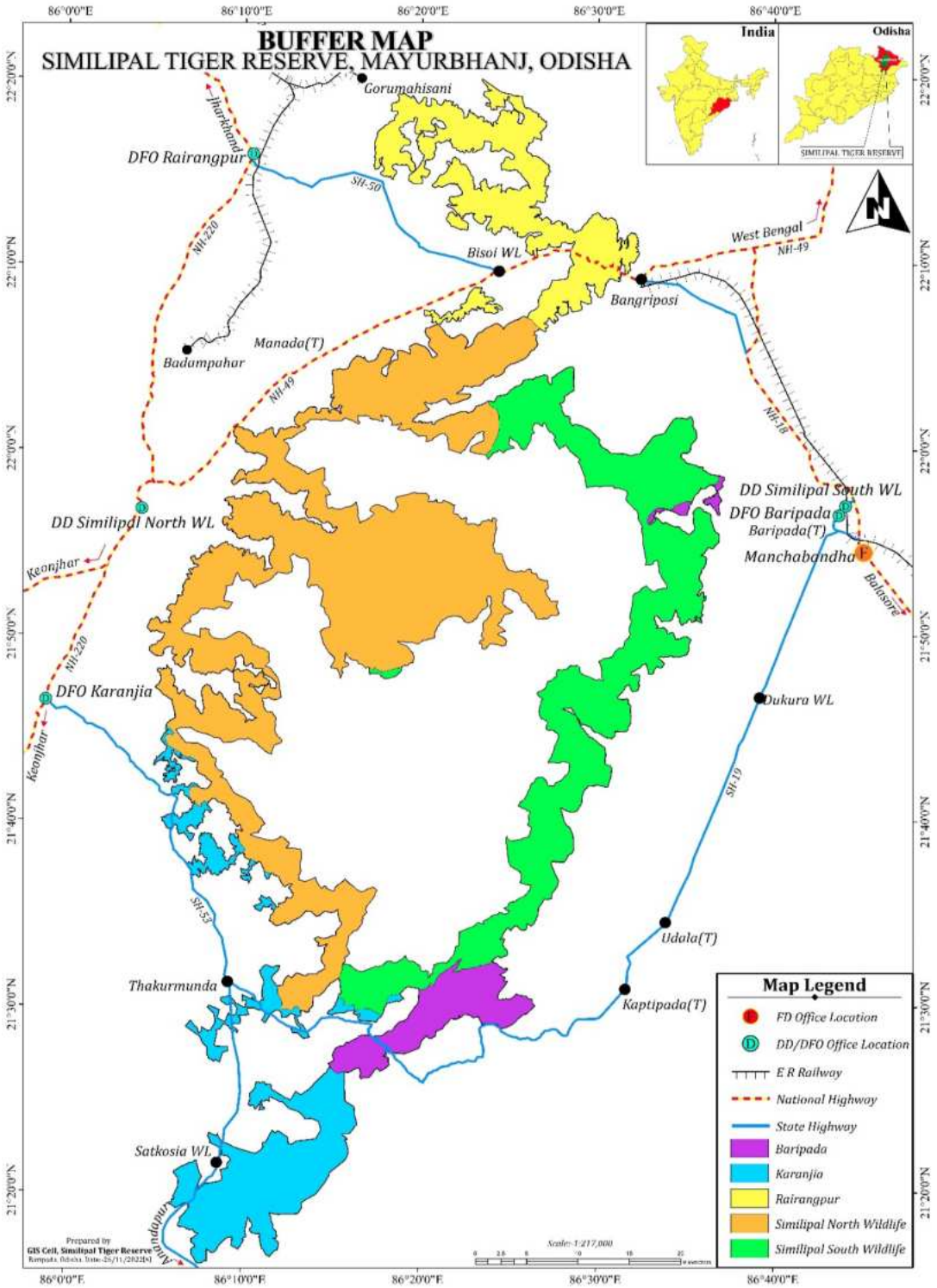
Buffer outside WLS

An area of about 409.40 sq. km is delineated as STR Buffer which is not the part of any WL Sanctuary or PA. this area is comprised of contiguous forest patches like Reserve Forest, Protected Forest etc. in the Divisions like Rairangpur, Baripada and Karanjia (excluding overlapping area of Hadgarh WL Sanctuary).

7.1.2 Zonation within buffer area

The entire buffer area of the four divisions is divided into the following zones:

1. Traditional Use & Forestry Zone (TUZ) (546.5 km²)
2. Eco-tourism Zone (0.47 km²)
3. Eco development Zone (101.62 km²)
4. Biodiversity Conservation Zone (18 km²)
5. Restoration Zone



Map 7A: Administrative Map of Similipal Tiger Reserve Buffer

7.2 ZONE AND THEME APPROACHES TO MANAGEMENT STRATEGIES.

7.2.1 Zone plan

Zonation is the most important activity of the management of landscapes for wildlife conservation. A zone is a specific management area distinguishable on account of its objectives. Separate zones need to be created because some of the management objectives may not necessarily be compatible. Zones cannot be managed in isolation and must relate to the functions of other zones and where relevant, to areas outside in a realistic web. Zoning is a frame work to a gradient of land use in a wildlife area. Management zones must be large enough to achieve the objectives proposed in that zone. The management zones need not be fixed in space or in time.

Regulations

The following general regulations are prescribed for the Buffer Zone.

1. The area will be protected against encroachments, since it has interface with habitations. This will be done by periodic boundary patrol as well as maintaining very conspicuous cairns.
2. The habitat of the area will be opened for restricted grazing and by different strategies and by providing alternative arrangements, through eco-development committees and developing fodder bank etc.,
3. The incidences of head loading will be minimized by focusing on the forest dependents through eco-development and providing free gas connection where feasible.
4. The resources of this zone will be protected from smuggling and poaching activities.
5. Habitat improvement works and maintenance of the existing facilities will be carried out.
6. Habitat restoration activities, like soil and moisture conservation works, the planting, removal of lantana and other weeds etc will be permitted.
7. Forest Fire prevention structure will be developed to control fire.
8. Habitat manipulation for improvement will be permitted in this zone.
9. NTFP collection will be allowed in the Buffer zone subject to WLPA and FRA
10. There will be no selection felling/ or thinning of timber species.
11. Shared use of Buffer Zone will be limited only to the non-consumptive use of the resources.
12. The biotic interference in the area will be minimized by the scheme of eco-development.
13. The scientific research will be encouraged in this zone. A separate guideline has already been given.
14. Regulation of traffic in the highways is very important, by speed regulation, parking regulation and also controlling the movement of vehicles during night time.
15. Awareness and nature camps will be encouraged to understand the importance of eco system.

SCOPE OF MANAGERIAL INTERVENTIONS

i. Providing ecologically sustainable livelihood options to local people in collaboration with various sectors/organizations.

ii. Incentivizing local people for protecting forests and wildlife (PES, Ecotourism).

iii. Ensuring retrofitting measures in sectors of development with reciprocal commitments.

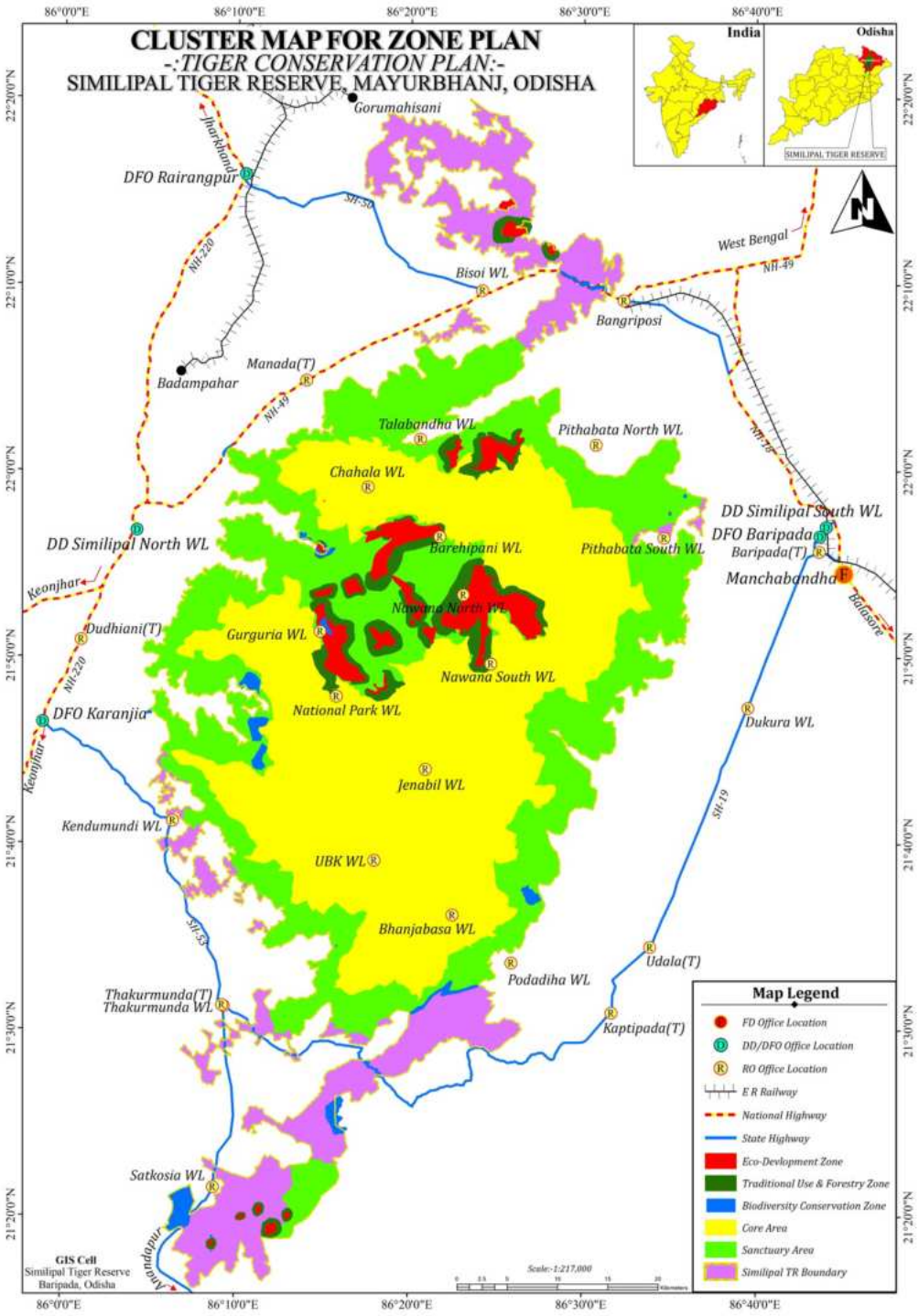
iv. Ensuring active management in areas where tiger / Co predators / wild ungulates co-occur with people to minimize human-wildlife interface conflicts.

v. Ensuring monitoring of tiger / wildlife on a periodic basis in standardized manner, amenable to scientific inference.

vi. Ensuring surveillance and protection of tiger and wildlife.

vii. Building up the capacity of field staff and local people as a part of an adaptive management to ensure effective implementation.

viii. In case the buffer comprises of protected area then managerial interventions should be in conformity with the provisions of the Wildlife (Protection) Act, 1972.



Map 7B: Zone Map of Similipal Tiger Reserve Buffer

7.2.1.1 TRADITIONAL USE & FORESTRY ZONE (TUZ) (546.5 km²)

There are 64 villages inside this zone. An area of 103.11 km² of the forest from the total area of the TUZ has been earmarked to the adjoining villages for bonafide use of the people. The details of such area are given in Annexure LVII. Further, an area of 443.39 km² covered under the Revised Working Plan of Karanjia, Rairangpur and Baripada Division (2021-22 to 2030-31) is also included in this zone. The wildlife management (overlapping) working circle has been created in the above plan to include the above proposed buffer area of Similipal Tiger Reserve with the objective to improve, maintain the environment in and around Similipal for the conservation of wild animals, to conserve the diversity and integrity of biotic conservation of plants and animals within natural eco-system and safeguard the genetic diversity of species on which their continuing evolution depends.

Strategies

- This zone is meant for traditional use of the enclaved villagers within which, regulated livestock grazing is allowed, and collection of NTFPs and firewood is permitted for the bonafide use of enclaved villagers as well as normal forestry practice with compliance of the rights and concessions of the villagers in those areas.
- Activities like construction of check dams, meadow formation for fodder demand of the cattle, plantation of the fruit bearing trees to meet the NTFP demand of the villagers and to supplement the food needs of herbivores, elephants and birds in degraded sites, soil and moisture conservation measures, silvicultural measure for improvement of the existing forest for the benefit of both animal and people need to be taken up.
- Resource use regulations *prima facie* need to be tied to wildlife habitat needs.
- NTFP harvesting shall be regulated with proper assessment of regeneration status of such species.
- Entry into the TUZ is to be regulated by providing **identity cards** to the villagers of the enclaved villages.
- As in core zone steps to be taken to develop refuges and shelters for wild animals and all the available nesting dens of different animals to be surveyed, identified and protected.
- Fire needs to be prevented by involving the people of the enclaved villages.
- Compartment or part of the compartment needs to be earmarked for villagers for the grazing of their cattle.
- Grazing area to be earmarked.
- Enrichment planting of favourable species of wildlife in blank patches. Planting of grasses at suitable places.
- Encouragement of undergrowth, middle storey and ground flora in the Forest.
- No fruit bearing trees like Harida *(Terminalia chebula)*, Bahada*(Terminalia belerica)*, Amla*(Emblica officinalis)*, *Ziziphus* species, *Ficus* species and Mahula(*Madhuca indica)* shall be felled.
- Soil and water conservation measures will be taken up.

Table No 7b: Area under WC of Territorial divisions in Similipal Tiger Reserve Buffer

Division	WP period	Land use with extent(km^2)		Landuse & WCs as perWP
Baripada	2021-22 to 2030-31	Forest area	70.10	1. NTFP overlapping WC JFM overlapping WC Wildlife overlapping WC
Sub-Total	70.10			

Karanjia	2021-22 to 2030-31	Forest area	167.64	1. NTFP overlapping WC 2. Wildlife overlapping WC 3. JFM overlapping WC
		Village area and agriculture land	24.37	
Sub-Total	192.01			
Rairangpur	2021-22 to 2030-31	Forest area	176.44	1. NTFP Overlapping WC 2. Wildlife overlapping WC 3. JFM overlapping WC
		Village area and agriculture land	4.84	
Sub-Total	181.28			

1. Forestry

Ecosystem management required

Ecological availability of a tree should be ascertained before removal

A tree should be considered ecologically available if

(a) Its removal does not create a gap beyond 43 to 45%.

(b) The regeneration of species at various formation levels within a radial distance of twice the crown radius of the tree being selected for felling should have an 'established' status.

Tree fellings / Thinnings

No clear felling and other silvicultural systems promoting concentrated regeneration

No conversion to uniform forests

A high forest system with diffused regeneration should be preferred

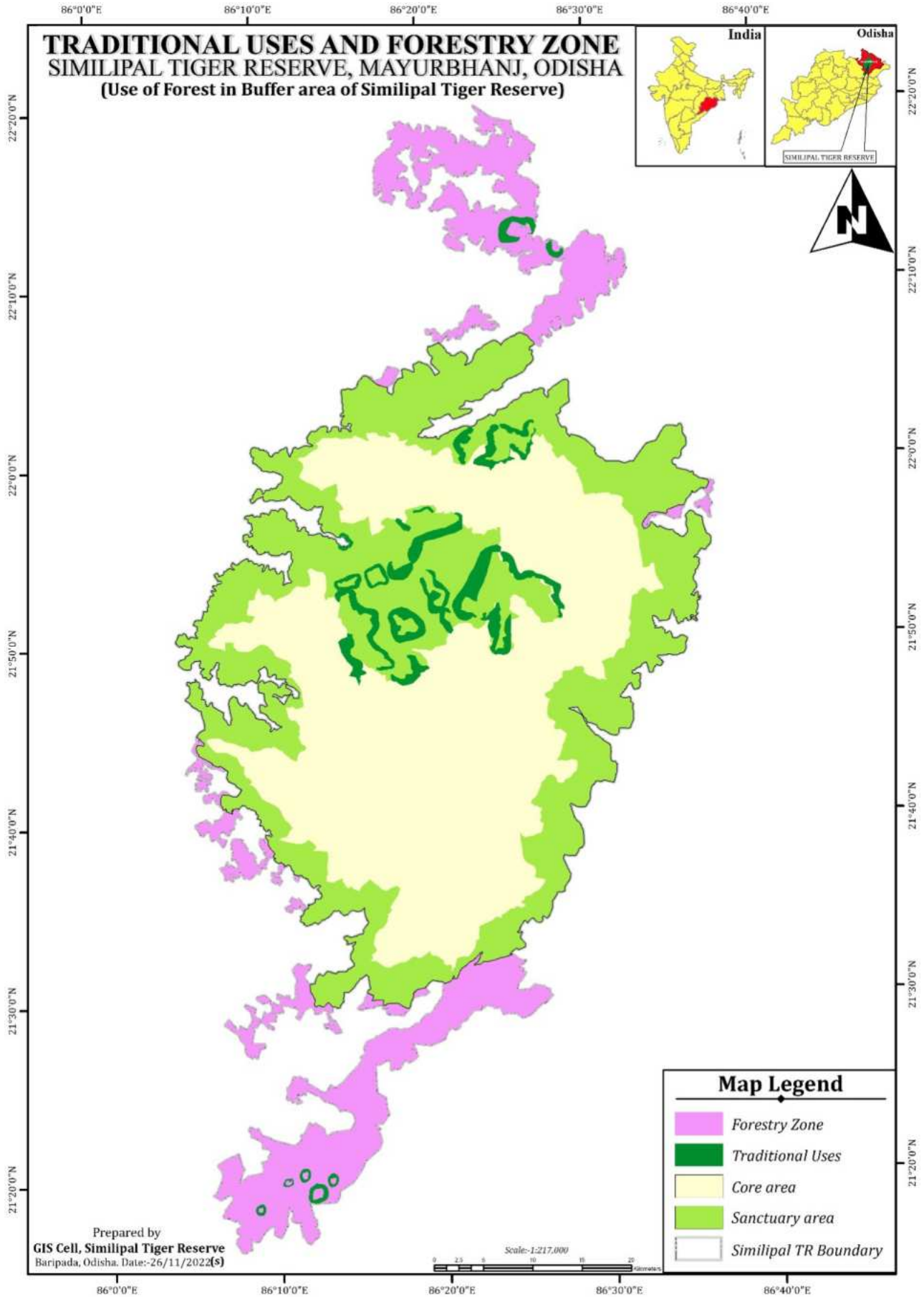
Status of regeneration should be an overarching consideration to permit felling

Areas having considerable disturbance should not be felled

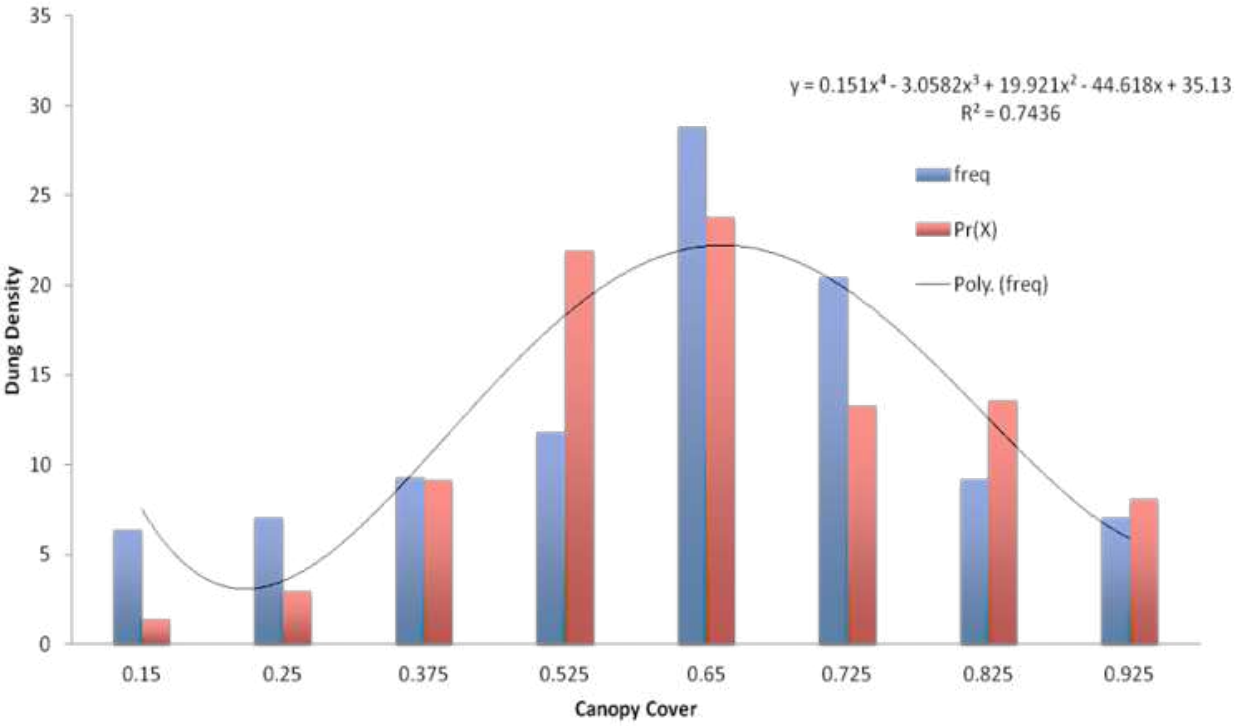
Tree fellings / Thinnings

Table No 7c: Canopy class and wild dung presence

Mid-Value	Wild dung	SE	Freq.
0.15	10.52	0.79	6
0.25	11.68	0.71	7
0.375	15.46	1.08	9
0.525	19.56	2.75	12
0.65	47.86	19.30	29
0.725	33.92	14.03	20
0.825	15.22	7.21	9
0.925	11.72		7



Map No 7C: Traditional Zone and Forestry Zone in Similipal Tiger Reserve Buffer



- After due consideration to regeneration/status, the relationship between canopy class and wild ungulate dung presence should be used as a guide to prescribe the stem removal
- Buffer areas should be managed for wild ungulates at a level which is 30% lower than the optimal levels in core areas
- In general, the relationship between mean ungulate density and canopy class intervals in a sal / tree dominated forests, with polynomial curve fitting shows that the 80% lower bound corresponds to a canopy cover of 43% (computed for sal forests of Central India; similar relationships need to be developed for other forest types to facilitate inference)
- Thus, for sal forests of Central India, the timber harvest in the buffer / corridor area may be permitted in a selective manner so that the canopy cover does not fall below 43% during winter months. This strategy will minimize tiger-human conflict while permitting selective extraction of timber species
- More openings will permit lighter while fostering more regeneration thereby attracting wild ungulates and tigers
- The idea behind buffer / corridor management is to sustain it for gene flow, while not elevating its status to that of core area in terms of wildlife abundance

Collection of NTFP

- NTFP collection should not be permitted in areas with maximum disturbance and unestablished regeneration status, as this would adversely affect the demography of such species.
- The regeneration status of NTFP species in the buffer / corridor area should be compared with its status in the core / critical habitat.
- Collection should not be permitted in areas having endangered arboreal fauna.
- No lopping / felling should be permitted during NTFP collection.
- Collection should not disturb 'canopy bridges' in an area.
- The timings for NTFP collection should be regulated while avoiding early morning or late evening.

- The patterns of NTFP collection should be studied for prescribing ecologically permissible collection.
- The quantum of NTFP collected in an area should be regulated, considering its consumption by wild animals.
- An estimation of the availability of NTFP (fruit / tuber / leaf) should be done (example: for total fruit crop estimation, considering several categories of branches and the number of fruits per branch etc.).
- Fire should not be used to promote new flush of leaves (usually done for Tendu), as this would lead to forest fire.
- Fruit removal affects frugivory, hence fruit tree should be fostered.
- The density of NTFP species in the buffer / corridor area should be compared with their densities in the core / critical tiger habitat. In low density areas such NTFP species should not be permitted for extraction.
- A chart depicting NTFPs collected in various areas within the division over months during a year should be prepared for close monitoring.
- Different parts of a tree / plant / shrub / herb are harvested as NTFP and many of them are valuable as medicinal plants. To avoid overexploitation, it is important to prescribe site specific indicators for their ecologically sustainable management, vis-à-vis the regeneration status.
- The nursery techniques of NTFP species (especially those having medicinal value) should be fostered through the community linked to incentives for growing subspecies.
- Regulation through PES (Payment for Ecosystem Services)

Table 7d: Indicators to avoid over exploitation of NTFP

NTPF part harvested	Indicators
Fuelwood	Regeneration status Intensity of girdling/cutting of young trees (number of stumps per unit area) Change in the rate of extraction Quantum of dead/fallen twig branches on forest floor
Leaves	Reduction in canopy cover Reduction in leaf litter Regeneration status Weed invasion Change in species composition
Fruit/flower/seed	Regeneration status Annual productivity per sample tree vis-à-vis the productivity in core/ critical tiger habitat Method of harvesting Season of harvesting vis-à-vis requirements of wild animals (fruit/ flower/seeds act as 'qualifiers' in a habitat, and their total harvesting would reduce such welfare factors)
Bark	Girdling Tree mortality Regeneration status Number of dead stems per unit area
Rhizome	Regeneration status

Fuel / fodder collection

(a) Grazing should be regulated in a rotational manner, and prophylactic immunization should be done for village livestock.

(b) Since the unrecorded removal from forest exceeds the recorded removal in many States, fuel / fodder collection should not be permitted in disturbed areas or compartments with poor regeneration status. Such areas should be prescribed a 'recovery' period before reopening them for fuel / fodder collection.

(c) A 'safe lopping index', based on site specific studies should be prescribed for fodder removal on a rotational basis.

7.2.1.2 ECO-TOURISM ZONE- (0.37 km²)

The ecotourism zone extends over 130 km road length, out of which 92 km road length is in buffer and major attraction points covering an area of around 0.37 km² which is used for tourism are notified as buffer of STR and included in the zone for ecotourism, interpretation and nature education during the last plan period. This area shall continue to be the zone for ecotourism, interpretation and nature education during the currentplan period. Management strategies for ecotourism, interpretation and nature education zone are described in **Chapter 14** of buffer plan.

7.2.1.3 ECODEVELOPMENT ZONE (101.62 km²)

The Ecodevelopment zone is confined to 101.62 km² of the village area where mainly agriculture products are produced.

Similipal hills serve as a life-support system for the tribals and tigers. It is a treasure house of nature with captive scenic beauty, the lush green valleys, the majestic Sal and the stream and rivulets cascading down the hills. Being located in the heart of Mayurbhanj District of Odisha, the hills, forests, rivers, wildlife of Similipal are deeply ingrained in the culture of the region. Majority of the population in the district are forest dependent communities with nearly 58.72 per cent of the total population (2011 census) are Scheduled Tribes. Many tribes like Kolha, Santal, Bhumija, Gond & Ho live in and around Similipal landscape in the district. Particularly vulnerable tribal groups (PVTGs) such as Khadia, Mankidia & Lodhas live in the landscape who are largely depended on forest-based livelihood.

The management strategies for eco-development and livelihood zone are described in **Chapter 8** of buffer Plan.

7.2.1.4. BIODIVERSITY CONSERVATION ZONE (18 KM²)

Wildlife management in Buffer Areas

- Buffer areas require a 'coarse filter' approach for maintaining a variety of plant / animal species
- Day to day monitoring
- Habitat amelioration (compensatory nature)
- Fostering indigenous fodder / fruit species
- Maintaining existing water points
- No drastic habitat interventions
- Cropping pattern / harvesting to factor in cover values
- Inherent / induced diversity indices need to be computed for maintaining the edges (without enhancing them)
- Human-wildlife interface issues to be addressed

- Treatment for riparian zones / unique features
- Retention of dead trees, snags
- Restoration / protection of existing corridors

The Biodiversity Conservation Zone is meant to identify, prioritise and conserve areas/patches rich in biodiversity within the buffer area. They can be any of the following

a. A patch of forest rich in overall floral diversity

b. A patch of forest rich in indigenous cultivars, medicinal plants

c. A patch of forests rich in interesting plant groups like orchids

d. A patch of forests, which supports special habitats/ microhabitats like dens, cliffs, overhangs etc

e. Various known corridors (vegetal/non-vegetal), forest patches linking to other divisions eg. Riverine patches, nalla beds, unique habitat features, gullies etc.

The special habitats will be demarcated, conserved by engagement of special watchers, installation of barriers in routes, signages at each human entry point with Do's and dont's. Regular monitoring of the site will be taken up to assess habitat condition, use by animals etc.

Some special habitats of a few wild animals have been identified as given below. The mapped area has been provided below.

- Peacocks in Rangamatia area of Notto R.F.,
- Vultures in Puljhariof Dukura WL Range
- Porcupines available in large numbers in Rangamatia of Notto R.F. of Baripada Division.
- Gaurs in Similipal R.F. in Barehipani WL Range,
- Pythons in Rajupal area of Barehipani WL Range of Similipal North WL Division.
- Bio diversity rich connectivity area of Kolha Ridge of Barehipani and Gurguria WL Range of Similipal North WL Division.
- Mouse deers, Red Jungle fowls found in plenty in Kendumundi and Gurgudia Ranges of Similipal North WL Division.

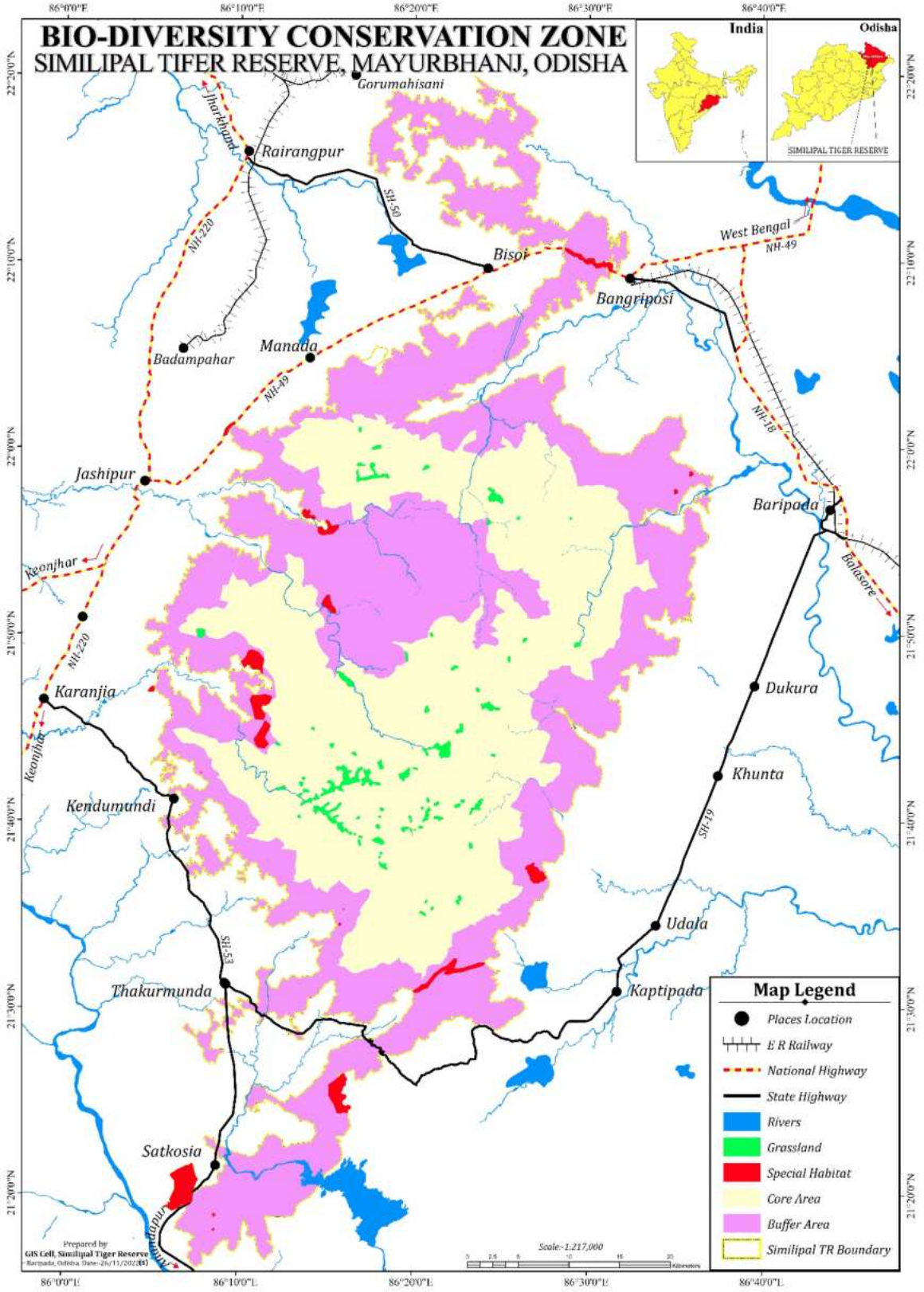
Similipal is a unique habitat for varieties of butterflies native to the area.Hence, in situ conservation measures will be taken up for the butterflies of Similipal to stabilize the ecosystem. The special habitats are relatively different than the other wildlife habitats in the buffer area of Similipal Tiger Reserve. These habitats are under threat due to degradation by the biotic interference. Hence a strict conservation measures to be taken up through annual action plans submitted by the respective buffer D.Ds/D.F.Os and regular monitoring of the special habitats of the above animals and strategic actions will be taken up with proper conservation and habitat improvement activities.

Apart from the above, following important patches have been identified which are serving as corridors connecting the forest patches within the tiger reserve as well as with other forests outside the reserve. These are critical patches from the point of migration of animals as the connectivity is disturbed due to passing of some important roads in these patches.

1. Forest patch connecting Bidhubhandar PRF and Tunguru RF on the northern side which is an important corridor for movement of wild elephants. National Highway No. 6 is passing through in a stretch of about 7 km. Langurs and macaques congregate on the road in that stretch in hope of getting food thrown by the commuters.

2. On the norther western side of the tiger reserve, small animals move between Similipal and Badampahad RF crossing NH 6 at a point near Chheligodhuli.

3. On the southern side, animal movement is noticed between Notto RF and Satkosia RF where the state highway is passing through a stretch of about 15 km.
4. The forest patch connecting Satkosia RF in STR to Santoshpur RF of Keonjhar (Wildlife) Division is an important corridor for elephants and tigers in particular and wildlife in general.



Map 7D: Bio-Diversity Conservation Zone of Similipal Tiger Reserve

Strategies:

- Special conservation area to be demarcated with proper signage at important foot trails with importance of the wild animals and their role to the ecosystem in Odia, English and Santhali/Bathudi language for better understanding and local awareness.
- Local people to be made aware of the ban of insecticides, fertilizers, chemicals in the crop field and make use of bio fertilisers, bio insecticides like neem oil cakes, neem oil instead.
- Restricted use of the demarcated area from collection of NTFP by the locals and ban of entry of domestic cattle in to the special habitats.
- Soil and moisture conservation measures to improve quality of forest and improve the degraded sites.
- Proper sanitation of the saltlicks, waterholes, caves, grasslands from poisons traps, snares, baits etc by regular patrolling.
- Regular vaccination of cattle, goats, sheep of the villages which have risk to enter in to these habitats accidentally.
- Ban of diclofenac sodium or its derivatives in cattle and domestic pets by the veterinary surgeons / livestock inspectors in entire buffer area for conservation of vultures. Alternative medicines to be supplied to the Vets in subsidized prices.
- Payment of incentives to the locals protecting and conserving the protected wildlife and their habitats.
- EDCs/VSSs to be activated by providing various livelihood activities through micro plans and their involvement to be made for conservation of the wildlife available at a close proximity to the village area.
- For butterfly conservation, an eco-friendly enclosure by net/wire mesh house will be created by naming Butterfly Park and proper conservation measures will be taken to protect endangered/ rare species of the butterflies.
- Signages and caution boards shall be fixed on the roads to aware the commuters regarding passing of wild animals. Awareness boards for commuters regarding movement of monkeys with pledge not to feed those monkeys will be fixed on NH 6 near Bidhubhandar PRF. Proper surveillance in those a4reas will be kept.

7.2.1.5. Restoration Zone:

The area which is available after successful voluntary relocation in Buffer areas will be included in this zone. The voluntary relocation is being carried out as per the revised guidelines for relocation of villages from the Sanctuaries/National Parks/ Tiger Reserves/inaccessible Forest Areas including areas connecting wildlife habitats issued vide Notification no. FE-WL-WLF-0021-2016/12390/F&E Dt. 19.07.2021 of Forest &Environment Department, Government of Odisha.

Kiajhari village located in the Buffer of Similipal Tiger Reserve has been completely relocated. The area is coming under the Restoration Zone in which meadow development works are going on. Similarly, Khejuri village has been partially relocated and efforts are going on to make the village fully relocated voluntarily. After full relocation of Khejuri village, the same area can be brough under this zone for further management interventions.

The detail management strategies are described in Chapter 7 of Core plan.

7.2.2 Theme Plans

The goal of the plan is to restore, maintain and enhance the biodiversity, habitat and conservation value of the Reserve as to ensure perpetuation of the tiger as flagship species. This can be ensured through a multifaceted approach to the complexity of the problems noticed at the time of management. They are:

1. Protection
2. Control of forest fire.
3. Boundary maintenance
4. Fostering awareness in local communities
5. GIS based Time Series monitoring of land use change

7.2.2.1 Protection

A Security Plan for protection of Similipal Tiger Reserve have been prepared for both the core and buffer area and given in the Theme Plans in Chapter 7 of Core Area plan.

7.2.2.2 Control of forest fire.

Out of the total area of the TR, 580 km^2 of forests under dry deciduous hill forests, high level sal forests and grassland are very much prone to fire during the period from February to May. The fire is mostly intentional i.e., people set fire for collection of non-wood forest produce and Akhanda Shikar. At times it is caused by the timber smugglers, carelessness of tourists and passersby. The objectives of control of forest fire are

- To prevent fire spreading into the forests so that the ground flora and fauna are well protected.
- To ensure germination of seeds and thereby maintain the stand with trees of all girth classes.
- To protect the humus, snags and down trees which harbour a lot of organisms.
- To eradicate coarse grasses giving place to annual grasses palatable to the herbivores.
- To maintain the ambush cover for the prey animals and refuge cover for all animals for reproduction.

Strategies:

The strategies discussed in Chapter 7 of Core Area Plan will be adopted for the buffer area also.

7.2.2.3 Boundary Maintenance

The total length of buffer boundary is 1059.05 Km and length of core boundary is 386.87 km. There are 64 villages in the buffer area of Similipal Tiger Reserve and 1200 villages within 10 km from periphery of the Sanctuary. There is pressure of encroachment of Reserve from these villages in future.

With the technological intervention, Odisha Forest Department completed the DGPS process. All the boundary and pillar positions are digitized with preparation of maps showing geo-coordinates. The joint team formed consisting of officials of both Revenue and Forest department have jointly surveyed the boundary along with DGPS personnel for rationalization. After the public consultation in Gram sabha of the concerned GPs, final map is prepared. The accuracy of DGPS survey comes in centimeters which will bring clarity of the jurisdictional issue.

Strategies:

- The cause of encroachment is because of low productivity from the land under agriculture. Hence attempts will be made to put more inputs in the form of irrigation, creation of water body in the periphery of the sanctuary or tail-end of the major rivers to provide water for agricultural purposes, use of bio fertilizer and change of cropping pattern so that the people concentrate on intensive agriculture against extensive one.
- Through awareness the local people need to be sensitized on the penal provisions in Wildlife (Protection) Act, 1972 and Orissa Forest Act for destruction of habitat and encroachment of forestland respectively.

- Pillar maintenance and new pillar posting where required will be done on the boundary of the reserve along the village boundaries.
- Regular inspection of the boundary with yearly inspection programme for all the staff and officers will be chalked out in each Division.
- The area where forest rights have been given will be properly shown in the map.

7.2.2.4. Fostering awareness in local communities

Ensuring the cooperation of the people living in the peripheral areas surrounding the Tiger Reserve is one of the most important priorities of the Tiger Reserve administration. The local people cooperation is needed for effective conservation of forest and wildlife in and around Tiger Reserve. It can be secured through massive awareness programme on the following lines:

Awareness about:

- The need to preserve the pristine forest of the region.
- The need to protect the various flora and fauna in the region including the rare, endemic and thretened species.
- Need to create awareness to mitigate the climate change adaptation.
- Awareness on bio-diversity register about the village.
- Awareness on protection of natural sites.
- Awareness on using eco-friendly devices such as Solar cooker, Solar lights.

The awareness programme will be conducted in all revenue villages/ hamlet in collaboration with the local Gram sabha and EDC. The programmes may include short plays, tribal dance, workshop and seminar, etc., The local NGOs, NSS units, Eco-Clubs and able local youths will be involved in all these programmes so that they can pass on the message to other people.

7.2.2.5. GIS based Time Series monitoring of land use change

All data relating to the existence of various types of lands with GPS readings and land use pattern in the peripheral area of the Tiger Reserve will be collected and stored. A land evaluation for ascertaining the land use pattern in the peripheral/ buffer area of the Tiger Reserve will be carried out based on soil survey data within a geographical information system. The soil-based GIS data will be compiled and interpreted for land use suitability and fertility assessment. Maps of fertility and land use suitability will be generated from interpretative records. A suitability map for each agricultural land use will be developed by combining the climatic and soil site factors for each crop. The study would be carried out with the assistance of GIS staff of Principal Chief Conservator of Forests (WL) & CWLW and ORSAC, Bhubaneswar. The land use planning would involve making knowledgeable decisions about land use and the environment. Soil information is a vital component in the planning process, reflecting directly upon land-use suitability. Advanced land evaluation techniques have been found useful in addressing soil fertility constraints and management problems in the areas of low productivity. In areas that are inhabited by tribal farming communities, crop failures were experienced frequently due to traditional agricultural practices. These areas will be given priorities for improved crop planning and agricultural development. Therefore, the study is aimed at using GIS for the integration of soil survey data to assess land use suitability to enhance land allocation processes for agricultural usage. The land use plan will be prepared from thematic maps with the land capability classification, land suitability and the fertility capability classification. Land capability classes will be used for land use assessment, determine erodible areas and to review land use potentials. The land resource data, that have been generated, could be integrated through GIS techniques for efficient crop planning, in the peripheral areas of the Tiger Reserve. The outcome of the study will be used to persuade the local people to follow certain norms towards proper land use method.

7.2.2.5.1. Use of GIS / Remote sensing / IT Techniques

For effective management, the utilisation of modern scientific and technological instruments like GIS, remote sensing, and IT are crucial. The park management at different levels will be trained in understanding and using these modern scientific tools and technologies. GIS cell to be established at Baripada and Jashipur. One GIS specialist each at Baripada and Jashipur should be recruited for all the GIS based interventions and analysis using modern tools and techniques.

Forest fire management using GIS tools by getting fire points well before the FSI points synced with OFMS (Odisha Forest Management System) portal and transmitting the details of fire points with geo-coordinates is being carried out from the GIS cell of the Field Director at Baripada.

Use of MSTrIPES mobile application for both Tiger estimation in Ecological module (Phase IV) and patrolling in Patrol module is being followed throughout the TR. Frontline staff are wel trained about the use and efficiency of the mobile app and are well acquainted with the system.

Use of "ANUKAMPA" mobile application for fast payment of compassionate grant for Crop damage, House damage, Cattle kill, Human injury and Human death caused by any wild animal is being used. It a citizen friendly application where common people can fill up the online generated form by specifying their loss of property and/or life due to wild animal and the same will be surveyed and verified by the department staff for initiation of payment immediately.

"i-WLMS" mobile application is being used for monitoring and tracking elephants and uploading their present status with both direct as well as indirect signs found in the field. The application is used by the staff of the TR and daily elephant monitoring data is being uploaded which can be monitored centrally from the State Wildlife Headquarters at Bhubaneswar.

Use of KYFL application also enables the bordering range of STR to know the ownership of the land on which they are currently standing. This also helps in finding out any encroachment, illegal boundary line disturbance etc. in the TR.

Beat information System (BIS) is a tool to know each and every detail of the beat during inspection or field visit. All the beats of STR have been covered under BIS and the data is regularly updated. Crime data analysis is also being done by putting layers in GIS platform and vulnerable beats prone to illegal activities is being carried out. This will enable the field staff to monitor and patrol in vulnerable areas for curtailing illegal activities in the Tiger Reserve. Works are under process to make it as mobile application.

Avenza maps are also being used by Geo-referencing the maps and plotting the required layers on it which helps the smooth management and patrolling.

CHAPTER 8
ECODEVELOPMENT AND LIVEHOODS

CHAPTER

08

ECODEVELOPMENT AND LIVELIHOODS

8.1. POLICY AND INSTITUTIONAL FRAME WORK

8.1.1. Policies

The main cause of destruction and degradation of forests is poverty among the people who live in and around forests and are dependent on the forest lands for their basic needs. It is true that the problems in wildlife conservation are intricately related to the quality of the local people. Unless this underlying problem is solved, efforts to ensure wildlife conservation can hardly succeed. This means that the conservation efforts should be directed towards solving the problem of people living adjacent to the forests. Involving people's participation in protecting natural resources is a part of the National Forest Policy (1988) of the Government of India. This strategy is also referred to as people's participation/community participation/ joint forest management. Jusoff and Majid (1995) while noting the acute problems in conservation when dense rural population exist in the neighbourhood of forests, opined that conservation efforts can't be effective without the active co-operation and participation of people living in and near the forest areas. Experiences in protecting the biodiversity of North-East India also revealed that unless financial income is generated and there is economic stake for the local people the biodiversity conservation goals might not be achieved to the desired level. It is possible to ensure sustainable development has to be ecologically harmonious and economically efficient and must aim at local self-reliance. The South Pacific Biodiversity Conservation Programme (SPBCP) also recommends the conservation of biodiversity goals by facilitating the involvement of local communities and other related government agencies addressing the issues of ecologically sustainable use of natural resources. Of late, the concept of people's participatory approach is in practice for management of natural resources in several parts of the globe.

National Wildlife Action Plan (NWAP 2017-31) aims at building, enhancing and sustaining people's support and participation in wildlife conservation. Keeping this in view, the following actions have been identified in Chapter 11of NWAP (2017-31) to ensure People's Participationin Wildlife Conservation. Conservation programmes must attempt to reconcile livelihood security with wildlife protection through creative zonationand by adding new PA categories in consultation with local communities, suchas an inviolate core, conservation buffer, community buffer and multiple useareas.

The actions required under NWAP (2017-31) are the following:

- Consolidate and improve upon the achievements made towards ensuring people's support and participation in wildlife conservation during the earlier NWAPs.
- Address the factors which adversely impact public support and attitude towards wildlife conservation.
- Revive, extend and sustain people's stake in wildlife conservation with due regard to relevant laws and without compromising with the scientific basis for conservation.
- Build capacity of the wildlife managers as well the local people to work together for wildlife conservation.

The policy of Govt. of Orissa on Joint Forest Management framed during 1998 is being followed. EDCs in protected areas and VSS in other areas are being formed. As on December,2012, 161 nos. of EDCs and 680 nos. of VSS have been formed. Confederation of the VSS and EDCs has been formed known as Forest Development Agency in three Divisions. Part of the buffer area is also part of Similipal Sanctuary and a small part of Hadgarh Sanctuary. In addition, the buffer area of the Tiger Reserve falls in the Similipal Biosphere Reserve which was declared on 22.06.1994. Since that time, a variety of eco-development and livelihood-development activities have been taken up. One Eco-technology centre will be established at Nawana which is the central place of the TR with an Eco-development Officer and his assistant.

The Concept of Eco-Development is catching up as an alternative strategy for Forest Protection and Conservation, involving local communities in the management of the Protected Areas. The Kalakad-Mundanthurai Tiger Reserve, Kanha Tiger Reserve have shown leadership in the field and successfully evolved and implemented eco- development strategy and brought up a model of eco-development, which is highly acclaimed. The same model is being adopted and replicated for Similipal Tiger Reserve by making local level adjustments imperative for matching ground level situation.

In STR, about 15,000 people live inside the Tiger Reserve. Hence, the role of Eco-Development committee will be of utmost importance and significance. The Eco-development objectives of Similipal TR have been designed in line with the general theme of eco-development philosophy of KMTR model, that helps effective conservation of the forests through the economic development of the forest fringe dwellers by adopting an active strategy evolved through micro-planning strategy.

The NTCA has issued exclusive guidelines for implementing the buffer zone activities in ensuring co-existing agenda.

8.1.1.1. Ecodevelopment / PES / Sustainable livelihood / District level local development

1. Village level micro planning for benefits to local people on a quid-pro-quo basis (involving VFC/EDC)
2. Innovative use of JFM / REDD+/ PES / recycling of tourism gate receipts to Ecodevelopment Committees
3. Benefits from district level developmental works (convergence), interalia, covering

   (i) Public health and family welfare

   (ii) Food and nutrition security

   (iii) Education

   (iv) Natural resource management and water security

   (v) Sanitation

   (vi) Roads

   (vii) Energy

   (viii) Housing, and

   (ix) Livelihoods

8.1.2. Legal Provisions

8.1.2.1. Legal Provision in the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act,2006.

The FRA 2006, under Section 3 of the Act, gives certain rights to scheduled tribes and other traditional forest dwellers as given below.

a. Right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member or members of a forest dwelling Scheduled Tribe or other traditional forest dwellers.

b. Community rights such as nistar, by whatever name called, including those used in erstwhile Princely Status, Zamindari or such intermediary regimes.

c. Right of ownership, access to collect, use and dispose of minor forest produce which has been traditionally collected within or outside village boundaries.

d. Other community rights of uses or entitlements such as fish and other products of water bodies, grazing (both settled or transhumant) and traditional seasonal resource access of nomadic or pastora list communities.

e. Rights including community tenures of habitat and habitation for particularly vulnerable tribal groups and pre-agricultural communities.

f. Rights in or over disputed lands under any nomenclature in any State where claims are disputed.

g. Rights for conversion of Pattas or leases or grants issued by any local authority or any State Government on forest lands to titles;

h. Rights of settlement and conversion of all forest villages, old habitation,unsurveyed villages and other villages in forests, whether recorded,notifiedornot intorevenue villages;

i. Right to protect, regenerate or conserve or manage any community forest resource which they have been traditionally protecting and conserving for sustainable use;

j. Rights which are recognized under any State law or laws of any Autonomous District Councilor Autonomous Regional Councilor which are accepted as rights of tribals under any traditional or customary law of the concerned tribes of any State;

k. Right of access to biodiversity and community right to intellectual property and traditional knowledge related to biodiversity and cultural diversity;

l. Any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes or other traditional forest dwellers, as the case may be,which are not mentioned in clauses(a) to (k) but excluding the traditional right of hunting or trapping or extracting a part of the body of any species of wild animal;

m. Right to insitu rehabilitation including alternative land in cases where the Scheduled Tribes and other traditional forest dwellers have been illegally evicted or displaced from forest land of any description without receiving their legal entitlement to rehabilitation prior to the13thday of December,2005.

Not withstanding anything contained in the FCA,1980, the central government shall provide for diversion of forest land for the following facilities managed by the government which involve felling of trees not exceeding75trees per hectare, namely:

a. Schools;

b. Dispensary or hospital;

c. Anganwadis;

d. Fair price shops;

e. Electric and telecommunication lines;

f. Tanks and other minor water bodies;

g. Drinking water supply and water pipe lines;

h. Water or rain water harvesting structures;

i. Minor irrigation canals;

j. Non-conventional source of energy;

k. Skill upgradation or vocational training centres;

l. Roads; and Community centres:

Provided that such diversion of forest land shall be allowed only if,

i. The forest land to be diverted for the purposes mentioned in this sub-section is less than one hectare in each case; and

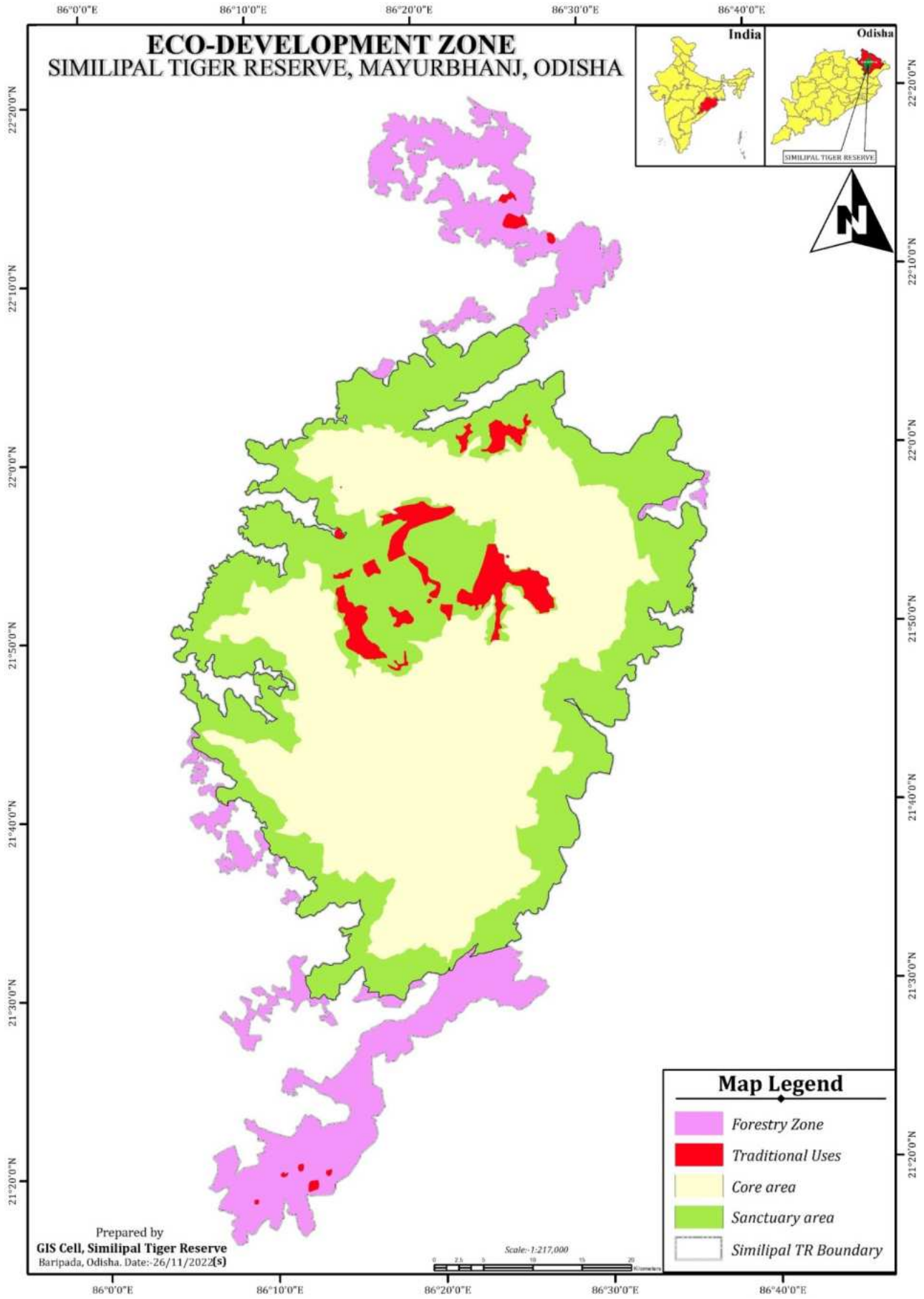
ii. The clearance of such developmental projects shall be subject to the condition that the same is recommended by the Gram Sabha.

The NTCA vide letter F.No.8-6/2020-WL dated October 2020 has clarified that wildlife clearance will be required for implementing Section 3 (2) of FRA,2006 in PAs.

8.1.2.2. Legal provisionin Wildlife (Protection) Act, 1972 as amended in2006

The explanation (ii) of Section38V(4) of WPA,1972 vests following rights to be enjoyed by the people in buffer area of TR.

ii) Buffer or peripheral area consisting of the area peripheral to critical tiger habitat or core area, identified and established in accordance with the provisions contained in Explanation (i) of section 38V(4), where a lesser degree of habitat protection is required to ensure the integrity of the critical tiger habitat with adequate dispersal for tiger species, and which aim at promoting co-existence between wildlife and human activity with due recognition of the livelihood, developmental,social and cultural rights of the local people, wherein the limits of such areas are determined onthe basis of scientific and objective criteria in consultation with the concerned Gram Sabha and an Expert Committee constituted for the purpose.



Map No.8A: Eco-development Zone of Similipal Tiger Reserve

8.1.3. INSTITUTIONAL FRAMEWORK

The institutional mechanism will be adopted in attaining the goal as per the policy of buffer zone, exclusive staff headed by the Eco Development Officer in the rank of ACF supported by One Ranger and three Foresters are needed to implement the Eco-development activities in the buffer zone. Ecologist, Sociologist and Computer Operator will be needed to support the eco-development officer.

NGO linkage: Sufficient NGOs are available to associate as part of project support team. Project Sociologist,

- Financial empowerment of EDCs.
- Transparency and joint account system; EDC chairman and member secretary jointly operate the accounts.
- People's contribution of 25% in all activities: Government contribution 75% only for all activities.
- Successful mutual trust building and mutual rapport building between the Forest fringe dwellers and Forest department staff.
- Dedicated project team headed by one Chief Conservator of Forests and Field Director and supported by Principal Chief Conservator of Forests and Chief Wildlife Warden by giving a free hand for all field activities.

This can be better achieved through the Similipal Tiger Conservation Foundation.

8.1.3.1. EDC: Similipal Tiger Reserve

Similipal Tiger Reserve lies on the North Eastern Region of Odisha. It is surrounded by Baripada Forest Division, Karanjia Forest Division and Rairangpur Forest Division. The heritage of these rich floral assemblages, diverse habitats, terrain, climate, the location along with the tribal communities gives an important scientific, educational, and recreational value for the tiger reserve. The tiger reserve management does not legally allow people to depend on the forest for any resources to be extracted from the sanctuaries with in buffer areas. Thus, the concept of eco development is catching up as an alternative strategy for forest protection and conservation, involving local communities in the management of protected areas. The KMTR/Pench/ Periyar TR have shown leadership in the field and successfully evolved and implemented eco – development strategy and brought up a model of eco – development which is highly acclaimed. The same model is being adopted and replicated for Similipalby making local level adjustments imperative for matching ground level situation.

Vegetation and Important Fauna

a) Tropical Dry Deciduous Forests with tall grasses on the hill slopes

   Key fauna: Gaur, Sambar, Elephants, Tiger, Panther, Hyaena, Sloth bear

b) Open Grasslands with sparse vegetation on hill tops

   Key fauna: Four horned antelope, Sambar, Hyena, Leopard, Wild dogs, Sloth bear

c) Dry Mixed Deciduous patches along the foothills

   Key fauna: Tigers, Leopard, Sloth bear, Hyena, Elephants, Gaur, Sambar, small carnivores

e) Riverine Forests along the Khairi-Bhandan and Budhabalanga,Deo perennial rivers:

   Key fauna: Tigers, Leopard, Elephants, Gaur, Chital, Sambar, Sloth bear, Hyeana

EDC Vision

The aim of Eco-Development is catching up as an alternative strategy for Forest Protection and Biodiversity Conservation Programme, involving local communities in the management of the Protected Areas. Ecological

development has to be achieved by adopting a strategy where forest fringe dwellers have zero dependency and resultant impact on the bio-resources of the Tiger Reserve. It will not only conserve the biodiversity; it will help us in achieving the goal of peaceful co-existence of Man and Animal.

8.2. LIVELIHOOD SUPPORT INITIATIVES THROUGH VILLAGE MICRO PLAN

The micro-planning is the essential component of the eco-development and includes involving people in Social Mapping, Resource Mapping, Semi-structured Interview, Wealth Ranking, Institutional Diagram, Past System Of Management, Pair-Wise Ranking, Seasonality Analysis other techniques to understand micro-level situation of the village. The micro plan includes community asset building, individual income generation activities, alternate energy and energy conservation devices, biomass regeneration, and human resources development suitable for the area. The micro plan is prepared by Village Forest council, General body members, NGOs and Forester, Ranger and Forest guard.

Micro Planning:

To be Prepared by	Eco Development Committee, General body members, NGO's and respctive Ranger, Forester and Forest guard
Process	PRA based processed approach
Approved by	Respective DD/DFOs
Implemented by	Eco Development Committee

Micro plan includes

- Community asset building
- Individual income generation activities
- Alternate energy and energy conservation devices
- Bio-mass regeneration
- Human resources development

The village eco-development activities drawn out of Participatory Learning & Action based Micro Planning may be of the following kinds:

a. Entry point activities to enlist the support of the people.

b. Community asset building to create facilities for the local people.

c. Micro credit programme to facilitate starting of micro enterprises for attaining sustainable alternative livelihood options focusing on forest dependent people.

d. Income generation activities, in addition to livelihood options emanating out of PA management like protection, fire-protection and tracing, eco-tourism services *etc*, to upgrade the economic status of the poor.

The eco-development is to be implemented in the Buffer Zone and Zone of Influence of the Protected Area. The efforts must be made to create at least one eco-development committee in each Range to cover all the areas of the core zone and buffer zone.

Ecological development has to be achieved by adopting a strategy where forest fringe dwellers have zero dependency and resultant impact on the bio-resources of the Tiger Reserve. It will not only conserve the biodiversity, it will help us in achieving the goal of peaceful co-existence of Man and Animal.

Specific Issues

The Similipal Tiger Reserve Management does not legally allow people to depend on the forest for any resource within the limits of Similipal Sanctuary as well as Hadgarh Sanctuary save the rights accrued through FRA. This includes collection of non-timber forest produce like honey, soap-nut, honey and collection of mulching materials from the forest. The resource available in the forest is meant for wildlife. Tribals who depend on the forest for their sustenance traditionally (collection of fuel wood, NTFP, grazing impact, poor land use pattern) they will be given their dues as per tribal rights act only in the buffer zone. The employment opportunities will be given to tribals and local people in fire controlling work and anti-poaching watchers.

8.3 INTEGRATION OF RURAL DEVELOPMENT PROGRAMME

Good relationship and liaison will be established between other departments such as ITDA, DRDA, Health, Agriculture, Horticulture, Sericulture, Animal husbandry, Public Works Department, Highways, Tourism, etc and the development works will be funnelled to these fringe villages so as to improve their lifestyle and livelihood Improvement. In order to ensure this bondage, the Line Departmental meetings are to be conducted. The services of the other members in the Tiger Foundation be utilized to achieve defined goal.

Depending upon site attributes (climate, terrain, soils, present patterns of farming, fishing, livestock raising, practices of other resource use, status of conservation/degradation, potential for restoration, variety of non-wood forest products, local skills, existing and possible infrastructure etc.) a holistic site-specific package of measures in an appropriate combination most suited to the given site should emerge as a result of a fully participatory planning process, involving local people, NGOs and government agencies (concerned with land and resource use, and rural development) as conducted by the PA management with the coordinating assistance of district administration.

A. In Forests, grasslands & Scrub-savannah lands

i. Orientation of forestry operations for the concurrent promotion of biodiversity conservation and meeting resource needs and generating employment for local people.

ii. Joint management of forests, grasslands and scrub-savannah lands with formalized prior agreements for substantial sharing of (even exclusive claim on) usufruct, in return for direct contribution to protection and conservation.

iii. Organized collection of important non-wood forest products with measures to ensure long term sustenance of productivity.

iv. Cultivation and/or organized collection of medicinal plants, essential oil bearing herbs, mushrooms, pepper, cardamom, etc, which is compatible with other forestry objectives, especially conservation and other local interests.

v. Preferential and concessional availability of wood and non-wood resources to local people directly participating in conservation of forest and other resources.

vi. Pasture improvement through weed suppression/eradication and enrichment planting with complete or rotational closures.

vii. Economic employment generation through weed suppression *e.g. Lantana* harvests for pulp, chipboard or basket making on small or cottage industry scale.

viii. Harvest of green grass and plant fodder during monsoon in designated areas (if necessary, rotational) in the 'conservation' and 'extension' buffer zones.

ix. Harvest of grass at the end of monsoon and providing hay in return for cooperation in observance of regulated grazing/lopping.

x. Preferential employment to locals in all the above works.

B. In private farms

- Improved dry farming techniques (improved seed, manure/ fertilizer regimes).
- Efficacious water harvesting (surface and ground water).
- Soil conservation measures.
- Preference to cash crops e.g., pulses, oil seeds, spices, cotton, medicinal plants.
- Agro forestry, Rubber plantation
- Sericulture & horticulture with assured employment through these on one's own land and from other community works, in order to tide over the 'gestation period'.

Chum areas.*:* Partial switch over to agro-forestry and/or cash crops (including medicinal plants and plantation crops) with assured employment through these work on one's own land and on other community works, in order to tide over the 'gestation period'.

Apiculture- Since Similipal Honey has a special preference in the markets of Baripada, Jashipur, Balasore and in major cities of Odisha and nearby West Bengal, Jharkhand, the local variety bees may be reared with proper marketing policy.

C. Minor Irrigation

(i) Simple diversion or diversion cum storage type micro-minor irrigation schemes will be implemented on the numerous perennial Nallah and streams of Similipal within the ambit of Wildlife Protection Act 1972, including development of village tanks with preferential employment to local people.

(ii) Lift irrigation schemes using micro-hydel (or grid where available) power or pump sets, based on rivers, reservoirs and wells.

(iii) Bore well irrigation, where feasible.

D. Animal Husbandry, dairying and pottery crafts

(i) Phased reduction in population of scrub livestock and improvement of breed through controlled fertilization of female stock in proper health and age with males of better local breeds, aided by sterilization of scrub bulls.

(ii) Goatry and sheep raising subject to stipulations suggested under ' A ' above and Australian or hybrid of it may be promoted with strict restriction of stall feeding and with proper vaccination.

(iii) Cooperative dairying with marketing support and proper marketing of milk, diary products such as Ghee, Cheese, butter, buttermilk at the village level .

(iv) Support to small scale enterprises based on pottery or terracotta crafts and Marketing at sale points to the eco-tourists.

E. Fisheries

(i) Exclusive rights to organized cooperatives/user groups of local people in all situations, subject to observance of regulations for sustainability and optimal economic productivity - especially, closed areas/seasons and mesh size of fishing nets, and cooperation in ensuring ban on use of explosives and other forms of poaching.

(ii) Marketing support backed by cold storage and appropriate transport arrangements.

F. Infrastructure

(i) Biogas plants/Gasifier/solar power/

(ii) Wind mills/ Wild power mills (Especially in Kaliani and at Tulsibani/Jamuani area where continuous stream of wind flow towards Northern side which can run the wind mills 8-10 hours in the afternoon to midnight) for energy for cottage industries and local value addition by processing the cereals, nuts, pulses, spices etc.

(iii) Piped (gravity) supply, hand pump or open wells for drinking water.

G. Cottage Industry & Handicrafts

(i) Promotion based on local skills with appropriate technological and infrastructure support.

(ii) Curing/processing of collected/cultivated products e.g., medicinal herbs and essential oil for value addition.

(iii) Investigation of potential plants/products by pursuing ethno botanical and ethno zoological studies and rich development for consumption/marketing.

Development Projects

(i) Obligated to have a local orientation so that they become part of local area development and in no case upset local people's resource equations, Appropriate compensation/alternatives to be built into project costs.

(ii) Obligated to compensate by providing inputs into site-specific packages of ecodevelopment measures *e.g.,* lift irrigation along reservoir and along the river upstream and downstream.

(iii) Obligated to allow (where admissible *vis-à-vis* the PA) local people to farm in draw down areas by providing lift irrigation facilities.

(iv) Preferential employment to locals, if necessary, after arranging education and/ or training.

Integrated management plan for Similipal Biosphere Reserve:

The Similipal Biosphere Reserve management plan has been prepared in an integrated mode for 5 years. The comprehensive plan has been prepared with a motto of Eco-development by providing additional income generating activities of local people. As SBR contains more than 1400 villages with in the 10km zone from the Similipal Sanctuary, providing alternate livelihood becomes very important aspect to reduce the pressure on buffer areas of the TR. The DDs and DFOs of Similipal Biosphere Reserve will take care of the livelihood improvement activities as proposed in the comprehensive plan.

The Food and Agriculture Organization has initiated Green Agriculture Project for the villages located in and around Similipal. The project aims at livelihood improvement of the people by coordinating among line department of the District Administration with Forest Department. The upliftment of Socio-economic status of villagers will reduce the Human-Wildlife conflict in a greater extent and also improve the overall health of the Similipal Landscape.

JICA (Japan International Cooperative Agency) is a Japan based funding agency that aims at livelihood improvement of local people along with protection of forests to reduce the resource dependency of the local villagers on forest. OFSDP (Odisha Forestry Sector Development Project) is funded by JICA for implementing the mandates for achieving the desired goal. Formation of VSSs is being done by following the Joint Forest Management resolution, 2011 and the funding is being carried out by JICA. About 952 VSSs are present in and around Similipal along with 170 EDCs.

A new approach which aims at "Involving Communities in Management in Similipal" having mandates as of OFSDS in the identified 308 vulnerable villages present inside and in the fringe of Similipal has been taken up. VSS will be formed with an aim of generating alternate livelihood in convergence mode by involving all the line departments and their development schemes to reduce the dependency on the forest. The community conservation idea will be inculcated among the villagers and Similipal will be protected in a long term prospect.

8.4. MONITORING AND EVALUATION

The entire eco-development programme shall be monitored by the Deputy Directors/DFOs on a regular interval vis-a-vis the course of action on spatial and temporal grounds and subsequently once in 3 months by the Field Director. The success of the programme depends upon creation of active and vibrant eco-development committees that can be ensured by proper monitoring. It may be appropriate a set of monitoring parameters that can be used for the purpose of reporting on periodical basis. NGOsmay be involved in monitoring and implementing the program. Those NGO's that are involved in monitoring the eco-development program should interact with people at regular interval and discuss the problem faced by them in implementing the program this will help in sustainable development of eco-development committee. At the same time evaluation of the programme will give chance for correction at different stages as also the real impact of the programme to achieve the desired objectives. The evaluation can better be done with the help of an internal or external system. A monitoring proforma can be developed for evaluation.

Monitoring and evaluation of eco-development initiatives may focus on the following.

- Management of fire to reduce forest degradation.
- Sustainable NTFP harvesting practices to reserve the declining trend of growth of valuable NTFPs.
- Application of indigenous knowledge of local communities on forest and biodiversity management.
- Promotion of biodiversity related intellectual property rights and
- harnessing this strength for forest management.
- Non-invasive ecotourism in forest areas.
- Reduction of illicit collection of NTFPs.
- Stoppingof further encroachment into forest areas.
- Reversing localized environmental degradation such a seasonal water shortages and soil erosion resulting from deforestation in watershed/catchments.
- Reduction in human–wildlife conflicts.
- Reduction in illicit brewing. Reduction in poaching of wild animals.
- Improvements in reciprocal commitments as described in micro plans .

8.5. RELOCATION

Voluntary relocation programme as per the guidelines of Forest, Environment & Climate Change Department, Govt. of Odisha Notification No. FE-WL-WLF-0021-2016/12390/F&E, Dt. 19.07.2021 for the settlements in the buffer of Similipal TR is applicable. Accordingly, Kiajhari village is fully relocated and Kejhuri is partly relocated. However, dialogues canbe continued with the willing members of the settlements such as Khejuri, Badkasira, Kolha, Lenjighosra, Garhsimilipal etc., for voluntary relocation. Similarly, villages present in the buffer of STR belonging to territorial divisions like Karanjia, Rairangpur and Baripada Divisions can be taken up for voluntary relocation. DDs/DFOs may continue dialogues with the members of the settlements for relocation.

CHAPTER 9
IMPLEMENTATION STRATEGY

CHAPTER

09

IMPLEMENTATION STRATEGY

9.1 STATE LEVEL MONITORING COMMITTEE

The entire eco-development programme will be monitored by the Field Director on a regular interval vis a vis the course of action on spatial and temporal grounds. The success of the programme depends upon creation of active and sensitive eco-development committees that can be ensured by proper monitoring. It may be appropriate if the overall implementation is monitored by forming State Level Monitoring Committee for timely evaluation of the programme which will give chance for correction at different stages as also the real impact of the programme to achieve the desired objectives.

As per the provisions laid down in the section 38 V (i) of the Wildlife (Protection) Act 1972 Amendment Act 2006, the State Government have constituted a Steering Committee for ensuring Coordination, monitoringof all activities related to protection of tigers, co-predators and their prey animals. The notification has been given in Annexure XI.

9.2 TIGER CONSERVATION FOUNDATION AND DISTRICT LEVEL COORDINATION COMMITTEE

9.2.1 Tiger Conservation Foundation

The section 38-X of the Wildlife (Protection) Act 1972 as amended in Act No. 39 of 2006 states that the State Government shall establish a Tiger Conservation Foundation for tiger reserves within the state in order to facilitate and support their management for conservation of tiger and bio-diversity and, to take initiatives in eco-development by involvement of people in such development process. In pursuance to this amendment, Tiger Conservation Foundation of Similipal Tiger Reserve has been established. The function of the foundation and its members as per deed of trust approved by government has been discussed in details in Annexure XII.

9.2.2. District level co-ordination committee for Eco-Development Activities

It is to mention that while implementing the Eco Development activities in the fringe villages, it would be essential to associate different development departments viz. Animal husbandry, Horticulture, Primary Health, Agricultural, Soil Conservation, Fishery, Tribal Welfare, Small Industries, Khadia- Mankidia Development Agency, etc., while in selected areas experts from such departments may be required to be taken on deputation for planning/ implementing the eco-development programmes, it will be important to ensure that these departments are actively associated with the scheme. It will therefore be necessary to constitute a District level Coordination Committee under the chairmanship of District Collector, Mayurbhanj, Divisional Forest Officers of Buffer Divisions, Project Administrator ITDA, Project Director DRDA, District Veterinary Officer,CDMO, as members with the Deputy Director of the Similipal Tiger Reserve as the Member Secretary. This would also facilitate Sectoral integration and pooling resources. The Committee should include representatives of the line departments, the NGOs and the concerned Grama Panchayat President.

The Committee should meet at least once in three months and the minutes of the meetings should be included in the proposals for Central assistance under the Project Tiger Scheme. The Field Director may consider payment of a modest honorarium to the committee members for attending the committee meetings and the expenditure on this account can be charged to the appropriate Budget head which will be allotted from the State Government.

9.3. FORMATION OF THE ECO-DEVELOPMENT COMMITTEES (EDC'S) CONFEDERATION OF EDCS AND OTHER SUPPORTING INSTITUTIONS LIKE SELF HELP GROUPS (SHGS) AND NATURE CLUBS.

9.3.1. Eco-Development Committee (EDC)/ Vana Samrakshan Samiti (V.S.S.) in buffer area outside the PA i.e. (Similipal Sanctuary):

The constitution of eco-development committees/VSS has to be made with the guidelines as per the Odisha Joint Forest Management Resolution 2011 published vide Notification No. 16524-1F- Affn. 17/2011/F. & E. Dt. 09.09.2011 of Forest, Environment & Climate Change Dept., Govt. of Odisha enclosed in Annexure LXIV.

9.4. LIVELIHOOD SUPPORT INITIATIVES THROUGH VILLAGE MICRO PLAN

Described in para 8.2 of buffer plan.

The micro-planning is the essential component of the eco-development and includes involving people in Social Mapping, Resource Mapping, Semi-structured Interview, Wealth Ranking, Institutional Diagram, Past System of Management, Pair-Wise Ranking, Seasonality Analysis other techniques to understand micro-level situation of the village. The microplan includes community asset building, individual income generation activities, alternate energy and energy conservation devices, biomass regeneration, and human resources development suitable for the area. The micro plan is prepared by Village Forest council, General body members, NGOs and Forester, Ranger and Forest guard.

The village eco-development activities drawn out of Participatory Learning & Action based Micro Planning may be of the following kinds:

a. Entry point activities to enlist the support of the people.

b. Community asset building to create facilities for the local people.

c. Micro credit programme to facilitate starting of micro enterprises for attaining sustainable alternative livelihood options focusing on forest dependent people.

d. Income generation activities, in addition to livelihood options emanating out of PA management like protection, fire-protection and tracing, eco-tourism services *etc*, to upgrade the economic status of the poor.

9.5. INTEGRATION OF RURAL DEVELOPMENT PROGRAMMES

Described in Para 8.3 of buffer plan.

9.6. MONITORING AND EVALUATION

Described in Para 8.4 of buffer plan.

The entire eco-development programme has to be monitored by the Field Director and Deputy Director (North and South WL Divisions) on a regular interval vis-a-vis the course of action on spatial and temporal grounds. The success of the programme depends upon creation of active and sensitive eco-development committees that can be ensured by proper monitoring. It may be appropriate a set of monitoring parameters that can be used for the purpose of reporting on periodical basis. NGOs could also involve in monitoring and implementing the program. Those NGOs that are involved in monitoring the eco-development program should interact with people at regular interval and discuss the problem faced by them in implementing the program. At the same time evaluation of the programme will give chance for correction at different stages as

also the real impact of the programme to achieve the desired objectives. The evaluation can better be done with the help of an internal or external system with the following vision.

1. Improve the livelihood activities for villagers.
2. Enhance the living standards among villagers.
3. All basic amenities to be augmented in village.
4. Improve education level for both sexes.
5. Increase annual Income for everyone in the village.
6. Ensure proper health care for villagers.
7. Develop a mechanism to earn more revenue from domestic livestock, by way of hybrid milch animals.
8. Houses for every family in the village.
9. Solar/windmill Power Supply for the village.
10. Water augmentation to be done for drinking and irrigation purpose.
11. Develop a strategy to earn more money through collection of NTFP products.
12. Proper harvesting techniques to be imparted for villagers to prevent destruction of forests while collecting NTFP products.
13. Improve the number of working days for villagers to meet out their daily livelihood.
14. Ensure that land-based activities are well conceived among the villagers as part of their sustainable livelihood programme.

CHAPTER 10
MAINSTREAMING STRATEGY WITH VARIOUS PRODUCTION SECTORS

CHAPTER

10

MAINSTREAMING STRATEGY WITH VARIOUS PRODUCTION SECTORS

10.1. FORESTRY

In the buffer zone area, the forestry sector has to play a major role for enhancing the productivity of unproductive land in adjoining villages through raising of indigenous tree crop. The afforestation activity in degraded forests will enhance the bio-diversity. The Reserved Forests in the buffer zone of the tiger reserve which are covered under working plans have and where Selection coupes have been formed, tree felling have not been done due to want of commercially available tree of exploitable girth. However, in future tree felling in those coupes if required, will be regulated to a lesser degree of intensity to avoid large scale canopy openings and to ensure that canopy cover does not fall below 40% in winter months. The timber exploitation activities in coupes shall be staggered in such to ensure minimum edge effect. The plantation activity shall be staggered to safeguard from induced edge effect, especially near human settlement. Only species indigenous to the locality shall be permitted to be planted.

- Ecosystem management required
- Ecological availability of a tree should be ascertained before removal
- A tree should be considered ecologically available if

  (a) Its removal does not create a gap beyond 43 to 45%.

  (b) The regeneration of species at various formation levels within a radial distance of twice the crown radius of the tree being selected for felling should have an 'established' status.

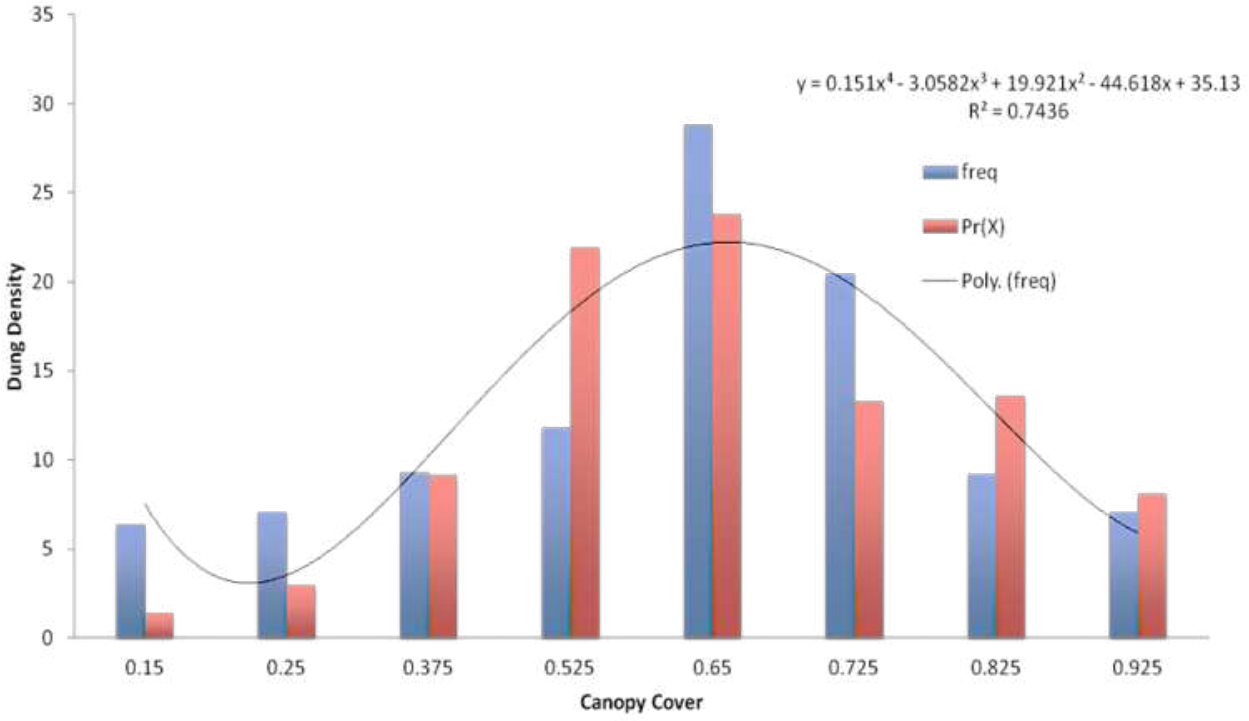
Tree fellings / Thinnings

- No clear felling and other silvicultural systems promoting concentrated regeneration
- No conversion to uniform forests
- A high forest system with diffused regeneration should be preferred
- Status of regeneration should be an overarching consideration to permit felling
- Areas having considerable disturbance should not be felled

Tree fellings / Thinnings

Table 10a: Canopy class and wild dung presence

Mid-Value	Wild dung	SE	Freq.
0.15	10.52	0.79	6
0.25	11.68	0.71	7
0.375	15.46	1.08	9
0.525	19.56	2.75	12
0.65	47.86	19.30	29
0.725	33.92	14.03	20
0.825	15.22	7.21	9
0.925	11.72		7



- After due consideration to regeneration/status, the relationship between canopy class and wild ungulate dung presence should be used as a guide to prescribe the stem removal
- Buffer / corridor areas should be managed for wild ungulates at a level which is 30% lower than the optimal levels in core areas.
- In general, the relationship between mean ungulate density and canopy class intervals in a sal / tree dominated forests, with polynomial curve fitting shows that the 80% lower bound corresponds to a canopy cover of 43% (computed for sal forests of Central India; similar relationships need to be developed for other forest types to facilitate inference)
- Thus, for sal forests of Central India, the timber harvest in the buffer / corridor area may be permitted in a selective manner so that the canopy cover does not fall below 43% during winter months. This strategy will minimize tiger-human conflict while permitting selective extraction of timber species

- More openings will permit more light while fostering more regeneration thereby attracting wild ungulates and tigers
- The idea behind buffer / corridor management is to sustain it for gene flow, while not elevating its status to that of core area in terms of wildlife abundance

10.2. AGRICULTURE

The buffer zone villagers of the Similipal Tiger Reserve are raising agriculture crop for the livelihood. But some of the crops being raised in outer buffer area are not eco-friendly. Frequent usage of banned pesticide and insecticide is also causing injury to the Carnivores and Herbivores. Eco friendly agriculture practices have to be encouraged to avert the chances of poisoning, poaching and man-animal conflict.A ban has been imposed since 2012 on entry of highly poisonous insecticides in to the villages inside the sanctuary. Awareness programmes shall be organised with help of agriculture department for use of organic manure and bio pesticides in the agriculture fields inside the tiger reserve.A special strategy will be adopted in coordination with agriculture department for monitoring the sale of pesticides in local outlets to prevent poisoning of wild animals or leaching of such pesticides in water courses resulting in wildlife mortality.

10.3. INTEGRATED DEVELOPMENT (DEVELOPMENT THROUGH

DISTRICT ADMINISTRATION)

Eco development

The concept of eco-development is catching up as an alternative strategy for Forest Protection and conservation, involving local communities in the management of the Protected Areas. The Kanha, Kalakad-Mundanthurai, Pench, Periyar Tiger Reserves have shown leadership in the field and successfully evolved and implemented eco-development strategy and brought up a model of eco-development, which is highly acclaimed. The same model is being adopted and replicated for Similipal by making local level adjustments imperative for matching ground level situation.The successful area of other tiger reserve will be visited by the staff and locals for exposure visit at regular interval.

Objectives

The Eco-development objectives of Similipal have been designed in line with the general theme of eco-development philosophy of a successful model observed in other Tiger Reserve, that helps effective conservation of the forests through the economic development of the forest fringe dwellers by adopting an active strategy evolved through micro-planning. Ecological development has to be achieved by adopting a strategy where forest fringe dwellers have zero dependency and resultant impact on the bio-resources of the Sanctuary.

Accordingly, the main Eco-development objectives of Similipal TR are

a. To provide opportunities for local people to participate in TR management through an institutional mechanism.

b. To establish committed Eco-development committees concerned with conservation by educating, motivating and eliciting participation in buffer villages.

c. To create awareness among the target villages about the value of the TR focusing on the vision of protecting world famous conservation unit and need for conserving it using different media.

d. To achieve reduction in resource dependency on forests of the Similipal TR by providing alternative livelihoods thereby leading to habitat improvement and conservation.

e. To enhance the capacity and upgrade skills of local people for alternate non-forest dependent economic activities by way of organizing training courses, workshops and field visits.

f. To promote collaboration of local people in conservation by reducing adverse impacts of local people on biodiversity and also to reduce the adverse impact of TR on local people by mitigating Human-Wildlife conflict.

Development through District Administration

i. Coordination with various institutions and line agencies to obtain their financial support and expertise to implement various EDC activities through District administration also.

ii. Developing specific proposals with the themes of EDC to obtain corpus funds from various donors.

Proposed Activities

a. Establishing Training Centres for Tailoring and Associated Activities, Small cottage industries, especially soap manufacturing, bamboo & sabai grass products, Small Petty Shops, cafeteria, Souvenir shops.

b. Dairy Farms with hybrid milching animals.

c. Community Apiculture and processing/packaging units of Honey.

d. Formation of Medicinal Gardens and processing.

e. Weaving Units.

f. Supply of bullocks for land based activities.

g. Agriculture Improvement – Land based activities.

h. Sale of NTFP products with value added products.

i. Integrated Poultry Farms.

j. Fish Farm.

k. Viable and Suitable Eco Tourism activity: (Only a few Selected Modules)

l. Promoting Women Self Help Group.

m. Developing plant nursery for afforestation schemes.

All the above activities can be taken up by the line departments in coordination and consultation with Field Director of Similipal Tiger Reserve.

Tribal Handicrafts Design Development Programme of ITDA, Baripada

Described in Chapter 4 of this plan.

10.4. TOURISM (D)

Eco-tourism activities in buffer area are described in chapter 4 and chapter 14 of buffer plan.

10.5. FISHERIES (D)

Described in Chapter 4 of this plan.

10.6. TEA AND COFFEE ESTATES

No tea and coffee estates are present in the TR.

10.7. ROAD/RAIL TRANSPORT

The existing road network is sufficient. No more road is to be allowed in the buffer zone. Otherwise, it will

hamper the movement of Carnivores and Herbivores since the Southern part of the buffer zone area is very good habitat for the wild animals and tigers.On the Goudabhanga (Satkosia) –Thakurmunda- Karanjia road, functional speed breakers at every kilometer need to be established in the portions passing through the forests. Similarly speed breakers will be provided through NH authority in Karanjia-Jashipur-Bisoi portion of NH- 49 and Bisoi-Bangiriposi portion of NH-49.

Mitigation strategy for linear infrastructure and other projects (roads/highways/railway lines/power transmission lines/irrigation canals/open mills/wind mills)

- Roads/highways: creation of overpasses / underpasses, speed regulation, closure to traffic
- Railway lines: SOP for information exchange through wireless, speed regulation, barricades, underpasses,
- Power transmission lines: insulation, surveillance, MOU with electricity boards, special patrolling, under ground cabling, adequate height,
- Irrigation canals: covering, crossing for animal movement
- Open wells: covering, closure of abandoned wells
- Wind mills: both offsite and onsite measures are required to prevent turbine collisions with avifauna.

10.8. INDUSTRY (D)

Described in Chapter 4 of buffer plan.

10.9. MINING (D)

Described in Chapter 4 of buffer plan.

10.10. THERMAL POWER PLANTS (I)

Described in Chapter 4 of buffer plan.

10.11. IRRIGATION PROJECTS (D)

A few irrigation channels are found in the buffer zone. No large and medium irrigation project will be allowed inside. Micro irrigation outside the sanctuary area shall be done only after proper study regarding their probable impact on the habitat.

Mitigation strategy for dams and hydro power sectors

The impacts include:

- First order impacts (barrier effects, effects on water quality, water quantity, flow regime and sediment load)
- Second order impacts (impact on terrestrial environment affecting primary production-planktons, aquatic flora), morphology (channel form, substrate composition)
- Third order impacts (impact on terrestrial environment affecting invertebrates, fish, birds and mammals)
- Mitigation measures are required to address impacts due to dams construction as well as its operation
- The mitigation plan should include onsite as well as offsite initiatives based on best global practices
- Retention of dead trees in submergence areas as 'snags' for water birds and aquatic fauna
- Prohibiting the reduction of river flow to 'zero' or 'critical' levels which would have a deleterious affect on local flora and fauna especially aquatic species permitting migration across dams through mitigation e.g. fish ladder etc.

- Mimicking the water release to the natural flooding regime
- Ensuring control of aquatic weeds and disease factors
- Safeguarding downriver flood protection
- Safeguarding against water pollution
- Appropriate fish management measures to benefit local communities through the tiger reserve management. Illegal fishing is a problem in tiger reserves like Pench and Satpura
- Site specific watershed management to safeguard against sedimentation
- Prescribing timings for use of access roads, and regulation on the maintenance infrastructure and retaining it to the minimum
- Prohibiting new, associated developmental projects in the core / critical tiger habitat
- Contributing resource support to the core / critical tiger habitat management as a 'compensatory' measure for loss of natural habitat
- Evolving and implementing a SOP, in collaboration with the tiger reserve management for rescuing wild animals from drowning
- Annual monitoring of the spatial use pattern of wild animals in the area, which should also include monitoring the development of related infrastructure
- Periodic monitoring of water quality and river ecosystem recovery
- Fostering re-vegetation of the construction site with indigenous species

10.12 TEMPLE TOURISM (D)

Described in Chapter 4 of buffer plan.

10.13. COMMUNICATION PROJECTS (D)

Described in Chapter 4 of buffer plan.

CHAPTER 11
RESEARCH, MONITORING, TRAINING AND WILDLIFE HEALTH

CHAPTER

11

RESEARCH, MONITORING, TRAINING AND WILDLIFE HEALTH

INTRODUCTION

As per National Wildlife Action Plan-2002, Monitoring and Research are tools for a better understanding of nature, its functions and to enable optimum or sustainable utilisation of its resources, as well as to evaluate the conservation status of species and habitats and the extent of impact of conservation endeavours undertaken. Such understanding will also help reduce man-animal conflicts. There is a marked deficiency in baseline biological data and on information we need to manage and monitor Buffer Areas. Little is known about the impact of human activities on wildlife habitats, or about the full range of benefits that flow from biodiversity-rich old growth, natural forests and ecosystems. Not much is known about techniques, which could *inter alia* help restore, at a very minimal cost, degraded habitats. Research for making use of ethnic knowledge in wildlife conservation and management as well as in applied research to obtain IPR's (Intellectual Property Rights) capable of benefiting the local communities and country should receive special attention.

Buffer areas of every Tiger Reserve are more susceptible to every chance of ecological degradation due to presence of biotic interference. In Similipal Tiger Reserve major part of buffer is lies within the Similipal sanctuary & three are more than 60 villages are in the buffer owing to enormous pressure on the Tiger Reserve. Systematic study and observations for a prolonged period and analysis are necessary in order to achieve the objectives of better management and conservation of bio-diversity in the buffer area of the Similipal Tiger Reserve. Researches are indeed much essential for making use of ethnic knowledge in wildlife conservation and management as well as in applied research to obtain IPR's (Intellectual Property Rights) capable of benefiting the local communities and country. In the buffer area of Similipal Tiger Reserve as on date very limited research has been carried out as earlier major of the research programmes were earlier concentrated into the Core area only. The research in the buffer areas should be problem solving studies, based on a consultative process involving PA management, indigenous people and overall ground reality. In this buffer area management plan research and monitoring is proposed on biological aspects and on management and sociological aspects and their impacts on wildlife habitat for getting a long-term sustainability in maintaining viable ecosystem.

11.1 RESEARCH PRIORITIES, MAIN PROJECTS AND IMPLEMENTATION

Institution linkages and collaboration with various Govt. & Non govt. Research Institutes, University and organization, expert in research will give an impetus in the field of research and provide management-oriented research output for a holistic management of climate, people, Forest and wildlife in buffer areas of Similipal TR. Networking between NCF, IISc, WWF, WII, BNHS, SACON, BSI, ZSI, NCBS, TISS, BARC, RPRC,

BSI, FSI and other interested universities like Utkal University, Fakir Mohan University, Maharaja Sriram Chandra Bhanjadeo University, IIT Kharagpur, IIT, Bhubaneswar and colleges should help evolve integrated, multidisciplinary research in representative ecosystems. This will require greater financial allocations for field research and monitoring through centrally sponsored schemes. Following are the broader subject should be targeted for research.

Research Activities: Buffer Zone

1. Man animal conflict: Reasons, Scope and Solution.
2. Study on seasonal migration of major carnivora and herbivores within buffer and between buffer and core.
3. Study of impact of forest fire on wildlife, ground flora, fauna and biodiversity composition.
4. Study of impact of NTFP collection on wildlife and sustainable collection methods.
5. Study on avifauna and its habitat.
6. Socio-economic study of villages within buffer zone.
7. Development of meadows and studies of existing meadows.
8. Impact of human presence/settlement in TR.
9. Long term effect of ecotourism in wildlife and ecology.
10. Study ethnic knowledge and apply it to wildlife management and work with communities to obtain reports to benefit both the communities and the nation.
11. Monitor and document the impact of cattle grazing in the buffer areas on TR.
12. Document and assess damage done by large projects and intrusions, such as dams, mines, canal systems, roads and the use of pesticides and chemicals.
13. Identification of wildlife corridors and management strategies
14. Impact of plant weeds on eco system.
15. Effect of climate change on vegetation and wildlife population, abundance & distribution.

In this buffer area management plan research and monitoring is proposed on biological, ecological, sociological aspects and their impacts on wildlife habitat for getting a long-term sustainability in maintaining viable ecosystem. Accordingly, all research programmes are prioritized.

Table No.11a: Priority of Research Programme

Field of Research	Priority-I	Priority-II
Biological	Study on Impact of Cattle grazing in buffer areas to Tiger Reserve and mitigation measures. Poaching and illegal Wildlife trade problem and mitigation measures. Population dynamics and feeding behavior of ungulates. Study on ungulate density, distribution, food availability and longterm measure to augment the population in buffer zone of STR. Study of human population trends & its growing impact on the composition of flora and faunal diversity.	Study on inventory, status and distribution of small cats/lesser cats, small carnivore in buffer areas. Study on Inventory, status and distribution of arboreal mammals other than lesser cats in Buffer areas of STR. Study on enumeration techniques of wild animals in Similipal Tiger Reserve, their distribution pattern, seasonal movement and habitat use behavior.

	Study on elephant distribution trends, migration pattern and behavioral changes of the elephants with respect to the buffer areas of Similipal Tiger Reserve. Research on monitoring populations of flag ship species and other endangered species and their habitat condition. Study on seasonal migration of major carnivora and herbivores within buffer and between buffer and core.	
Ecological	Study on river system and impact assessment of climate change on river waterflow & biology. Identification of fragile ecosystem and habitats/ niches and means for their conservation. Study on effect of forest fire incidences on flora and fauna of STR and a cost effective, ecofriendly & long-term mitigation measures. Study of Ecotourism/vehicular movements in buffer areas and its residual consequences in biology of Tiger reserve. Long term research on change in weather pattern affecting the regeneration, composition of biodiversity in buffer areas of Similipal.	Impact of change in land-use, habitat changes on population of wildlife in buffer areas. Habitat suitability study for grassland/meadows development in buffer areas. Long-term study on effect of climatic aberration/change on ground water table in buffer areas.
Socio-Economic	Study on NTFP economics and its impact on village economy. Micro level analysis of Ecotourism potentiality and impact on local economy in Similipal TR. Study on institution development, participation and empowerment of social organization and financial sustainability of village Institutions. Impact assessment of dependence of local people on Similipal TR.	Details study on medicinal plant and its linkage with traditional medicinal knowledge in buffer areas. Study on edible Mushroom diversity & economic value in buffer areas of Similipal TR.
Others	Study on Human animal conflict and impacts of current land-use pattern on Human-wildlife interface. Integrated watershed approach for SMC in buffer areas. Study on effect of intensive/modern agricultural practices in buffer areas on water & soil of TR.	

11.2 MONITORING AND FRAMEWORK

Eco-systems are dynamic. Monitoring of impacts of management interventions is necessary. It enables the management to analyze and evaluate the effect of changes. Continuous monitoring and recording of data are proposed to be done through an elaborate, systematic and management-oriented monitoring mechanism.

The Park Management should continue to ensure that the monitoring of biological resources form a basic routine activity in protected area management, and it is the principal way in which the management can identify trends or changes, and to gauge the effectiveness of its managerial inputs. Though it may sound an unplanned and subjective procedure, it is easy to collect useful biological information in a simple, systematic and scientific manner. The management should strive to include a number of useful monitoring activities in the routine duties of the staff, as well as regular annual estimation of wildlife, counts and other activities. All such data should be incorporated in the MIS in a routine manner.

The following key areas of research and monitoring need to be focussed.

11.2.1 Monitoring of Physical changes: -

Monitoring of physical changes, mainly air and water qualities, is essential. Monitoring the water quality of streams and rivers passing through the buffer areas of Tiger Reserve particularly with reference to pesticides is very important as some of the river catchments are linked to agricultural cropping areas of Barehipani, Gurguria and Nawana North WL Range.

11.2.2 Monitoring changes in vegetation:

Vegetational changes will be monitored in different vegetation types, both natural and man-made. Information should be collected every year for changes in pattern of succession, species composition, effect of grazing and fire on vegetation, etc. It should be recorded systematically and analyzed through computer. Some permanent vegetation plot (50 m X 40 m) should be laid out for this purpose. Some plots should be laid out in riparian area. Similarly, some plots should be laid in fringe area. Study of density and frequency of species should be done by Point centered Quarter (PCQ) method and ground cover by Area Sampling or point sampling method.

11.2.3 Monitoring Changes in wildlife population:

(a) By regular recording of animal sighting in different compartment/patrolling grid when a staff go for patrolling. A register will be maintained in each APC and weekly data will be sent to Range Office in a following prescribed proforma and from there data will be sent to Division office for consolidation and analysis to get information about seasonal movement, habitat utilization, etc.

Similarly, daily monitoring of elephant should be carried out through recording of indirect evidences and direct sighting by the staffs while performing patrolling. All data related elephant is to be registered in a separate register in Anti-poaching camp wise with location details, compartment details and time & communicate the same to the divisional control room on daily basis for compilation and analysis. For app based/web-based monitoring all report is to be uploaded in the Wildlife Odisha app or iWLMS portal using android phones. All data compiled must be collated and analyzed on monthly basis to have a track upon the trend of wildlife population, seasonal distribution & Migration.

Tiger monitoring should be done by regular tracing of pugmarks, Camera trap deployment to know the population dynamics, movement pattern, and identification of individual and sex ratio etc. Regular monitoring of RBT must be ensured through deployment of trap cameras in strategic location throughout the year in all Tiger bearing Ranges of Buffer division. A monthly report on sighting and evidences of large carnivore like Tiger and leopard must be submitted to the Field Director-cum-RCCF, Similipal Tiger Reserve on regular basis. All data related to wildlife monitoring must be analyzed monthly by the Tiger Cell constituted at Field Director office, Baripada for continuous monitoring.

(b) By conducting periodical census operation:

Annual census on crocodile & birds are to be carried out as per the schedule fixed by the state. Beside this, alike core area Phase-IV monitoring shall be caried out scrupulously in all buffer areas of Tiger Reserve impressing same priority as core area. Apart from AITE exercise, Megaherbivore/Herbivore census and Tiger/ Leopard/ Census by should be conducted in every two-year interval.

Proforma for Daily Wild Animal Monitoring:

Range	Beat	Date & Time	Animal Sighted	No	Grid/ Compt.	Sex			Age	
						Male	Female	Unknown	Adult	Young

Proforma for Daily Elephant Monitoring:

SL No	Division	Range	Section	Beat	Location	Herd	M	F	C	Sub-adult	Makhna	Total	Lat	Long.	From time	To time	Remarks

11.2.4 Monitoring wildlife Health and Diseases:

It should be done regularly as there is danger of spread of epidemic through domestic cattle grazing in the Reserve. Water Samples should be regularly checked by field research Laboratories like Centre for Wildlife, OUAT, Bhubaneswar. Survey of adjacent fringed villages should be done to know about the spread of any epidemic. Vaccination of fringe cattle against F.M.D., Anthrax, H.S & B.Q, etc. should be ensured at suitable intervals by the veterinary unit.

11.2.5 Monitoring the Impact of management Practices initiated in and around Similipal Tiger Reserve:

Management interventions impact human population in and around Similipal TR. Monitoring of such impacts is necessary. Its socio-economic impact is especially important. Cultural impacts shall not be neglected. Management intervention only with congenial impacts is sustainable over a long period of time.

11.2.6 Monitoring the impact of Tourism:

Tourism impacts Protected Area and people socio-economically and culturally. Tourism has both positive and negative impacts on PA and people Monitoring of impacts of tourism is necessary to know sustainability of tourism in Similipal TR. Separate research programme should be encouraged for detail study on various positive and negative aspects of ecotourism on PA and People and way forward for sustainable tourism in the buffer areas of Similipal TR.

11.2.7 Monitoring of Developmental activities

Developmental activities in 10 km radius of the Reserve such as residential buildings, industries and minor mineral quarries closer to the corridors and other human activities need proper impact assessment studies to enforce regulation.

11.2.8 Monitoring of Anthropogenic Pressure in Buffer areas of Similipal TR

Anthropogenic pressure such as cattle grazing, fuel would collection and wood cutting especially in Eastern/ Southern/Western parts of the Reserve, man-elephant conflict, identification of specific forest dependents, would help for appropriate management interventions.

11.2.9 The research support on pathological issues, estimation of parasite loads, helminthes infestations and their ecology, incidences of zoonosis, threat of large cattle population in terms of infestations, to develop and standardize methodologies for disease surveillance epidemiology of wildlife is much solicited. The specific recommendations on these aspects need to be brought into management action.

11.2.10 Undertake long term projects to assess the water contribution of and buffer zone forests in terms of lean season flows, ground water recharge and flood and drought mitigation.

11.2.11 Study of ethnic knowledge with anthropological / social science institutions with a view to apply such knowledge to wildlife management and to obtain reports to benefit local communities and the nation.

11.2.12 Monitoring of Habitat

Habitat improvement study is needed since density of herbs and shrubs is very poor in buffer zone & there is an immense need of grassland expansion. Periodic analysis of Medicinal herbs, weeds infestation area, intensity of weed infestation, water availability etc. through Mapping in GIS domain should be carried out.

11.3 TRAINING NEEDS ASSESSMENT

Training forms an important aspect for all levels in the administration, which results in generation of better and innovative ideas leading to enhanced conservation and managerial measures. There is a lack of intensive training in almost all the strata, which will address important practical and day-to-day issues facing the frontline men in particular. Training is essential to increase the managerial capability and technical skill of the staff. Present days Protected Areas planning and management is a highly technical science bringing together the theory of several diverse disciplines, i.e., ecology, forestry, geography, wildlife Training should be carried out in an organized and structured manner in order to achieve optimum result. It should be organized for the different levels of staff. It should address the specific needs, duties and responsibilities carried out by the staff.

The challenging wildlife conservation scenario today requires committed wildlife managers who possess scientific competence and social awareness aided by communication skills. They also need sharp detection and enforcement capabilities against organised criminal elements nursed by big-money illegal trade. Accomplished wildlife biologists and social scientists are also necessary. Frontline staff equally must have similar skills at the grassroots level. The current capacity building and personnel management planning, HRD and management measures need to be greatly strengthened to meet these challenges. Training programmes aimed at upgrading the skill levels of the staff to match these challenges have to be part of routine rather than exception.

The field staff at the level of Foresters, Forest Guards and Protection Assistant and the anti-poaching watchers to be trained regularly in wildlife monitoring works, Camera trapping, organizing and conducting wildlife census work, recording population structure of wild animals like chital, Sambar, elephant and gaur on a regular basis when they go for their perambulation.

They should also be trained in taking photograph of tiger and leopard pugmarks for further analysis to identify individual animals. They need to be trained to use the modern equipment like range finders, field compass, Global Positioning System (GPS) etc. And to use this equipment in their regular work like fire mapping and plantation mapping etc. They will be also be trained to distinguish various predator scats. Further analysis of predator scats collected by field staff will reveal food habit of carnivores. They need to also be trained to collect the jaw bones from predator kills to assess the age of animals killed by predators.

11.3.1. On the job training

Effective management of wildlife and their habitat requires rigorous training in wildlife management. Specialised Training & theme based internal training modules of short duration shall be organized at regular interval for the frontline staffs which will be helpful in achieving the desired skill and capacity of the staffs. Specialized trainings like MSTrIPES, Drone training, Arms & weapon handling training, Dog squad training, Animal rescue & release training, Grassland management, intelligence gathering training, firefighting training, wildlife monitoring training& theme based modules like Census techniques for Mugger, Birds & Elephants, Orchid identification & restoration, field Botanization, Forest law, Road & Infra maintenance, AITE, Phase-IV monitoring, Camera trapping etc. shall be conducted as a part of internal training programme of the TR. They will be given refresher courses at least once in a year's interval. The course need be conducted with the help of experienced field Biologists. Case study based demonstration that forest and wildlife conservation and ecologically sound rural development are mutually complementary can be arranged. The training workshops

need to be conducted in Wildlife crime investigation, recording evidences, preparation of charge-sheets, and trial of offences for successful prosecution. This needs to be done with the help of local judiciary, the police and other law enforcement agencies, apart from certain NGO's working in the field.

11.3.2 Formal training courses

Formal training is generally conducted by recognized Institutes on National, International level. Wildlife Institute of India (W.I.I.) Dehradun organizes a large no. of training courses under Govt. of India assistance or with the collaboration of International organizations.

Table No.11b: Training programmes or courses organized at national level.

Sl. No.	Name of the Course	Duration	Eligibility
1	Post Graduate diploma course in Advance Wildlife management at W.I.I.	10 months	DCF/ACF
2	Certificate course in Wildlife management at W.I.I., Dehradun	03 month	FRO
3	Wildlife Management Training in State training school (B.F. School) as prescribed by W.I.I.	03 month	Dy. Ranger/ Forester/ F.G
4	Wireless operation and Weapon training/intelligence gathering/ Cyber crime at Police Academy	-	CAF/FRO/Dy. Ranger/ Forester/ F.G
5	Tourism management, receptionist, interpretation and environmental education at C.E.E., Ahmadabad	-	ACF/FRO
6	Wildlife health, Chemical immobilization, application of power fencing etc. at W.I.I, Dehradun	-	FRO/Dy.Ranger
7	Capsule courses in Wildlife		CCF/CF
8	Remote sensing at IIRS at Dehradun	10 months	
9	Decision Support system (DSS) & e-Green Watch	03	ACF/DCF/CF
10	Application of Drone/DGPS in Forest Survey and Demarcation	05	DCF/ACF/ROs
11	Refreshing Course at CASFoS, Dehradun/Coimbatore/Burnihat	3-7 days	ACF/ Sr.FRO

11.3.3 Proposed trainings for EDC members

Table No.11c: Training Programme for EDC members.

1	Apiculture, pisciculture vermin compost, soft toys making, bamboo weaving, Jute carpet, hand bag preparation, etc.
2	Hospitality training, personal grooming, hygiene & Dressing for Ecotourism Groups managing nature camps.
3	Housekeeping, Bed making & gesture training for Ecotourism Groups.
4	Cooking & food preparation.
5	Exposure visits to ITTM, IIHM, Bhubaneswar.
6	Nature Guide Training Programme

11.3.4 Exposure Visits

The buffer areas are filled with more challenges & complexities in management point of view as it involved both people and wildlife. Alike Core staffs the buffer areas staffs are need to be taken to exposure visit to other Tiger Reserve/PAs in other parts of country. These exposure visits will empower the staffs to understand the complexity and dynamicity of the landscape and suggest better implementation practice for better management of both people and wildlife in juxtaposition.

11.3.5 Establishing a learning centre/Museum at Jashipur

A learning centre can be created at Jashipur in order to store the biological specimens collected by field staff. Biological specimens such as lower jaw of deers and elephants can be kept over there, pugmarks and hoof marks of various animals, herbarium specimens of plant specimens should be kept. Field staff should be asked to visit and make use of the centre. There is also a need to develop reference handbook for the staff in Odia, specifically for Similipal field staff that they can refer. A composite house of museum, learning centre, library can be developed inside Khairi Campus, Jashipur for best used by the visitors and Staffs. Fund provisioning for the same may be made from the STCF or state Plan.A model training needs to be prescribed incorporating all the above programmes.

11.4 HUMAN RESOURCES DEVELOPMENT PLAN

Along with monitoring and need-based training, HR measures should include more activities directed towards better management and also towards welfare of the staff. Welfare schemes like subsidized availability of ration, literacy drives for the children of staff, arrangement of transport facility for school students residing in core areas, formation of women self-help groups will be encouraged. More long-term plans should include encouragement of small-scale cottage industries based on the traditional knowledge, proper marketing as well as setting up of sale and distribution centers. Wildlife management is a specialized branch, which need special orientation, skill and knowledge. Training makes a technocrat and field staffs perfect in his profession. Exposure of good efforts done in the *Par excellence* site develops a feeling of motivation to achieve the goal to the same degree or sometimes higher also. Not only this, tremendous degree of confidence is also developed if the initiative done is appreciated by others. Hence it is nice to initiate effort to impart special training to all level of staff in various relevant fields.

11.4.1 Training programs. These has been described in section 11.3 of Buffer Plan.

The objective is to create such an environment in the working condition in the buffer zone that the project personnel are encouraged to give out their beat in achieving the aims and objectives of management.

The strategy adopted for this purpose would be to closely examine all aspects of human resources development namely training, discipline, team building, facilities for staff, special allowances and general service conditions and constant work on improving all these aspects.

It is proposed to give comprehensive training on biodiversity conservation and livelihood improvement strategies as part of the Biodiversity Conservation and Rural Livelihood Improvement Project.

It is also proposed to provide training in handling fire arms, shooting practice, swimming, jungle patrol, night camping, evidence collection, census, conservation laws and road and building maintenance etc., as a regular activitythrough out the year.

11.4.2 Staff Amenities:

In Similipal TR majority of the buffer areas are lies inside the Similipal Sanctuary. Large nos. of Beats & Sections are remotely located and are available inside the deep forest in the formidable terrain. The staffs posted there are working in very hostile condition without basic amenities like electricity, pure drinking water facilities and cellular network. The Staff amenities presently provided are far from satisfactory. As a regular practice, they keep their family either in adjoining town like Jashipur, Baripada or with their parents

for educating their children. This is also done to get medical facilities for their family. Thus, they maintain double establishment. This causes financial hardships. Following basic amenities to staff are proposed: -

11.4.2.1 Housing Facilities

Because of lack of education and health facilities within the area, housing has to be seen from two different perspectives i.e., in situ housing at camp sites and housing for families at Jashipur&Baripada where basic education and health facilities for kith and kin of staff are available. The buildings are to be maintained in such a way that they have toilets, non-leaking roofs, mosquito net protection and white washed etc. so they are livable.

Re-organization of Similipal Tiger Reserve was done in 01.10.2019 without developing the infrastructure & the Staff strength has also increased by that time. Existing residential accommodations are inadequate for the staffs. So, the in-situ accommodation of the staffs must be ensured in order to improve the efficacy of forest protection on priority basis. All the infrastructure for accommodation of the staffs shall be completed by 2024-25 without stretching it further.

Staff Housing Facilities in this project are easily the best in the state forest department. These are proposed to be further improved so that every staff member working in the buffer may have housing and other facility. Annual maintenance and special repairs have to be carried out for all the residential buildings.

11.4.2.2 Project Allowance:

Project allowance is now being given to the staff working in the reserve management. However, the proposal may be made to enhance the current limit to make it more lucrative for the staffs.

11.4.2.3 Facilities for Children's Education

In addition to above allowance a special allowance for the children of the staff of buffer zone studying may be provided at Rs.2000/- per month to meet the boarding facilities. This will motivate the staff.

11.4.2.4 Medical Facilities

Most of the staff is working in inaccessible areas. Therefore, Para Medical centre may be opened at a suitable place in the buffer zone. First Aid Equipment should be provided at easily accessible locations.

Staff should be sent for First Aid course conducted by Red Cross of St. John Ambulance Institute so that they are available at our disposal to administer first aid at the time of emergency.

Anti-snakebite treatment: The antidote (anti venom) for snake bite shall be procured and always kept in readiness at all the Range Offices. This is very important and urgent. Necessary facilities will be provided at the proposed tribal medical centre for the same.

Sufficient medical kit/ First Aid kit must be kept at each Anti-poaching camp/ Beat level to administer first aid during emergency.

All the field staffs & their families must be incorporated under Group Health Insurance Scheme in order to provide better medical support during the odd hours.

11.4.2.5 Water Supply

Water supply through installation of hand pumps must be ensured to each residential premises/ accommodation inside the Forest. Where ever possible solar pump may be used to establish water supply to the camps and Beat/Section quarters. Proposal shall be made under CAMPA or CSS-PT to achieve 100% target by 2024-25 on priority basis.

Deep tube wells shall be Proposals have been made in this plan to establish water supply to all staff colonies and quarters with separate connection and suitable motors depending on the requirement. Periodical

maintenance is also necessary for the same. A sub-committee may constitute with the Chairman of Forest Range Officer and representative from Range Staff to assess and executive the water requirements to the staff quarters in all the ranges. The existing facilities are not adequate and it is necessary to provide basic facilities without any compromise.

11.4.2.6 Food/Ration Allowance

The patrolling staffs require food supply in terms of package since the cost of food rations including transportation is much higher in the interior areas where staff work. Hence a special food/ration allowance of Rs 1500/ per month/person need to be provided for the staff working inside the Tiger Reserve. The State Government is exploring the resources to fund the Anti-poaching watchers in form of Ration allowance.

11.4.2.7 Awards

Merit Certificate will be issued to deserving staff during wildlife week celebrations. Suitable recommendations need be sent for Sub-divisional level Biju Pattanaik Award for Wildlife conservation, State Level Forestry Award & NTCA award for their distinguishing service in the field of Wildlife Conservation. A separate protocol will be set up to identify suitable field staff, drivers and office staff for the purpose.

11.4.2.8 Rewards

Suitable Rewards need to be given to Eco Staff as well as Protection Staff based on their performance in Preventing Fire, Poaching Incidences and other discipline matters.

11.5 WILDLIFE HEALTH MONITORING

Protected areas are established with an aim to conserve components of biodiversity to maintain their status in the natural ecosystem to protect the species from premature extinction. Outbreak of fatal diseases among the population of wild animals has lost considerable wild fauna in the past. Large-scale mortality of Bison in South India during (1968 and 1975) and Kaziranga National Park (1981) by Foot and Mouth Disease (FMD) in 1952, Mortality of 24 lions due to babesiosis & CDV in 2018 & in recent past death of 6 Nos. of elephants occurred in Karlapat Sanctuary in Kalahandi district of Odisha had been reported in the past. Dissemination of a number of diseases, like; FMD, Anthrax, TB and Rabies are common in wild animals. In order to maintain the good health status of the wild animals, efforts for disease surveillance are extremely important in the Protected Areas.

In Similipal TR there is every chance of transmission of contagious disease from the livestock to the wild animals particularly in the buffer areas due to cattle intrusion in most of part of the interior villages of Barehipani, Gurguria&Astakuanr G.P. apart from that, cattle trespassing is also visible in the fringe villages in the outskirts of Similipal TR. here is a great competition of survival among wild ungulates and cattle for both forage and water. The domestic animals come in contact with wild animals, particularly ungulates at common grazing fields and at waterholes. Due to this, chances of the transmission of various fatal infectious diseases from livestock, to wild animals, namely Anthrax, Foot and Mouth Disease (FMD), HaemorrhagicSepticaemia (HS) etc., are extremely high. It is also known that there are few diseases which are communicable to carnivores form diseased ungulates; e.g.Rabies, Anthrax, Hydatidosis and Trypanosomiasis Free-ranging wild animals are as susceptible to diseases as any other living beings.

Diseases have been a major cause of local extirpation of a number of wild animal species in India. With the increasing interaction between wild and domestic animals, the chances of disease transmission amongst them are high. Therefore, similar to the attempts made for recording the occurrence of disease outbreaks in wild animals of protected regions, efforts should also be made to know the occurrence of specific infectious and contagious diseases in domestic animals at the periphery of the protected wildlife areas. Until and unless different epizootiological cycles of various parasitic and infectious diseases are delineated, it will not be possible to plan out measures to eradicate these diseases from free ranging wild animals.

For maintenance of health of wild animals, it is essential to monitor and survey the parasitic and infectious

diseases periodically so that necessary actions could be taken to prevent disease outbreaks and control large-scale mortality. Surveillance programs will be a major aid in the implementation of long-term health management plan on the appropriate measures to maintain healthy population of wild animals and guarding them against the risk of sudden and heavy mortality or morbidity in Protected Areas. This can be best achieved by preventing transmission of diseases between wild and domestic and in-between wild animals by manipulating the factors involved in the transmission. Establishing the database for forecasting the diseases by performing epizootiological studies in and around the Protected Areas round the year is of utmost importance and needs attention. In free ranging Wild animals, only a fraction of mortalities due to diseases are visible at a time, except during epizootics, when the mortality exceeds the rate of predation and scavenging. Hence, the impact of diseases visible in these animals is far lesser than the actual scenario. Therefore, it is essential to understand the magnitude of disease problem in free-ranging wild animals. More recent investigations by conservation agencies have shown that diseases and parasites are a decimating factor affecting population dynamics of wild animals.

It is of utmost importance to carry out epizootiological studies covering at least 3 complete years so as to generate information on prevalence of infectious and parasitic. diseases and various climatic factors influencing the rate of infection. This will help in proper mapping and developing a forecasting system on various infections among native wild animals. This contribution will be a major aid in the implementation of long-term health management plan and guarding the wild animals from the risk of sudden and heavy mortality or morbidity. To achieve the above objective need of establishing a well-equipped field veterinary laboratory is of utmost importance along with the trained staff.

Prophylactic Immunization:

Some diseases which are common to this area and are epidemic in nature and spread by both wild and domestic animals, preventive treatment against these diseases by the means of prophylactic immunization to the domestic animals is given. Domestic cattle, which may transmit the disease among wild fauna, can be vaccinated to prevent the occurrence of FMD, BQ and HS. Prophylactic immunization to cover FMD, BQ and HS are regularly carried out with the help of Veterinary Department every year, to reduce the chances of spread of disease from cattle to the wildlife.

Similipal Tiger Reserve (STR) comprised of 64 buffer villages & more than 1200 villages are surrounding the TR. Most of the Forest villagers depend on agriculture and livestock rearing for their daily source of income. They cultivate their land & rear large number of livestock.

The following table presents recent livestock census figures of different villages under Similipal North WL Division,

Table No.11d: Livestock census figures of different villages under Similipal

SL No	Livestock	Barehipani WL	Nawana North WL	Gurguria WL	Talabandha WL	Total
1	Cattle	1029	3658	782	1821	7520
2	Buffalo	45	182	37	19	283
3	Sheep	73	110	76	0	259
4	Goat	1427	3610	1689	3950	10676

Wildlife and livestock can have the same diseases. Such large number cattle residing in and around Similipal Tiger Reserve can be a major source of diseases and may come in Contact with wild animals and can be dangerous to health of wildlife & vice versa. The domestic livestock compete with the wild counterparts for fodder in the fringe areas. They share the common water holes with wild animals. So, there is a fair chance of dissemination of life-threatening livestock borne diseases (F.M.D, H.S., B.Q., etc.) to wildlife. Thus, livestock

vaccination at recommended intervals is a must to indirectly protect wildlife. Vaccination promotes animal welfare by protecting animal health-both domestic & wildlife. In this regard, vaccines are an important tool, which increases the level of immunity in a herd & the relative resistance of individual animals. The following vaccine is prescribed and can be used for livestock vaccination as per recommended dose & interval in Similipal TR at the said time & year for routine vaccination of livestock present at the PA interface villages. Apart from this ARD department also vaccinates and takes measures to prevent spread of diseases in domestic animals. Care must be taken to organize synchronized immunization programs in all buffer & Fringe villages especially adjacent to Ranges like Pithabta North WL, Pithabata South WL, Dukura WL, Podadiha WL, Thakurmunda WL, Kendumundi WL, Gurguria WL, Talabandha WL, Nawana North WL, Barehipani WL &Nawana South WL.

Table No.11e: Vaccination to livestock in Similipal

Name of the vaccine	Ingredients/adjuvant	Dose recommended
Raksha trio vac (FMD+HS+BQ)	FMD inactivated antigens against O, A, Asia-1 and formaldehyde inactivated *Pasteurella multocida*culture, inactivated *Clostridium chauvoei*culture mixed together in light mineral oil emulsion	3 ml, mid-neck, deep i/m (Vial: 30 ml)

It is estimated that around 2 lakh cattle are residing in the Tiger Reserve interface and vaccinating them is a must as a precautionary measure. Pre-monsoon season is the best time for vaccination of livestock-regularly this schedule shall be followed practically as far as possible. Cattle reared in all the fringe & buffer villages in the vicinity of tiger reserve shall be vaccinated during pre-monsoon season annually.

Adequate awareness programmes about livestock, diseases & importance of vaccination are necessary and should be organized in consonance with Veterinary & Animal husbandry dept. to take these villagers in confidence so that every shed keeping animals are vaccinated for the betterment of wildlife. A healthy collaboration should be established between Tiger Reserve, Animal husbandry department and NGOs to create awareness among villagers and also lean them away from letting their cattle into tiger reserve to stall feeding.

A dedicated mobile veterinary unit may be kept at Jashipur&Baripada with a Veterinary Asst. or Livestock Inspector for the said purpose for timely implementation of the prophylactic immunization & spreading adequate awareness for yielding best results.

Disease Surveillance:

A quick disease reporting detection treatment system only can achieve proper disease surveillance. In the case of wild animals, detection of disease is only based on observation on animal behaviour and their day to day activities. Concept of landscape epidemiology that associates the occurrence of a certain disease with the existing landscape may also be kept in the mind. The knowledge of animal species typical to the given area and particular disease maintained and spread by them may be extremely useful in disease detection and treatment. If such a disease is detected, its prophylactic treatment by immunization, water hole treatment or aerosol immunization can be done. To protect and maintain wildlife in PA with good health, it is necessary to achieve disease surveillance of –

i. Native wild population

ii. Domestic cattle of adjoining village

Parameters for the Monitoring of Wild animals Health –

1. General examination
    - Physical examination
    - Clinical observation
2. Laboratory investigations
    - Faecal examination
    - Haematological examination
    - Serological examination
3. Study of kill / Mortality
4. Detailed post-mortem examination
5. Collection of material for laboratory examination

11.5.1 Care of rescued animals

Strategies: -

(a) The V.S. should prescribe the diet of each animal in the rescue centre and also enforce quality control.

(b) Health record of each captive animal should be maintained.

(c) Deer and other herbivores should not be kept in captivity for long – but should bereleased in the sanctuary as soon as they are fit to fend for themselves.

(d) Leopard and other carnivores should not be kept in captivity for long. All trapped adult carnivores may be released in suitable habitat in the sanctuary or any other suitable forest area other than sanctuary as soon as it has been declared medically fit by the V.S.

11.5.2 Rescue Centre

There is a rescue centre available at Pithabata under Similipal South WL Division which is functional & managed by WTI to provide immediate care of the rescued animals. Similarly, A dedicated rescue centre with mobile care unit may be proposed to established at Jashipur/ Gurguria under the administrative control of Deputy Director, Similipal North WL Division to cater the needs of all rescued animals & their rehabilitation.

Main objective to develop rescue centre is:

(a) To take care of captured wild animals from the sanctuary or outside the sanctuary.

(b) Treatment of small herbivores, etc. and

(c) Then release into the wild.

The existing rescue centre may be strengthened during the plan period with additional facilities.

"Wildlife disease has been defined as any condition which jeopardizes the survival of an animal in a particular environment. This is a broad definition but one most useful in considering diseases of wildlife (Richard.1971)".

Diseases caused by pathogens are inherent events of the natural system, like predation by predators. Like increasing incident forest fires, the role of parasites and pathogens need particular attention in the present day environment of habitat encroachment, disturbance and fragmentation.Disease of wildlife occurs in many different forms in a wide range of animal species and populations. Diseases, when expressed in free-ranging

animals, can have significant effect on wildlife ecologies. Whilst some diseases exist as symptom less, sub clinical infections without any obvious ecological impact and of no consequence for domestic animals or humans, occasionally there are dramatic epizootic outbreaks characterized by high morbidity and mortality.

In the wild the cause of mortality could be due to intrinsic and extrinsic factors and generally they are: starvation, diseases, parasite, predation, pollution, poisoning, accidents, poaching etc, Treatment of individual is not possible in case of diseases of wildlife. Preventive medicine is a far more effective means of dealing with diseases in free living animals. Disease in a wildlife population is rarely simple, one cause, one effect situation. Usually it is the product of profound changes in the environment. Eg. Diclofenac poisoning in Vulture leading to crash in their population in Indian subcontinent. Disease management in free-raging wild animals is attempted not by treating individual sick animals but by manipulating those factors that play a role in transmission of disease. Surveillance and monitoring programmes are the first steps towards providing an appropriate level of understanding of the health status of wildlife populations. The basis for developing and maintaining such a capability includes the management of wildlife population and their habitats, the security of animal based export trade and translocation of animals, the protection of natural biodiversity values and to safeguard public health.

The details of existing wildlife health management, key problem, remedial action a proposed management plan has discussed in detail in core plan in Chapter 12. The facilities at core zone can be utilized for buffer zone as well.

11.6 MORTALITY SURVEY

Wildlife natality and mortality are interrelated. Usually, animals with high levels of natality will also have high level of mortality. Normal mortality and natality have been reached during the evolutionary history of the animal and the net population should yield some harvestable surplus. Mortality has one beneficial point for the population since it culls the inferior animals and improves the quality of animal population, because it is a mechanism of natural selection. But mortality, when noticed often causes concern with lay people. However, an increase in mortality rate for species concerned has to be considered seriously. Death due to unknown aetiology must be investigated thoroughly. Mortality due to anthropogenic pressure must also be investigated.

Mortality survey is an important tool for monitoring a population in the TR as important as population estimator. Abnormal mortality has to be recognized and handled with due importance.

1. Newly Emerging Infectious Disease(EID),
2. Diseases of anthropogenic origin; epidemics of infectious diseases ‘spill over’ effect from stray cattle and dogs, and other human sources.
3. Mortality related to man-made cause like road kill, train accident, poaching or hunting, electrocution, poisoning, dynamite blast hidden in the agricultural fields, and manmade structure such as wells, etc.
4. Mortality related to natural origin like aging, predation, flood, parasitism, fall and death, malnutrition, starvation, drought, in fight and injuries, territory fighting, density dependent death etc
5. Mortality related to pollution from industrial units and quarries, contaminants, drug residue like diclofenac, etc

Mortality rates than the normal can lead to serious conservation problems because it reduces the population to abnormally low levels or even wipe out a population. This is of greater importance if the animal under conservation is seen only in smaller areas in few numbers like vulture, lion of Gir, Hangul of Dachigam or brow antlered deer at KeibulLamjao, because of exclusive nature of these animals in these areas.

Systematic mortality survey and data collection over the period must be analyzed and the end result can be used to strengthen wildlife management in a scientific way. This has to be handled most professionally by a

wildlife manger. The standard recommendation for mortality is the old dictum of 'remove the cause' is not always possible in wildlife management because asserting the cause and its removal is not easy in wildlife. Wildlife manager often has little control over the ecological factors. Evaluation of habitat quality \may be done if death occurs due to malnutrition and starvation. Poor health can lead to excessive predation. But other man-made etiological factors like cattle grazing, highways cutting across the Reserve, poaching or hunting, electrocution, poisoning, dynamite blast hidden in the agricultural fields, and man-made structures such as wells, pollution from industrial units and quarries, contaminants, drug residue like diclofenac, etc., should be handled in a professional manner.

GPS locations of poaching or hunting cases, recorded and plotted on a GIS map will provide information to strengthen protection. Similarly, GPS locations of disease out-break recorded will also be useful to understand the disease epizootology. By understanding their pattern of disease out breaks, the mechanisms of spread from cattle or by other causes, timely preventive and control measures can be taken.

11.6.1 Existing Mortality Survey

Presently there is no systematic survey for carcasses of dead animals. If the Forest department staff on their regular field patrols, come across any carcass of a Schedule-I species, they will report this to their range headquarters. The Range Officer will in turn request the Forest Veterinary Assistant Surgeon to conduct a post-mortem and to report the cause of death. There is no proper documentation on the mortality on the prey base, that die of natural causes. This has to be done systematically for scientific management.

11.6.2 Proposed management of mortality

11.6.2.1 Mortality Survey and data collection

The field staff during their regular patrol in their respective beat area needs to look for death of all animals including natural kill by a carnivore and report to the concerned range officer on a daily basis. Each range office to maintain a mortality survey register and death details to be entered then and there and an abstract of same fact in a specified format with digital photograph submitted to the office of the field director and office of the Forest Veterinary Assistant Surgeon. In case of other natural death (other than kill by a carnivore), death due to diseases and poaching should be immediately informed to the Forest Veterinary Assistant surgeon with proper requisition letter to conduct post-mortem examination. Subsequently the fact also should report to the O/o the Field Director cum Regional Chief Conservator Forests, Baripada.

11.6.2.2 Training on Mortality Survey

Periodical training to the Forest Field staff for collection of details on mortality need to be given regularly to maintain proper records by the wildlife health monitoring and Forest Veterinary Unit.

11.6.2.3 NTCA Guidelines for Tiger Mortality

On 17.12.2012 NTCA have issued a Standard Operating Procedure to be followed in case of tiger death which shall be scrupulously followed.

11.6.2.4 Developing a wildlife disease monitoring laboratory having Forensic department:

A sophisticated lab needs to be developed for regular wildlife disease surveillance and other tiger DNA mapping related molecular work and meat speciation or forensic work. Building, infrastructure and above mentioned man power like molecular scientists and labarotory technician is required to develop a sophisticated laboratory at Baripada under the supervision of the Field Director & guidance under Centre for Wildlife, OUAT, Bhubaneswar.

11.6.2.5 Vehicles (Animal Ambulance)

Two vehicles, fully furnished ambulance equipped with facilities such as a winch and pulley, Stretchers, Nets, ropes, animal mask, dis-infectants, Bandages, Medical life support instruments to treat and bring the injured

wild animals to be kept under surveillance at two the rescue centres proposed in Gurguria/ Jashipur&Nawana.

11.6.2.6 Animal Restraining/ tranquilizing units:

Minimum three experts in problematic wild animal restraining/ tranquilizing fields need to be built up by procuring tranquilizing guns, restraining chemicals, other supporting equipment and training of suitable staff as well as VAS at Baripada, Karanjia and at Udala for dealing problem wild animals in and around the Tiger reserve. Sufficient funds need to be provided for this programme.

11.6.2.7 Wildlife Rescue Centres at Gurguria/ Jashipur&Nawana :

At present, 2 Nos. of rescue centre are in position in the outskirt of Similipal TR i.e., one at Pithabata& another at Karanjia to treat the rescued animals from TR & outside the Tiger reserve area. However, to treat the rescued animals from Ranges like Nawana North & South, Gurguria, National Park, Barehipani, Chahala, Talabandha etc. a Wildlife rescue centres having sufficient space for rescued animals from the above Ranges of the Tiger reserve area are required to be made at Gurguria/ Jashipur to give proper treatment and ground for rehabilitation in to their native habitat.

However, Wildlife rescue centres having sufficient space for rescued animals from outside/inside the Tiger reserve area are required to be made at Gurguria&Nawana to give proper treatment and ground for rehabilitation in to their native habitat. Hence sufficient fund needs to be provided by the funding agencies for building such rescue centres with recruitment of animal care assistant, vet surgeons. Each animal rescue centre must have separate cages, wards for Elephants, Tigers/ Leopards, Herbivores and for small animals, birds, reptiles.

11.6.2.8 Establishment of GIS Laboratory at Baripada in the Office of the Field Director:

A well furnished building with high capacity computers and Latest GIS software, printers of A4, A3 and A1 size map printing facilities, Air conditioned rooms/equipment, Electric power back up system, and security system to protect database and the system need to be established at Headquarters and sufficient fund provision to be provided. GIS lab will play a vital role in monitoring of various parameters in STR.

11.6.2.9 Recruitment of Sociologists/ Field Biologists and Veterinary Assistant Surgeons:

Sufficient fund requires to be supplied for recruitment/engagement of one sociologist for round the year survey, monitoring of socio-economic status of tribal and other forest dependant local people living in and around the Tiger Reserve. One GIS assistant and computer assistant need to be engaged for the GIS cell. One wildlife trained V.A.S. need to be engaged in Field director's office for overall monitoring of wildlife health and rescue operations, and relocation of problem animals.

11.6.2.10 Periodical training to the field staff on Wildlife disease and monitoring as a capacity building.

11.6.4 Disease Preventive Measure Programme.

1. Periodical vaccination of village cattle against contagious diseases and de-worming
2. Elimination of dog in protected areas
3. Periodical vaccination and de-worming of stray dogs in fringe areas
4. Continuous monitoring of infectious disease by sending sample from each possible wildlife death

Mortality survey form (filled by a forest field staff)

Date and time:_____

Name of the Range:_____ Section:_____

Beat :_____ Compartment:_____

Location :_____

GPS co-ordinates : Lat: _____ Long:_____

Species :_____

Age :_____Sex :_____

Signs around the carcass:_____

_____

Signs on the carcass:_____

_____

Inference / probable cause of death:_____

_____

Remarks:_____

_____

Name of the Forest field staff and Signature

Mortality survey abstract (to be filled in by the Range Head-quarters)

Mortality survey abstract for the month of _____ Year _____

Name of the Forest Division:_____

Range: _____

No	Date	Species	Sex	Age	Location				Cause of death	Re-marks
					Beat	Compart-ment	Location	GPS coor-dinates		

Submitted to the Field Director cum Regional Chief Conservator of Forests

Signature of the Range Officer

1. Copy to Forest Veterinary Assistant Surgeon

CHAPTER 12
TIGER POPULATION AND HABITAT ASSESMENT

CHAPTER

12

TIGER POPULATION AND HABITAT ASSESSMENT

12.1 DAILY MONITORING PROTOCOL

For designing, implementing, and evaluating the success of any conservation program for endangered species, it is imperative to monitor the status, distribution and trends in the populations of the target species. The monitoring program to be transparent in its approach, and holistic, addressing an array of parameters related to the survival of the species by using the blend of best available science and technology Jhala *et al* (2008).

Daily monitoring task to be planned and sincerely executed by the ground staff like the forest guards, STPFs and the anti poaching staff which involve simple observations on a regular basis and keeping track of the said observations discreetly and meticulously. The daily walk of a forest staff is a tool that could be effectively used for monitoring of different animal populations across different seasons and habitats. The observations should include:

1. Number and species of animals seen during any patrolling through the forest. For every walk the total kilometres walked to be uploaded with time and intervals of rest. Effort will be made to see that every walk is taken during more or less at a fixed time during the day all though the year.
2. Number of different signs of carnivores like pugmark, scrape, rake, scat encounter and kill to be uploaded on every walk. Efforts should be given towards identifying the species for which signs are being uploaded along with some special notes if any.
3. Care to be taken in maintaining as much silence as possible during the walks and uploading the associated information for habitat and weather.

The records of these walks if maintained properly and compared over time can provide reliable information towards understanding and deriving an overall idea about the forest health.

Reporting and database maintenance are the two most important part of the entire program. Data collected during these daily walks should be collected and compiled by the office, if possible, at the range level and should be able to produce when and where needed. Data for the whole TR will be compiled and submitted to NTCA by the FD, STR Office.

All the exercises should be carried out as per the AITE Protocol of NTCA which NTCA may be revised from time to time. The AITE-2021-22 has been completed in STR by following paperless approach and was done completely through MSTrIPES mobile application (Ecological module). All the data was fed through mobile and simultaneous scat/dung collection was also done as per prescription of NTCA.

12.2 TIGER POPULATION ESTIMATION FRAME WORK: BUFFER ZONE

Sampling For Tiger, Leopard and Other Carnivores Encounter Rate

Data should be obtained on the presence, absence and intensity of use of a beat by tigers and other carnivores, quantification of the abundance of tiger, leopard and carnivores sign in an area. The following procedure needs to be followed for data collection:

- A beat will be considered as a sampling unit.
- Areas within the beat that have the maximum potential for tiger occupancy will be intensively surveyed.
- Since tiger and leopard have the tendency of using dirt roads, trails, foot paths, river beds and nullahas, these landscape feature within the beats need to be searched intensively.
- One to three persons who know the terrain and habitat features of the beats should conduct the survey for tiger sign.
- Signs like tracks, scats, scrape, rake, rolling, dung, direct sighting and vocalization should be recorded.
- Minimum 3 searches each of 5 km at least
- Best Location for camera trap placement can be identified during this survey
- Continuous Pugmark track set should be counted as one sign (shall be explained in the field)
- Pugmarks found in opposite direction, scat/ dung, scrape, rake and other signs have to recorded individually
- As it is done through MSTrIPES mobile application, distance covered, GPS coordinates of signs observed along with photographs will be recorded in the mobile phone itself.
- The total minimum distance covered while searching for tiger and other carnivore sign should be 15km per beat.
- Tiger and leopard signs should be classified into following categories 1) Pugmark trails, 2) Scat (Old: dry with hair and bones visible; Fresh: dry but intact with shiny surface; Very Fresh: soft, moist, and smelly, 3) Scrapes,4) Scent marks(spray, rolling), 5) Rake marks on trunks, 6) Actual sighting, 7) Roaring (vocalization) 8) Kills (Predation on wild prey).
- A brief description of the topography and forest type is to be recorded for each sign.
- In the case of pugmark trails, each trail set is considered as one sign (not each pugmark as one sign). In case a tiger (or other carnivore) continues to walk along a dirt road for a long distance (say 1 km), then this should be considered as one sign, and a comment recorded in the remarks section of the data regarding distance covered by a pugmark trail of a single tiger.
- Tiger and leopard signs if encountered outside the sampling route should also be recorded with GPS coordinates in the mobile application and with appropriate comments.
- Special emphasis should be given to sign of tigress and leopards with cubs and any authentic evidence of cubs (sighting of cubs, lactating tigress, tracks, etc.) obtained within the past twelve months should be mentioned in the data sheets.
- While sampling for tiger and leopard signs of any other carnivores that are encountered.
- The number of livestock killed by predators within the past three months needs to be recorded in the questionnaire following the data sheet.

- It is important to report data sincerely. It is likely that there may be reliable information that tiger /leopard is present in the beat being sampled, but no tiger /leopard signs are recorded during the intensive search survey. In such cases, mention should be made in the remarks column of the data sheets in the mobile App. However, failure in obtaining tiger sign from a beat is equally important as recording tiger/ leopard sign and for appropriate analysis of this data the actual should be reported.

Sampling For Ungulates Encounter Rate

This protocol outlines a simple method for quantifying ungulates abundance in an area based on visual encounters while walking along fixed line transects.

The following numbers of transect lines of 2 km length have been made which will be kept as permanent lines and will be maintained regularly.

Table No.12a : Transect lines in Similipal Buffer

Name of Division	No of transect lines
Baripada	4
Karanjia	15
Rairangpur	11
Similipal North	45
Similipal South	28

The following procedure needs to be followed for data collection:

- Each Forest Beat would be considered as the unit for sampling.
- Each forest beat (around 15 km^2), should have at least one transect line, Beats more than 15 km^2 may consider for two transect lines.
- If a forest beat has two or more distinct habitat types (e.g., grassland 40%, deciduous forest 60%), then two habitats specific transects should be laid and sampled.
- Length of transect should preferably be of 2 km (not exceeding 4 km).
- Transect should not be located near busy road nor parallel to the river, road or other features of the landscape which may bias the sighting of ungulates.
- Transect should clearly marked throughout the line so that observers do not deviate from the line of walk.
- Transect should be walked by only 2-3 persons during the early morning hours.
- Before Transect walk, Get well acquainted with use of Range finder, Compass and MSTrIPES Ecological Mobile App.
- The observer should minimize the chances of the animal getting disturbed by the noise and presence of the observer during transect walk.
- Each line transect needs to be walked at least on three different mornings (temporal Replicates).
- Record walk bearing, animal bearing, radial distance and count of each species (Adults and Young)
- For each animal sighting, the animals are considered to belong to two different groups if the closest animals from the two groups are separated by a distance of over 30m.

- Record **animal bearing** (suntto compass)**, transect bearing** (suntto compass)**, GPS location, distance of animal** (range finder) at every sighting
- To calculate Perpendicular Distance of the sighted animal from the transect line We record Radial Distance & Sighting Angles

The following assumptions have to be taken into consideration:

- The detected animals should be recorded at their initial location.
- The distance measurement should be exact.
- Walk bearing and transect bearing are essentially the same but we record walk bearing to account for some deviation from the transect line that may arise due to physical obstruction due to very thick vegetation or terrain complexities.

Sampling for Vegetation, Human Disturbance and Ungulate Pellets

To quantify the habitat parameters and determine relative abundance of ungulates sampling will be done along the same line transect on which ungulate encounter rates were estimated. For economy of time and effort it would be possible to first sample the line transect during early morning hours for ungulates encounter rate and then while returning along the same line, sample for vegetation and ungulate pellets. Sampling for vegetation, ungulates dung and human disturbance will be done only once on a transect.

- Again the beat will be sampling unit, and sampling will be done along the established line transect.
- For beginning and end point coordinates of the line transects need to be recorded using MSTrIPES mobile App.
- The principle of line transects as explained in the section on ungulate encounter rates is applicable here.
- Vegetation would need to be quantified visually at the following categories for each plot:

15m radius circular plot

1. Broad vegetation type and associated terrain type eg. mixed teak forest on hilly terrain, sal forest on flat land etc.
2. Within the distance of approximately 15m of the observer the five most dominant trees (over-story, all vegetation >6ft. in height, including bamboo) need to be listed in the order of dominance (abundance).
3. The observer needs to list the 5 most dominant shrub species (middle –story, vegetation >20cm &<6ft.) in order of dominance (abundance) within 15m of the location. He needs to categorize shrub density (under – story vegetation) as absent, very low, low, medium, and dense. Shrubs will be assessed on five point scale (0 to 4 i.e. absent to most abundant) for density estimation.
4. If weeds are present their abundance needs to scored on 0 to 4 scale (0 being absent and 4 for high abundance) and the three most common weeds seen in 15 m need to be listed in order of abundance.
5. Within the same 15m distance the observer needs to record number of signs of looping, wood cutting, and presence /absence of human foot trail. Mention needs to be made if people and or livestock are seen from the plot.
6. The observer needs to visually quantify the canopy cover at the location. The observer should subjectively classify the proportion of the sky above him that is covered by canopy foliage and categorize it into <0.1, 0.1- 0.2,0.2-0.4,0.4-0.6,0.4-0.6,0.6-0.8,>0.8 canopy cover.
7. A mention needs to be made in the data sheet of the App regarding the number of permanent human settlement, human population and livestock population present in the beat.

8. A mention needs to be made based on the observers' knowledge if any non timber product is collected from the beat. If yes which NTFP and to score the magnitude of collection on a 5 point scale (0- no collection, 4- high rate of collection)

9. If the beat was burnt, the proportion burnt in the past 3 years needs to be mentioned in the data sheet.

1m radius circular plot

The plot should be laid 5m away from the centre of the 15m circular plot. The observer needs to use a 2m long stick to define an imaginary circle around him with the stick as the diameter. Within this circular plot (2m diameter) the observer needs to a) quantify the percent ground cover, i.e., the proportion of ground covered by herbs, grasses, litter and bare ground b) List the 3 most dominant grass species, and herb species in order of abundance.

Sampling for Ungulates Pellets

Ungulates abundance will also be indexed by enumerating their faecal pellets. This exercise will be done on the same line transect that has been sampled for ungulate encounter rate. To save time, this exercise could be done after the line transect has been sampled in the early morning for ungulates encounters.

- At every 400m along the transect (line of walk) the observer needs to sample an area of 2m by 20m, perpendicular to the transect for quantifying ungulates pellets. This is done by using the 2m long stick held at the centre horizontally in his hand and by slowly, 20m right and left of the transect alternately at every 400m.
- All ungulate pellets encountered need to be recognized to ungulates species and recorded in the appropriate columns.
- The number of individual faecal pellet need to be counted. In the case the pellets occur in the large heaps, then they should be categorized into the following categories A(50-100), B (100-200) and C (>200).
- In areas where small livestock like sheep and goat are known to be grazed, it is possible that faecal
- Pellets of these can be confused with wild ungulates especially those puff chital. In such areas, a mention needs to be made that goat or sheep graze the area.
- In the last row of the data sheet the observer needs to report if ungulates/animal listed in the data sheet occurs in the sampled beat to the best of his knowledge irrespective of whether its pellets/ dung were recorded in the plots.

Phase II

The data from phase I one will be plotted in geographical information system (GIS) to develop a presence/ absence map for tigers, at the beat or range level across the park. The presence/absence map is then to be used to develop a resource selection probability function using attribute data on transportation network (i.e., linear features such as roads and train tracks), forest cover, normalized difference vegetation index (NDVI), vegetation cover, terrain model, hydrology, and night light satellite (to represent human disturbance). The output of this phase will be a map with relative rankings of high, medium, and low probability of tiger occurrence throughout the park.

This data could be assembled and processed by any institution that has GIS facility and are eager to provide them. Outsourcing of this work would be helpful keeping in mind the feasibility and the amount of technicality that is supposed to be involved. This data once generated can serve as the inventory for the park and could be subsequently used by the park on future occasions.

Phase III

Estimation of tiger and ungulate abundance will be done by using intensive sampling. The habitat rank map

for tiger developed in phase II will be used to draw a sample of location for intensive density estimation of tiger and ungulates density. Tiger population will be estimated using photographic mark- recapture sampling techniques in medium and high density (probability) areas. The following frameworks are tiger densities estimation by Capture recapture frame work and ungulate densities by Distance sampling.

Estimation of tiger populations using capture recaptures frame work

With the first animal triggered photograph being taken in 1877 (from Cutler and Swann, 1999), remote photography has been used to study avian nest predation, feeding ecology, nesting behaviour, determining activity patterns, presence – absence monitoring and estimating population parameters. The increasing popularity of remote photography in wildlife research has led to the development of a large variety of equipment and methods (Kucera and Barrett 1993).

With the help of remote photography, the elusive lives of cryptic animals have been better understood (eg. Pierce *et al.*1998). Since previously all other information regarding cryptic animals, carnivores in particular, were derived either from direct observations or indirect signs, remote photography studies have proved more successful (Kucera and Barrett 1993). From the times of Champion (1928) photographing cryptic animals such as the tiger (*Panthera tigris*) in the Indian sub-continent using remote photographic techniques has sought popularity.

With developments in capture – recapture theory (Otis *et al.,* 1978, Pollock *et al.,* 1990) and the use of cameras to capture individually marked or identifiable animals and photographically recapture them, resulted in the use of cameras for estimating population parameters. Since individual tigers are readily identifiable using the stripes on the body (Schaller 1967, McDougal 1977, Karanth 1995, Franklin *et al.,* 1999), the sight-resight (White 1996) or capture-recapture approach can be used to estimate population parameters. The capture – recapture theory requires that all individually identifiable animals will have to be identified with surety. By estimating the capture probability *p – hat* an estimate of the population size (*N*) is arrived at (Nichols 1992). Owing to the large number of estimators available for estimating the population size (*N*) various computer programs have been formulated to aid analysis (e.g. White 1996).

Karanth (1995) developed and implemented a method of photographic capture-recapture analysis to aid estimate and monitor tiger populations. Years of using this method of analysis has proved that photographic capture recapture sampling is a reliable technique for estimating abundances of tiger and other cryptic animals (Karanth and Nichols 1998, 2000, 2002, O'Brien *et al.,* 2003, Trolle and Kery 2003, Karanth*et al.,* 2004b).

However most published studies report population sizes accompanied by low levels of precision (e.g.Karanth and Nichols 1998, 2000, Silver *et al.,* 2004) and low sample sizes (Kawanishi and Sunquist 2004). It is only recently that issues regarding sampling design related to photographic capture-recapture analysis are being discussed (Wegge*et al.,* 2004). This brings to notice that though this method of population estimation has proven successful, issues regarding sampling require rigorous field validation so as to improve the quality of the results thus obtained.

Estimating tiger population using photographic capture-recaptures

In order to estimate the population density of tigers in the study area photographic capture recapture analysis was chosen as an appropriate method (Karanth 1995, Karanth and Nichols 1998). The sampling design was modified to suit field conditions. Each site two cameras are equipped to photograph both flank of the tiger at every capture. The cameras are placed within wooden housings so as to protect the units from weather and animal damage. As to photograph the two flanks of individual tigers to aid individual identification.

These trapping sites are selected based on presence of tracks, scats and other evidence indicative of frequent tiger activity so as to maximise the capture probabilities of tigers (Karanth 1995). An important consideration

is to ensure coverage of the entire area, without leaving holes or gaps that were sufficiently large within which any tiger have a zerocapture probability. Therefore, trap placement was planned with a minimum of 1.65 km inter trap spacing. Owing to the good network of roads all trapping sites in each of this should be checked on a daily basis.

Following the identification of tigers from the photographic captures using stripe patterns capture histories will be developed. The capture history for an animal t_x consists of a row vector of 15entries, denoting the number of sampling occasions. Each entry, denoted as X_{ij} for an individual *i* on occasion *j*, assumes a value of either "0" if the animal is not photographed on that particular occasion, or "1" if the animal is photographed on that occasion. Referred to as an *X* matrix (Otis *et al.,* 1978) this data matrix will be used to estimate tiger population size *N*.

The capture history data will be analyzed using program CAPTURE (Otis *et al.,* 1978, White *et al.,* 1982, Rexstad and Burnham 1991), software developed to implement closed-population capture-recapture models. Program CAPTURE computes the estimate of N under seven different models which differ in their assumed sources of variation in capture probability (*p - hat*).

Since it is aimed to estimate the density (*D*) of tigers in the study area, the population size (*N*) is divided by the effective sampled area (*A(W)*). In trapping studies, *A(W)* is calculated by assuming that the perimeter traps represent the minimum sampling area *A*. The mean maximum distance *d* between recaptures of individual animals is calculated and the boundary strip width *W* is calculated as *W* = *d*/2 (Dice 1938, Wilson and Anderson 1985). The boundary *W* is then added to the minimum sampling area *A* on a GIS domain and *A (W)* thus calculated. Theestimates of density and population size are evaluated using two principle measures: bias and precision.

Estimating ungulate density by distance sampling

Densities of the prey species is estimated using the line transect method (Anderson *et al.,* 1979, Burnham *et al.,* 1980, Buckland *et al.,* 1993). Line transects have been found to be very effective and reliable in estimating densities of ungulates in the Indian Subcontinent (Karanth*et al.,* 2004a). With the hypothesis that detection probability is related to the distance between animals and the point of observation, the obtained estimates of density are in effect adjusted for no detection bias.

Line transect data will be collected between 06:15 hrs and 09:30 hrs by two observers. On every walk the followings were noted –

i. Species and group size: On every detection the name of the species will be noted along with the sex.

ii. Position: Observation of animal clusters or individuals has to be noted as distance from the start.

iii. Sighting angle: Using a hand-held compass (SUNNTO), the bearing of the animal clusters or individuals are taken. Since the bearing of walk is determined the angle of sighting will be calculated.

iv. Sighting distance: Using a laser range finder the distance to the animal cluster or individual is measured from the point of observation.

The line transect data will be analysed using program DISTANCE 4.1 (Buckland *et al.,* 1993, Laake*et al.,* 1993). For reliable estimates of prey species density a minimum number observations are required in order to be able to reliably model the detection function. As a rule of thumb, it is often difficult to get a robust result with less than 60 – 80 observations, although the number depends on the characteristics of the species (Burnham *et al.,* 1980).

This is a more appropriate method of calculating the prey density (*D*) and the associated Coefficient of Variance (CV %) since it takes into account the temporal variation in species detection (Jathanna 2001). In a straighter forward approach to the calculation of the prey densities from a line transect, each temporal replicated is treated as a separate effort and thus the variance is underestimated.

12.3 HABITAT ASSESSMENT FRAMEWORK

Prey base improvement:

Assessment of fodder availability:

Objective: to estimate quantitatively the extent of fodder availability for animals in different areas of buffer zone.

Methodology:

- Based on the logistics few permanent/semi-permanent vegetation plots of 1 sq m are to be established in different locations of the buffer zone. In which equal number of plots are kept as control and grazed ones.
- In each of these plots regular extraction of biomass to be carried out and the collected biomass is to be divided as grass, non grass and other dry materials.
- Fresh and dry weight of the biomass is to be measured so as to know the exact amount of biomass.
- Collected biomass samples are to be subjected to nutrient analysis.

Expected outcome:

- Such type of quantitative exercise in biomass availability will indicate the grazing pressure on biomass in different locations of the buffer zone.
- It also indicates the seasonal dependency of animals on the biomass.
- The result is very important in assessing the extent of nutrient availability.
- The obtained data can be correlated with soil moisture, rainfall, and other weather parameters so as to know the influencing factor for balanced production and supply of biomass in the buffer zone.

12.4 SPATIAL DATABASE DEVELOPMENT

Development of spatial data base with the data collected during the monitoring phases and subsequent programs will be out sourced to scientific organization equipped for the job and technical support of experts in the said field will be sought.

12.5 ANALYSIS AND REPORTING FRAMEWORK

Analysis of the data collected by the forest department will be done by Research Officer at the Office of the Field Director. The recommendations of the Research Bodies will be considered during any decision making for the park.

A half yearly report from each Range will be collected by the office of the Field Director regarding the proceedings and forth coming programs of the Range and a half yearly report will be mandatory for each Range that will describe the activities of the Range in detail during the year.

CHAPTER 13
PROTECTION AND INTELLIGENCE GATHERING

CHAPTER

13

PROTECTION AND INTELLIGENCE GATHERING

13.1 DEPLOYMENT OF NATIVE WORK FORCE

Similipal Tiger Reserve and adjoining buffer zone area is surrounded by more than 1200 villages and have a constant threat of poaching, hunting, forest fire and illegal trade. From last 10 years, protection is continuously being strengthened and the chances of poaching have been averted. Protection is one of the major and important concerns for the buffer zone. The existing staff is insufficient to counter the problem in a better way. Participation and involvement of local people in protection by way of social fencing will help the department in controlling the illegal activities. Although efforts have been made to control the area with a native work force creating a strong network among local villagers and anti-poaching watchers.It needs further strengthening to counter any threat in the buffer area of the reserve.The existing anti-poaching network is functioning well and helps in the management to protect the viable diversity. But the number of Anti-poaching staff or Protection Assistants is very less averaging less than 3 Protection Assistants per Anti-poaching Camp in buffer areas which overburdens the staff as well as increase the level of threat to wildlife. With focus on EDC or community development is resulting in their active participation in protection scenario.

13.2 PATROLLING STRATEGY INCLUDING JOINT PATROLLING

Highway Patrolling including night raid patrolling

Patrolling in the Similipal Tiger Reserve and buffer zone area needs a strong base after the declaration of Tiger Reserve. At present, highway patrolling is being taken up in Eastern, Western and Southern sides of the Tiger Reserve. More patrolling squad is needed to be deployed at the check posts to check the illegal entry of the vehicles. It is needed to monitor the movement of vehicles to curb the menace of poaching, hunting or illegal trade. There will be different forms of patrolling.

One is highway patrolling which can be confined only at the main highways leading to West Bengal and Jharkhand with sufficient number of staff with weapons and other modern equipment. Intensive forest patrolling squad will be of two type 1. Walking squad, 2. Vehicular squad. Camp elephants can be utilized for patrolling in tall grass areas only in certain period. The Tiger force under the control of Field Director can be used to counter the emergency problem and for surprise raid. The strike force can be utilized as the Rapid Response Team with rescue and modern equipment to reach any place of emergency to address human-wildlife conflict situations.

Joint Patrolling

For joint patrolling and coordination among the core and buffer staff the entire tiger reserve has been divided into three landscapes as given below.

Table 13a: Landscape level joint patrolling and coordination among the core and buffer

Landscape No.	Name of Core Ranges	Name of Buffer Ranges
Landscape No. 1	National Park WL Nawana North WL Nawana South WL	Barehipani WL Gurguria WL Kendumundi WL
Landscape No. 2	Jenabil WL Upper Barakamuda WL Bhanjabasa WL	Dukura WL Podadiha WL Thakurmunda WL Thakurmunda Satkosia WL Kaptipada
Landscape No. 3	PithabataNorth WL Pithabata South WL Chahala WL	Pithabata North WL Pithabata South WL Talabandha WL BisoiWL

Landscape No.	Name of STR Ranges	Name of Territorial ranges
Landscape No. A	Gurguria WL Kendumundi WL Thakurmunda WL UBK WL Podadiha WL Satakosia WL	Dhudiani Karanjia Thakurmunda
Landscape No. B	Chahala WL Talabanda WL Barehipani WL Bisoi WL	Manada Bangriposi
Landscape No. C	Pithabata North WL Pithabata South WL Nawana North WL Talabanda WL	Bangriposi Baripada
Landscape No. D	Dukura WL Podadidiha WL Bhanjabasa WL Jenabil WL	Baripada Udala Kaptipada

The Range Officers will meet at Landscape level regularly and chalk out strategies for joint patrolling and other activities relating to protection. The ACFs of the concerned Divisions will coordinate and also attend the Landscape level meetings without fail.

Anti-poaching operation

The details of protection system dealt in detail in core plan Chapter 7.

13.3 MAINTENANCE OF VILLAGE LEVEL CRIME DOSSIER: -

Since the buffer zone area is adjoining to human habitation, each range can develop village level crime dossier keeping the past history of all the accused collected from records. Crime record must have certain details about the criminal such as his past record, occupation, present residence, past employment, a recent photograph, mobile number etc. This will help the staff to have a close watch on the illegal activities.

a. One copy of the dossier will be with the Deputy Directors/DFOs and one with Field Director.

b. Crime dossier record of interstate accused can be maintained by the Deputy Director/DFO of the Tiger Reserve with the help of the Range Officer. From neighbouring State similar information can be obtained and dossiers of accused can be exchanged. This will help both the State to have a watch on the criminals. The photographs of the usual offenders can be given to patrolling staff. This will help in checking the movement of usual offenders from one place to another.

c. Informers in the tiger landscape in different villages are very important to control poaching. They should be taken in to confidence and trustworthy informers must be identified for extracting accurate information. Periodical incentivization will be provided.

13.4 FIRE PROTECTION:

Fire protection measures have been discussed in Chapter 7 under the theme plan of fire control.

13.5 INTELLIGENCE GATHERING AND CO-ORDINATION

There will be strong network of local intelligence gathering. Each Ranger will keep a record of informants and day to day information will be collected and maintained in Division office of Similipal North, Similipal South, Karanjia, Baripada and Rairangpur area. This local intelligence report will be reviewed by the Field Director once in fortnight to get details of the usual offenders, suspected offenders and casual offenders. Apart from this, local intelligence network will also help in managing the situation and taking immediate action. Same intelligence networking can be extended and shared with the neighbouring States to have a periodical watch on the criminals.

The above measures would yield a potential result in managing the buffer area, especially from protection aspects in the long run.

Proposed Steps for improving protection measures in buffer areas

a. Check posts in vulnerable areas should be provided with communication facilities, arms and adequate staff

b. Periodical surveillance and surprise raids in village areas with proper networking

c. Increasing separate ground squads, strike force, Rapid Response Team to prevent poaching incidences for meat purposes

d. Proper arm training, ambush and combing operations to be ensured for the ground staff in coordination with STF police along with

e. Providing training to the ground staff in dealing with poaching incidences in the field.

f. Providing training/moot courts for building up case records, evidence collection, investigation of wildlife cases etc.

g. S-WIN (Similipal – Wildlife Intelligence Network) has already been constituted in Baripda Circle in which an ACF along with 25 dedicated field staff consisting of Dy. Range Officers, Foresters & Forest Guards will form a team for collection of intelligence from the field and the information will be shared with Police for carrying out joint operations.

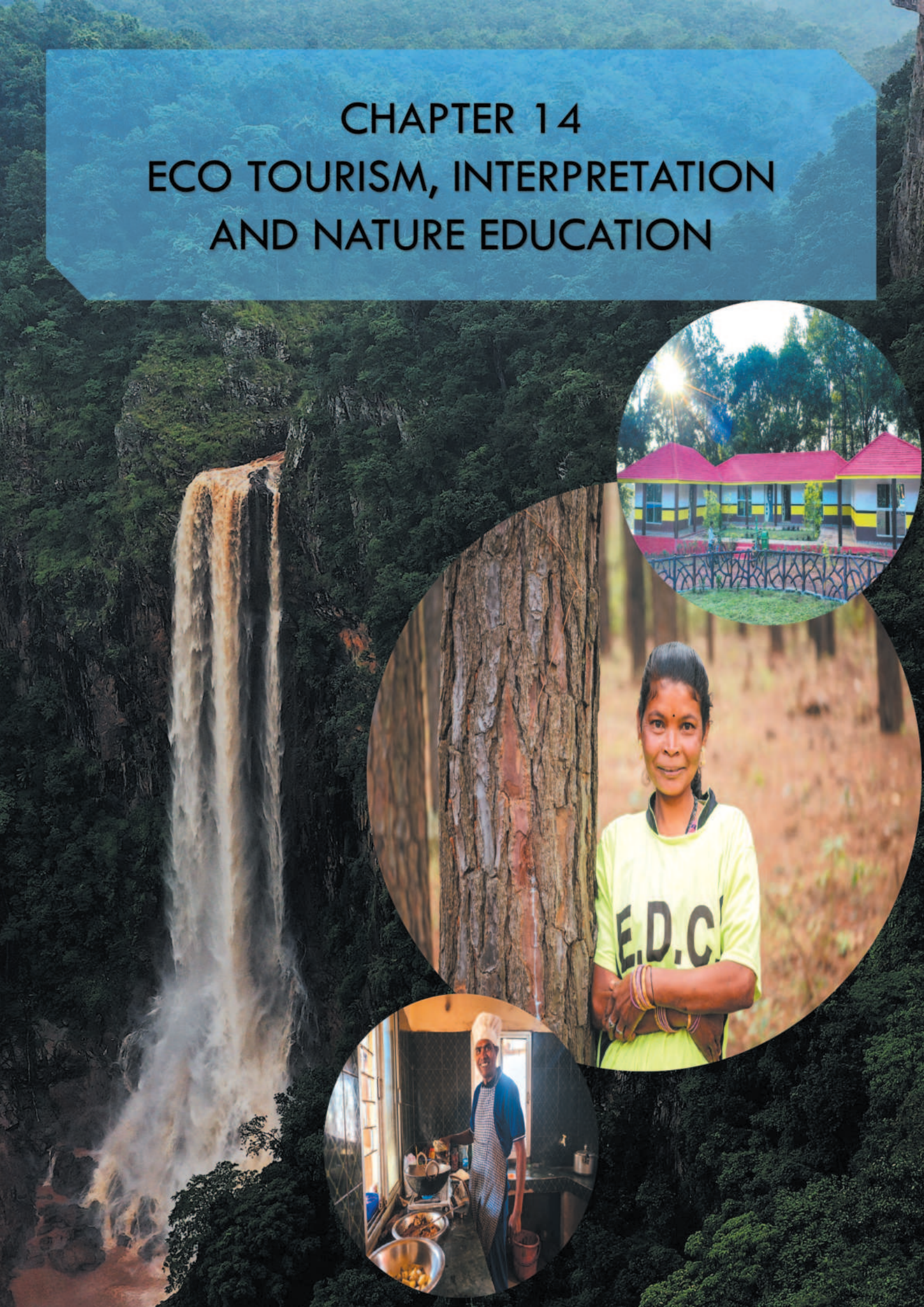
h. Joint Task Force has been formed vide Notification no. 16064 dated 01.08.2023 of Forest, Environment & Climate Change Department of Govt. of Odisha involving Forest Department and Police department for intelligence gathering, enforcement and protection of sensitive areas of Similipal Tiger Reserve.

The strategies and method of carrying out intelligence gathering has been outlined in core plan in Chapter No.7 under Theme Plan for Protection.

Rewards to Informers:

The informers will be rewarded with a handsome amount of monetary award for his faithfulness and loyalty towards the department. Identifying the loyal informers is the key to have success in reducing the illegal activities in STR. Proper care should be given towards no-disclosure of names of the informers' name in the public and rewards must be given in private.

CHAPTER 14
ECO TOURISM, INTERPRETATION AND NATURE EDUCATION



CHAPTER

14

ECOTOURISM, INTERPRETATION AND NATURE EDUCATION

Need for Ecotourism, Interpretation and Nature Education

Regulated low impact ecotourism has the potential to be a vital conservation tool as it helps to win public support for wildlife conservation. Highlighting the role of ecotourism, the **NWAP (2017-31)** suggests the following priority actions for management of tourism in wildlife areas.

- Prepare tourism plans based on the prescribed guidelines for promotingsustainable ecotourism in TRs, PAs (including WPAs and CMPAs) and the mountain ecosystems.
- Develop standards and guidelines to prevent damage to wildlife andhabitats, in particular to mountain vegetation, wetlands and marinehabitats including coral beds.
- Frame rules and regulations for visitors' conduct which should be widelypublicised among tourists and tourism agencies as well as prominentlydisplayed on public notice boards in all tourism sites.
- Create a cadre of local communities who can be trained as nature guidesand strengthen the capacity of the local communities and the tourismagencies for managing responsible and sustainable tourism.
- Institutionalise a mechanism for ploughing back a part of the incomegenerated from wildlife tourism for management of TRs and PAs andeco-development of the local communities.

The eco-tourism in Similipal Tiger Reserve is based on the comprehensive guidelines for tiger conservation and tourism issued by NTCA. The prescriptions made in the plan are based onthe WPA, 1972; FCA, 1980;EPA, 1986 and guidelines issued by NTCA.

The ecotourism, interpretation and nature education plan for Similipal Tiger Reserve focuses on participatory, community based, low impact, educational, eco-friendly, ecologically sustainable, socially and culturally acceptable programmes which are aligned with the objective of tiger and its landscape conservation.

The Similipal Tiger Reserve being an ecologically significant area has envisaged following objectives for ecotourism to be carried out:

- Minimize the impact of tourism on wildlife and its crucial habitat.
- Develop mechanisms to generate revenue from ecotourism for the welfare of local communities, STPF, frontline staff and village eco-development.

- Integrating ecotourism and conservation awareness to promote tiger conservation in the landscape.
- Increase visitors concern for nature conservation.
- Create a sense of belongingness and public support for the conservation.
- Create opportunities for the local people through community based eco tourism programs and benefit sharing mechanism.
- Enhance the livelihood of the local people including the unemployed tribal youth by involving them in the tourism activities.

14.1 Tiger Conservation Foundation and Management of Community Based Ecotourism Programmes (CBET)

14.1.1 Similipal Tiger Conservation Foundation (STCF)

Details regarding establishment of STCF, its administration and functions are detailed in Para **12.2** of the core TCP.

14.1.2 Community Based Ecotourism (CBET)

CBET is important in the present scenario. The host community will be actively involved in conservation and eco-tourism planning. Professional and technical training would be imparted to the local people which would ensure them a sustained income from eco-tourism initiatives, apart from according a priority status. At present, in Similipal, the involvement of local people in eco-tourism is as below:

- Managing Nature camps
- as nature guides
- as vehicle owners/ small tour operators
- SHG day canteen
- as small cafeteria owners
- as petty shop keepers

There is more scope for involving the local community in several activities, viz. owners of modest tourist accommodation, catering (ethnic dishes), souvenir making, cultural events and the like. There are several examples of local community involvement in eco-tourism.

An eco-tourism program has been proposed for the Buffer Zone, which would shift the tourism pressure from Core Zone. The proposals form a part the site-specific eco-development programme evolved in a participatory manner with the indigenous people from villages peripheral to the park. Eco-tourism is visualised here as an important source of income for the host communities living close to the Protected Area, compensating for the curtailment of their access to the PA, and as an incentive for wildlife conservation. The Govt. of Odisha have laid down the guiding principles for constituting Eco-development Committees (EDC), apart from microplanning through these committees, to ensure the active participation of the local people for forest protection and rehabilitation. The program addresses both to the indigenous host communities and the visitors (urban/ rural).

The revenue sharing mechanism presently followed in Nature camps under Eco-tourism is based on the guidelines issued by the Department of Forest, Environment & Climate Change, Govt. of Odisha Notification No. 24324/FE-WL-WLF-003-2016/F&E, Dt. 09.11.2018 (Annexure LXV).

Table No.14a: Revenue sharing mechanism

Heads	ETG Wage share	Recurring	Infrastructure development	EDC share	Corpus fund	Govt. revenue
Percentage	35	25	10	10	10	10

Another proposal for enhancing the revenue of STCF from the revenue of Nature camps to be placed before the Government for consideration in which 10% of the revenue generated from the Nature camps will be deposited in the Similipal Tiger Conservation Foundation.

The EDC share obtained from each nature camp has been utilized for community development programmes to improve their socio-economic status by providing alternate livelihood. The EDC share is being used in construction of Poultry farm, Community halls, Purchase of tent house equipment for rent purpose, Utensils for rent purpose etc.

14.1.3 Zone Plan for Ecotourism, Interpretation and Nature Education – Management Strategy

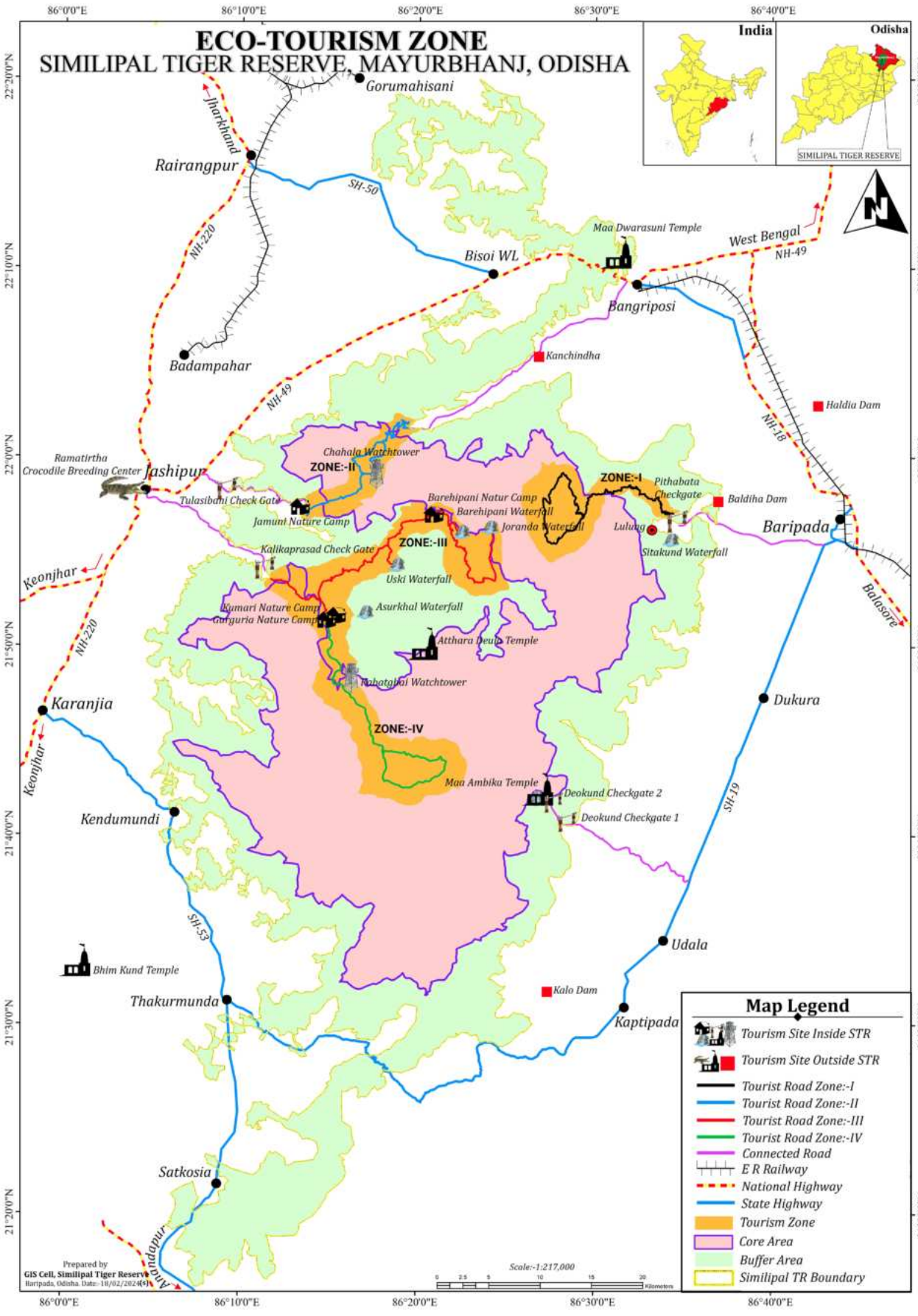
14.1.3.1 Ecotourism Plan

14.1.3.1.1 Ecotourism Zone

The ecotourism zone extends over 165 km road length, out of which 103 km road length is in buffer, 62 km is in Core and major attraction areas which is to be used as tourism zone. Many spots in the periphery need to be promoted as ecotourism sites by encouraging EDC participation. These are Devkund, Ramtirtha, Olkudar, Sitakund, ecotourism site at Salabani near Baripada, Samibriksha etc. Many new components of tourism have been launched like bird watching trips and trekking from Gudgudia, Kumari, Jamuani, Barehipani and Nawana. Night stay are available at Barehipani, Kumari, Gurguria & Nawana inside Buffer and Jamuani at fringeof Similipal with facilities and managed by EDCs. Plans are afoot to provide limited accommodationfacilities in eco-villages at Guguria, Nawana and Bareipani G.P.s and Talabanda, Sanramchandrapur near Deo Dam and Devkund through involvement of local EDCs. The meadow of Chahala, magnificent waterfall at Barehipani, NawanaValley, bank of the river Budhabalanga near Jambu, waterfall and majestic hillsat Joranda, Lulung and the shrine at Deokund attract people far and near. Being one of the finest and the largest TR of the State, it not only attractsthe visitors from places like Cuttack, Bhubaneswar, Sambalpur and Rourkela inside Odisha but also tourists from other states of India. A significantnumber of foreign tourists also visit the Reserve. The park is open to tourists from October till the middle of June next year. During Closure period of TR, only vehicles permitted by FD to be allowed through Jashipur entry permit booking counter at the western side, to limited destinations in Buffer areas of Similipal like Barehipani, Joranda, Uski with provision of eco-guide with every safari vehicle made mandatory. Only 103 vehicles are allowed through entry gates i.e. The provision of eco-guide with every tourist vehicle has been made mandatory from both the gates since 2012.

The Eco-tourism can be divided in to the following Clusters:

1. Jashipur Cluster consisiting of Ramtirtha, Olkudar, Gudgudia, Barehipani, Chahala, Uski and Joranda
2. Pithabata Cluster consisting of Sitakund, Lulung, Baldiha Dam, Bhajam
3. Devkund Cluster consisting of Devkund, Samibrukhya



Map No.14A: Ecotourism Zone in Similipal Tiger Reserve

14.1.3.1.2 Ecotourism Area, attractions

Chahala:-

A royal forest resort from Maharaja times with a sprawling meadow and a saltlick for observing animals from a hide

Ramatirtha:-

Situated on the confluence of Khairi and Bhandan rivers emerging from Similipal, Ramtirtha is a place of worship attached to the sentiment of Hindus due to its mythological importance. It is a place of picnic with an Astral Garden and Mugger Research Centre. Accommodations for the tourists in cottages with catering facilities are available throughout the year.

Gurguria:-

On the bank of River Khairi with planned landscaping and surrounded by wooded hillocks, Gurguria gives the feeling of a hill station. The Orchidarium with 76 indigenous orchids in pots is very attractive during summer when it flowers. The main attraction is elephant ride and hill trekking. Accommodation with catering facility and conference hall are available.

Barehipani:-

Resemble the shape of a rope locally known as Barehi. The rolling waterfall with a height of 399 mtrs presents a majestic view with reverberating sound in the gorge from where the RiverBudhabalanga runs to the plain land. Tented accommodation in a natural environment is enjoyable during winter and summer.

Joranda:-

The waterfall from a height of 181 mtrs touches the ground on the gorge perpendicularly. Tourist cottage with cooking provision was available prior to 2010. Elephants, Chital and Sambars frequently visit Saltlicksaltlick near the campus as the sun sets in naturein the nature unfolds the beauty through a vastthrough vast stage of green lush vegetation. A watch tower with a glasswith glass house available for observing the wild observing wild beauty of forests.

Sitakund:-

A place of religious importance for Hindus, is a site of attraction for picnickers due to the picturesque beauty of a small waterfall and a gorge filled with water.

Lulung:-

Lulung is situated at the entrance of the park on the bank of a tributary to River Palpala with perennial water flow. The crystal clear water with pebble of different sizes on the river bed and dense forest on both sides of the River wins the heart of the people to assemble for picnic. A tourist lodge run by Orissa Tourism development Corporation caters the needs of the tourists.

Deokund:-

Deokund is located on the bank of River Deo, while meandering on the hills, a placeplace of worship by the Hindus. The temple of Goddess Ambica was built bybuilt up by the royal dynasty of Mayurbhanj in ancient times. The cascade touching the base of the temple falls on a gorge where the River rests awhile and further follows its course. It is the most lovable picnic spot.

Samibrukshya:-

Samibrukshya is the place of worship of Lord Shiva near Podadiha of Baripada Division. A Shiva ling is naturally sprouted from the ground and thousands of devotee visit here in rainy season.

Kalo Dam:-

It is near to Samibrukshya on Kaloriver. Thousands of picnickers visit KalodamfromBaripada and outer skirts during November to February. Tons of garbage and plastic bottles are dumped in the lower bank of the river by local tourists.

Haladia Dam and Jambhira Dam:-

Similarly, as above thousands of picnickers visit Haladia dam near Kuchei and Jambhira Dam near Deuli of Baripada Division from Baripada/Balasore town during November to February. Tons of garbage and plastic bottles are dumped in the lower bank of the river by local tourists.

Suleipat Dam:-

There is beautiful Dam found at Badampahad R.F. of Rairangpur Division and a major picnic site. Tourists from Baripada, Rairangpur, Karanjia and from Jamshedpur visit the place during November to February.Tons of garbage and plastic bottles are dumped in the lower bank of the river by local tourists.

Balidiha Dam:-

There is a small reservoir of about 1acre submerged area found near Balidihaof Baripada Division used by tourists as a picnic site. Tourists from Baripada, Rairangpur visit the place during November to February. Tons of garbage and plastic bottles are dumped at the site by local tourists.

Sankarmara Dam:-

There is small reservoir submerging about 1.5 acre found on the way in Baldiha-Bhuasuni road used by tourists as a picnic site. Tourists from Baripada, Rairangpur visit the place during November to February.

Nedam Dam:-

This is also a small reservoir covering 6 acres of area near Nedam village of Sorishaphal G.P. made for irrigation purpose but it attracts hundreds of tourists during winter and the scenic view of hills, reservoir water and forests are the key attraction of the site.

Kanchhinda:-

It is a scenic place well surrounded by hills and near to Bangiriposhi. The place is picnickers' paradise and thousands of them visit every year for recreation purpose.

Talabandha:-

A valley present at the foot hill of North Similipal is a place of scenic beauty near Talabandha, which attracts hundreds of visitors in winter.

Baribeda:-

Near Baribeda village, a big water pool is full of freshwater fishes of 10-15 K.G. weights are the key attraction of tourists. The tank is known as Brahmankunda. And thousands of local tourists visit the site every year.

Eco-Park, Manchabandha:-

It a recent project on natural sal forest nature park, six kilometers away from Baripada on the way to Balasore. People visit this site for picnic and recreation. The salforest, nature trails, small reservoir gives pleasant feeling of natural habitat of wildlife.

Tribal Culture of Mayurbhanj:-

Most of the tribes of Mayurbhanj are culturally affluent with folk dance, tribal ethnic dance, tribal songs and rituals. The eco-tourists have keen interest to see the life styles of these forest living people. The famous tribal dances of similipal are Chhow, Dantha, and Bahabanga Dance of Santhal tribe. Pinkali, Bahabana, Kathi dance of Kolha tribes. Changu dance of Bathudis, Khadia folk dance and Mankidia Folk dance. Bhuiyan dance of Bhuinya tribes are famous and worth viewing. Along with above tribal festivals, art forms, handicrafts, cuisine to be appreciated.

Olkudar:-

Olkudar is situated 5 Kms far from Kaliani Gate in the right side direction. A short trek of about 1.5 km will take the tourists to the scenic fall view of Olkudar. There is a waterfall falling from a height of 50 meters on rocks and looks very scenic. The waterfall is perennial although the flow of water gets reduced during dry season. The approach road needs to be improved with retaining walls and guard wall provision. One culvert can be constructed near the rest shed for all weather access. The space near the rest shed can be utilized as parking place for vehicles. Ticket counter can be placed involving a local EDC (preferably from Olkudar village) to collect entry fee and parking fee from the tourists. The fall view is about 300 m from the parking place. About 200 m to the fall view, there is steep slopy footpath can be protected with provision of railings at the cliff side. A toilet facility can be provided at the start of the narrow footpath. EDC run Bamboo hut can be installed near the ticket counter to provide additional income generation source to local people. The same area can be encouraged for birdwatching also as it is rich in terrestrial bird diversity. The Olkudar waterfall needs a wide publicity and approach roads and site development activities to make it a well known tourist place.

14.1.3.1.3 Facilities related to Ecotourism

Similipal TR has established system of ecotourism, nature education andinterpretation focusing on livelihood improvement of forest dependent communities. On an average Similipal is visited by 30000 people annually.

The following facilities have been created for regulating the tourism in the buffer area:

Table No.14b: Facilities available for tourism in Similipal

Sl no	Tourism Cluster	Tourist Spot	Facilities Available						EDC Responsible
			Drinking water	Washrooms	Feeding room	Cafeteria (Run by EDC)	Guided treks and cycling	Night Stay	
1	Jashipur	Ramthirtha Nature camp/ Interpretation centre	✓	✓	✓	✓	✓	✓	
2		Khairi booking Counter	✓	✓	✓	✓			
3		Kalikaprasad Entry Gate	✓	✓		✓			Kalika prasad
4		Olkudar Falls					✓		Olkudar
5	Jamuani	Jamuani							Jamuani
6		Falls							
7		Tulasibani Exit Gate							
8		Chahala	✓	✓	✓	✓			Haldia

9	Gurguria	Gurguria *Pine forest & Orchidarium/ Interpretation centre*	✓	✓	✓	✓	✓	✓	Gurguria
10									
11		Kumari	✓	✓	✓	✓	✓	✓	Kumari
12		Khari River trail					✓		Gurguria
13		Asurkal Falls					✓		Kumari
14	Barehi-pani	Barehipani	✓	✓	✓	✓	✓	✓	Barehipani
15		Barehipani Falls	✓	✓		✓			Barehipani
16		Barehipani Canteen	✓	✓		✓			Barehipani
17		Uski Falls	✓			✓			Baduski
18	Nawana	Nawana	✓	✓	✓	✓	✓	✓	Nawana
19		Joranda	✓	✓	✓	✓			Khukur-bhuka
20	Pithaba-ta	Pithabata Entry Gate	✓	✓	✓	✓	✓ (Trek Only)	✓ (Private, OTDC)	Lulung/ Sitakund
21		Sitakund	✓	✓		✓	✓ (Trek Only)	✓ (Pri-vate)	Sitakund
22		Bhajam	✓	✓					
23	Deokund	Deokund	✓	✓		✓	✓		Deokund
24	Deo Dam	Sanramchan-drapur							
25		Hatibari							

14.1.3.1.4 Tourist Entry points

There are four entry points for tourists, Pithabata, KalikaPrasad, Tulasibani and Talabandha. Entry permits are issued at the booking counter there. Entry to Devkund and Sitakund sites are managed by local EDC. Day tourism routes can be modified keeping in view of the Tiger density, distribution and other wildlife population as per the recommendation of a committee formulated by the Chief Wildlife Warden.

14.1.3.1.5 Vehicles

Private vehicles (ground clearance of 180mm and above 4-wheeler, SUV) are allowed to enter the park. Cars (hatchbacks & sedans) are not allowed due to road conditions. Maximum 103 vehicles are allowed per day.

Vehicle restrictions:

Vehicles (Taxis) with proper registration in the FD office will be given priority to enter Similipal with tourists. The vehicle drivers must have requisite license, experience in Similipal roads, age of vehicle (preferebaly less than 5 years) etc. for getting the permit. Pollution clearance certificate, fitness certificates, insurance of the vehicles are the other necessary documents required to be permitted inside the TR. A tourist guide is mandatory for each and every vehicle entering Similipal.

For registering the vehicles in FD office, the documents required for each and every vehicle are RC of Vehicle, Fitness certificate, Pollution clearance, Vehicle insurance, Seating capacity (not above 12 including driver and guide) and Driving license. Field Director finalizes the registration of vehicles on recommendation of the committee.

The committee members may be as follows:

- Representative of FD, STR
- One ACF each from Similipal North and South Division.
- RO Ecotourism Range and Pithabata South WL Range.
- Representative of Collector
- MVI deputed by RTO

Ratings may be provided to vehicles as per the behaviour of driver, vehicle ambiance, driving skill, knowledge about Similipal roads, rules and regulations Wildlife Protection Act, 1972. The ratings will be given by a committee every year following the tourist feedback collected in exit gates and ratings will be approved by FD, STR.

EDC managed Safari vehicle are provided at Jashipur and Pithabata side to be given preference for better safety and guidance.Over a period of 5 years, it is contemplated to allow only specifically designed eco friendly vehicles to be provided by the local inhabitants to ply within the zone for tourist.Green vehicles (electric/bio gas/CNG) vehicles to be given concession in entry fee and private vehicle entry fee may be increased to discourage inexperienced drivers from entering the park and to opt the local safari services. A feedback system is developed online at www.similipal.org and offline forms are also available.

14.1.3.1.6 Guides

Tourist guide service is available at Pithabata and Jashipur. Guide services have been made compulsory for all tourist groups. Nature guides will be provided basic training regarding tourism management by Tourism Development agencies etc. and exposure visits to other Tiger Reserves. A pocket tourism note about Tourism in Similipal can be developed as a documentation about Similipal which can be used to describe tourists during their visit to Similipal. Such document can be prepared by compiling the inputs from the experienced nature guides and local villagers.

14.1.3.1.7 Night stay

Night stay facility is available at Gurguria, Kumari, Barehipani (Muktapur), Nawana (inside Buffer) and Jamuani & Ramtirtha (outside buffer) inside the park. Apart from these, private hotels are available outside the park at Jashipur and Baripada. As of now stay facilities at Ramthirtha and Jamuani are available throughout the year. It is also proposed for opening of other night stay facilities during closure period in view of continued livelihood to locals and nil impact on wildlife areas. Feasibility of Night stay and Ecoturism in other buffer and fringe villages may be explored and implemented for livelihood improvement. Regulated Home stay feasabilty may be explored in the villages inside Similipal where tourists interested to experience tribal

culture in an up close and personal way by staying in their home and interacting with them directly. Tourists can also take part in their household works like Agriculture, cooking etc. if interested and if allowed by the Host.

14.1.3.1.8 Guided treks and cycling

Trekking has been started at Jamuani, Barehipani, Gurguria, Kumari and Nawana Nature camps. Nature trail is also available in Ramtirtha for tourists. Designated cycling path has also been developed in the Nature camps for the tourists who can explore the wilderness on wheels of a cycle. Trekking near rivers, caves, waterfalls can be developed to attract more tourists for night stay in nature camps and enjoy a thrilling night in Similipal.

14.1.3.1.9 Souvenir shop

Souvenir shops have been opened at all Nature camps, Pithabata and Jashipur/ Ramtirtha for promotion of local handicrafts and small souvenir items with Similipal logo. Other tourist sites like Barehipani falls, Chahala are provided with temporary outlets for sale of souvenirs. Local women Self Help Groups/EDC members have been entrusted with the management of the outlets. Upgradation of the existing Souvenir shops should be done new hand made items collected from different SHGs will be sold which will not only encourage the SHGs to make more of such products but also set an example for other SHGs to get involved in such activity more so that alternate livelihood can be created.

14.1.3.1.10 Timing

Entry Permit counters remain open from 6 AM to 9 AM. The day tourists have to leave the last gate of the park by 5 PM. Field Director issues orders for any modifications.

14.1.3.1.11 Entry Fee:-

Table 14c: Entry Fee in Similipal for Visitors

Sl.No.	Person/Day	Entry Fee (in Rs.)
1	Indian Citizens	100
2	A group of 10 or more@ per person	50
3	Foreign nationals	1000
4	A group of 10 or more@ per person	200
5	Students	30
6	A group of 10 or more@ per student	20
7	For conducting scientific research:	
8	Indian	30
9	Foreign nationals	450
10	Children below three years	Free
11	Physical handicapped	Free
12	Jeep/Car/LMV per day	Rs.100.00 per vehicle per day
13	HMV/2-wheelers	Not allowed

Separate fees are also levied for trekking, photography and video shooting. All the tariffs mentioned here are revised from time to time by the Government. Other fees are as follows:

Table 14d: Trekking Fee and Camera Fee for visitors in Similipal

Person/Day	Fee (in Rs.)
TREKKING/NATURE TRAIL	
Indian	Rs.20/- per person/day
Foreign National	Rs.100/- per person/day
STILL CAMERA	
Amateur photographer	
Indian	Rs.100/- per camera for first 3 days & Rs.30/-/day thereafter.
Foreign National	Rs.200/- per camera for first 3 days & Rs.100/-/day thereafter.
Professionals	
Indian	Rs.1000/- per camera/day
Foreign National	Rs.2000/- per camera/day
CINE CAMERA SMALLER THAN 35 MM	
Amateur	
Indian	Rs.5000/- per camera/day
Foreign National	Rs.10000/- per camera/day
Professional	
Indian	Rs.25000/- per camera/day
Foreign National	Rs.50000/- per camera/day

Separate entry fees have been regulated in Deokund and Ramtirtha area for day visits. In Ramtirtha a nominal Rs.5 is being collected per person and in Deokund Rs.10 is being collected. The price may be subjected to change from time to time as per the direction of Executive Committee of STCF headed by Field Director and approved by General Body of STCF.

14.1.3.1.12 New facilities to be provided:

- Open gyms in all Nature camps
- Eco Development Akhada in each nature camp
- Binoculars to be provided to nature guides of nature camps
- Regular upgradation of basic amenities at all tourist spots
- Basic amenities provision at Uski, Olkudar.Self guided nature trail path at Gurguria for day tourists.
- Visitor Orientation centre at Jashipur and Pithabata.
- Support to local EDC to procure and maintain Eco friendly safari vehicle
- Development of Audio tours for visitors.
- Guided nature walk at Deokund, Pithabata, Brahmankund and other tourist interest locations.
- Provision for renting out binoculars and field guides to visitors by EDC.

DD, Similipal North and South WL Division shall make necessary arrangements for operationalizing the above programmes.

14.1.3.2 Carrying Capacity

14.1.3.2.1 Carrying Capacity-Night Stay

The available night stay capacity in the ecotourism zone is detailed in below table.

Table No.14e: Available of night stay capacity in the ecotourism zone of Similipal.

Sl.No	Nature Camp	Name of the Cottages	No. of Room	Capacity	
Night stay inside buffer					
1	Barehipani	Santal Cottage	8	16	
		Nawa santalolla-h	4	8	
2	Gurguria	Santal Cottage	4	8	
		Pine villa-A	2	4	
		Pine villa-B	2	4	
		Khairi Bosa (Bamboo Hut)	2	4	
3	Kumari	Santal cottage	12	24	
		Bamboo Cottage	4	8	
		Nawa santal olla-h	4	8	
Night stay outside buffer					
4	Jamuani	Santal Cottage	9	18	
		Tent	4	8	
		Tree Top House	2	4	
5	Ramthirtha	Debasthali Cottage	4	8	
		Dormitory	3	30	
		Tribal Cottage	1	6	
Total	65	158			
Proposed Night stay within buffer					
6	Nawana	Eco-friendly structures	14	28	

* Facilities may be upgraded and increased according to carrying capacity.

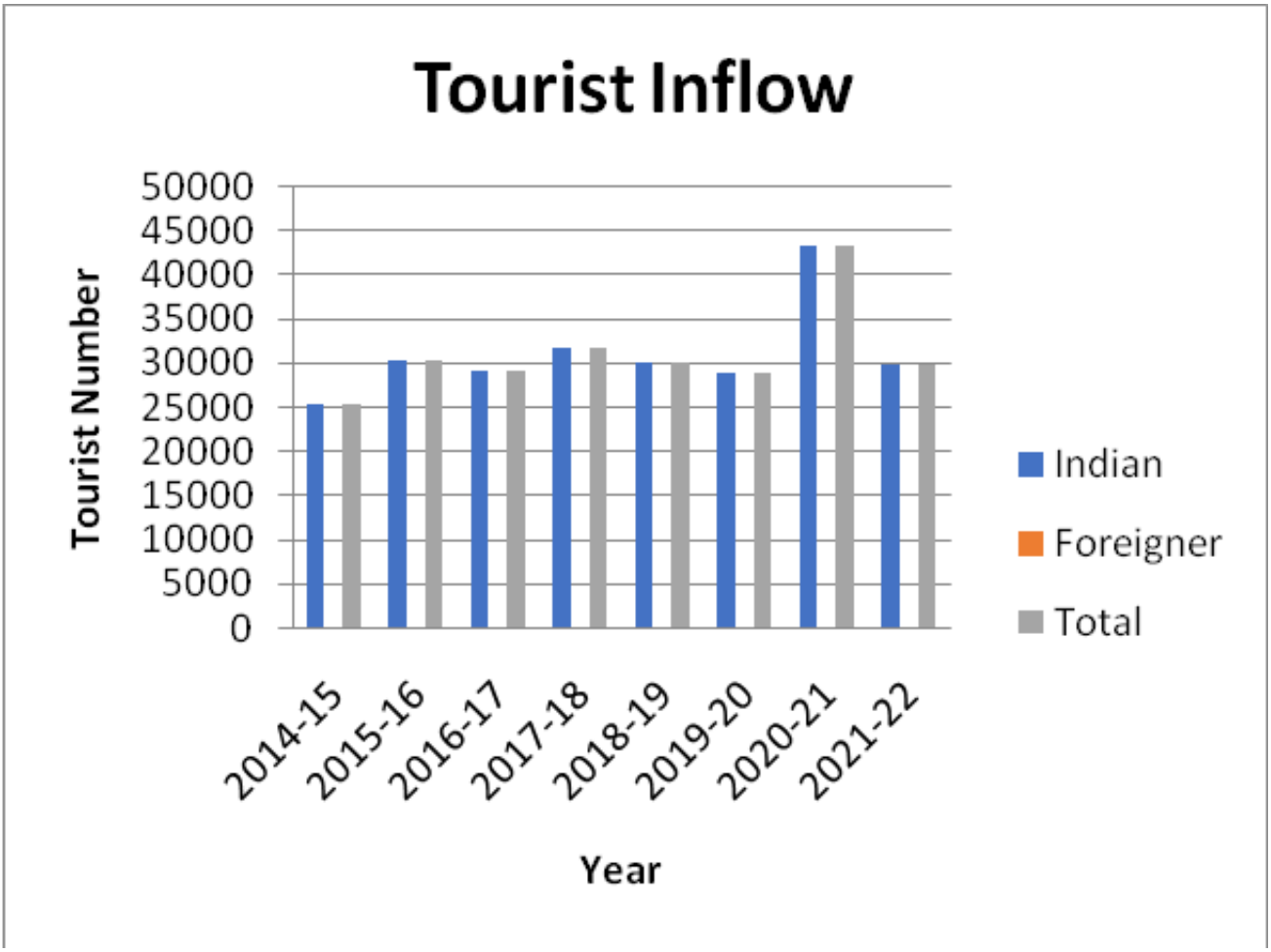
14.1.3.2.2 Carrying Capacity-Day Visitors

The numbers of visitors for last eight years to Similipal TR is given below:

Table14f: Details of visitation in Similipal TR

Year	Period	Indian	Foreigner	Total	Tourism closed Season
2014-15	01.11.2014 - 15.06.2015	25437	22	25459	16th June - 31st October
2015-16	01.11.2015 - 15.06.2016	30422	9	30431	16th June - 31st October

2016-17	01.11.2016 - 15.06.2017	29066	64	29130	16th June - 31st October
2017-18	01.11.2017 - 15.06.2018	31730	10	31740	16th June - 31st October
2018-19	01.11.2018 - 15.06.2019	30062	30	30092	16th June - 31st October
2019-20	01.11.2019 - 15.06.2020	28825	55	28880	16th June - 31st October
2020-21	01.11.2020 - 15.06.2021	43354	4	43358	16th June - 31st October
2021-22	01.11.2021 - 15.06.2022	29856	3	29859	16th June - 31st October
Total		248752	197	248949	



EDC managed Safari vehicle are provided at Jashipur and Pithabata side to be given preference for better safety and guidance. No of Safari vehicles to be increased. Over a period of 5 years, it is contemplated to allow only specifically designed eco friendly vehicles to be provided by the local inhabitants to ply within the zone for tourist. Green vehicles will be given concession in entry fee and private vehicle entry fee to be increased to discourage from entering the Park and tourists may opt for local safari services.

Estimation Of Carrying Capacity of Similipal Tiger Reserve (AS per NTCA guidelines)

Physical Carrying Capacity (PCC)

Criteria :

- Vehicular movement is permitted on forest roads only.
- There is a required distance of at least 500m between 2 vehicles to avoid dust (V/a).
- At least 4 hours are needed for a single park excursion (Average time of one visit).
- Similipal Tiger Reserve is open to tourists for 8 months in a year and 11 hours per day (Opening period).
- Total roads are opened for tourism is 80KM

PCC=A* V/a * R.F.

Where, A is the available area for public use. Here linear road length within the tourist zone is taken and the total road length is130KM.

V/a = Required distance of vehicles to avoid dust.

= 2 vehicles/km

R. F is the rotation factor which is calculated as

$$R.F. = \frac{\text{Opening Period}}{\text{Average time of one visit}}$$

R.F. = 11/4 = 2.75

Therefore P.C.C.

= 85 km* 2 * 2.75 = 467.5 visits/day

=v80 km* 2 * 2.75 = 440 visits/day

Real Carrying Capacity (RCC)

RCC is the maximum permissible number of visits to a site, once the 'reductive factors' (corrective) derived from the particular characteristics of the site have been applied to the P.C.C. These corrective factors are based on biophysical, environmental, ecological, social and management variables.

R.C.C = P.C.C –Cf1–Cf2.....Cfn;

Where, Cf is a corrective factor expressed as a percentage. Thus, the formula for calculating R.C.C is,

$$R.C.C = P.C.C - \frac{100-Cf1}{100} \times \frac{100-Cf2}{100} \times \ldots \frac{100-Cfn}{100}$$

Corrective factors are 'site specific' and are expressed in percentage as below:

$$\text{Corrective factor (cf)} = \frac{M_1}{M_t} \times 100$$

Where,

M_1 = limiting magnitude of the variable

M_t = total magnitude of the variable

$$\frac{M_1}{M_t}$$

The corrective factor for erosion, CFe is

$$= \frac{\text{Road with mediumerosion risk*weighing factor 2+Road with high erosion risk*weighing factor 3}}{\text{Total road length}}$$

= (4*2) + (2*3) / 80 = 17.5%

Cfw (Disturbance to wildlife)

$$= \frac{\text{Limiting months /yr} \times 100}{\text{Tourism months / yr}}$$

Cfw_1 (spotted deer) = (2/7) × 100 = 28.6 %

Cfw_2 (tiger) = (2/7) × 100 = 28.6 %

$Cfw = Cfw_1 + Cfw_2$ = 57.2 %

Cf_1 (Temporary closing of road) – For maintenance and other managerial reason, 2 weeks may be taken into account.

$$\frac{\text{Limiting weeks / yr} \times 100}{\text{Total weeks / yr opened}}$$

= (2/ 28) × 100 = 7.1 %

$$RCC = PCC * \frac{100-CFe}{100} * \frac{100-57.2}{100} * \frac{100-7.1}{100}$$

$$RCC = PCC * \frac{100-CFe}{100} * 0.428 * 0.929$$

$$= 440 * (100-17.5)/100 * \frac{0.428 * 0.929}{} = 144.33=144$$

Effective Permissible Carrying Capacity (ECC)

ECC is the maximum no. of visitors that a site can sustain, with the available management capacity (MC). MC is defined as the sum of the conditions that PA administration requires, if it is to carry out its functions atoptimum level. Limitations in management like lack of staff and infrastructure limit RCC.

Owing to storage of staff, inadequate infrastructure, the management capacity (MC) is taken as 50 %.

ECC = RCC × MC

=144 * 50 % = 72

Hence, the Effective Permissible Carrying Capacity for Similipal Tiger Reserve for a single day in the in **Buffer Area is 70 vehicles per day.**

14.1.3.3 Monitoring and Evaluation

Each Nature camp/CBET programs shall be monitored by the ACF, Ecotourism to assess the ecological, economic and social impacts. RO Ecotourism Range shall maintain a monitoring register and conduct monitoring at six-month interval during the plan period and assess the impacts and submit report to DD, Similipal North and South WL Divisions. In case the negative impacts are on increase, the camp site / CBET program shall be reviewed and necessary rectification measures adopted. The annual reports of monitoring may be placed before the FD, Similipal TR.

ACF, Ecotourism and RO, Ecotourism Range responsibilities:

- Manage and coordinate all ecotourism programmes and livelihood improvement activities of the local communities in STR and adjoining landscape.
- Prepare protection-oriented, ecologically sustainable, socially acceptable and economically viable ecotourism programmes/ projects in tune with the TCP of STR and extend technical support for the implementation.
- Conduct periodic review/monitoring of ecotourism/livelihood programmes for streamlining and improving the efficiency.
- Undertake capacity building programmes for the EDC members for effective implementation of ecotourism and ecodevelopment programmes in Similipal TR and adjoining landscape.
- Carry out feasibility studies; assess market/financial sustainability of ecotourism and other ecodevelopment programmes.

14.1.3.4 Responsible Tourism Management

As is mentioned earlier, the main objective is the conservation of habitat and wildlife and tourism is a secondary off-shoot, that need to be carefully planned in order to minimize its negative impact on the conservation. The nature and magnitude of impact of eco-tourism on wildlife and habitat is likely to be influenced by many variables, including the type of activity, the sensitivity of the ecology of the area. However, it is a difficult task to know and evaluate all the impacts. Little quantitative information exists about the type, scale and significance of the environmental impacts arising from wildlife tourism. There is, however, some acceptance that negative impacts will result from tourism-induced change. Therefore, the reserve management must be sensitive to the need to control the impacts arising from tourist activities.

The principles include:

- Minimising the negative economic, environmental and social impacts,
- Generating greater economic benefits for local people and enhance the well-being of tribal communities and their livelihoods,
- Involving local communities in decisions that affect their lives, making a positive contribution to the conservation of natural and cultural heritage, to the maintenance of the world's diversity,
- Enhancing visitor experiences through natural and cultural history incorporation
- Providing equitable access to tourism facilities, and Ensuring culturally/spiritually sensitive ecotourism, engendering respect between tourists and host community there by building local pride and confidence.

14.2 ECO-TOURISM GUIDELINES AND CONSTITUTION OF PARKWELFARE FUND

Comprehensive guidelines for management of eco-tourism in tiger reserves called as the National Tiger Conservation Authority (Normative Standards for Tourism activities and Project Tiger) guidelines, issued vide F. No. 15-31/2012-NTCA Dt. 15.10.2012 and Govt of Odisha vide Notification No. 11487-T.TSP-II 19/2016/TSM. Dt. 24.11.2016 have issued the Odisha Tourism Policy (Annexure LXVI). The prescriptions of the above guidelines will be followed while managing eco-tourism activities in and around Similipal Tiger Reserve. The following regulations are suggested for different categories of stakeholders:

14.2.1 For the Park Management

The following operational guidelines are proposed:

- The eco-tourism planning should be flexible, site-specific and participatory, and should form part of a larger eco-development/ eco-regional plan for the area
- Assessment of existing infrastructure, surface transportation, air service, road, electricity, water supply, law and order situation
- The eco-tourism package should invariably include:
  - » Simple, adequate boarding and lodging facilities, in tune with the environment, culture and the general setting of the landscape
  - » Road network within the identified tourism zone
  - » Self - guided Nature trails
  - » Transportation options
  - » Interpretive Centres
  - » Way-side exhibits
  - » Signage
  - » Observation towers
  - » Public conveniences
  - » Garbage disposal facility
  - » Living quarters for staff/ personnel
- Structures with an exotic look causing visual pollution and non-compatible and un-aesthetic architecture should be avoided
- Site-specific micro - planning for community based eco-tourism should be resorted to
- Facilitating soft-loans for identified beneficiaries
- Temporary housing structures blending with the surrounding should be encouraged
- Environmental, physical & social carrying capacities to limit the various developmental activities in the fringe area to be identified for eco-tourism
- Mechanism to ensure continuous monitoring of adverse effects of tourism for quick redressal should be devised
- Recognize eco-tourism operators, provide incentives to deserving cases and award quality labels
- Provide visitor information & interpretation services (bilingual) covering:
  - » "Do's" and "Don'ts"
  - » What to see?
  - » Where to see?

(Brochures, leaflets, guide service, visitor centres)

- Periodic training programmes on eco-tourism should be conducted for tourism administration, planners, operators and general public
- Ensuring training programme to the host community in:
  - » Lodge ownership/ management
  - » Basic education and awareness
  - » Health and sanitation
  - » Skill development for preparation of local souvenirs as appropriate
  - » Codes of conduct
  - » Forest and wildlife conservation
  - » Litter control
  - » Forging partnerships with tourists & tourism industry
  - » Environmental management
- To evolve and implement eco-tourism package in a few selected sites initially as pilot projects
- Eco-tourism nature camps should be developed based on community involvement and Eco-tourism Group Formation. Individual based home stays not to be allowed inside Similipal Tiger Reserve to regulate tourism and prevent any illegal activities.

14.2.2 For Tour Operators/ Developers

- To abide by the planning restrictions, codes and standards prescribed by the authorities
- Implementation of desired environmental principles through regulation
- Conducting EIA/ environmental audits for new/ ongoing eco-tourism projects
- Being sensitive to the conservation of endangered species & corridor value of the area
- To ensure construction of structures blending with the environment as per the prescribed building code
- To take into consideration the carrying capacity and sociological use-limits of the site while creating tourist facilities, and ensuring safety & convenience of tourists
- To use local material and design as far as possible, while avoiding over-construction
- The planning, architectural design and construction of tourist facilities should use eco-friendly techniques viz., solar energy, recycling of garbage, harvesting of rain water, natural cross-ventilation, self-sufficiency in food through kitchen garden & farming
- Energy & water saving devices should be used apart from controlled sewage disposal
- Control of noise pollution, chemical pollution and air emissions
- Use of signage/ boards as per the standard prescriptions in the code
- Reduced use of environmental unfriendly items like asbestos, CIS, pesticides, inflammable material
- Respecting the historic and religious sites in the area
- Providing appropriate interpretive service to visitors for communication with nature& local culture
- Ensuring proper marketing of eco-tourism products
- Ensuring training of staff on environmental issues
- Ensuring safety and security of visitors
- Respecting local inhabitants, culture & involving them in various activities and vocations as far as possible

14.2.3 For the Visitors

- Abiding by the code of conduct, “Do’s” & “Don’ts”
- Helping conservation, apart from protecting any site natural or cultural, which may be adversely affected by tourism
- Avoiding wastage of resources
- Avoiding littering & carrying back all non - degradable litter
- Leaving the camp sites clean before departing
- Avoiding removal of plants, seeds, drift - wood from the site
- Respecting local culture/ customs
- Respecting holy places
- Strictly adhering to the safety precautions

14.2.4 For the Host Community

- Respect the value of environment and cultural heritage
- Avoid overusing the area
- Co-operate with the authorities in ensuring healthy eco-tourism
- Realize and react to the threat of investors who see opportunities and exploit the locals
- Be friendly with the visitors as effective “nature guides” & “conservationists”
- The private canteens already established in the villages inside Buffer of STR should maintain hygiene and should not use plastic or polythene. The standard of food should be as per the guidelines of Food Safety and Standards Authority of India (FSSAI). Regular checking by the concerned Range Officers should be done.

14.2.5 Park Welfare Fund

- A portion of the revenue generated from tourism and deposited with the Foundation will be kept apart for park welfare which will be decided by the Executive Committee of the Foundation. The Park Welfare Fund will be utilised for prosecution expenses, collecting secret information, expenses for functioning and administration of Eco development programmes in Tiger Reserve, contingencies in day to day functioning, medical relief to staff and EDC members, organizing protection camps, publicity and extension of Eco tourism programmes etc.

14.2.6 Plastic and Pollution management

14.2.6. 1 Control of plastic and waste

Plastic as a non-biodegradable substance easily available in the market in cheap rate and people use to purchase for drinking water, utensils, carry bags, wrappers etc. inside the TR. Similipal Tiger Reserve will be a Plastic free zone and all forms of plastic should be ban for entering in to the park. Tourists are advised to leave all the forms of plastic at the entry gate and replace the plastic or thermocoul plates with Sal leaf plate sold by the EDCs. This will not only reduce the plastic waste inside the park but also act as an income generating source for the local people. As Mayurbhanj is predominantly composed of Sal Forest, Sal plates can be prepared by the VSSs adjoining to Similipal under the jurisdiction of Territorial Divisions.

Plastic shredder machines installed at the entry gates to dispose the plastics immediately there itself and more may be procured to make it part of livelihood opportunity.

Use of dustbins and signboards for awareness should be done intensively. The tourist vehicle driver and nature guide should be advised to motivate and aware the tourists not to use plastics inside TR and they

should ensure their vehicle must be plastic free.

As discussed earlier, use of tag system for water bottles can be followed to ensure the use of plastic bottles in a better way.

14.2.6.2 Noise pollution

In the peak tourist season during the month of December and January, the park reaches it optimum carrying capacity of tourist vehicle entering into the TR. This causes unnecessary honking and public gathering at a single place which ultimately resulting in les sighting of animals. Proper awareness and brainstorming to the vehicle owners and drivers can be done to make less noise as possible inside the park and overcrowding a particular place should be avoided by maintaining adequate distance from vehicle to vehicle.

14.2.6.3 Air pollution

The roads inside TR are murram roads which gets dry after the monsoon season. Due to continuous movement of vehicle in the tourist road, the upper layer of the soil gets loose and flying dusts use to appear on the road. This causes limited visibility to the following vehicles and increase in air pollution. The dust gets deposited over the leaves of the trees adjacent to the tourist road which also results in less photosynthesis and growth. To manage the situation, lower speed limit of the vehicles, adequate distance from vehicle to vehicle and sprinkling of the roads by use of tractor mounted water tanks can be followed. Apart from this, the emission of harmful gases from the vehicles is also contributing towards global air pollution. Similipal acts as lungs to the North eastern Odisha, Jharkhand and West Bengal which should be taken care of by allowing Green vehicles as much as possible in the future.

14.2.7 Proposed Eco tourism development Strategies

14.2.7.1 Involvement of local communities

Tourism in a wilderness area can be a two-edged sword. With proper planning and slow growth, eco-tourism can both benefit the local economy and preserve the resource base. If local inhabitants can be assured some economic benefits from eco-tourism, as well as continued necessities such as food, fuel, and land tenure, eco-tourism can integrate conservation and development.

The present level of involvement of local communities in the activities of Similipal Tiger Reserve is barely conspicuous. There is a need to do the stake-holders analysis correctly. The local communities make lot of sacrifices of their developmental needs for the sake of conservation and their sacrifice need to be adequately compensated by involving them; creating livelihood opportunities for them and also by channelizing the resource generation in a way that it helps them in meaningful livelihoods.

An institutional mechanism needs to be developed for this sort of partnership which gives scope for local level small innovations. As far as eco-tourism is concerned the local participation can be achieved by the activities like

1) Eco-guides by skill up-gradation and proper training of local youth.

2) More Self Help groups for catering and canteen services.

3) Sanitation and support services.

4) Maintenance of eco-tourism facilities.

5) Eco-development activities by identifying specific target groups.

14.2.7.2 New tourism Packages

The following eco-tourism activities are envisaged

- Package tour cum trekking in pre-defined routes for wilderness visits in selected locations of the buffer zone with specially designed vehicles.
- Package tour for children.
- Short nature walks with appropriate interpretation.
- Orchidarium upgradation.
- Butterfly park at Jashipur, Nawana and Pithabata.
- Eco-interpretation.
- Education talks and power point presentations by experts.
- Wildlife documentaries.
- Nature camps and eco-awareness camps.
- Witness captive Elephant Management
- Machan and watch tower views.
- Orchid walks
- Paid Nature camp visit for day tourists.
- Birding and bird watching excursions.
- Camping in tents at specified camp sites.
- Nature photography and guided tours.
- Cultural tourism and peep into local tribal's lifestyle.
- Online/Offline feedback system.
- Competitions for school students.
- One day with Mahout.
- Trekking.
- Package tour for wild venture for eco-tourists
- Dirt track and ATV adventure near fringe.
- Agricultural/farming and rural tourism.

Along with recreation, conservation efforts may be showcased to sensitize the public regarding hardships faced by Similipal Rakshaks, wildlife management and habitat management with specific regulation of criteria for selection by the management from time to time.

- A day with Forester
- Participation in scientific activities like wildlife census, Fireline management etc.,

Devlopment of Devkund Waterfalls

Devkund is a waterfall formed by river East Deo which is located at Udala Block of Mayurbhanj District. It is one of the popular tourist destination which is visited by large number of tourists. A temple of the goddess Ambika devi is located at the top of Devkund waterfall. Therefore, this place is also important from religious point of view. The locality is also an important wildlife area. Visitor amenities shall be provided without hampering the wildlife habitat.

14.2.7.3 Development of Trekking Path

The following trekking paths will be developed. Suitable local youth will be trained as nature guides to accompany the eco tourists in the trekking.

Table 14g: Trekking paths for tourists in Similipal

Sl No.	Name of the Location	Distance (In Kms.)	Name of the Division
1.	Kaliani-Olkudar	5	Similipal N
2.	Jamuani-Rajupal	6.5	Similipal N
3.	Pithabata-Sitakund-Lulung	9	Similipal S
4.	Jamuani-Brundaban-Chahala	13	Similipal N
5.	Ramjodi-Kiajhari	5	Similipal N
6.	Duarsuni-Khadambeda	10	Similipal N
7.	Keshdiha-Mandaljhari	8	Similipal N
8.	Gurguria-Barigaon	5	Similipal N
9.	Nedam to Brahmankunda	5	Similipal S
10.	Jamuani to Hadhadi	2	Similipal N
11.	Kumari to Asurkhal	6	Similipal N
12.	Khairi River Trek	8	Similipal N

14.2.7.4 Eco village stay

There are 4 nos of Eco-villages available at Gurguria, Kumari, Jamuani and Barehipani. One Eco-village is proposed to be created at Nawana. The design of the Eco-villages will be as model tribal village with all basic amenities. The facilities will be managed by local EDCs in collaboration with the Tiger Reserve Management. They will provide ethnic foods, run gift shop of local artefacts and act as nature guides for the tourists. They will also organise tribal cultural shows for the tourists.

Major aim is to promote cause for wildlife conservation and give impitus to cultural and rural tourism. Village visit cum Agricultural tourism can also be promoted where tourists can visit the agricultural land of the villagers and interact with them regarding the cropping pattern, crop rotation, traditional cropping practices and exchange valuable inputs among them. Organic farming in the villages inside STR can be taken up as a model to showcase the tourists about organic farming and its benefits.

14.2.7.4.1 Facilities for tourists in Nature Camps

Ramtirtha: It is located outside the Tiger Reserve near Jashipur Town. The Nature camp is having 4 suites in Debasthali cottage, one tribal cottage and three dormitories for group tourists. The various facilities are being taken care of by departmentally and tourists have been provided with all basic amenities like guided trekking and cycling path, games, swings, open gyms, children playing area, drinking water facilities, souvenir shop etc. Astral garden, Rashi van have been maintained. Proposal for development of a lilly pool near Debasthali cottage is under process.

Jamuani: It is also located outside the Tiger Reserve but very close to the boundary of the TR. It is having 9 suites of Satali cottage, four tented accommodation and two Tree top houses. It also has guided cycling and trekking paths inside the nature camp. Trekking to Hadhadi Waterfall is also being carried out for the tourists. Adventure sports like canopy walk, Burma bridge are also available. Children playing area, Trampoline jump, indoor sport equipment, library, tribal cultural activities, Souvenir shop etc. are provided to tourists. The nature camp is run by Jamuani EDC who have constructed a community hall in EDC share obtained from

running the Nature camp.

Barehipani: It is located in Barehipani WL Range near Barehpani village inside buffer area of Similipal. The nature camp is run by Barehipani EDC. The nature camp is having 8 Suites of Santal cottages and 4 suites of Nawa Santal Olla-h. The nature camp is also having facilities like Canopy walk, Burma bridge, Swings, Indoor sports facilities, trampoline jump, tribal cultural activities, Souvenir shop etc. The tourists are provided with cycle for cycling in nearby areas. New cottages like Tented cottages and Tree top houses can be developed in the campus.

Gurguria: It is located in Gurguia WL Range near Gurguria village inside buffer area of Similipal. The nature camp is managed by Gurugria EDC. It has 4 suites of Santal cottage, 4 suites of Pine villas, 2 suites of newly constructed Khairi Basa. Four new Santal cottages are under construction. The nature camp is having Cycling facility as well as guided nature trek. Tourists can go for nature trail near the campus covering Pine forests, Orchidarium and Forest patches having very good diversity of orchids and birds. Khairi river trek facility near the nature camp is also available for interested bird watchers. The Pine villas may be converted to Mud house structures as the buildings are very old. Other facilities like indoor sports, Burma bridge, trampoline jump, tribal cultural activities, souvenir shops etc. are available for the tourists.

Kumari: It is also located in Gurguria WL Range coming under Buffer area of Similipal Tiger Reserve. It is managed by Kumari EDC and is having 12 suites of Santal cottages, 4 bamboo cottages and 4 newly constructed Nawa Santal Olla-h. the Bamboo cottages can be renovated with new cottages using eco friendly materials. The Nature camp is having adventure sports facilities like trampoline jump, children playing area, commando tower, indoor sports, cycling, open amphitheatre, tribal cultural programs etc. Trekking to Asurkhal waterfall for the tourists is being carried out.

Nawana: it is located in the Nawana North WL Range coming under Buffer area of the Tiger Reserve. The area has been proposed for establishment of new Nature camp by involving the local EDC. The proposed nature camp will have infrastructures made with eco-friendly materials with all basic amenities for tourists. New trekking paths will be developed and guided cycling paths will be provided to the tourists along with adventure sports, indoor sports, children playing area etc.

14.2.7.5 Development of Ecotourism sites outside Similipal Tiger Reserve

The following sites outside Similipal Tiger Reserve will be developed as ecotourism destinations. Both day tourism, Night stay and Infrastructures as per site requirement will be developed by engaging community.

1. Ramtirtha
2. Jamuani
3. Olkudar
4. Bhimakunda
5. Samibruksha
6. Kalo Dam
7. Haladia Dam
8. Jambhira Dam
9. Suleipat Dam
10. Kanachhinda
11. Balidiha Dam
12. Sankarmara Dam
13. Nedam Dam

14. Talabandha
15. Baribeda
16. Manchabandha Eco-Park

14.2.7.6 Training of nature guides

At present due to seasonal fluctuation in tourists flow, the guides are not getting year-round engagement. After development of more tourist sites and with diversification of ecotourism activities the requirement of the services of nature guides will increase manifold. Local youth will be selected and will be given quality training to cater to the need of various kinds of tourists. Educated nature guides will be created to cater to overseas tourists. The guides will be trained on bird and tree identification, skill in English and other languages, knowledge of local culture, oratory skill, etiquettes etc. Along with this Women guides and drivers to be trained as part of **Pink Safari initiative.** Guides to be reviewed on regular basis and rating may be provided accordingly.

14.2.7.7 Souvenir Shop

At present two souvenir shops are running at Jashipur, Pithabata near the tourist booking counters and all nature camps promoting local artefacts and souvenir items. Local women SHGs have been involved in managing the Souvenir Shop at Jashipur. Local artisans will be given skill development training on making of artefacts out of bamboo and sabai grass and their products will be marketed through the SHGs/EDCs at the souvenir shop. All nature camps to be provided with **Eco-Development area/akhada,** where local artisans can make the crafts and sell to the tourists.

14.2.7.8 Melanistic Tiger Safari

Melanistic Tiger Safari may be considered forestablishment near Jashipur (fringe areas of tiger) reserves to reduce pressure of tourism from core/criticaltiger habitats and to foster awareness for eliciting public support. In the same regard there is communication vide Letter no.7-23/2015-NTCA dated 07/01/2020 from Asst. Inspector General, NTCA and to follow the established NTCA and CZA guidelines in the establishment of safari. Proposed establishment includes visitors centre and veterinary care units. This project can act as focal point of development of the Jashipur and Karanjia blocks and has potential to generate livelihood to the local communities. Accordingly, Deputy Director, Similipal North may prepare DPR and execute the project in the plan period.

14.2.7.9 Infrastructure Development

The details of infrastructure proposed to be developed at different tourist spots as well as proposed new spots have been described earlier in this chapter. Apart from these it is proposed to develop the office establishment with the followings.

1. Six nos family quarters at Jashipur
2. Visitors' Orientation Hall at Jashipur and Pithabata
3. ACF Ecotourism residence at Jashipur
4. All the FRHs present in the core area such as at Chahala, Nawana will be converted to FD/DD camp office.
5. Tribal Interpretation Centre at Gurguria will be developed showcasing the Cultural diversity and Tribal ethics of Similipal in Dioramas and and interactive panels. The Orchid interpretation centre can be modified and upgraded for the development of Tribal Interpretaion Centre.

14.2.8 Stakeholders Participation

Ecotourism requires cooperation between various stakeholders. Consultation with the stakeholders is an essential process of development of an ecotourism plan.

Local Communities understand impacts of tourism and take considerate decisions, offer services for employment and supplementary income. They own and operate ecotourism enterprises.

Tourism Department promotes destinations, develop appropriate infrastructure, enforce and monitor policies and strategies, establish standards and implement certification programmes, ensure local involvement, compile and disseminate tourism figures.

Forest Department & Protected Areas define objectives and acceptable levels of impact, develop management plans and practices, regulate access and enforce environmental laws, monitor impacts and promote interpretation programmes.

Private Sector develop and market tourism products (activities, facilities and destinations), implement good practices, proactively support conservation and community development, ensure product consistency and client satisfaction.

NGOs & Academic Institutions offer information, training and technical advice, collect information to monitor and evaluate ecotourism, foster linkages between various stakeholders, undertake action research and develop materials for interpretation programmes.

Government develops policies, strategies, land use plans and regulations, define jurisdictional mandate and responsibilities of different agencies, provide mechanism for participatory planning and finance for project implementation, ensure environmental protection and visitor safety, determine fees commensurate with visitors' willingness to pay.

14.2.9 Possible outcome of the eco-tourism

1. Improved protection status
2. Continuity of anti-poaching operation
3. A motivated team of officials matching the task
4. Increased visitor satisfaction level
5. Increased public support for conservation.
6. Maximizing visitors enjoyment.
7. Creation of stakes of local communities in park management.
8. Direct benefit accruing out of educational programmes for various user groups.
9. Increased revenue forecasts.

14.3 INTERPRETATION PROGRAMME

Interpretation is the art of explaining the character of the places to visitors so that they become aware of the significance and objectives of the PA and develop a desire to support conservation. Interpretation facilities play a very important role in education and awareness building of the tourists arriving at the tourism destination. A properly designed PA interpretation program would serve to awaken public awareness of the park purposes and policies and develop a concern for its protection. It would also educate the visitor to appreciate the importance of the PA to the region and the nation and thereby create a constituency in support of the PA. This group can become an important ally in lobbying for political support for conservation.

One Interpretation centre has been developed at Ramtirtha in technical assistance with CEE, Ahmedabad to educate the visitors on the PA, the objectives of the PA and the policies that govern its management. It is also proposed to upgrade the existing interpretation centre on the lines with present technology, to develop another world class Interpretation Centre, near Pithabata Entry Gate and upgrade the orchid interpretation

centre at Gurguria. Along with the above, need for development of Khairi and Dr.Saroj Raj Choudhary exhibition centre and libraries at all nature camps is observed as priority.

- Upgradation of existing interpretation centre building at Ramtirtha, Jashipur
- Upgradation of dormitory and new training centre
- Landscaping and nature trails
- Skill upgradation and micro-enterprise demonstration centres

There are a number of techniques available to communicate information about the PA.

The following are widely used methods for communicating with visitors:

- Brochures and leaflets
- Designated Similipal information mobile application
- Signage
- Specialized guides and checklists
- Nature camps
- Self-guided and guided trails and tours
- Audio-visual presentations
- Field demonstrations and
- Exhibits etc.

The interpretation and information material shall be made available to public alongwith signages at strategic locations both in and outside theTR.

However, it must be recognized that for maximum effectiveness, these programs must be simple, easy to interpret and understand, in the local language, directly related to the local situation, with low technology inputs and costs, and easy to maintain.

14.3.1 Tourist Feedback and Its Evaluation

Feedback helps in rectification of deficiencies and further improvement of a programme. A good feedback also boosts the enthusiasm of the people involved in implementation of that particular programme. Many factors, which determine a person's enjoyment of a visit to the Park, result from the courteousness and efficiency of staff, provision of information, quality and safety of amenities. To know more about the tourist's opinion, a questionnaire would be most appropriate. Feedback facilities will be made available in the following forms.

1. Visitor books will be made available at booking counters at Pithabata&Jashipur, exit check gates and tourist accommodation places at Gurguria, Jamuani, Ramatirtha and also tourist spot at Chahala.
2. Feedback format to be uploaded in the official website www.similipal.org where the visitor can fill up the form online.
3. Offline feedback is in place and provided to the tourists in nature camps. Fortnight review of the feedbacks should be checked by the ACF (Ecotourism) and monthly by DD Similipal North for improvement of the facilities of the stay. The feedback form for nature camps has been furnished in Annexure LXVII.
4. Feedback for day tourism has been provided to the day tourists as one form per vehicle. They are submitting the duly filled feedback form at the exit gate. The feedback form basically about the day tourism facilities, nature guides and driver. Fortnight review of the feedbacks should be checked by the ACF (Ecotourism) and monthly by DD Similipal North & South. The feedback form for nature camps has been furnished in Annexure LXVIII.

14.3.2 Closure Period

The number of tourists varies greatly from season to season. This presents managerial problems for both forest department and tourism facility providers. The number of tourists during the peak seasons is much higher than the manageable limits and during the off-season the facilities are vacant. Strategies need to be developed to spread out the pressures at the peak times by limiting the time that an individual can remain inside the PA.

The park is open to tourists from the end of monsoon to the onset of monsoon next year. During the Closure period of TR, all the Nature camps in the buffer which has access to locals throughout the year are proposed to be opened for tourists to ensure continuous livelihood to the host community.

The Field Director, Similipal Tiger Reserve will give public notice about opening/closure of Tiger Reserve every year.

14.4 NATURE EDUCATION AND AWARENESS

Considering the immense volume of problems and seriousness of measures that need to be taken to conserve bio-diversity, socio-economic and cultural diversities of communities residing inside and outside the park, a comprehensive strategy on Education and Communication at various levels is proposed. Such an education it is felt, would bridge the gap between the Parkstaff and the communities, build better working relations, coordination and enhance the role of stakeholders.

All sections of society are involved, directly or indirectly, in harvesting resources, in managing the resources and in making decisions on resource planning. Thus, target audience for Environmental Education would necessarily encompass all ages and all levels of education and society. Any strategy for Environmental Education must necessarily be multi-pronged reaching out simultaneously to the different target groups through different methods, approaches and media. Thus, a strategy for Environment education has to be integrative, problem oriented, practical, continuous and diversified. STCF Barrack at Gurguria can be taken up as a training centre in which a capacity of about 60 trainees can be accommodated along with a Training Hall cum Classroom facility. Target groups identified are as follows:

- Communities residing within and in the fringe villages of the park.
- Park Managers
- Personnel from other Government departments
- Non-Governmental Organisations (NGO's)
- Visitors
- Tourist Organisations
- Students
- Decision makers
- Media
- Researchers

14.4.1. Education Strategies and Awareness Programme

The Environmental Education strategy is grouped under two categories, awareness and action. Awareness programmes aim at improving awareness of different groups on various issues related to conservation aspects. Action programmes essentially aim at enhancing the skills of different target groups on various technologies and practices and improve the life of local communities which in turn will trigger the action for better Park Management.

The Park would develop its own environmental education and awareness (EEA) strategy and plan. It would include identification of the different issues and target groups to be covered by the program; the nature and type of activities for each target group; the programs to link PA interpretation centers with extension and education; linkages with other EEA programs of NGOs, universities, and schools, and institutional, informational, research, training, man power, financial and organizational needs for its design and implementation.

The team from District Cultutal Department under the District Administration can be used for creating awareness among people by doing street plays, acts, dance, songs etc. about Similipal and its diversity. DFO Baripada can coordinate with District Administration and concerned line department for the same during Fire season, festival seasons and important celebration days related to Forest and Wildlife etc.

Rallies and flagmarches in coordination with NSS units and Eco-clubs of various schools and colleges should be organized in sensitive areas to create awareness and sensitization among local people. DFO Baripada can coordinate with the in-charge of the Eco-clubs for organizing the same in sensitive areas.

Activities to be undertaken:

i. Community interaction for conservation awareness

ii. Orientation on bio-diversity conservation and the Eco- development Project

iii. Educating farmers, women folk, youth, school children and teachers about village eco-development activities, improving skill and change in attitude towards propagation of non-conventional energy devices.

iv. Educating the elected representatives of the local self Government to involve themselves in the project.

v. Building a rapport between the villagers and the PA authorities.

vi. Conduct street plays in different villages using local folk media, to build up an awareness of the project.

vii. Conduct rallies to spread the cause of conservation

viii. Need based training system (Ecotourism/Grassland management/Orchid management/Tribal culture etc.)

14.4.1.1. Education Programs for School Children

Educating school children in TR neighbourhoods on the values and importance of PAs is an effective strategy for getting broad-based long-term support for conservation. School children and youth can be brought to the TR to provide them with an experience and understanding of its role and importance; or the conservation message can be taken to the classrooms (through lectures and talks, audio-visual presentations etc.). The former could use day visits to the TRs and nature camps; or it could involve groups (particularly of higher grade students) in short assignments to get them involved in TR activities (such as setting up nature trails, animal surveys and census, establishing botanical collections or study topics of interest, etc.,). These programs would require simple and inexpensive accommodation facilities such as dormitories or tents.

14.4.1.2 "Bagha Sathi" Initiative

It is a new initiative by Similipal Tiger Reserve Management since 2012 to create a group of volunteers from among the school students around the tiger reserve on the "Catch them Young" principle. The objective is to motivate them towards conservation of forest and wildlife so that they will spread the message among their friends, relatives, elders and villagers and resist them from the pernicious practice of poaching of wild animals. Continuous follow up with the volunteers, taking them for nature excursion, group discussion etc are some of the activities to be taken up.

14.4.1.3. Mass Media Campaigns for Creating Public Awareness

The use of mass media in developing countries has shown phenomenal growth in recent years. India's rapid

advance in opening up its markets and liberalizing its economy, is likely to increase enormously the use of radio, television, print media and other communication media. The mass media can and should be used for urban receivers. At this level, schools and universities, policy makers, and bureaucrats can all be successfully reached through distance education and general programs; the wide reach of mass media gives it enormous potential for disseminating and educating the general public and national and state level decision makers of the country. At the rural level, however, being tailored to local-specific issues, it has less flexibility in providing education and awareness.

Use of social media like Twitter, Facebook, Instagram, Whatsapp groups, Telegram groups etc. can be used for wide publication of developmental works and creation of mass awareness among people to know the importance of Similipal and its attributes.

14.4.1.4 Research activities

Students of Universities throughout the State as well as India can do research in Similipal Landscape by obtaining necessary permission from the State Wildife Headquarters, Bhubaneswar. Similipal is lacking the baseline data regarding the biodiversity, climate change effect on a TR, Spacio-temporal changes of growth and vigour of fauna, altitudinal variation in diversity of flora in STR, weed infestation rate in STR etc. Many more topics can be selected by the interested researcher and data can be collected and significant results can be obtained which will help in proper documentation and further implementation of the management strategies. A national level seminar/workshop on research topics on TRs can be organized annually on regular basis so that nature education and research can be taken up in a large scale.

Ongoing activities by STR management

i. “Bagha Sathi” initiative involving school students.

ii. School contact programme and student environment awareness rallies.

iii. Mass awareness campaigns in villages on forest fire, bio- diversity.

iv. Nature excursion programme for students in Similipal Tiger Reserve

v. Training workshop for forest department staff.

vi. Exposure visits for the trainees to study the flora and fauna of the park.

14.5 Institutional Mechanism for implementation of Ecotourism, Interpretation and Nature Education

Presently, Ecotourism programmes are managed as detailed below.

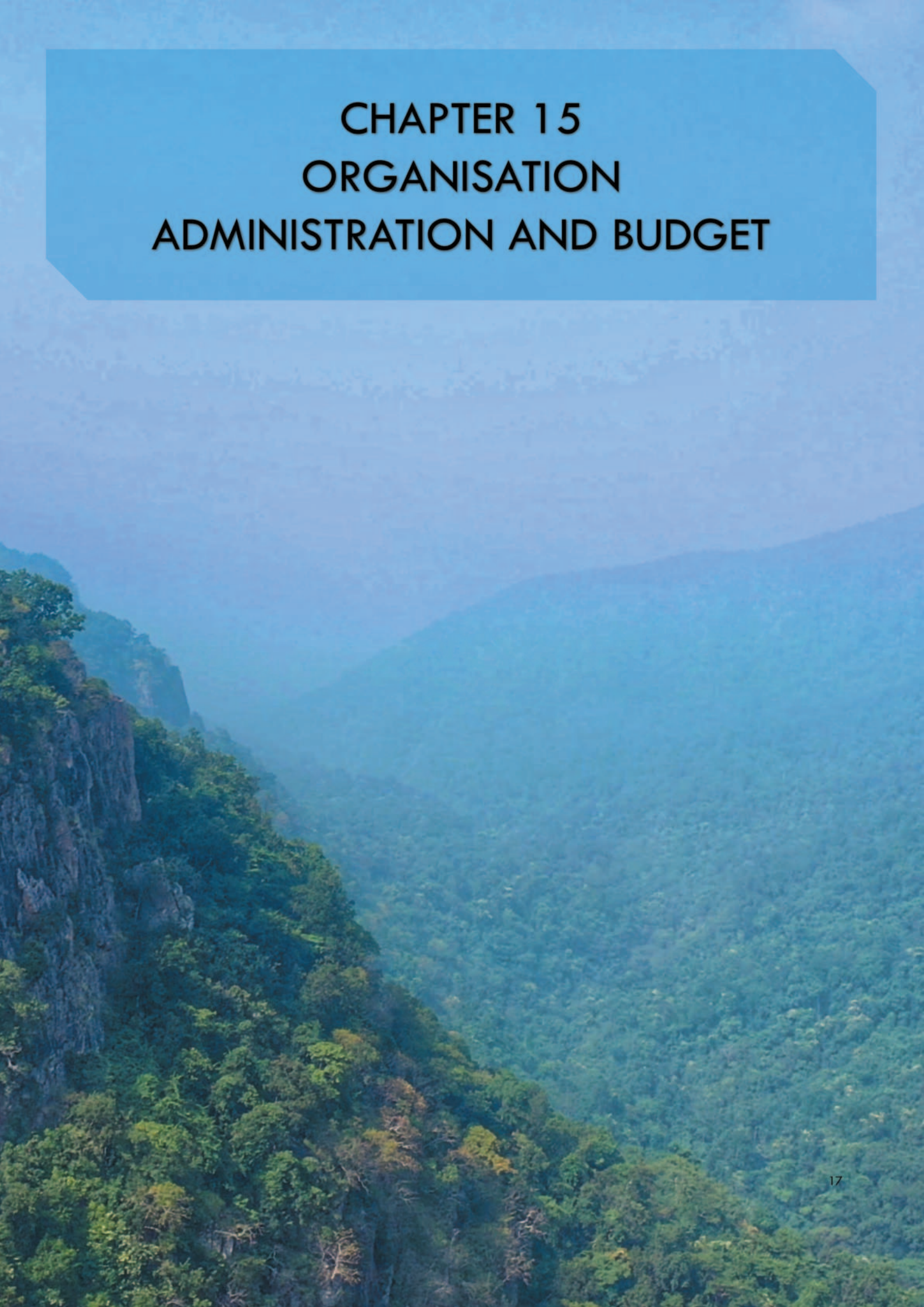
In order to effectively manage the package programmes, revenue generation and proper accounting, visitor satisfaction, interlinking ecotourism, conservation awareness, village eco development and timely addressing the day today issues the following institutional mechanism is proposed for implementing Ecotourism, Interpretation and Nature Education Plan.

1. ACF-Ecotourismand Ecodevelopment–1No.to be sanctioned for Jashipur under DD, Similipal North WL Division.
2. Wildlife Assistant – To look after Nature Education Camp, outreach activities, Library and Interpretation.
3. Sociologist/Anthropologist-To look after the Eco-Developmental activities
4. Accountant on contract basis and 3rd party auditing of Nature camps.

14.6 Annual Reports

The ACF, Ecotourism shall prepare the Annual Report of various activities of ecotourism, nature education and interpretation.

CHAPTER 15
ORGANISATION ADMINISTRATION AND BUDGET



CHAPTER

15

ORGANIZATION, ADMINISTRATION AND BUDGET

15.1 BUFFER AREAS COORDINATION COMMITTEE AND ITS LINKAGE WITH TIGER STEERING COMMITTEE AND TIGER CONSERVATION FOUNDATION

The buffer zone management will be organized in coordination with the following committees.

As per G.O. Notification No 565 of Environment and Forests (FR-V) Department Dated 08.01.2010, a State Level Steering Committee for tiger conservation for ensuring coordination, monitoring, protection and conservation of tiger, co-predators and prey animals within the tiger Range under sub sections (1) and (2) of section 38-U of the Wildlife (Protection) Act 1972 (Central Act, 53 of 1972) has been constituted. The details of members are furnished in the Annexure XI.

The section 38-X of the Wildlife (Protection) Act 1972 as amended in Act No. 39 of 2006 states that the State Government shall establish a Tiger Conservation Foundation for tiger reserves within the state in order to facilitate and support their management for conservation of tiger and bio-diversity and, to take initiatives in eco-development by involvement of people in such development process. In pursuance to this amendment, Similipal Tiger Conservation Foundation has been formed and became functional with holding of its first Governing Body Meeting on 28.06.2012. The detailed guide lines / deed of trust isfurnished in the Annexure XII.

The method of administration has already been dealt in Chapter no: 3.6

15.2 COORDINATION WITH ECODEVELOPMENT COMMITTEES, CONFEDERATION AND OTHER LINE AGENCIES / DEPARTMENTS / PRODUCTION SECTORS.

Development through District Administration

a. Coordination with various institutions and line agencies to obtain their financial support and expertise to implement various EDC activities through District administration also.

b. Developing specific proposals with the themes of EDC to obtain corpus funds from various donors.

Proposed Activities

1. Establishing Training Centres for Tailoring and Associated Activities
2. Small cottage industries, especially earthen pots manufacturing, bamboo products, Terracotta items, Cloth bags, Sal/Siali leaf plates etc.
3. Small Petty Shops, souvenir shops
4. Dairy Farms with hybrid milch animals

5. Community Apiculture, processing packaging unit
6. Formation of Medicinal Gardens
7. Weaving Units
8. Agriculture Improvement – Land based activities
9. Sale of NTFP products with value added products
10. Integrated Poultry Farms
11. Fish Farm
12. Viable and Suitable Eco Tourism activity: (Only a few Selected Modules)
13. Promoting Women Self Help Group
14. Developing medicinal plant nursery for Odisha State medicinal plant Board.

All the above activities can be taken up by the line departments in coordination and consultation with Field Director of Similipal Tiger Reserve.

15.3 STAFF DEPLOYMENT

The staff working in the buffer areas of Similipal Tiger Reserve is at present under the administrative control of the Respective Wildlife and territorial divisions under Field Director Similipal TR.

15.4 FUND RAISING STRATEGIES

With the formation of the Tiger Conservation Foundation the funding source shall be as briefed in the core plan vide chapter No 12.2. The bylaws Governing all activities is provided in Annexure –XII.

The income generated from levying tourist entry fees and eco-development surcharge on visitors to Similipal tiger reserve, compounding fees, elephant ride charges, rest house rents and income through vehicle ride etc. shall be pooled into the fund of Tiger Conservation Foundation of Similipal.

Contribution from other sources such as fund raising for the Similipal Tiger Reserve at National as well as International level as permitted by law and Government orders.

Grant, donation, or assistance from any kind from any individuals or organizations including foreign Governments and external agencies as permitted by law and Government orders.

As provision under site specific management plans.

By any other activity as permitted by law and in confirmative with the terms and conditions of the deed of trust.

Donation received in favour of the Foundation shall be exempted under 80G of the Income Tax Act, 1961. This will enhance the fund availability with the Foundation for socio economic development acitivity for communities living in and around Similipal Tiger Reserve.

Media and Social media campaigns shall be made for encouraging donations to the STCF.

15.5 SCHEDULE OF OPERATIONS

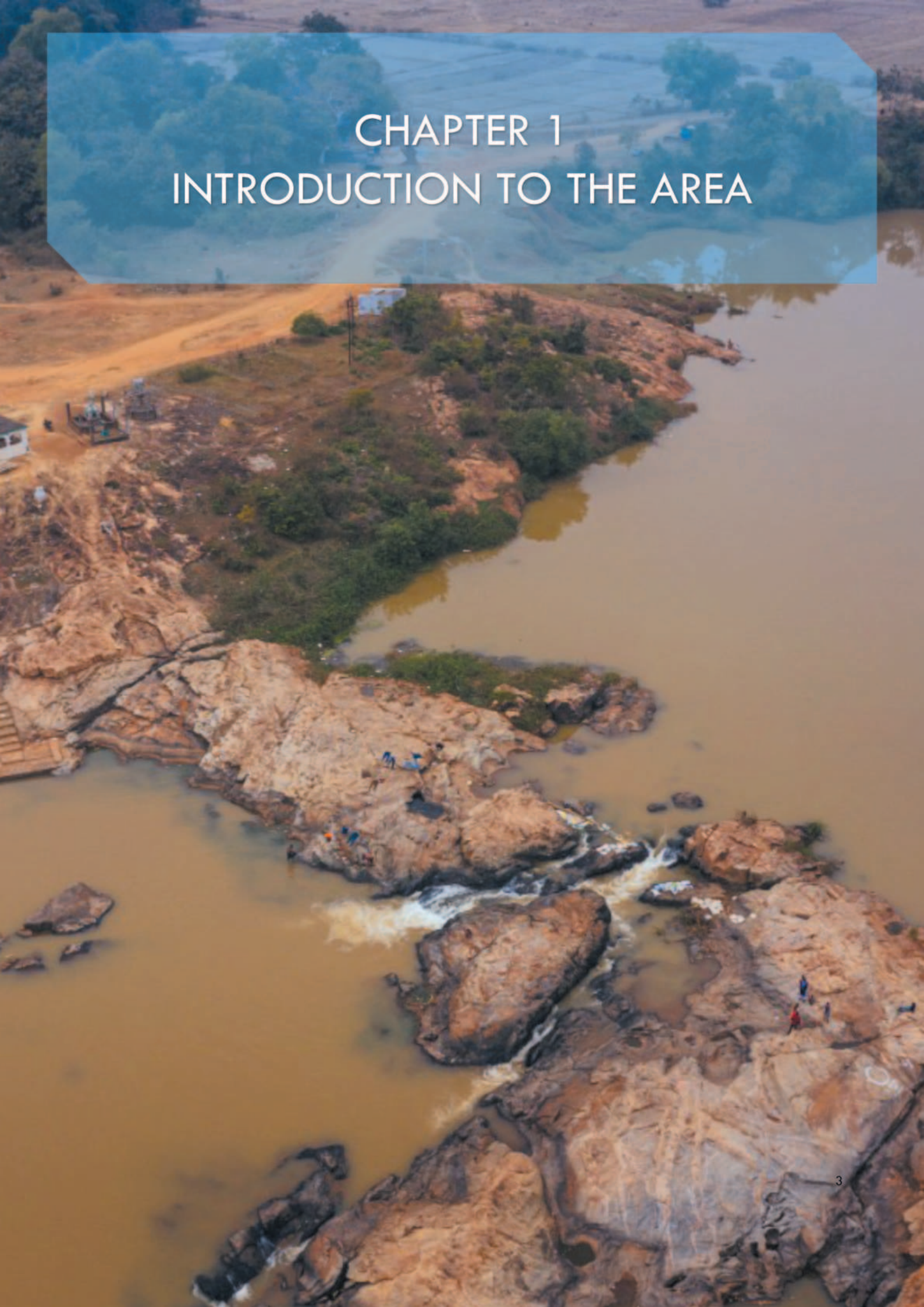
The following schedule of operations are prescribed for successful implementation of the Management of buffer zone of Similipal Tiger Reserve apart from the present operation as is followed by the concerned divisions.

Table No.15a: Schedule of operations for Management of Buffer Zone

Sl. No.	Works	Month
	For Silvicultural operation /Weed Management, Fire Management Demarcation / preparation of site / survey etc.,	January to April
	Removal of Weeds, burning etc.,	May
	Protection: Engaging anti-poaching watcher to look after the protection works	April to March of next year.
	Engaging Fire watchers	January to June
	Fire line scrapping	November to January

Control burning of dry leaves fallen on the Forest floor can be taken up with proper watch and care. Mahula trees present near the villages inside Similipal should be treated with control burning below the trees well before the start of the fire season to minimize uncontrolled burning in the buffer areas.

CORRIDOR PLAN



CHAPTER 1
INTRODUCTION TO THE AREA

CHAPTER

01

INTRODUCTION OF THE AREA

Wildlife corridors have been broadly defined as the landscape elements linking historically connected habitats in order to facilitate movement and offset possible long term negative impacts of inbreeding and genetic isolation. Studies during the last few years have indicated that wildlife corridors have emerged as a critical conservation strategy that can help minimise genetic isolation, offset fragmentation problems, improve animal dispersal, restore ecological processes and reduce of man animal conflict. Corridors may also help facilitate the re-establishment of populations that have been reduced or eliminated due to random events. This may potentially moderate some of the worst effects of habitat fragmentation. Wildlife corridors are important for large species requiring significant sized ranges; however, they are also vital as connection corridors for smaller animals and plants as well as ecological connectors to provide a rescue effect.

1. THE EXISTING SITUATION

The important connectivity with Similipal Tiger Reserve requiring management attention are patches of forests connecting Similipal TR to Badampahar R.F. in western side, Kuldiha Sanctuary in the south-eastern side and up to Santospur RF in Keonjhar District in south-western side respectively. All the corridors are very important area for wild animal migration which needs to be protected from further degradation by human interferences. Tigers, Elephants, Leopards, Sloth Bear and big herbivores such as Mouse deer, Chitals and Boar are often found in these areas and are believed to be using the corridors. These are potential dispersal routes for the animals mentioned above. It is also believed that tigers were using these corridors on previous occasions to migrate from Similipal to other potential areas like Kuldiha Sanctuary located in the eastern part in the neighboring district i.e., Balasore, Satkosia Tiger Reserve in Angul passing through forest areas of Keonjhar and Dhenkanal Districts and Dalma sanctuary of neighboring Jharkhand state through Badampahar. Similipal is the source of largest breeding tigers in eastern ghat. Thus, these corridors provide a potential dispersal route to tigers and other co- predators in future if proper protection measures are taken.

1.1 BRIEF DESCRIPTION OF THE AREA AND SIGNIFICANCE FOR TIGER CONSERVATION.

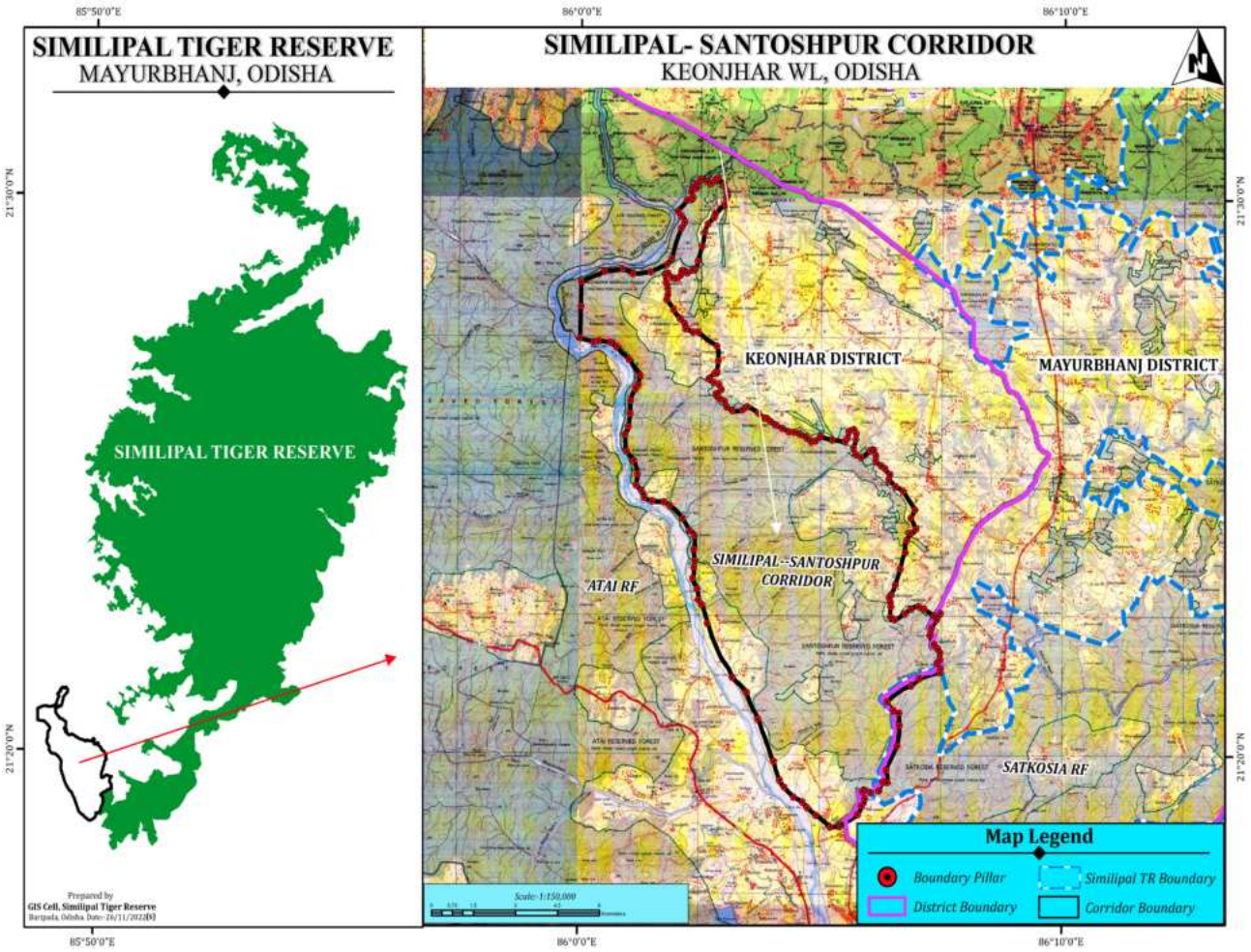
1.1.1 Delineation of Corridors (Macro level & Micro level)

Macro level delineation of corridors connecting Similipal Tiger Reserve to other Protected Areas and other major wildlife habitats have been done based on the report on country level assessment of tigers done in 2010 by NTCA which has identified potential tiger corridors as well as the connectivity lying in adjoining areas of Similipal Tiger Reserve. For assessment of the existing situation of Similipal – Santoshpur corridor, joint inspection of the corridor with adjoining area DFOs was done on 20.07.2013. Assessment of prey base and carnivore signs in the corridors was conducted in 2018 as per protocol of Phase-IV monitoring for which necessary field training was imparted to the staff of corridor areas on 11.10.2021 for Similipal – Kuldiha corridor and Similipal – Santoshpur and Similipal – Badampahar corridors. The data obtained thus are being analysed and assessed by NTCA. The ground truthing reports of adjoining area DFOs were incorporated in GIS domain at Tiger Reserve headquarters for micro level delineation of the corridors.

1.1.2 Similipal-Santoshpur Corridor (Area: 113.46 km²)

During 2010 country level assessment of tigers a potential connectivity between Similipal and Satkosia Tiger Reserves of Odisha was identified. This lies in the south-western part of Similipal Tiger Reserve connecting Satkosia RF and Noto RF of Similipal Tiger Reserve to Satkosia Tiger Reserve through forest blocks of Keonjhar and Dhenkanal District covering five forests Divisions. The portion of the corridor falling in Similipal landscape from Similipal TR up to Santospur RF in Keonjhar Wildlife Division is discussed in this plan.

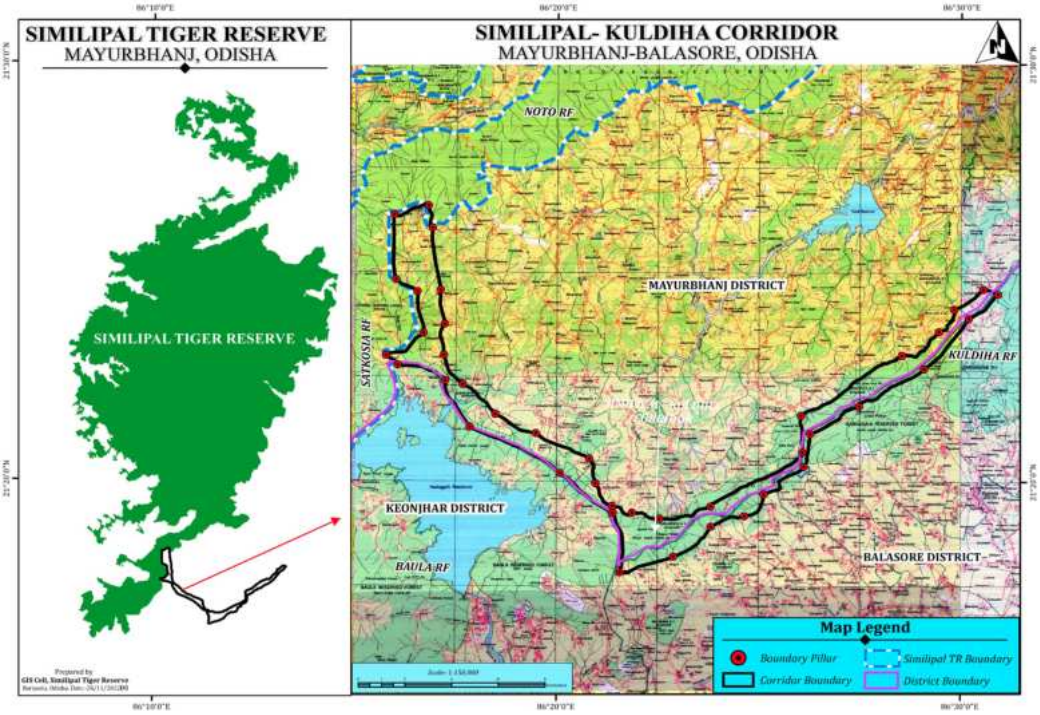
Apart from movement of tiger, this was also an earlier migration route between two largest elephant habitats of Orissa i.e., Similipal and Satkosia. The migration route covers the districts like Angul, Dhenkanal, Cuttack and Keonjhar. In course of time, this has fragmented and does not appear to exist at present. Safeguarding the genetic exchanges amongst wildlife populations, located in these two spatially separated but biologically rich PAs is a prerequisite for the longevity of these conservation areas.



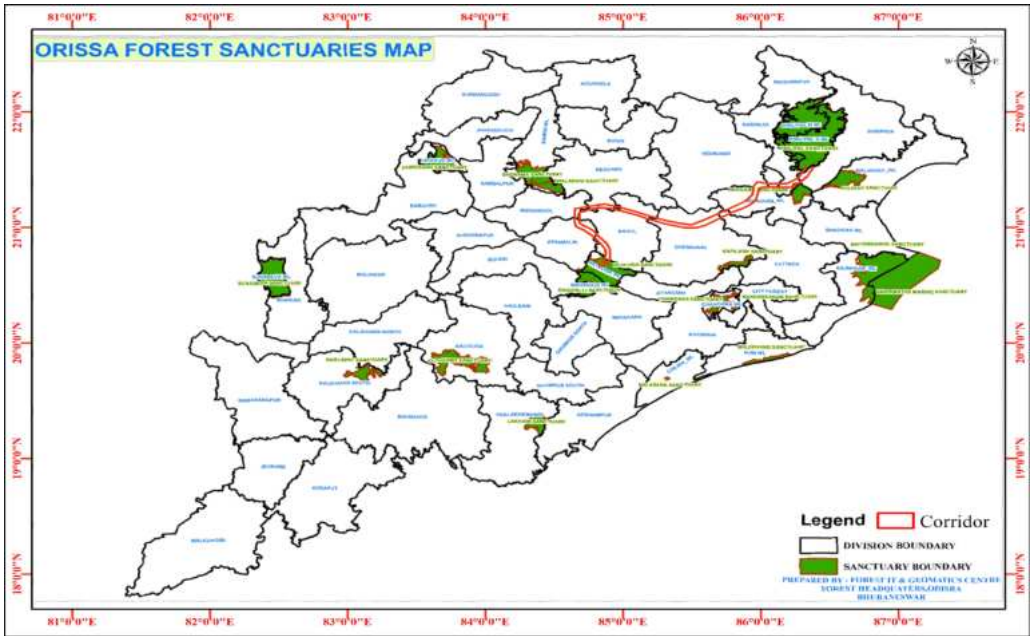
Map 1A: Similipal-Santoshpur Corridor

1.1.3 Similipal-Kuldiha Corridor (Area: 38.15 km²)

In the Extreme south-eastern side, the area joins the Satkosia R.F. of Similipal Tiger Reserve with Hadagarh sanctuary of Keonjhar (WL) Division and Kuldiha Sanctuary of Balasore District. Movement of wild elephants occur from Similipal R.F. to Kuldiha Sanctuary of Balasore WL Division which is quite important for exchange of gene pool between different Meta populations.



Map No.1B: Similipal-Kuldiha Corridor



Map No.1C: Corridor connecting Similipal and Satkosia

(Source: Status of Tigers, Co-predators and Preys in India, 2010, WII & Official website of State Wildlife Headquarters, Odisha)

Map No.1D: Corridor connecting Similipal and Satkosia

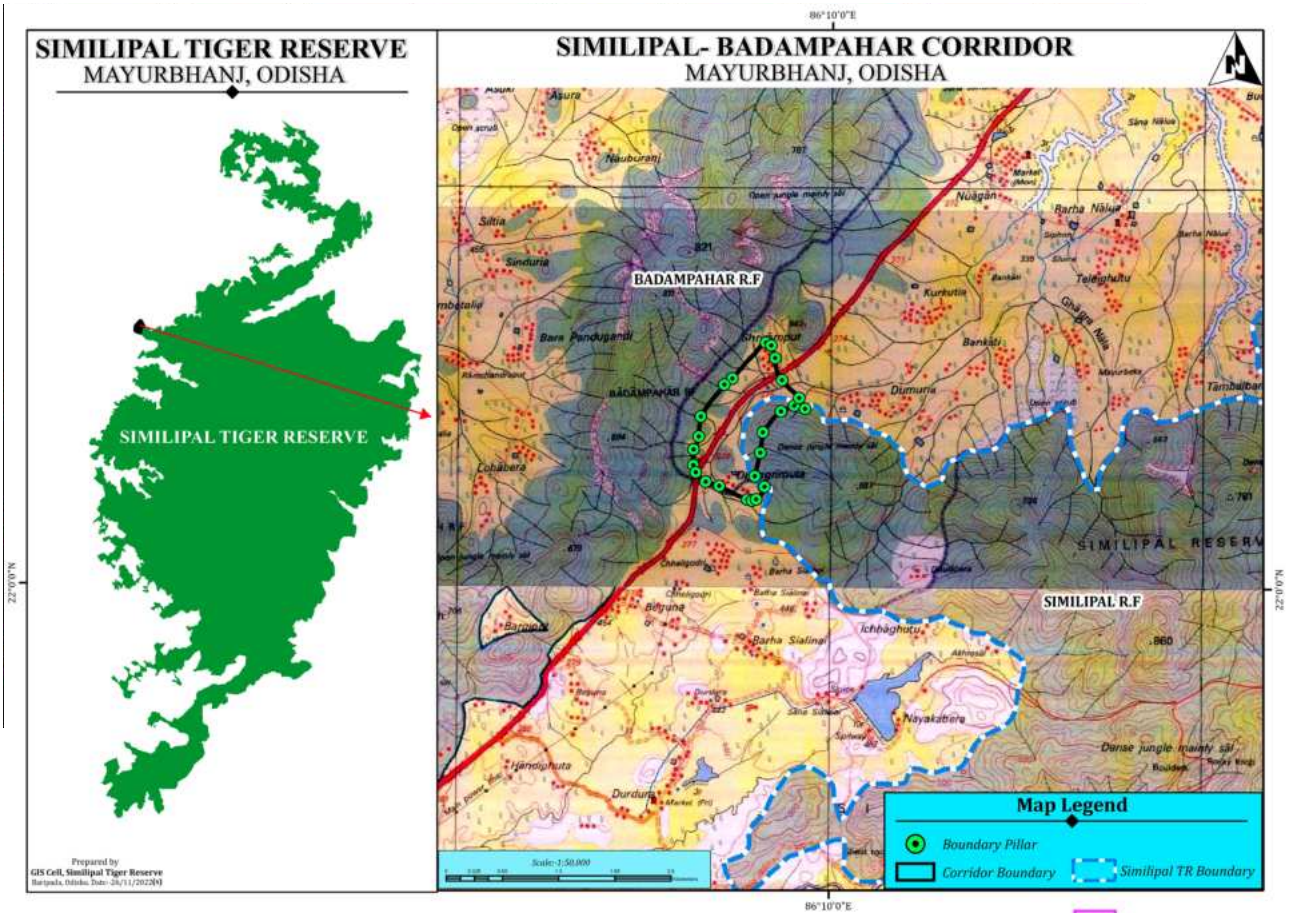
(Source: Status of Tigers, Co-predators and Preys in India, 2010, WII)

1.1.4 Similipal-Satkosia Corridor (Corridor between two TRs):

There is no such designated corridor available on map rather this corridor has been prepared to be developed as a functional corridor for free Wildlife movement from one TR to another. There are so many physical barriers present in between the two TRs of Odisha and this imaginary corridor crosses barriers like NH, SH, Railway lines, one major River Brahmani, small towns and huge number of villages and human habitations along with agriculture fields. It's a herculean task for the management to develop this imaginary path as a functional corridor as it involves so many line departments compromising other developmental works in the area. The length of the corridor covers almost half of the length of the State. However, small pockets in this corridor can be identified to be developed once in a time to make the corridor feasible for free movement of the animals.

1.1.5 Similipal-Badampahar Corridor (Area: 1.15 km²)

It lies in the western side where a small strip of 115.87 ha (1840 meters long) joins the Similipal Tiger Reserve with Badampahar R.F. The NH 49 passes through this patch of forest. The forest is enriched with Sal and its associates and lies between hamlets of Dhangirimula and Srirampur of village Chelligodhuli under Gurguria Range of Karanjia Division.



Map No.1E: Similipal-Badampahar Corridor

1.1.6 Geo coordinates of Corridor boundaries

Table No.1a: Geo Coordinates of Similipal – Santoshpur Corridor//

Sl. no	Longitude	Latitude
1	86° 00’01.296”	21°28’28.801”
2	86° 00’30.427”	21°28’40.393”
3	86° 00’52.841”	21°28’43.064”
4	86° 01’05.286”	21°28’38.104”
5	86° 01’27.336”	21°28’40.170”
6	86° 01’47.690”	21°28’48.288”
7	86° 01’53.440”	21°28’54.775”
8	86° 02’04.898”	21°29’27.272”
9	86° 02’09.197”	21°29’33.886”
10	86° 02’04.924”	21°29’40.398”
11	86° 02’00.661”	21°29’45.625”
12	86° 02’11.893”	21°29’57.563”
13	86° 02’17.128”	21°29’58.456”

14	86° 02’19.230”	21° 30’00.360”
15	86° 02’17.074”	21° 30’06.628”
16	86° 02’19.248”	21° 30’11.376”
17	86° 02’23.302”	21° 30’10.451”
18	86° 02’24.648”	21° 30’15.278”
19	86° 02’29.029”	21° 30’20.466”
20	86° 02’36.586”	21° 30’17.755”
21	86° 02’42.115”	21° 30’16.067”
22	86° 02’47.242”	21° 30’19.451”
23	86° 02’49.801”	21° 30’21.632”
24	86° 02’56.976”	21° 30’14.360”
25	86° 03’01.390”	21° 30’07.499”
26	86° 03’01.876”	21° 30’03.416”
27	86° 03’00.749”	21° 29’59.752”
28	86° 02’58.722”	21° 29’53.070”
29	86° 02’47.065”	21° 29’43.109”
30	86° 02’45.024”	21° 29’39.008”
31	86° 02’38.173”	21° 29’32.086”
32	86° 02’34.094”	21° 29’23.028”
33	86° 02’30.746”	21° 29’07.951”
34	86° 02’25.793”	21° 28’52.003”
35	86° 02’22.405”	21° 28’43.162”
36	86° 02’19.277”	21° 28’42.434”
37	86° 02’12.833”	21° 28’38.964”
38	86° 02’05.651”	21° 28’41.401”
39	86° 02’04.438”	21° 28’36.462”
40	86° 01’59.084”	21° 28’32.689”
41	86° 01’53.962”	21° 28’33.665”
42	86° 01’48.893”	21° 28’38.629”
43	86° 01’45.268”	21° 28’36.610”
44	86° 01’46.283”	21° 28’29.129”
45	86° 01’48.569”	21° 28’22.231”
46	86° 01’48.716”	21° 28’15.463”
47	86° 01’47.381”	21° 28’10.301”
48	86° 01’55.726”	21° 27’59.699”
49	86° 02’04.006”	21° 27’49.745”
50	86° 02’09.614”	21° 27’44.291”
51	86° 02’11.022”	21° 27’38.707”

52	86° 02’20.130”	21° 27’35.208”
53	86° 02’27.258”	21° 27’34.927”
54	86° 02’49.643”	21° 27’20.318”
55	86° 02’51.814”	21° 27’04.626”
56	86° 02’49.823”	21° 26’52.674”
57	86° 02’47.195”	21° 26’50.723”
58	86° 02’40.290”	21° 26’45.226”
59	86° 02’46.309”	21° 26’41.014”
60	86° 02’52.660”	21° 26’38.926”
61	86° 02’55.561”	21° 26’33.418”
62	86° 02’48.696”	21° 26’28.648”
63	86° 02’53.138”	21° 26’24.284”
64	86° 02’59.687”	21° 26’20.879”
65	86° 03’02.300”	21° 26’14.784”
66	86° 03’09.587”	21° 26’10.867”
67	86° 03’21.809”	21° 26’11.620”
68	86° 03’27.648”	21° 26’14.989”
69	86° 03’41.584”	21° 26’08.725”
70	86° 03’48.607”	21° 26’02.998”
71	86° 03’52.387”	21° 26’02.656”
72	86° 03’56.624”	21° 25’59.344”
73	86° 04’03.911”	21° 25’55.682”
74	86° 04’11.636”	21° 25’52.075”
75	86° 04’19.718”	21° 25’48.468”
76	86° 04’26.497”	21° 25’47.813”
77	86° 04’33.928”	21° 25’45.408”
78	86° 04’41.401”	21° 25’42.038”
79	86° 04’46.384”	21° 25’38.968”
80	86° 04’52.777”	21° 25’38.568”
81	86° 04’58.609”	21° 25’43.226”
82	86° 05’13.794”	21° 25’39.760”
83	86° 05’29.317”	21° 25’37.801”
84	86° 05’32.395”	21° 25’41.581”
85	86° 05’34.073”	21° 25’48.904”
86	86° 05’40.146”	21° 25’51.305”
87	86° 05’43.040”	21° 25’46.675”
88	86° 05’42.619”	21° 25’40.480”
89	86° 05’39.736”	21° 25’31.256”

90	86° 05’42.630”	21° 25’24.215”
91	86° 05’49.481”	21° 25’21.187”
92	86° 06’00.274”	21° 25’28.384”
93	86° 06’05.159”	21° 25’29.154”
94	86° 06’07.470”	21° 25’23.502”
95	86° 06’07.470”	21° 25’17.846”
96	86° 06’14.152”	21° 25’12.194”
97	86° 06’19.033”	21° 25’09.109”
98	86° 06’25.459”	21° 25’02.683”
99	86° 06’23.918”	21° 24’57.287”
100	86° 06’32.141”	21° 24’49.835”
101	86° 06’41.393”	21° 24’44.698”
102	86° 06’56.297”	21° 24’24.653”
103	86° 06’51.415”	21° 24’15.916”
104	86° 06’57.838”	21° 24’04.093”
105	86° 06’50.584”	21° 23’59.471”
106	86° 06’46.228”	21° 23’51.544”
107	86° 06’44.582”	21° 23’38.519”
108	86° 06’38.452”	21° 23’20.954”
109	86° 06’32.504”	21° 23’03.710”
110	86° 06’27.400”	21° 22’53.033”
111	86° 06’25.132”	21° 22’50.390”
112	86° 06’26.647”	21° 22’44.962”
113	86° 06’27.230”	21° 22’40.073”
114	86° 06’26.636”	21° 22’29.071”
115	86° 06’32.000”	21° 22’26.209”
116	86° 06’44.453”	21° 22’32.545”
117	86° 06’52.002”	21° 22’37.747”
118	86° 07’01.402”	21° 22’40.552”
119	86° 07’08.404”	21° 22’37.844”
120	86° 07’20.287”	21° 22’30.688”
121	86° 07’28.812”	21° 22’33.215”
122	86° 07’24.053”	21° 22’26.440”
123	86° 07’17.882”	21° 22’16.932”
124	86° 07’15.571”	21° 22’09.736”
125	86° 07’21.223”	21° 21’59.458”
126	86° 07’25.594”	21° 21’54.832”
127	86° 07’28.164”	21° 21’50.976”

128	86° 07’28.164”	21° 21’43.780”
129	86° 07’24.564”	21° 21’39.668”
130	86° 07’29.190”	21° 21’33.246”
131	86° 07’28.164”	21° 21’29.390”
132	86° 07’02.978”	21° 21’22.709”
133	86° 06’52.700”	21° 21’14.742”
134	86° 06’23.148”	21° 20’57.782”
135	86° 06’30.600”	21° 20’48.016”
136	86° 06’37.778”	21° 20’45.121”
137	86° 06’38.567”	21° 20’32.082”
138	86° 06’35.996”	21° 20’09.982”
139	86° 06’22.374”	21° 19’43.770”
140	86° 06’23.918”	21° 19’30.666”
141	86° 06’18.522”	21° 19’30.666”
142	86° 06’13.547”	21° 19’21.356”
143	86° 06’03.269”	21° 19’20.071”
144	86° 05’54.787”	21° 19’22.127”
145	86° 05’53.502”	21° 19’20.842”
146	86° 05’56.072”	21° 19’12.875”
147	86° 05’52.220”	21° 19’04.908”
148	86° 05’47.335”	21° 18’55.400”
149	86° 05’25.235”	21° 18’42.552”
150	86° 05’13.157”	21° 18’42.037”
151	86° 04’55.553”	21° 18’54.756”
152	86° 04’44.634”	21° 19’02.852”
153	86° 04’38.723”	21° 19’09.019”
154	86° 04’27.930”	21° 19’14.160”
155	86° 04’16.108”	21° 19’24.823”
156	86° 04’10.196”	21° 19’32.534”
157	86° 04’02.813”	21° 19’52.871”
158	86° 03’42.847”	21° 20’38.198”
159	86° 03’28.573”	21° 21’06.901”
160	86° 03’10.800”	21° 21’22.964”
161	86° 02’39.523”	21° 22’21.324”
162	86° 02’32.557”	21° 22’41.581”
163	86° 02’28.529”	21° 22’46.592”
164	86° 02’26.934”	21° 22’58.588”
165	86° 02’21.350”	21° 23’09.658”

166	86° 02’22.650”	21° 23’21.538”
167	86° 02’23.708”	21° 23’28.774”
168	86° 02’22.654”	21° 23’41.258”
169	86° 02’23.338”	21° 23’55.745”
170	86° 02’16.958”	21° 24’01.523”
171	86° 02’08.477”	21° 24’14.371”
172	86° 01’52.504”	21° 24’28.001”
173	86° 01’44.710”	21° 24’31.846”
174	86° 01’30.468”	21° 24’32.702”
175	86° 01’20.510”	21° 24’36.554”
176	86° 01’17.072”	21° 24’44.190”
177	86° 01’10.603”	21° 24’49.748”
178	86° 01’12.173”	21° 25’01.974”
179	86° 01’07.482”	21° 25’16.234”
180	86° 00’58.320”	21° 25’26.076”
181	86° 00’56.264”	21° 25’44.479”
182	86° 01’00.620”	21° 25’53.108”
183	86° 01’02.640”	21° 26’06.976”
184	86° 01’03.097”	21° 26’21.005”
185	86° 01’08.879”	21° 26’33.371”
186	86° 01’12.292”	21° 26’38.105”
187	86° 01’14.700”	21° 26’48.502”
188	86° 01’00.779”	21° 27’05.220”
189	86° 00’45.410”	21° 27’18.864”
190	86° 00’37.793”	21° 27’23.465”
191	86° 00’23.443”	21° 27’25.315”
192	86° 00’16.693”	21° 27’24.242”
193	86° 00’00.050”	21° 27’28.800”
194	86° 00’01.022”	21° 28’02.539”

Table 1b: Geo-coordinates of Similipal – Kuldiha Corridor

Sl. No	Longitude	Latitude
1	86°16’48.71”	21°26’35.02”
2	86°15’57.52”	21°26’22.39”
3	86°16’00.74”	21°24’48.91”
4	86°16’32.32”	21°24’31.78”
5	86°16’41.58”	21°23’32.34”
6	86°15’45.92”	21°23’00.06”

7	86°16’03.40”	21°22’46.37”
8	86°17’13.82”	21°22’24.15”
9	86°17’50.76”	21°21’17.56”
10	86°20’04.77”	21°20’11.33”
11	86°21’23.76”	21°19’14.66”
12	86°21’34.64”	21°17’49.11”
13	86°22’53.42”	21°18’11.78”
14	86°23’49.11”	21°18’54.84”
15	86°24’38.64”	21°19’10.09”
16	86°25’07.82”	21°19’41.36”
17	86°26’07.29”	21°20’21.27”
18	86°26’16.71”	21°21’08.38”
19	86°27’29.18”	21°21’48.30”
20	86°29’05.63”	21°22’42.09”
21	86°30’11.70”	21°23’54.42”
22	86°30’55.17”	21°24’29.11”
23	86°30’33.54”	21°24’36.57”
24	86°29’50.22”	21°24’07.27”
25	86°29’27.67”	21°23’35.37”
26	86°28’32.48”	21°23’01.29”
27	86°26’02.84”	21°21’34.66”
28	86°26’05.11”	21°20’41.48”
29	86°23’48.60”	21°19’23.82”
30	86°22’32.84”	21°19’06.24”
31	86°21’52.23”	21°19’14.61”
32	86°21’22.84”	21°19’24.57”
33	86°20’57.90”	21°19’56.74”
34	86°20’48.65”	21°20’32.20”
35	86°19’28.85”	21°21’08.55”
36	86°18’28.37”	21°21’35.80”
37	86°17’40.07”	21°22’18.45”
38	86°17’11.89”	21°23’00.67”
39	86°17’12.91”	21°23’45.34”
40	86°17’06.89”	21°24’33.85”
41	86°16’54.60”	21°26’03.44”

Table 1c: Geo coordinates of Similipal – Badampahar Corridor

Sl. No	Longitude	Latitude
1	86°09'33.82"	22°01'31.81"
2	86°09'20.27"	22°01'18.24"
3	86°09'17.06"	22°01'15.90"
4	86°09'07.62"	22°01'03.89"
5	86°09'06.93"	22°00'56.40"
6	86°09'04.84"	22°00'51.48"
7	86°09'04.78"	22°00'45.63"
8	86°09'05.72"	22°00'42.88"
9	86°09'09.71"	22°00'39.38"
10	86°09'15.25"	22°00'37.86"
11	86°09'26.63"	22°00'32.75"
12	86°09'28.53"	22°00'32.38"
13	86°09'30.14"	22°00'32.86"
14	86°09'33.51"	22°00'37.57"
15	86°09'29.53"	22°00'41.54"
16	86°09'31.68"	22°00'50.42"
17	86°09'32.72"	22°00'58.06"
18	86°09'39.96"	22°01'05.99"
19	86°09'45.26"	22°01'08.16"
20	86°09'49.69"	22°01'07.03"
21	86°09'47.26"	22°01'11.06"
22	86°09'40.30"	22°01'17.65"
23	86°09'37.49"	22°01'25.98"
24	86°09'35.89"	22°01'30.71"

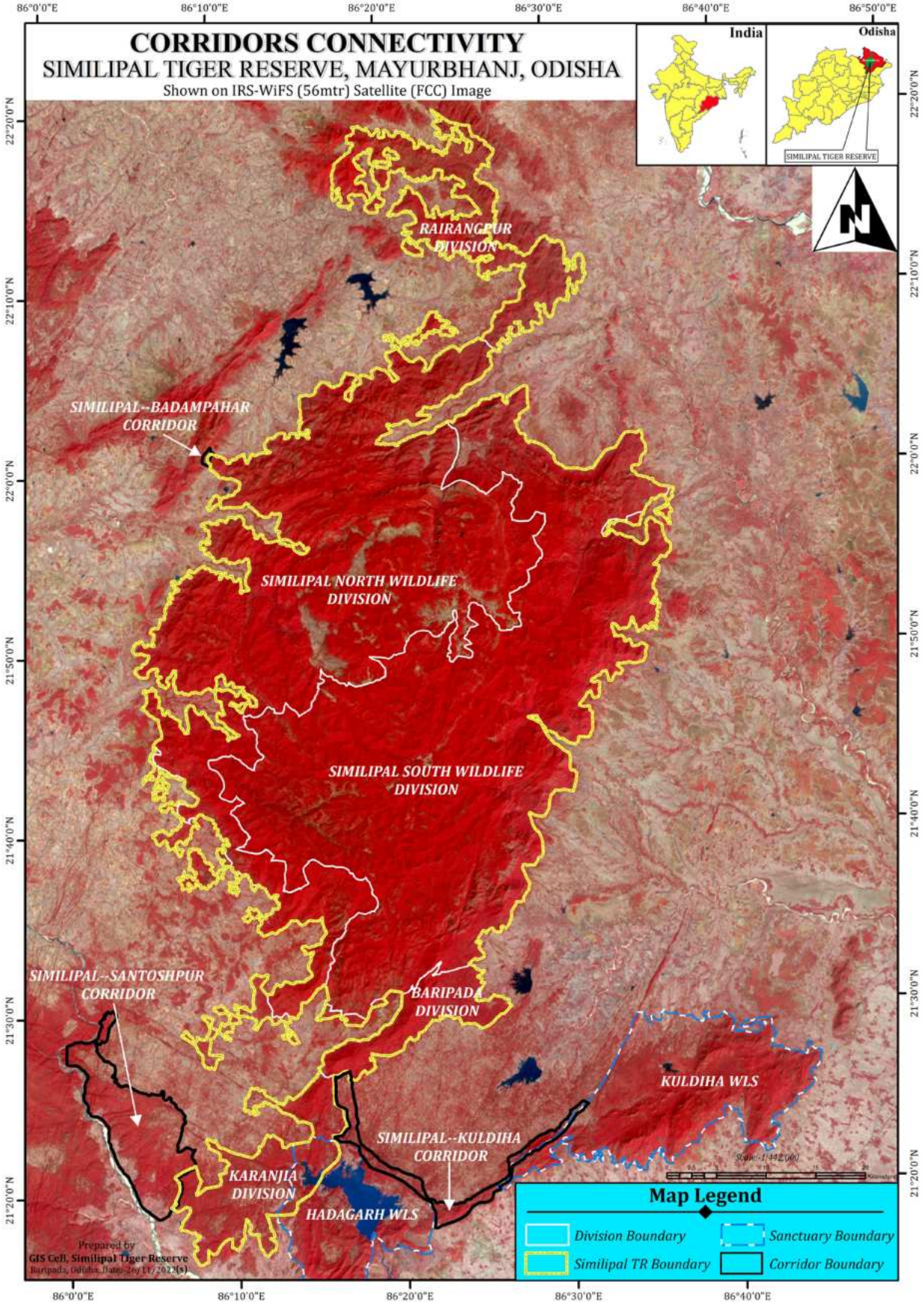
1.1.7 Disturbances in Habitat Corridors (railway lines, cleared transmission line, etc.).

Similipal – Santoshpur Corridor: This was also an earlier migration route between two largest elephant habitats of Odisha i.e., Similipal and Satkosia. The migration route covers the districts like Angul, Dhenkanal, Cuttack and Keonjhar. In course of time, this has fragmented and does not appear to exist at present. At present movement of elephants in this tract has been restricted due to disturbance and fragmentation of corridor as a direct fall out of intensive mining in Sukinda and Daitari areas and industrial development in Talcher and Angul areas. The corridor has also been disturbed due to heavy traffic in NH-215 beyond Santospur RF and Atei RF adjoining Baitarani River and due to major irrigation projects.

Similipal – Kuldiha Corridor : The corridor has been affected by encroachment of land, un-authorized operation of stone quarries and other developmental works causing threat for the survival of the pachyderms. The corridor is also highly disturbed by human activities such as Sal leaf collectors, firewood collectors and cattle graziers.

Similipal – Badampahar Corridor: The corridor is disturbed by the heavy traffic of goods and mining mineral trucks, cars, buses, small utility vehicles (SUV), noisy tractors on the NH No. 49 round the clock and often wild animal mortalities are noticed on the road by the speeding vehicles.

1.2 MAP SHOWING LANDSCAPE BEYOND STR AREA



Map No.1F: Landscape Beyond STR Area.

1.3 MAJOR LAND USE CLASSIFICATION IN THE AREA.

Table 1d: Major Land Use Classification

Major Land use	Area under major land use in Ha.		
	Similipal – Santospur Corridor	Similipal – Kuldiha Corridor	Similipal - Badampahar Corridor
Very dense forest	397.95	191.03	6.38
Moderately dense forest	5742.81	1325.00	70.77
Open forest	1584.99	1497.31	25.40
Water body	396.93	12.21	0.0
Other non-forest/ village area	3224.09	789.82	13.32
Total	8012.32	3815.37	115.87

1.3.1 Reserved Forest/ Proposed Reserve Forests/ Unclassified State Forests (Divisions/ Range/Blocks/ Beats).

Table 1e: Forest Blocks

Name of the Corridor	Forest Divisions	Ranges	Sections	Beats	Forest Blocks
Similipal- Santospur	Keonjhar Wildlife Division	Anandapur	Budhikuda	Budhikuda	Gayalmunda RF Santospur RF
				Taneipal	
			Gayalmunda	Gayalmunda	
				Panasadiha	
Similipal- Kuldiha	Baripada Division	Kaptipada	Sarata	Noto	Sukhuapata Hill Block Kaithagadia Forest
			Sarisua	Sarisua	
				Raipal	
	Balasore Wildlife Division	Soro	Kupari	Balihudi	
				Kupari	
				Kaithagadia	
Similipal-Badampahad	Karanjia	Dudhiani	Dudhiani	Sanjuabani	

1.3.2 Villages/ Towns/ Cities (Districts, Sub-Divisions, Blocks, Panchayats)

Table 1f: Village/Towns/Cities

Name of Corridor	District	Tahasil	Village	Area in Ha	No of Household	Population
Similipal-Santospur	Keonjhar	Anandapur	Ratuan	273.16	114	583
			Taneipal	489.38	216	912
			Budhikud	301	121	539
			Santospur	408	136	621
			Singinali	116.08	49	264
			Dumuria	140.20	306	1340
			Purunapani	381.72	99	392
			Palabani	160	42	201
			Baigundi	265.14	79	404
			PunasiJharana	434.71	209	893
			Badudighara	370.78	86	455
			Rotijhari	243.65	93	392
			Kantala	330	143	569
			Gendabasa	78.3	5	25
			Bhalughara	435	152	610
			Haribeda	104	31	160
Similipal-Kuldiha	Mayurbhanj	Thakurmunda	Noto	987	373	1705
			Garhasahi	222.14	78	323
			Karanjagadia	401.87	86	402
			Barakunria	269.0	116	394
			Tenda	245.33	363	1678
			Suranga	101.03	34	112
Similipal-Badampa-har	Mayurbhanj	Jashipur	Chelligodhuli	178.65	66	288

1.3.3 Quality of Habitat

The vegetation types are same as that of the core area. However, occurrence of dry deciduous forest type is more marked in the north-western edges of the reserve; the percentage of moist deciduous and semi-evergreen forests is correspondingly lower in the adjoining area. The canopy is also more open here with the forests subject to increased biotic pressure mainly illicit felling and grazing. In the Badampahad corridor, Sal is the predominant species whereas Kuldiha- Similipal corridor is facing huge biotic pressure from the nearby villagers as a result the forest has become open and scrub land. However, the clear-felled trees have signs of regeneration of Sal, Jamun, *Hollarrhena*, *Butea* etc and if protected can turn in to dense forest.

1.4 STATEMENT OF SIGNIFICANCE (NOT COVERED UNDER 1.1 ABOVE).

All the corridors are very important area for wild animal migration which needs to be protected from further degradation by human interferences. Tigers, Elephants, Leopards, Sloth Bear and big herbivores such as Mouse deer, Chitals and Boar are often found in these areas and are believed to be using the corridors. These are potential dispersal routes for the animals mentioned above.

1.5 GEOLOGICAL ATTRIBUTES AND HYDROLOGY.

The water resources in the adjoining areas of the Tiger reserve is very rich with perennial water sources in the form of Nullahs, tributaries of the rivers i.e. Budhabalanga, Salandi and Baitarani. These flow through the districts of Mayurbhanj, Balasore, Keonjhar and Bhadrak and serve as life-lines for the districts and finally winds their way to the Bay of Bengal. The other tributaries are Palpala, East Deo, West Deo, Khairi, Tel, Sanjo, Bherol etc. along with many rivulets and nullahs most of which are perennial. An analysis of water availability in the area has shown that more than 50% of the streams carry water during the driest period of the year although the rest get totally dry.

1.6 VEGETATION TYPES:

The forests of Similipal – Santospur corridor are mainly dense Sal Forest, open Sal Forest, dense mixed forests and degraded/scrub forest. The slope percentage of this route varies from gentle sloping (3-5%) to strongly sloping (10-15%). In the Badampahad corridor, the Sal forms 50% to 90% of the standing crop. Quality of sal being 'IV' on the steep drier aspects and 'II' on gentler slopes with deep soil and cooler aspects. Quality-I Sal occurs in small pockets under good soil and climatic conditions. In Similipal – Kuldiha corridor, the forest type pertaining to Reserve Forest i.e., Notto is confined to good quality of Sal. Main associates of Sal are Piasal, Sisoo, Bandhan, Asan, Dhaura, Kuruma, Kusum, Jamu, Mai etc. The proportion of Rai, Mai & Sidha increases on sloppy area where moisture content decreases. The canopy density varies from 0.4 to 0.6 due to heavy biotic interference. The regeneration is adequate throughout the area and profuse mostly in valleys. The Medicinal shrubs like, *Banahaldi, Patalagaruda, Asoka, Amla* etc. are available sporadically. Some Sal indicators plants like, *Flemingia, Combretum, Karada* etc are found in these areas. This Reserve Forest comes under selection working circle. The forest type pertaining to area other than reserve forest, the vegetation is bushy in nature having sporadic distribution of mother trees like Sal, *Kusum, Mahul, Dhaura, Asan, Char, Kaim* etc. The forest which is found in a bushy form are miscellaneous in nature having preponderance of *Chara, Asan, Dhaura, Karada, Mahula, Jamu, Atundi, Muturi, Siali* and intrusion of weeds species like Eupatorium & Lantana are found in patches and also some phoenix species are available.

The various forest types met with in this landscape is given below.

- Northern Tropical Semi-Evergreen Forests. (Type: 2b/c3): The species found under this forest type depending upon the soil and micro climatic conditions are as follows: -
    - On Stream Beds: *Salix tetrasperma, Trewia nudiflora, Macaranga peltata, Aphanamixis polystachya, Symplocos laurina, Glochidion spp., Bischofia javanica, Syzygium cumini, Pongamia pinnata, Diospyros peregrina, Saraca indica* and at places *Terminalia arjuna.*
    - Damp Areas: *Bombax ceiba, Alstonia scholaris, Ficus spp., Polyalthia cerasioides, Anthocephalus cadamba, Dillenia pentagyna, Litsea spp., and Citrus spp*. are met with.
- Northern Tropical Moist Deciduous Forests (Type: 3C/C2e): The common species of trees found in this type of forests are *Terminalia sp., Pterocarpus marsupium, Anogeissus latifolia, Schleichera oleosa, Adina cardifolia, Toona ciliata (rare), Michelia champaca, Mangifera indica, Bombax ceiba, Careya arborea, Dillenia pentagyna, Gmelina aroborea, Garuga pinnata, Lannea coromandelica, Syzygium cumini, Ougeinia dalbergioides, Xylia xylocarpa, Kydia calycina, Lagerstroemia parviflora, Bridelia retusa, Mitragyna parvifolia, Trema orientalis, Emblica officinalis, Zizyphus spp., Cassia fistula, Buchanania lanzan, Sterculia villosa, Miliusa velutina, Helicteres isora, Indigofera pulchella, Croton*

oblongifolius, Colebrookia oppositifolia, Flemingia chappar, Strobilanthes spp., Wendlandia exserta, Imperata cylindrica, Themeda caudata, Cymbopogon martini, Eulaliopsis binata, Thysanolaena maxima, Curcuma aromatica, Bauhinia vahlii, Millettia auriculata, Smilax macrophylla, Combretum decandrum, Disocorea spp., Asparagus racemosus. Ferns and orchids are found in moist places. *Ferns- Adiantum spp., Doryopteris spp., Cyathea gigantean, Spinulosa spp., Cyclosorus spp. and Holtt Tree Fern.*

- Dry Deciduous Hill Forests (Type: 5B/C1c and 3C/C3): It is spread in the southern Similipal corridors with steep and exposed slopes; this type of forest has sal as major species covering up to 30% of the crop. Other associates are *Anogeissus latifolia, Sterculia urens, Boswellia serrata, Dalbergia latifolia, Cleistanthus collinus, Gardenia gummifera, G. latifolia, G. turgide, Erythrina suberosa, Cochlospermum gossypium, Helicteres isora, Nyctanthes arbortristis* with an abundance of herbs, shrubs and grasses as ground cover.

- Grass Land and Savannah. (Type: 3C/DS-I): The grasslands found in corridor are in small patches especially along nallah banks. The species are- *Apluda mutica, Arundo donax, Eragrostis atrovirens, Phragmitis karka, Sporobolus indicus, Sacciolepsis indica.*

1.7 WILD FAUNA AND HABITATS.

Many wild animals including some endangered ones like tiger, panther, elephant, gaur and four horned antelope etc. are found in different levels of abundance. Ratel, pangolin, giant squirrel, flying squirrel, sambar and chital are among the other few worth mentioning. The presence of the big cats in the corridors is reported from time to time.

1.8 MAJOR CHANGES IN THE LANDSCAPES (SETTLEMENTS / OTHER INFRASTRUCTURE).

There is no major change reported in the recent past except widening of National Highway 49 at the Badampahar- Similipal corridor about 20 years before. The number of heavy vehicles plying in this road has increased many folds since then. The human settlements were there but the human and cattle population have increased significantly leading to thinning of the forest patches.

1.9 ADMINISTRATION AND ORGANIZATION.

The administrative set up of the corridors (Divisions, Ranges, Sections & Beats) have been shown in Para 1.3.1. The Similipal- Kuldiha and Similipal – Badampahar corridors are coming under territorial jurisdiction of Baripada Circle under administrative control of Field Director, Similipal Tiger Reserve-cum-Regional Chief Conservator of Forests, Baripada. The territorial jurisdiction of Similipal – Santospur corridor of Keonjhar Wildlife Division is lying in Rourkela Circle under administrative control of Regional chief Conservator of Forests, Rourkela. A proposal has been submitted to Government for bringing the Keonjhar Wildlife Division under administrative control of Baripada Circle since important areas of the Division including the Hadgarh Sanctuary is lying in the Similipal landscape.

CHAPTER 2
STATUS OF TIGERS AND CO-PREDATORS

CHAPTER

02

STATUS OF TIGER AND CO-PREDATORS

2.1 DISTRIBUTION AND ABUNDANCE STATUS WITH TYPE OF USE BY THE TIGER AND CO-PREDATORS.

Presence of tiger has not been reported in the tiger sign surveys in the recent past. But cases of cattle kill are being reported in Satkosia RF of Karanjia Division and Santospur RF and Hadgarh Sanctuary of Keonjhar WL Division which shows presence of tiger in the area and using the corridor. It is also believed that tigers were using these corridors on previous occasions to migrate from Similipal to other potential areas like Kuldiha Sanctuary located in the eastern part in the neighbouring district i.e., Balasore, Satkosia Tiger Reserve in Angul and Dalma sanctuary of neighbouring Jharkhand state. Similipal is the source of largest breeding tigers in eastern ghat. Thus, these corridors provide a potential dispersal route to tigers and other co- predators in future if proper protection measures are taken, hence the significance.

2.2 PREY-PREDATOR RELATIONSHIPS

The available prey base in the adjoining buffer areas is much less when compared to the core area. Large prey favoured by the Tiger, like Sambar remains confined to a few pockets on the hill side. However, Boar & Langur are distributed widely. Low prey base in the corridor is leading to cattle lifting by tiger.

2.3 PHASE IV TIGER MONITORING IN CORRIDOR AREA

During 2013, 17 permanent line transects was laid in Satkosia- Santospur Corridor and 14 permanent transects laid in Similipal- Kuldiha Corridor. Relative abundance of prey animal and carnivore signs was collected in both the corridor areas in November 2013 as per Phase IV tiger monitoring protocol.

2.3.1 Satkosia- Santoshpur Corridor:

Carnivore Signs

Satkosia- Santospur Corridor area is representing total four beats. Tiger and their co-predator sign survey was conducted in this potential area. Total 42 carnivore signs was observed in four beats (n = 60 km) in 15 km surveyed in each beat. The sign encounter rate (ER) is 0.7/Km of the area. Major carnivore signs including Sloth bear, Hyena, Jackal and Fox. Sloth bear sign was maximum in the area. Tiger and leopard sign was not observed during the survey.

Prey abundance (Density)

Prey abundance was estimated through distance line transect method and distance 6.0 software was used. Prey animal sighted along the transect line including Barking deer, Chital, Wild pig, Langur, Rhesus and Hare. Total prey observation was carried out n = 64, in an effort of 102 km by monitoring 17 line transects of 2 km length during the month of November 2013 covering Satkosia - Santospur Corridor to estimate the density of major prey species for tigers and co-predators. However, individual prey sighting was poor and therefore

cumulative sighting of all prey species were taken into account. Overall or average prey abundance was estimated to be 15.9±2.3 per km^2 (Table 1).

Table 1 Overall density estimate of key prey species for Satkosia- Santoshpur Corridor

Prey	Density ± SE (Km^2)	Effective Strip Width (ESW)	Model Selection
Average prey	15.9 ± 2.3	23.9 ± 1.8	Uniform/Polynomial

2.3.2 Similipal- Kuldiha Corridor:

Carnivore Signs

Similipal- Kuldiha Corridor area is representing total 6 beats. Tiger and their co-predator sign survey was conducted in this area. Total 27 carnivore signs were observed in six beats (n = 90 km) in 15 km surveyed in each beat. The sign encounter rate (ER) is 0.3/Km for the area. Major carnivores included Leopard, Wolf, Sloth bear, Hyena and Jackal. Sloth bear sign was maximum in the area. Tiger sign was not observed during the survey in the corridor. Only one leopard sign was observed.

Prey abundance (Density)

Prey abundance was estimated through distance line transects method and distance 6.0 software was used. Prey animal sighted along the transect line including 12 numbers of Cattle, 3 numbers of Wild pig and 9 Langurs. Total prey observation were carried out n = 24, in an effort of 84 km by monitoring 14 line transects of 2 km length during the month of November 2013, covering Similipal- Kuldiha Corridor to estimate the density of major prey species for tigers and co-predators. The sighting record was nil in all transect lines in corridor area except one transect in Sarat and two transect lines laid in Sarisua section of Kaptipada range. Therefore, prey density estimation was not possible due to low intensity of sighting.

2.4 ASSESSMENT OF THREATS.

- Subsistence hunting of wild animals by the local tribes.
- Poaching for the purpose of selling of meat is occasional and confined to the forest fringes.
- Targeted poaching for ivory by people coming from outside, with the help of local people.
- Gradual loss of habitat by way of illicit felling of trees
- Grazing of huge flock of cattle inside the forests
- The incidence of fire during summer
- Growing human-wildlife conflicts
- Loss of connectivity due to development projects
- Quarrying of stones in the areas adjoining the corridors

***The updation of Chapter 2 of Corridor Plan of STR is under progress and awaiting for AITE 2022 Report.**

CHAPTER 3
LANDUSE PATTERN CONSERVATION AND MANAGEMENT ISSUES

CHAPTER

03

LAND USE PATTERNS AND CONSERVATION-MANAGEMENT ISSUES

3.1 SOCIO-ECONOMIC PROFILE OF VILLAGES AND RESOURCE DEPENDENCY AND HUMAN-WILDLIFE MUTUAL IMPACTS.

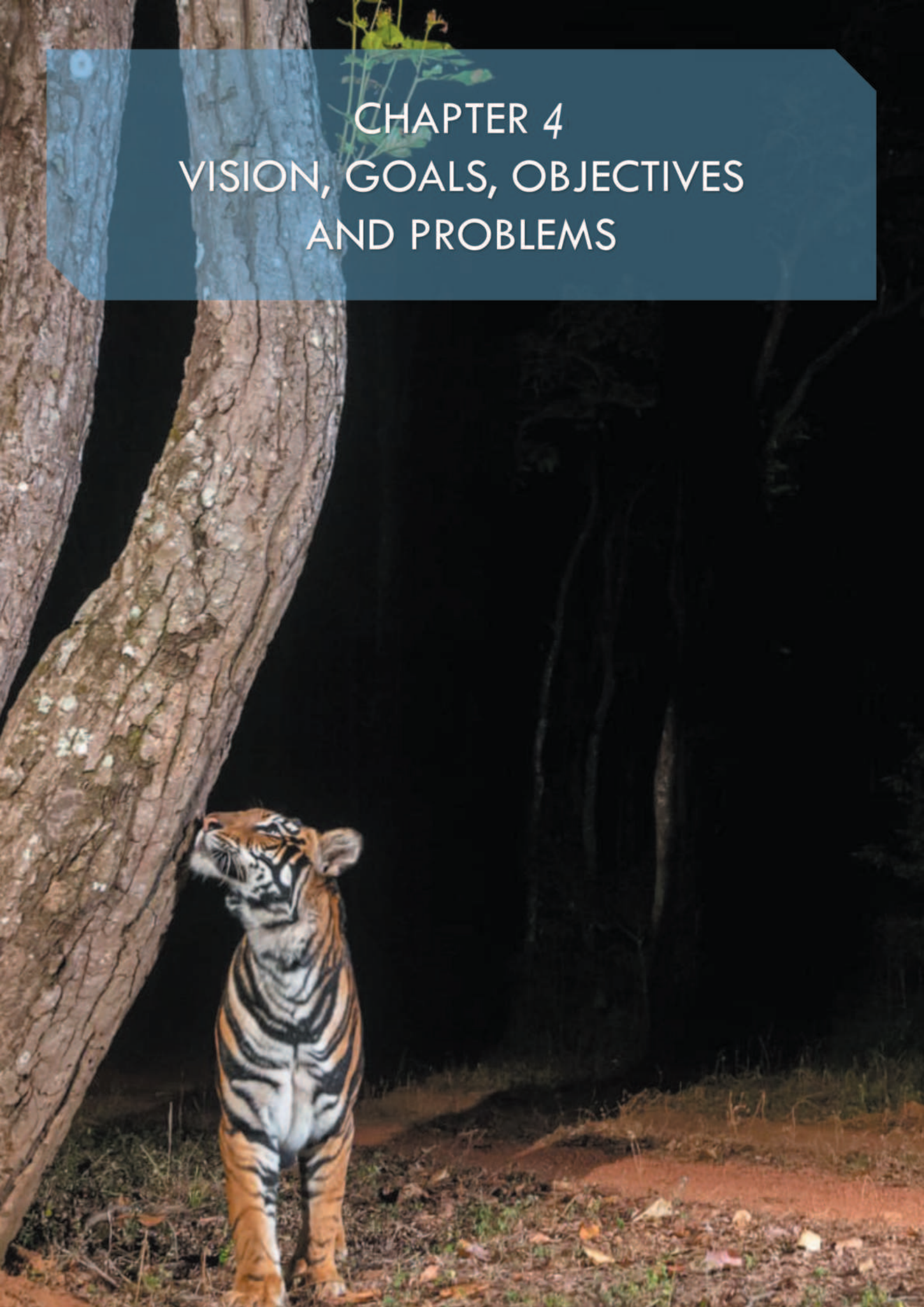
There are 23 villages lying in the three corridors of Similipal. More than 70% of the population are tribal. There is no major industry in the adjoining area of Similipal. The villagers are dependent mostly on rain fed agriculture and on the forest for timber, firewood, cattle grazing and NTFP collection. There are a number of villages adjoining the corridor areas that also put a pressure on forest resources of the corridors. In Similipal – Kuldiha corridor a substantial population are engaged as labourers in a number of stone quarries running in adjoining areas.

3.2 ASSESSMENTS OF INPUTS OF LINE AGENCIES/ OTHER DEPARTMENTS.

The line departments such as Revenue, Irrigation, Rural Development., Horticulture, Agriculture and Soil-conservation department have been working in these areas. Morrum roads are maintained by RD department, cement concrete road in villages constructed by Panchayats with the help of local BDOs, backyard plantation has been taken up by Horticulture department in which hybrid mango, guava, papaya etc. have been provided to villagers. Agriculture department has provided good quality paddy seeds, fertilizer and insecticides. Soil conservation department have made landscape levelling of the high gradient and hilly lands in the corridor areas.

PART B

THE PROPOSED MANAGEMENT



CHAPTER *4*
VISION, GOALS, OBJECTIVES AND PROBLEMS

CHAPTER

04

VISIONS, GOALS, OBJECTIVES AND PROBLEMS

The National Wildlife Action Plan for 2017-2031 has reiterated the need to identify and preserve wildlife corridors. It has been proposed that all wildlife corridors be given the status of 'ecologically sensitive areas' under the provisions of the Environmental (Protection) Act, 1986.

The historical demography of tigers provides strong evidence that a population doubling is possible in the context of large landscapes where habitat connectivity allows for tiger ecology to persist. Tigers can disperse over 100 km from their natal areas to establish territories, and immigration across the landscape of contiguous, suitable habitat likely played a large role in population recovery (Sunquist et al. 1999). However, tigers are reluctant to cross more than a few kilometres of unsuitable land cover (Smith 1993). Without connectivity, tiger populations might not have rebounded in the hunted areas. Below we provide evidence from recent events to indicate how habitat connectivity contributes to population recovery and persistence. The extirpation of tigers from Sariska and Panna, two of India's premier tiger reserves, in 2005 and 2009, respectively (Gopal et al. 2010), is evidence of how the lack of connectivity can preclude tiger population recovery and re-colonization. Because neither is connected to other reserves through habitat corridors, the government had to transport tigers by helicopter to attempt to re-establish populations in these reserves.

India with its population of about 25,000 wild elephants enables us to enjoy such sights even now in many of our protected areas. Yet, degradation, characterised by an abundance of unpalatable species, fragmentation and shrinkage of forest cover to accommodate an ever-increasing human population (1.1 billion now) and associated developmental activities, pose great threats to a wide range of species, including the tiger and the elephant.

The population of elephant at the tri-junction of three northern districts of Odisha (Mayurbhanj, Balasore and Keonjhar), which has the luxury of living in a large interconnected landscape (Similipal, Kuldiha and Hadgarh) is more than one fourth of elephant population in Odisha, and therefore this landscape, which also has significant populations of other charismatic species such as the tiger and the gaur, warrants the best possible protection and management.

4.1 VISION:

With the above background, the vision statement for corridors of Similipal Tiger Reserve will be:

"A commitment to nurture Similipal and surrounding Landscape into a Conservation Unit and priority given to protect and manage the corridor area, where wildlife representing entire pyramid of life can happily dwell and co-exist in viable populations, without fear of man, preserving eco-systems, ecological services and the processes, with people benefiting out of the interactions in the present and future generations and making a safe passage of dispersing wildlife."

4.2 MANAGEMENT GOALS:

The management goals for the adjoining Zone of Similipal Tiger Reserve are to;

a. Address Long term conservation of the natural resources, specifically wildlife, of Similipal and nearby protected area and reserve forests consistent with the national policies and directives.

b. Eliminate the biotic influences deleterious to the eco-system and the existing bio-diversity.

c. Enhance the livelihood status of local people and reduce their dependency on the viable landscape.

d. Create the quintessence of conservation awareness amongst a range of stakeholders.

4.3 MANAGEMENT OBJECTIVES:

With the vision and goals stated above, long term objectives are set forth as under:-

- Protection and conservation of the flora and fauna with special reference to the Tiger and its co-predators and their corridors.
- To reduce man- wildlife conflicts.
- Convergence of production sectors for wildlife conservation.
- To enhance the efficiency to work of the local people by educating them and providing health care benefits to the human being as well as cattle.
- To augment the propensity of the people to accept various poverty alleviation programmes taken up by other Agencies by associating the NGOs and engagement of local youth on forest protection measures.
- To facilitate safe movements of tigers and its' co-predators and their prey base in the corridor area.

4.4 PROBLEMS IN ACHIEVING OBJECTIVES:

Objective-Protection and conservation of the flora and fauna with special reference to the Tiger and its co-predators and their corridors.

Problems:

i. Human settlements are very close to the corridors and highly populated and Forests dependency is very high

ii. Stone quarries, and mining activity are existing.

iii. Similipal-Badampahar corridor is intersected by National Highway having heavy traffic round the clock.

To reduce man- wildlife conflicts.

Problem:

i. Crop fields are very close to the corridors. Paddy, Ragi, Maize are usually grown by the villagers, which attract the wildlife such as Chital, Sambar, Elephants, the resultant damage creates man- wildlife conflicts.

ii. Lack of adequate funds for compassionate grants.

iii. Tribal locals are poor and often hunt the herbivores to supplement their protein requirements by killing the wildlife coming to their crop field.

Convergence of production sectors for wildlife conservation.

Problems:

i. Lack of co-ordination among the line departments and other production sectors.

ii. Insufficient database of the developmental activities by various production sectors.

iii. Lack of common forum where an integrated action plan can be made by the line departments.

To enhance the efficiency of the local people by imparting education, awareness and various livelihood training.

Problems:

i) Illiteracy, backwardness and poor socio-economic conditions of the local villagers

ii) Lack of alternative livelihood options

iii) Lack of proper communication facility.

To augment the propensity of the people to accept various poverty alleviation programmes taken up by other Agencies by associating the NGOs and engagement of local youth on forest protection measures.

Problem:

People are less ambitious

Availability of work in illegal stone/metal chip quarries

ii) Lack of efforts by local NGOs.

To facilitate safe movements of tigers and its' co-predators and their prey base.

Problems:

i) Large populated human settlements found close proximity to the corridors.

ii) More biotic interference such as firewood collection, cattle grazing, Sal leaf collection in corridor area

iii) Large number of metal chips quarries makes the corridors noisy, crowded

and disturbed for the wildlife.

4.5 STRENGTHS-WEAKNESSES-OPPORTUNITIES-LIMITATIONS (SWOT) ANALYSES:

Strengths

- Extensive largely intact forests rich in biodiversity and forestry resources,
- Suitable for the tigers and co-predators for their migration to other areas like Kuldiha sanctuary, Saranda forests, Satkosia TR and Dalma sanctuary.
- Length of the corridors is more and dense enough to provide shelter to the migrating wildlife.
- Largest breeding population of tigers in Similipal

Weakness

- Extremely backward and poor socio-economic conditions of the people.
- High and Increasing population of the adjoining villages with high dependence on forests
- High population of unproductive cattle and livestock.
- Increasing man-wildlife conflicts
- Existing quarries and mining activities

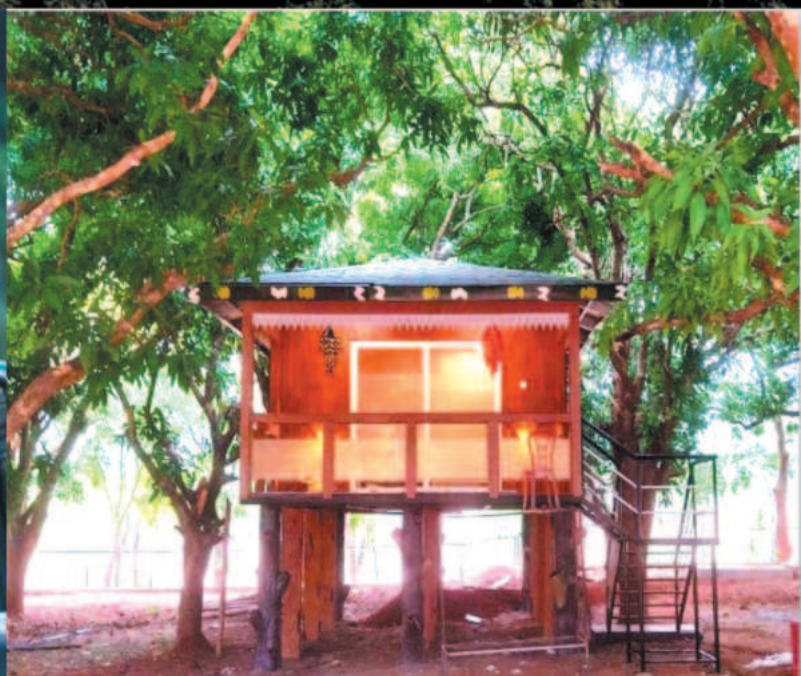
Opportunities

- To work out a model multi-pronged strategy for rural development based on agro-horticulture.
- To develop a sustainable model of NTFP harvesting & marketing.
- To develop an Education centre for awareness of villagers and nature lovers.

Limitations

- Very low levels of literacy and complacent tribal population with limited aspirations.
- Busy and crowded National High Way passes through Badampahar corridor.
- Inhospitable terrain, climate and endemic malaria-prone area.
- Very poor socio-economic condition of local residents.
- Conflict of interest in an underdeveloped district with a few mining /quarry activity deploying many local people but destructive to wildlife.
- Restocking of forest in stone quarry and mining areas is difficult.

CHAPTER 5
MANAGEMENT STATEGIES



CHAPTER

05

MANAGEMENT STRATEGIES

5.1 DELINEATION OF CORRIDORS AND OTHER HABITAT USED BY TIGERS AND CO-PREDATORS.

The corridor area is divided into the following zones

1. Traditional Use & Forestry Zone (TUZ)
2. Eco-development Zone
3. Eco-education Zone
4. Biodiversity Conservation Zone
5. Eco sensitive Zone

Traditional Use and Forestry Zone (TUZ) Zone

The TUZ is the area within revenue forests that connects Similipal with Kuldiha and Similipal with Badampahar R.F. It also includes the Gayalmunda RF and Santospur RF in the Similipal – Santospur corridor. The adjoining area of the Similipal Tiger Reserve will be considered as Forestry zone spreading over entire corridors where plantation of native species and fruit bearing species, wild banana, palatable grasses, soil and moisture conservation measures will be taken up in the Blank/ open areas.

Strategies

The plan prescribes the improvement of habitat by adopting the following measures.

- As the name suggests, traditional use of the adjoining villages need to be permitted which means regulated livestock grazing is allowed, and collection of NTFPs and firewood is permitted for the bonafide use of adjoining villages.
- Resource use regulations *prima facie* need to be tied to wildlife habitat needs and regulated through VSS.
- Fire needs to be prevented by involving the people.
- Grazing area to be earmarked.
- The boundary is to be surveyed, demarcated and mapped and fresh proposal to be submitted to declare the forest as Reserve Forest under Orissa Forest Act, 1972.
- Enrichment planting of favorable species of wildlife in blank patches. Planting of grasses at suitable places.

- Encouragement of undergrowth, middle storey and ground flora in the Forest.
- Fruit bearing trees like Harida *(Terminalia chebula)*, Bahada *(Terminalia bellirica)*, Amla *(Phyllanthus emblica)*, *Ziziphus* species, *Ficus* species will not be felled.
- Soil and water conservation measures will be taken up.
- The forest blocks which are covered under working plans have been Included under improvement working circle and rehabilitation working circle where there is no prescription for tree felling by making annual coupes. Hence there would not be situation of canopy opening by intense forestry practice.

SCOPE OF MANAGERIAL INTERVENTIONS

i. Providing ecologically sustainable livelihood options to local people in collaboration with various sectors/organizations.

ii. Incentivizing local people for protecting forests and wildlife (PES, Ecotourism).

iii. Ensuring retrofitting measures in sectors of development with reciprocal commitments.

iv. Ensuring active management in areas where tiger / Co-predators / wild ungulates co-occur with people to minimize human-wildlife interface conflicts.

v. Ensuring monitoring of tiger / wildlife on a periodic basis in standardized manner, amenable to scientific inference.

vi. Ensuring surveillance and protection of tiger and wildlife.

vii. Building up the capacity of field staff and local people as a part of an adaptive management to ensure effective implementation.

viii. In case the buffer comprises of protected area then managerial interventions should be inconformity with the provisions of the Wildlife (Protection) Act, 1972.

Forestry

- Ecosystem management required
- Ecological availability of a tree should be ascertained before removal
- A tree should be considered ecologically available if

  (a) Its removal does not create a gap beyond 43 to 45%.

  (b) The regeneration of species at various formation levels within a radial distance of twice the crown radius of the tree being selected for felling should have an 'established' status.

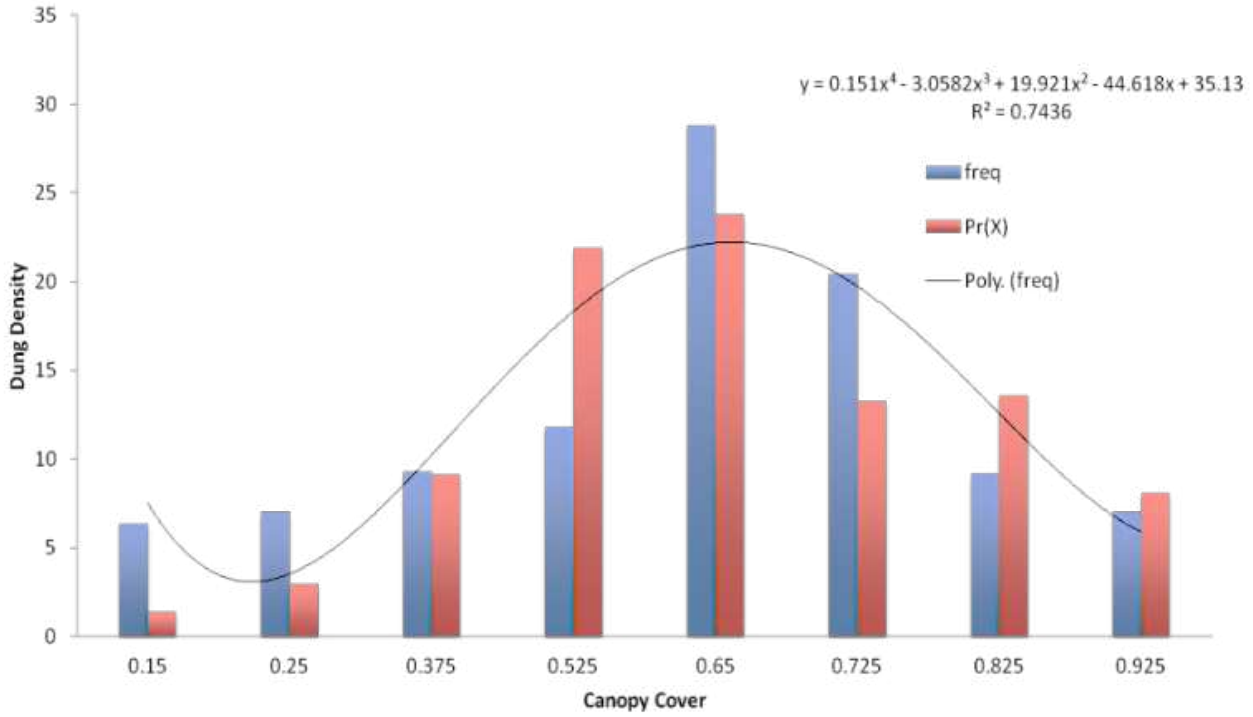
Tree fellings / Thinnings

- No clear felling and other silvicultural systems promoting concentrated regeneration
- No conversion to uniform forests
- A high forest system with diffused regeneration should be preferred
- Status of regeneration should be an over arching consideration to permit felling
- Areas having considerable disturbance should not be felled

Tree fellings / Thinnings

Table No.5a: Canopy class and wild dung presence

Mid-Value	Wild dung	SE	Freq.
0.15	10.52	0.79	6
0.25	11.68	0.71	7
0.375	15.46	1.08	9
0.525	19.56	2.75	12
0.65	47.86	19.30	29
0.725	33.92	14.03	20
0.825	15.22	7.21	9
0.925	11.72		7



- After due consideration to regeneration/status, the relationship between canopy class and wild ungulate dung presence should be used as a guide to prescribe the stem removal
- Buffer / corridor areas should be managed for wild ungulates at a level which is 30% lower than the optimal levels in core areas
- In general, the relationship between mean ungulate density and canopy class intervals in a Sal / tree dominated forests, with polynomial curve fitting shows that the 80% lower bound corresponds to a canopy cover of 43% (computed for sal forests of Central India; similar relationships need to be developed for other forest types to facilitate inference)

- Thus, for Sal forests of Central India, the timber harvest in the buffer / corridor area may be permitted in a selective manner so that the canopy cover does not fall below 43% during winter months. This strategy will minimize tiger-human conflict while permitting selective extraction of timber species
- More openings will permit lighter while fostering more regeneration thereby attracting wild ungulates and tigers
- The idea behind buffer / corridor management is to sustain it for gene flow, while not elevating its status to that of core area in terms of wildlife abundance

Collection of NTFP

- NTFP collection should not be permitted in areas with maximum disturbance and unestablished regeneration status, as this would adversely affect the demography of such species.
- The regeneration status of NTFP species in the buffer / corridor area should be compared with its status in the core / critical habitat.
- Collection should not be permitted in areas having endangered arboreal fauna.
- No lopping / felling should be permitted during NTFP collection.
- Collection should not disturb 'canopy bridges' in an area.
- The timings for NTFP collection should be regulated while avoiding early morning or late evening.
- The patterns of NTFP collection should be studied for prescribing ecologically permissible collection.
- The quantum of NTFP collected in an area should be regulated, considering its consumption by wild animals.
- An estimation of the availability of NTFP (fruit / tuber / leaf) should be done (example: for total fruit crop estimation, considering several categories of branches and the number of fruits per branch etc.).
- Fire should not be used to promote new flush of leaves (usually done for Tendu), as this would lead to forest fire.
- Fruit removal affects frugivory, hence fruit tree should be fostered.
- The density of NTFP species in the buffer / corridor area should be compared with their densities in the core / critical tiger habitat. In low density areas such NTFP species should not be permitted for extraction.
- A chart depicting NTFPs collected in various areas within the division over months during a year should be prepared for close monitoring.
- Different parts of a tree / plant / shrub / herb are harvested as NTFP and many of them are valuable as medicinal plants. To avoid overexploitation, it is important to prescribe site specific indicators for their ecologically sustainable management, vis-à-vis the regeneration status.
- The nursery techniques of NTFP species (especially those having medicinal value) should be fostered through the community linked to incentives for growing subspecies.
- Regulation through PES (Payment for Ecosystem Services)

Collection of NTFP

Table 5b: Indicators to avoid over exploitation of NTFP

NTPF part harvested	Indicators
Fuel wood	Regeneration status Intensity of girdling/cutting of young trees (number of stumps per unit area) Change in the rate of extraction Quantum of dead/fallen twig branches on forest floor
Leaves	Reduction in canopy cover Reduction in leaf litter Regeneration status Weed invasion Change in species composition
Fruit/flower/seed	Regeneration status Annual productivity per sample tree vis-à-vis the productivity in core/critical tiger habitat Method of harvesting Season of harvesting vis-à-vis requirements of wild animals (fruit/flower/seeds act as 'qualifiers' in a habitat, and their total harvesting would reduce such welfare factors)
Bark	Girdling Tree mortality Regeneration status Number of dead stems per unit area
Rhizome	Regeneration status

Fuel / fodder collection

a. Grazing should be regulated in a rotational manner, and prophylactic immunization should be done for village livestock.

b. Since the unrecorded removal from forest exceeds the recorded removal in many States, fuel / fodder collection should not be permitted in disturbed areas or compartments with poor regeneration status. Such areas should be prescribed a 'recovery' period before reopening them for fuel / fodder collection.

c. A 'safe lopping index', based on site specific studies should be prescribed for fodder removal on a rotational basis.

2. Eco-development zone

There are 23 villages within this zone. An area of 1.2 km^2 of the forest from the total area of the TUZ has been earmarked to the adjoining villages for bonafide use of the people. An Eco-development officer will be engaged on a contractual basis to co-ordinate and plan all eco-development activities.

Strategies.

1. Village level micro planning for benefits to local people on a quid-pro-quo basis (involving VFC/EDC)

2. Innovative use of JFM/ recycling of tourism gate receipts to Ecodevelopment Committees

3. Benefits from district level developmental works (convergence), inter-alia, covering

(i) Public health and family welfare

(ii) Food and nutrition security

(iii) Education

(iv) Natural resource management and water security

(v) sanitation

(vi) Roads

(vii) Energy

(viii) Housing, and

(ix) Livelihoods

- Eco-developmental activities like construction of check dam in adjoining area for the benefit of both animal and people need to be permitted.
- Resource use regulations *prima facie* need to be tied to wildlife habitat needs.
- Entry into the TUZ is to be regulated by providing identity cards to the villagers of the adjoining villagers.
- Fire needs to be prevented by involving the people of the adjoining villages.
- Compartment or part of the compartment needs to be earmarked for villagers for the grazing of their cattle.

3 Eco-education Zone

Similipal Tiger Reserve draws the attention of nature lovers, wild lifers and conservationists for its rich and diverse flora, fauna and splendid natural beauty. The Sanctuary remains open to visitors tentatively from 1st November to 15th June. Ideal season of visit is from November to February. Arrival of tourists reaches peak during December and January. Camping facilities in Eco cottages have been developed in the periphery along the bank of the river Khairi-Bhandan at Ramatirtha, Lulung and Deokund for groups coming to picnic. These tourists require to be educated by making a corridor interpretation centre and a corridor view watch tower require to be constructed at a suitable point to educate the tourists.

Biodiversity Conservation Zone

The Biodiversity Conservation Zone is meant to identify, prioritise and conserve areas/patches rich in biodiversity within the corridor area. They can be any of the following

a. A patch of forest rich in overall floral diversity

b. A patch of forest rich in indigenous cultivars, medicinal plants

c. A patch of forests rich in interesting plant groups like orchids

d. A patch of forests, which supports special habitats/ microhabitats like dens, cliffs, overhangs etc

e. Various known corridors (vegetal/non-vegetal), forest patches linking to other divisions e.g., Riverine patches, nalla beds, unique habitat features, gullies etc.

The special habitats will be demarcated, conserved by engagement of special watchers, installation of barriers in routes, signages at each human entry point with Do's and dont's. Regular monitoring of the site will be taken up to assess habitat condition, use by animals etc.

4. Eco-sensitive Zone:

The draft notification of ESZ around Similipal Tiger Reserve and Hadgarh WL Sanctuary was published vide notification no. 392 Dt. 29.01.2019. Later a fresh proposal for the same has been submitted to the Central Government for approval vide State Government on 11.10.2021. The proposed ESZ covers an area of 1411.81 km^2 with an extent ranging from 1 to 5 km from the boundary of Similipal WLS. The draft notification is given in Annexure LXIII. The ESZ after final notification shall be managed as per rules, based on the zonal master plan prepared for the same. ESZ covers the portions of Zone of Influence and Buffer areas of STR including Satakosia RF, Notto RF, Bidubhandar PF, Tungru RF, Kanpat RF, Mahubhandar RF.

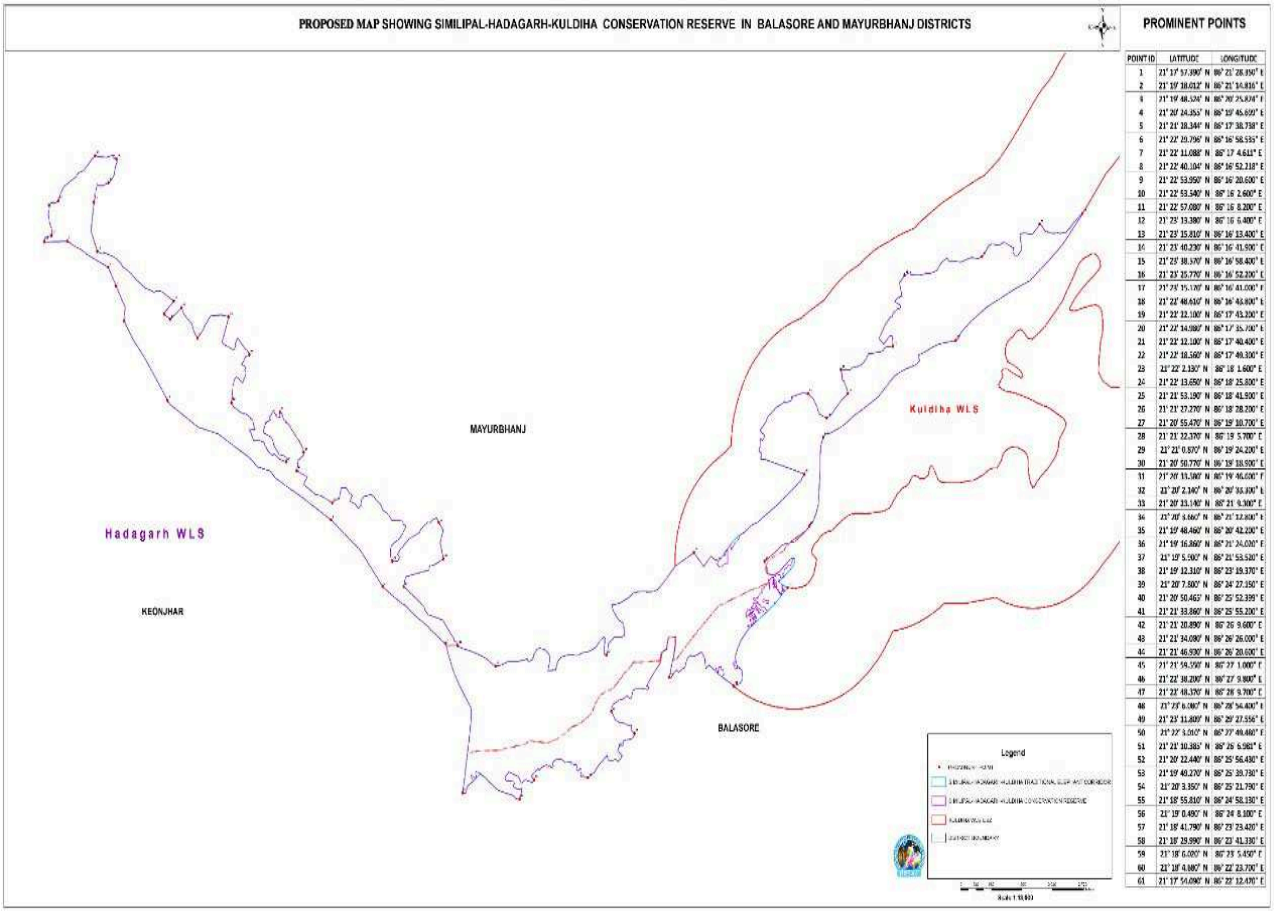
5.2 DECLARATION OF SIMILIPAL-HADGARH-KULDIHA TRADITIONAL ELEPHANT CORRIDOR AS CONSERVATION RESERVE:

The Similipal-Hadgarh-Kuldiha Traditional Elephant Corridor is proposed to be declared as Conservation Reserve as per the direction under section 36 (A) of Wildlife Protection Act, 1972. The proposed Reserve is having area in both Mayurbhanj and Balasore District that connects 3 important PAs of North Odisha such as Similipal WL Sanctuary (part of Similipal Tiger Reserve), Hadgarh WL Sanctuary and Kuldiha WL Sanctuary. The area is having government land with kissam forest which is traditionally used by elephants. The proposal is under pipeline for declaration as a Conservation Reserve that will be the first ever Conservation Reserve in Odisha. The proposed Conservation Reserve is having the following area details:

Total area of the Proposed Conservation Reserve: 2941.363 Ha

In Balasore District: 444.275 Ha

In Mayurbhanj District: 2497.088 Ha



Map 5: Declaration of Similipal-Hadgarh-Kuldiha Traditional Elephant Corridor as Conservation Reserve.

5.3 PRIORITIZATION OF LINKAGES

The linkage prioritization is as follows, The Similipal – Santoshpur and Similipal - Kuldiha corridors are more important for tigers and elephants than the Similipal-Badampahar corridor as Badampahar RF is more degraded and prone to the biotic interference. The tiger population will use this corridor gradually as the prey base grows over the period in Badampahar RF.

5.4 DEVELOPMENT OF INTEGRATED LANDUSE APPROACH FOR THE AREA COMMENSURATE WITH TIGER CONSERVATION AND CO-EXISTENCE AGENDA (FORMULATION AND COORDINATION).

Integrated approach to the area development programme will be taken up with all Line departments, NGOs, with forest department. Micro plan-based development to be taken up to uplift the economic condition of the people living around the corridors. Multiple farming such as poultry, piggery, honey production, Sericulture, dairy farming, cash crop raising, fishery, cottage industry, value addition to the forest products and marketing of the produce will be made in aggressive manner to raise of the economic condition of the people to reduce forest dependency.

5.5 WILDLIFE MANAGEMENT IN TERRITORIAL FOREST AREAS (IDENTIFICATION AND INCLUSION OF PRESCRIPTIONS IN THE WORKING PLANS OF RESPECTIVE DIVISIONS AS PER WORKING PLAN CODE).

- Buffer / corridor areas require a 'coarse filter' approach for maintaining a variety of plant / animal species
- Day to day monitoring
- Habitat amelioration (compensatory nature)
- Fostering indigenous fodder / fruit species
- Maintaining existing water points
- No drastic habitat interventions
- Cropping pattern / harvesting to factor in cover values
- Inherent / induced diversity indices need to be computed for maintaining the edges (without enhancing them)
- Human-wildlife interface issues to be addressed
- Treatment for riparian zones / unique features
- Retention of dead trees, snags
- Restoration / protection of existing corridors

The existing working plan prescriptions will be adopted in the Badampahar RF and Satkosia RF to manage the wildlife habitats and minimized forestry production such as timber collection, NTFP collection in a restricted manner. All these areas have been included in the rehabilitation working circle with an overlapping wildlife management circle.

5.6 ZONE PLAN MANAGEMENT STRATEGIES (PROTECTION, HABITAT MANAGEMENT AND HABITAT RESTORATION, SUPPLEMENTING DECLINING LOCAL POPULATIONS ANDFACILITATING THEIR RE-COLONISATION):

Mitigation strategy for linear infrastructure and other projects (roads/highways/railway lines/power transmission lines/irrigation canals/open mills/wind mills)

- Roads/highways: creation of overpasses / underpasses, speed regulation, closure to traffic
- Railway lines: SOP for information exchange through wireless, speed regulation, barricades, underpasses,

- Power transmission lines: insulation, surveillance, MOU with electricity boards, special patrolling, underground cabling, adequate height,
- Irrigation canals: covering, crossing for animals movement
- Open wells: covering, closure of abandoned wells
- Wind mills: both offsite and onsite measures are required to prevent turbine collisions with avifauna.

Mining/ Quarrying

No mining activity is at present in corridor. However, a number of quarries of minor minerals are operating in revenue land adjoining to Similipal – Kuldiha corridor causing disturbance to the movement of animals. These quarries need to be closed. All the non-functional and closed quarries will be reclaimed by filling the pits with quarry overburdens and planting over it for soil stabilisation. No new quarry shall be allowed to operate.

Mitigation strategy for dams and hydro power sectors

- The impacts include:
  - » First order impacts (barrier effects, effects on water quality, water quantity, flow regime and sediment load)
  - » Second order impacts (impact on terrestrial environment affecting primary production-planktons, aquatic flora), morphology (channel form, substrate composition)
  - » Third order impacts (impact on terrestrial environment affecting invertebrates, fish, birds and mammals)
- Mitigation measures are required to address impacts due to dams construction as well as its operation
- The mitigation plan should include onsite as well as offsite initiatives based on best global practices
- Retention of dead trees in submergence areas as 'snags' for water birds and aquatic fauna
- Prohibiting the reduction of river flow to 'zero' or 'critical' levels which would have a deleterious effect on local flora and fauna especially aquatic species permitting migration across dams through mitigation e.g. Fish ladder etc.
- Mimicking the water release to the natural flooding regime
- Ensuring control of aquatic weeds and disease factors
- Safeguarding downriver flood protection
- Safeguarding against water pollution
- Appropriate fish management measures to benefit local communities through the tiger reserve management.
- Site specific watershed management to safeguard against sedimentation
- Prescribing timings for use of access roads, and regulation on the maintenance infrastructure and retaining it to the minimum
- Prohibiting new, associated developmental projects in the core / critical tiger habitat
- Contributing resource support to the core / critical tiger habitat management as a 'compensatory' measure for loss of natural habitat

- Evolving and implementing a SOP, in collaboration with the tiger reserve management for rescuing wild animals from drowning
- Annual monitoring of the spatial use pattern of wild animals in the area, which should also include monitoring the development of related infrastructure
- Periodic monitoring of water quality and river ecosystem recovery
- Fostering re-vegetation of the construction site with indigenous species

Communication Projects

Projects with minimum impacts will be allowed subject to NTCA guidelines.

5.7 THEME PLANS

The goal of the plan is to restore, maintain and enhance the biodiversity, habitat and conservation value of the corridor as to ensure perpetuation of the tiger as flagship species. This can be ensured through a multifaceted approach to the complexity of the problems noticed at the time of management. They are:

1. Control of illicit felling of trees and poaching.
2. Control of forest fire.
3. Man-wildlife conflict mitigation.
4. Control of grazing.
5. Habitat Improvement

5.7.1 Control of illicit felling of trees and poaching.

The illicit felling of trees occurs throughout the year in general but during the monsoon period it is intensive. Likewise, the poaching of wild animal is more during winter and summer and almost negligible during the rainy season. At present because of inadequate field staff people are accustomed to illicitly fell selective trees of Bija *(Pterocarpus marsupium)*, Sal *(Shorea robusta)*, Kaim *(Hadina cordifolia)* and Kasi *(Bridelia retusa)* from the forest in adjoining area of Similipal. These species are gradually decreasing from the forests owing to large scale demand in the adjoining urban areas of Baripada, Balasore, Bhadrak and adjoining States of Jharkhand and West Bengal. Similarly poaching of wild animals though controlled prevails in the Compartments adjoining to villages.

The strategies

- Minimum 10 camps will be created in these areas, 4 camps each in the Similipal- Kuldiha & Similipal-Santospur Corridor and 1 camp in the Badampahar-Similipal corridor.
- In each camp 10 to 12 persons shall be deployed with fire arms and walkie talkies who will patrol over the area and collect information on activities of poachers and wood cutters from the field signs and if confronted they will apprehended the culprits and recover the seized produce.
- The timber smuggling routes have been identified and strict patrolling measures will be enforced along the routes.
- Through a network of spies engaged on incentives, the information on hoarding of timber, entry of poachers into the forest and possession of body parts of wild animal will be collected and immediate action will be taken.
- There is provision for reward for seizure of forest produce, which is given from the sale-proceeds of the forest produce seized. Such benefits do not accrue in case of cases under Wildlife (Protection) Act

and the materials seized are not disposed of by sale. In order to encourage the staff as well as the local people special awards will be given to the staff / informants involved in detection of the case.

- Training and workshops on various changes in Forest laws, procedure to deal with the preparation of case records and detection of case will be organized.
- Training on handling of firearms including maintenance will be imparted to the staff at regular intervals.

5.7.2 Control of forest fire.

Out of the total area of the corridor forests, which are under dry deciduous hill forests, high level Sal forests and grassland are very much prone to fire during the period from February to May. The fire is mostly intentional i.e., people set fire for collection of non-wood forest produce and mass hunting. At times it is caused by the timber smugglers, carelessness of tourists and passersby. The objectives of control of forest fire are

- To prevent fire spreading into the forests so that the ground flora and fauna are well protected.
- To ensure germination of seeds and thereby maintain the stand with trees of all girth classes.
- To protect the humus, snags and down trees which harbor a lot of organisms.
- To eradicate coarse grasses giving place to annual grasses palatable to the herbivores.
- To maintain the ambush cover for the prey animals and refuge cover for all animals for reproduction.

Strategies:

The fire season in Mayurbhanj starts from 1st February and continues up to 31st May or till receipt of first shower of pre-monsoon. It causes a lot of harm to the ground flora and micro-fauna. In order to make these corridors free from fire, the following measures are laid down.

Preparation of Fire Map:

The fire map of entire Range need to be prepared Range-wise showing therein the different type of fire sensitive zones in a topo sheet (1:50,000); so that it will be easier to draw the attention of the management. It can be divided into three zones viz:

i. Fire sensitive zones

ii. Medium fire prone areas

iii. Less fire prone areas

The map may not be up to scale; but should be approximate and to be prepared after field inspection. Different zones will be colored with vermilion red, pink and yellow respectively. The parameter to determine the proneness to fire is:

i. Nearness to habitation.

ii. Type of forest (microclimatic)

iii. Passages through the forest

iv. Distance from the water bodies

- **Prevention of fire:** Always it should be the motto to work with the principle of "Prevention is better than cure". To achieve the objective the following steps are to be taken:
- **Creation of awareness:** The evils of forest fire and the duties of the villagers residing on the fringes and enjoying the usufructs as per section 84 and 86 of Orissa Forest Act, 1972 and the penal provision u/s 27 will be disseminated among the people through beating of drums, posters, handouts and slides.

- **Provision of incentives:** In adjoining area villages have been identified which are to be involved in the protection of forests, especially from fire. These villages are allotted to different Ranges of Similipal Tiger Reserve and Territorial Divisions to motivate the villagers against fire. The motto will be to prevent forest fire by weaning them away through incentives. The advantage of prevalent mechanism of Joint Forest Management through VSS/EDC may be taken in order to achieve the goal. The incentives to each village will be determined depending upon the size of the village, the size of the forest and the length of boundary of such forest.

- **Clearance of fire lines**: All the forest boundaries, roads and foot paths passing through or touching the forest will be taken as fire lines and they will be cleared of the leaves and other inflammable material. In case of forest roads at least 3mtr on either side will be maintained clean and in case of live foot path a 6mt strip to be cleaned. The cleanliness to be maintained thereafter weekly. If the patch of forest in sensitive zones as per map is too big, then the area is to be suitably divided into sub-areas with artificial fire lines of 3 mtr wide.

- **Deployment of fire watchers**: Sufficient number of firewatchers are to be deployed on the fire lines who will patrol over the area to give information on incidence of fire. Care will be taken to select non-controversial person as firewatchers.

  Preparation of detailed Fire Action Plan in each Division and a District Fire Action Plan in coordination with all the line departments of the District and entrusting duties and responsibilities for each and every department.

- **Fire fighting:** In order to combat the fire, fire-fighting squads at the rate of one per Range are to be pressed into operation. The personnel to be recruited in the squad and as firewatcher are to be properly trained by field demonstration. Their work will be to:

  - Prevent forest fire in collaboration with the villagers to whom incentives have been given.
  - Extinguish the fire on receipt of information on out-break of fire.
  - Patrol over the area in medium fire prone areas and less fire prone areas when they are not in duty in (i).
  - Monitor and evaluate the control of forest fire during and after the fire season is over respectively.

One vehicle with VHF connection will be provided to them. They will be provided with bill-hook/axe, torch-light and water bottles. The vehicle and the squad will work round the clock from 1st February to 31st March. They will promote awareness in the fringe villages, prevent fire with assistance of the VSS/EDC concerned, extinguish the fire if set in and evaluate the effectiveness of the incentives for consideration of award at the Range/Division/Circle level. The squad will consist of daily wagers along with the Forester and Forest Guard of the concerned Section/Beat.

The amount earmarked for fire fighting includes the cost of creating awareness, clearance of fire lines, deployment of fire watchers and spies, beating of the fire, recruitment of fire fighting squad on daily wages, equipment, rewards, hiring of vehicles and cost of POL.

- **Post-fire operations:** In spite of all the precautions, if fire breaks out, immediate steps to be taken to extinguish it and the gutted area to be measured and mapped out, the loss to be assessed and the reasons for fire along with responsibility need to be fixed.

- **Accountability:** The staff will be accountable for fire in their area and necessary disciplinary action will be taken against them.

S.L. No	Post	Accountability
1	Field Director cum R.C.C.F., Baripada Circle	Overall fire management of the Entire Circle and daily monitoring with D.F.O.s
2	D.F.Os and Deputy Directors.	They will be accountable for overall area of the divisions/ area under their jurisdiction to manage fire problems with daily monitoring with ACFs and Range officers and preparation/ implementation of fire management plan.
	A.C.F. and Assistant Directors	They will be accountable to look after fire control parties, vehicle movement, and communication of each fire incidence in the division, movement of additional division level party with all equipments, fire fighting equipments and fire mapping and implementation of prevention measures.
	Range officers	Range officers have to plan fire prevention measures before fire seasons, Implementation of Fire management plan, Monitoring fire incidences and controlling the situation immediately in their jurisdiction and inspecting each and every section of his Range areas.
	Section Officers	Section officers (Foresters) have to take action according to the Fire management plan, Monitoring fire incidences and controlling the situations immediately in their jurisdiction and inspecting each and every part of their section areas. They have to monitor the fire prevention units to work in time, motivation to villagers not to ignite to fallen leaves. They have to look after every party whether well equipped with fire fighting measures, sufficient drinking water, motor vehicles or bicycles, communicating equipment's and first aids. They have to report twice daily to the Range officers about the fire management in their sections.
	Beat Officers	Beat Officers (F.G.s) have to look after fire management activities in his jurisdiction as well as to assist the adjoining beat officers in fire prevention. They have to monitor the fire prevention units to work in time, motivation to villagers not to ignite to fallen leaves. They have to look after every party whether well equipped with fire fighting measures, sufficient drinking water, motor vehicles or bicycles, communicating equipments and first aids. They have to report twice daily to the section/Range officers about the fire management in their beats, seek more assistance immediately if fire incidence go beyond the control. They will be accountable for negligence in any activities.
	Fire Watchers	They have to work in a team to prevent fire in forests. They are accountable for any fire incidence occurs due to their negligence and failure to report to Beat F.G.s/ Foresters in time.

5.7.3 Human-wildlife conflict mitigation.

Since the time immemorial, Human wildlife conflict has been going on around the Similipal Tiger Reserve. But no incident of tiger attack or uplift of human beings by Leopard has been ever reported. Cases of cattle kill by big cats are occasional in corridor area particularly, in Similipal – Santoshpur corridor. Other wildlife cases such as Bear attack as well as Hyena attacks are known to occur but these are very accidental and causalities have been reported on this count in corridor area. Crop raiding and other depredation by elephants in corridors is confined to limited pockets. Following strategies are suggested for mitigation of man-wildlife conflict in corridor area.

- Timely payment of compassion amount to the victims.
- Proper education on wildlife conservation to the people, especially to the children, lawyers, and legislatures on the subject is key to find a solution.

- Developmental programmes must be thoroughly tuned to protect animal rights. Prior to allowing forest diversion proposals, an Environment Impact Assessment must be done in which wildlife aspect should be examined carefully by an organisation having expertise on wildlife management and impose stipulations to ease out the problems that would arise due to execution of that project.
- Closure of all stone quarries around the Similipal – Kuldiha corridor.
- Proper training to field staff on handling of conflict situation.
- Finally, man- animal conflict can be resolved with involvement of all sections of the society.

5.7.4 Control of grazing.

Grazing is the worst form of biotic interference to the forests contrary to others, which is not felt by the people. It acts as a carrier of diseases to the wildlife, compact the soils and makes the forests more xerophytic. In order to strike out a solution to the problem of grazing, the following strategies are aimed at:

Strategies

- The people of the adjoining area will be educated to confine grazing of their cattle to the village forests only.
- In case, where the village forest is not sufficient enough to accommodate the cattle, the grazing will be allowed in TUZ on rotational basis. In this case the boundary limit for each village will be earmarked in consideration of the size of the cattle population in the village.
- In no case grazing will be allowed inside the corridor area.
- Through awareness the people would be sensitized to resort to stall feeding by collecting the fodder and keeping them in silo pits.
- The land earmarked for grazing "gochars" in the villages is to be restored and renovated.
- During elephant migrating seasons, alternative crop to paddy such as hot Chillies- Bhut Jolokia, Deogarh Chilli, Capsicum, Ground nuts, Radish, cotton, lemon crops to be raised by giving subsidy to the farmers.
- Chilli fencing, solar fencing and trenches to be raised around the villages to prevent elephant/wild pest entering in to the villages and crop fields.

5.7.5 Habitat improvement

With the backdrop of the vastness of the area, the diversities of the habitat types and the diffused nature of the wild animal populations, it is necessary to adopt following strategies to improve the habitat congenial for the growth of wild animal population.

Strategies:

- **Improvement of existing meadows**

The meadows are now invaded by sal saplings. These need to be uprooted and obnoxious and unpalatable grass and shrub species eradicated by ploughing the meadows. More palatable and indigenous grass species like *Cynodon dactylon* is to be sown in patches by fencing the area with the help of solar power fencing.

- **Eradication of weeds**

All weeds like *Lantana* and *Eupatorium* need to be uprooted and destroyed during rainy season.

- **Development of saltlicks**

Both natural and existing artificial salt licks are to be maintained and enriched with application of salts and other minerals in consultation with the A.H. department

- All the saltlicks beyond the eye of the field staff are to be destroyed by application of neem oil as the poachers take the advantage of killing the animals there only.
- Staff will visit the saltlicks on patrolling duty every day morning and evening.

Miscellaneous

- For dust baths during dry months and wallowing during the rains and winter as many spots as possible will be developed. These spots will be maintained by treating the same with tick repellents.
- Patch planting with the qualifier indigenous species will be taken up to provide shelter, food and fodder to the wild animals. Bamboos *(Dendrocalamus strictus), wild* banana, fruit bearing species such as Jamun, berries, are to be planted extensively.
- Molecules of refuges and shelters will be provided for the tiger and its prey animals in dispersed pockets all over the corridor wherever possible.
- In large open valleys, viable patches of scrub and woodland will be created to provide the disperse edge of shelter for fuller use of the available fodder.
- Entrance holes will be made at the base of hollow trees – where there is no such entrance – to make those available as shelters for the wild animals like mouse deer.
- Dense growth of climbers like *Combretum* and *Milletia* will be cut in the corridor area. But *Bauhinia vahlii* not be cut as it serves as an important food plant for elephants during scarcity.
- Forest ponds, water harvesting structures, waterholes to be raised in adequate numbers in the corridors to meet water scarcity in the area.
- Sign boards showing elephant corridor, speed breakers, wildlife corridors, will be raised to educate the people moving around.

Improvement of wild animal health

The health of wild animals inside Similipal is noticed to be good except elephants. They are seen to be suffering from formation of abscess, gastroenteritis and some congenital diseases. The principal prey animals like sambar and wild boar available in good numbers are seen to be very healthy. Monkeys, chital, gaur and other animals are observed to be free from any diseases. However, regular vaccination of the cattle in the adjoining villages needs to be made. The carcass of the cattle will be disposed of by burning. Similarly, death of any wild animal due to poisoning and suffering from any infectious disease will also be burnt.

People participation

Forest and Forestry cannot be isolated from the people. It is necessary to march forward along with the people leaving within and around the Managed Area.

Strategy:

- Health camp – It is a confidence building measure and as there is no medical facility available in remote villages around the TR, it is our sacred duty to act as a facilitator for providing medical aid to the people at the time of need. This will not only act a confidence building step to restore the lost confidence which the people reposed on Forest Department earlier when they were allowed to enjoy the forest resource without any hindrance. For the purpose health camps will be organized in each cluster of village at least twice in a year i.e. during the rainy season and spring, which are very much prone to diseases due to climatic changes. Volunteer health workers will be selected from the villagers and trained on basic health care practices by the Doctors of allopathy and homeopathy and they will be provided with health kids for emergency treatment of the people around the TR.

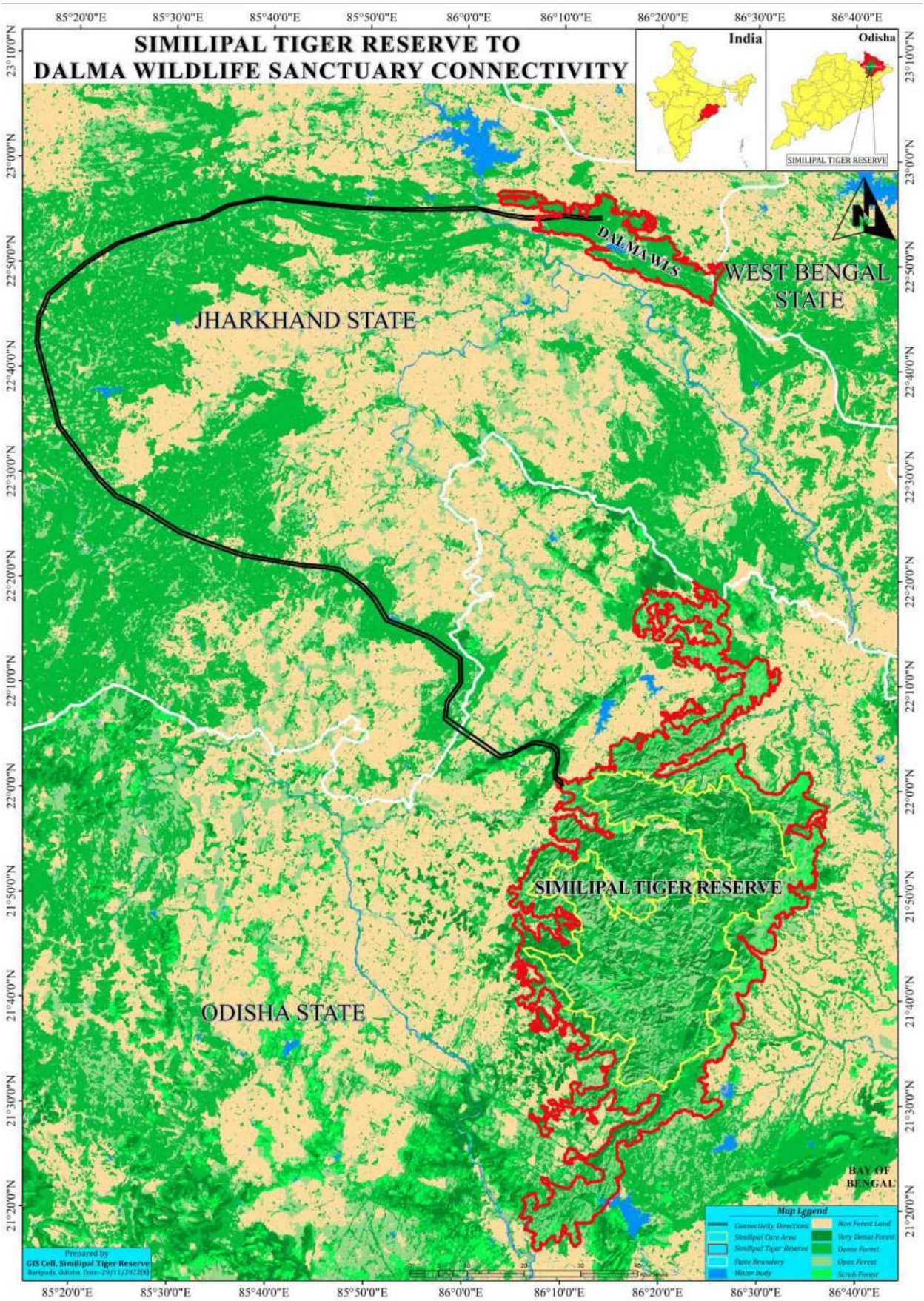
- Creation of awareness- The harms inflicted by the local people are due to lack of education and provocation of superstitions, religious stigma. The poaching, cutting of trees / adoption of new methods of eco-technology, Joint Forest Management and carelessness towards own health are the result of such factors. This can be eradicated from their mind by way of educating them and creating awareness among them through facilitators like NGOs.

5.7.6 New Corridors to be Proposed:

The potential Tiger Corridors in Odisha is described in details in the AITE-2018 report published by NTCA. The followings are the potential corridors which may be developed for having better gene flow and wildlife movement in the Odisha landscape:

- Bargarh Forest Division has potential to be developed as a connecting link between Sunabeda-Bargarh-Debrigarh WL Sanctuary through Badrama WL Sanctuary to Similipal-Satkosia tiger corridors if the degraded land between these areas can be restored (No tiger was photo captured during AITE 2018 in camera trapping).
- Bonai Forest Division is one of the largest Forest Division of Odisha with contiguous forest. It is a potential site for the tiger recovery if Similipal Tiger Reserve population restored. This Division is connected to Similipal through the forests of Dhenkanal and Keonjhar Divisions.
- Debrigarh WL Sanctuary was camera trapped for the first time for the National Tiger Estimation Program. Though a small area was sampled, only one tiger was detected which validates the importance of this Wildlife Sanctuary in maintaining the meta population of tiger occupancy in the landscape (Only one tiger image was obtained, yielding one tiger individual).
- In Hadgarh Wildlife Sanctuary of Keonjhar Wildlife Division, no tiger was captured in camera trapping, but this has a very good connectivity with STR which further extends to Kuldiha Wildlife Sanctuary. Proper management interventions could be helpful in the conservation of the area.
- Kuldiha Wildlife Sanctuary is connected to Similipal Tiger Reserve through the Similipal-Hadgarh-Kuldiha Traditional Elephant Corridor which could act as the possible corridor for the tiger movement. As in AITE-2022, tiger presence was noticed in Kuldiha WL Sanctuary, proper management and restoration of the area is necessary to foster the Big Cat habitation and herbivore population.
- Rourkela Forest Division is continuous to Bonai Forest Division which can also be the area for tiger recovery along with Bonai Forest Division. Both the Divisions can be brough under ambit of a new protected area which will be helpful for management and restoration of the area that can be used by Tigers.

5.7.6.1 Similipal-Dalma Sanctuary, Jharkhand (via Badampahar)



Map 5A: Similipal-Dalma Sanctuary, Jharkhand (via Badampahar)

The above corridor can be identified to address the isolated gene pool issue of Similipal Wildlife with other PAs. Dalma Wildlife Sanctuary is situated around the Dalma Hills. Dalma Wildlife Sanctuary is a much larger area starting from Chandil to 40 km east. The sanctuary covers around 195 km^2.

It is about 100 km from the capital city Ranchi, and 15 km from the steel city Jamshedpur. The wildlife sanctuary runs parallel to the NH-18 with hills as high as 915 m from sea level. Dalma Sanctuary is spread over 193 km^2 of forests of East Singhbhum and Saraikela-Kharsawan districts of the state of Jharkhand. The forests of Dalma come under the category "Dry peninsular Sal" and "Northern Dry Mixed Deciduous Forest". Most part of Dalma forests shed leaves in the summer and attains its full bloom at the onset of monsoon.

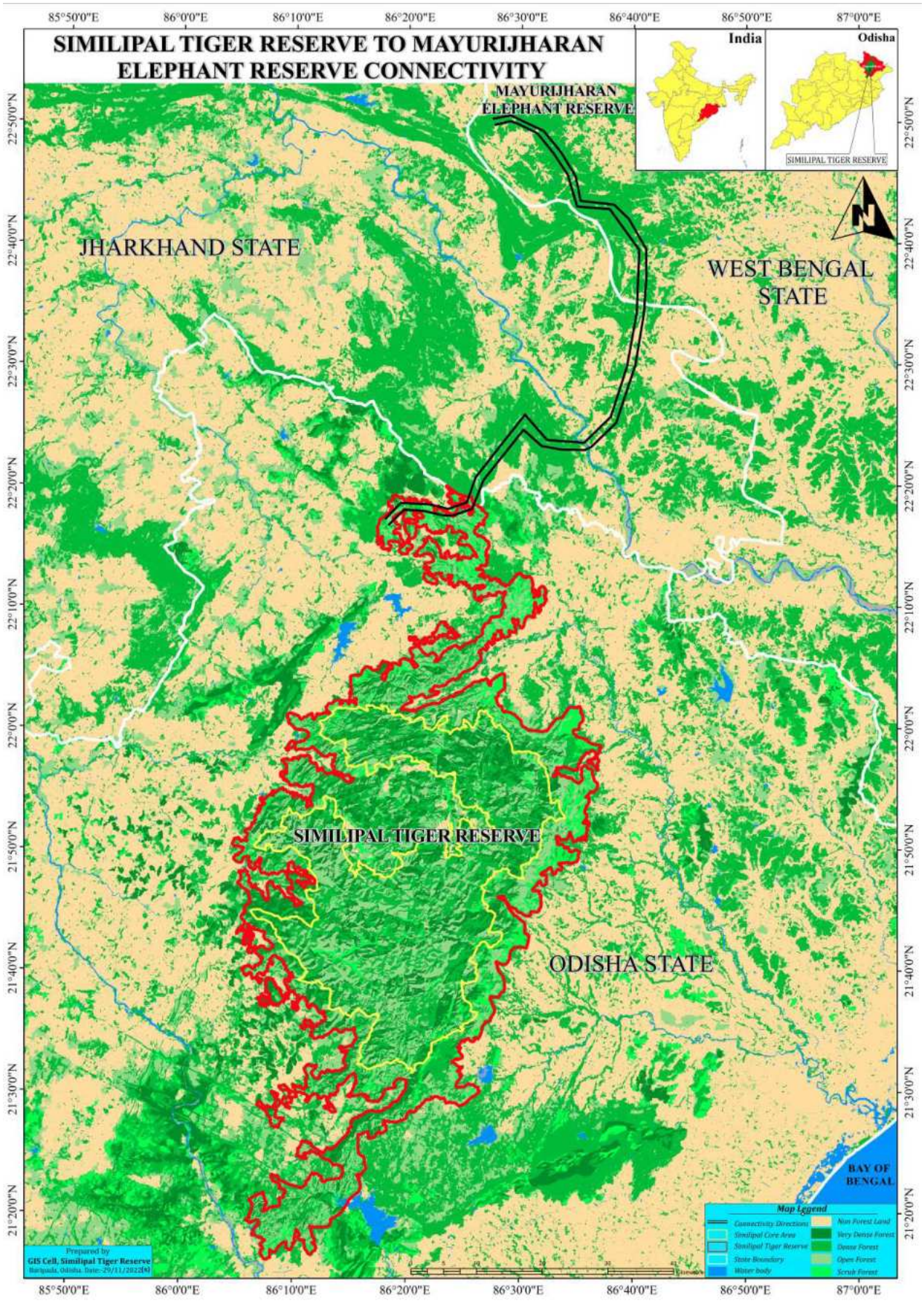
The above corridor will start from Similipal and reach Dalma Sanctuary of Jharkhand via Badampahar RF, Kumardunga Forest Range of Jharkhand, Saranda-Singhbhum Forest Range, which then moves northwards to Chandil-Gamharia Range of Jharkhand via an elephant corridor of Jharkhand. Then it moves in North-East direction and reaches Dalma Sanctuary.

5.7.6.2 Similipal-Mayurijharan Elephant Reserve, WB

This forest connectivity can be taken up as a potential corridor between Similipal TR and an Elephant Reserve in the Eastern India. Mayurijharan Elephant Reserve is located over parts of Paschim Medinipur district, Jhargram district and Bankura district of West Bengal, India. The area of this Elephant Reserve is 414.06 km^2 (159.87 sq mi) and adjoining 1,436 km^2 (554 sq mi) area is also declared as 'Zone of Influence'. The elephant population in MER increased from 47 in 1987 to 118 in 2010. The reserve is declared on 24 October 2002 by the Government of West Bengal.

This corridor starts at the northern end of STR i.e., from Bisoi WL Range of Rairangpur Division which shares border with Jharkhand State. It passes through Dumaria Hill forest and proceeds towards Mayurijharan Elephant Reserve through a narrow hill range in West Bengal.

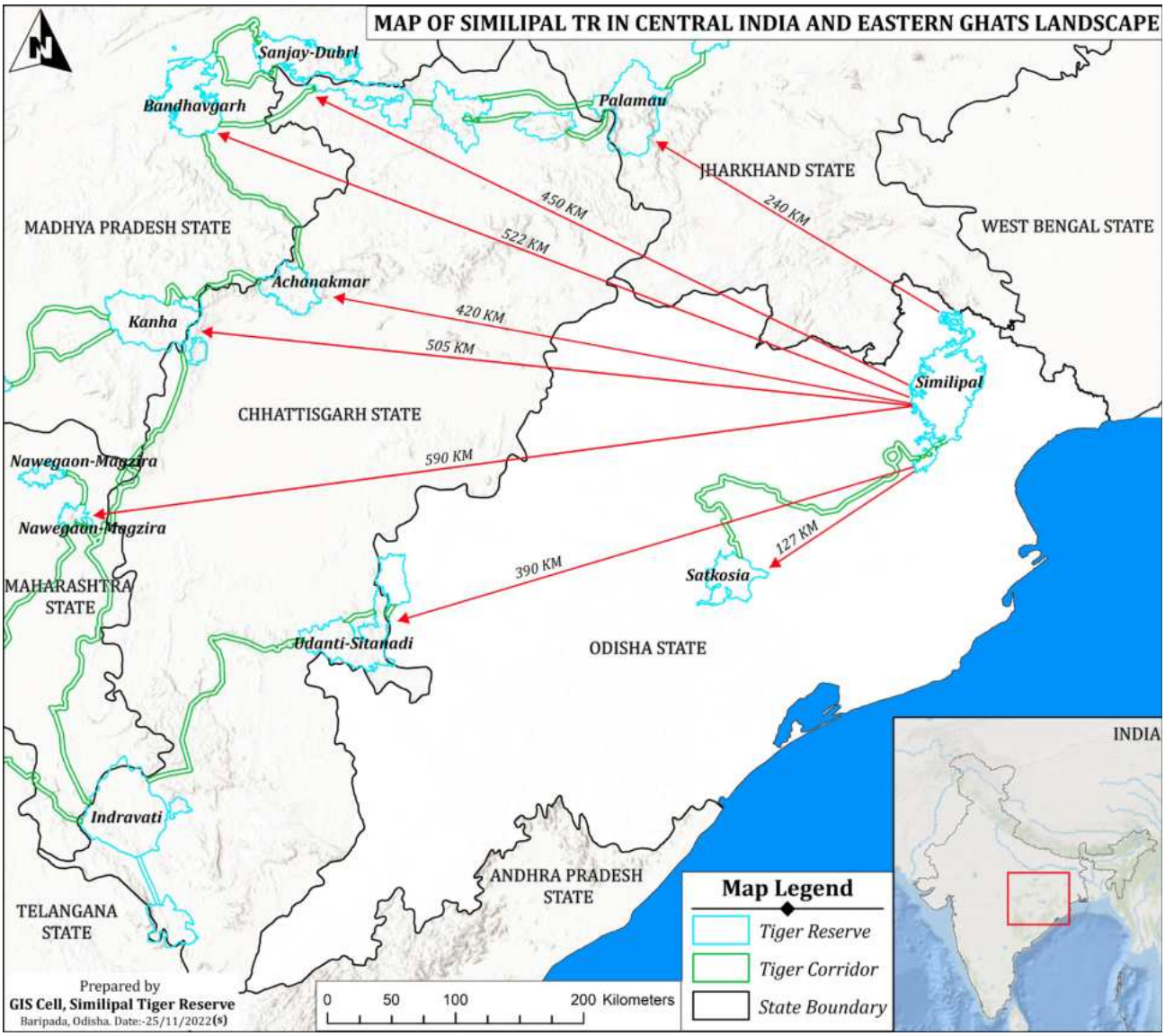
The above two potential corridors involve states like Odisha, Jharkhand and West Bengal. Half yearly Interstate coordination meetings between the CCFs or RCCF level along with the concerned DFOs can be taken up to build the cooperation and understanding about the importance of the corridor connectivity. Border sharing Ranges should also monitor the wildlife movement for safeguarding them by giving a safe passage. Local people in and around the corridor should be motivated and awareness campaigns should be conducted regularly. Further, plantation of fruit bearing trees and edible tree species for herbivores may be taken up to increase the productivity of the forest and also to ensure less Human-wildlife conflict in the area.



Map 5B: Similipal-Mayurijharan Elephant Reserve, WB

5.7.6.3 Possible Corridor connectivity to Central India TRs from STR:

The nearest TR from Similipal TR is Satkosia TR in Central Odisha which is about 127 Km far (By air distance). Other TRs are present outside the state with only one proposed TR at Sunabeda in Odisha. As described above in the Para 5.7.6, potential sites in Odisha can be restored and developed so that movement of wild animals can be possible through such potential sites to other Tiger Reserves in Cantral India Landscape.



Map 5C: Possible Corridor connectivity to Central India TRs from STR

5.7.6.4 Identification and adoption of degraded forest area patches around Tiger Reserve:

The idea behind the concept is to identify the degraded forest patches around STR which can be developed and restored so that the sink population can utilize the area as their habitat. The same area can be included in TR subsequently. NTCA vide letter no. 7-3/2014-NTCA, Dt. 09.02.2022 had asked for identification of such areas around STR. About 10 of such patches from Karanjia, Keonjhar Wildlife and Balasore WL Divisions were identified and communicated to NTCA by the Field Director, Similipal TR vide memo No. 613/3F-38/2022, Dt. 02.03.2022 (Annexure LXIX).

5.7.6.5 Inclusion of Hadgarh Wildlife Sanctuary in Similipal Tiger Reserve:

The discussion for the same has happened in the 2nd meeting of the Standing Committee of State Board for Wildlife held on 20.04.2016 under the chairmanship of Hon'ble Minister, Forest & environment Department, Govt. of Odisha. The detail discussion in the meeting is as follows:

Similipal Tiger Reserve is known for its source tiger population. For long term survival of tigers, corridors linking habitat of source population is an absolute necessity. Similipal Tiger Reserve extends over 2750 sq km and is ecologically and geographically connected to Hadgarh Wildlife Sanctuary in Keonjhar Wildlife Division. Moreover, frequent movement of elephants and tigers from Similipal Tiger Reserve through Hadgarh is observed. Therefore, this area forms a part of formidable corridor for both elephants and tigers. So, Similipal and Hadgarh together constitute a single ecological landscape, which needs to be managed by a single authority for management efficiency.

CHAPTER 6

ECO-DEVELOPMENT AND LIVELIHOODS

CHAPTER

06

ECO-DEVELOPMENT AND LIVELIHOODS

6.1 CONSTITUTION OF ADJOINING CORRIDOR AREA MANAGEMENT COMMITTEE (WITH REPRESENTATION OF DIFFERENT FOREST DIVISIONS, LINE AGENCIES AND OTHER STAKEHOLDERS) AND LINKAGES WITH TIGER CONSERVATION AUTHORITY

The Adjoining corridor area management committee will be formed under the chairmanship of Field Director, STR cum Regional Chief Conservator of Forests and this committee will also act as Monitoring Committee of the activities taken up in the adjoining area. The committee meeting will be convened every six months interval to make convergence of the action plans for collective effort of development of the adjoining areas.

Table No.6a: management committee for adjoining corridor area

	The Field Director, STR cum Regional Chief Conservator of Forests Baripada.	Chairperson
	District Magistrates cum Collector, Baripada and Balasore	Member
	Divisional Forest Officer, Baripada	Member
	Divisional Forest Officer, Karanjia Division	Member
	Divisional Forest Officer Balasore WL Division,	Member
	Divisional Forest Officer, Keonjhar WL Division,	Member
	The Deputy Director, Similipal North WL Division	Member
	The Deputy Director, Similipal South WL Division.	Member
	Block Development Officer, Kaptipada	Member
	Block Development Officer, Khaira	Member
	Block Development Officer, Jashipur	Member
	Executive engineer, Rural development, Baripada.	Member
	District Soil Conservation Officer Baripada	Member
	District Agriculture Officer, Baripada	Member
	District Horticulture Officer, Baripada	Member
	District Veterinary Officer, Baripada	Member
	District Fishery Officer, Baripada	Member
	District Sericulture Officer, Baripada	Member
	P. A. ITDA, Baripada	Member

	Project Director. D.R.D.A, Baripada.	Member
	Chief District Medical Officer, Baripada	Member
	Superintendent of Police, Baripada.	Member
	Block Chairman of Kaptipada Block	Member
	Block chairman of Jashipur Block.	Member

6.2 FORMATION OF ECO-DEVELOPMENT COMMITTEES (EDCS) AND SUPPORTING INSTITUTIONAL FRAMEWORK (CONFEDERATION OF EDCS, SELF HELP GROUPS AND NATURE CLUBS)

The policy of Govt. of Orissa on Joint Forestry Management framed during 1998 and the resolution of Odisha Joint Forest Management, 2011 will be followed for formation of EDCs in protected areas and VSSs in the corridor areas. Hence, functioning of the VSSs should be ensured by the concerned Divisions.

6.3 LIVELIHOOD SUPPORT INITIATIVES THROUGH VILLAGE MICRO-PLANS SUPPORTED BY TIGER CONSERVATION FOUNDATION AND OTHER LINE AGENCIES:

Micro plans for each EDC/VSS to be formed and Forest development work synchronized with livelihood support to the villagers are being taken up over the area. Micro plans are developed after conducting effective PRA exercises with the targeted villagers. Help and support of local NGOs are being taken for this purpose.

6.4 MONITORING AND EVALUATION

In order to monitor the programme, control rooms in the Division and Range Officers with the help of Forest range Officers and Foresters respectively will function round the clock. In the Circle Office, it will remain open, which will be manned by the Foresters. After the fire season is over, the entire area is to be inspected by the concerned Divisional Forest Officer and suggest the names of Forest Guards who have prevented the fire and similarly of the villages. On receipt of the report, a team at the Circle level will evaluate the work and the officers/villages showing outstanding work will be rewarded, on the World Environment Day. Efficacy of fire protection work in all the Divisions will be evaluated through a team to be framed by the concerned Divisional Forest Officer with the Asst. Conservator of Forests of the Division as its head who will be go round the forest and evaluate the damages done to the forest and the negligence of staff in duty to the Divisional Forest Officer, who in term will report the matter with the Field Director, Similipal Tiger Reserve after taking necessary action at his end.

6.5 MONITORING OF TIGER MOVEMENT IN THE CORRIDORS

Protection and monitoring of tiger movement in the corridors is important. Part of the corridor on the western side proposed in this plan falls under jurisdiction of Keonjhar Wildlife Division which is under the administrative control of Field Director, Similipal Tiger Reserve. Hence to monitor the movement of tiger in this corridor and for sharing of information on cattle kills and other protection related matter there will be quarterly coordination meeting between the Field Director, Similipal Tiger Reserve and DFO, Keonjhar Wildlife Division along with other forest officials and the Chief Wildlife Warden will be kept informed at regular intervals.

CHAPTER 7
TIGER POPULATION AND HABITAT ASSESMENT

CHAPTER

07

TIGER POPULATION AND HABITAT ASSESSMENT

7.1 DAY TO DAY MONITORING PROTOCOL:

Daily Monitoring Protocol

For designing, implementing, and evaluating the success of any conservation program for endangered species, it is imperative to monitor the status, distribution and trends in the populations of the target species. The monitoring program will be transparent in its approach, and holistic, addressing an array of parameters related to the survival of the species by using the blend of best available science and technology Jhala *et al* (2008).

Daily monitoring task will be planned and sincerely executed by the ground staff like the forest guards and the anti-poaching staff which involve simple observations on a regular basis and keeping track of the said observations discreetly and meticulously. The daily walk of a forest staff is a tool that could be effectively used for monitoring of different animal populations across different seasons and habitats. The observations should include:

1. Number and species of animals seen during any patrolling through the forest. For every walk the total kilometres walked will be noted down with time and intervals of rest. Effort will be given that every walk is taken during more or less at a fixed time during the day all though the year.
2. Number of different signs of carnivores like pugmark, scrape, and rake, scat encounter and kill to be noted down on every walk. Effort will be given towards identifying the species for which signs are being registered along with some special notes if any.
3. Care will be taken in maintaining as much silence as possible during the walks and noting down the associated information for habitat and weather.

The records of these walks if maintained properly and compared over time can provide reliable information towards understanding and deriving an overall idea about the forest health.

Reporting and database maintenance are the two most important part of the entire program. Data collected during these daily walks will be collected and compiled by the office, if possible, at the beat range level and to be produced when and where needed.

Tiger Population Estimation Framework (Phase-I, Phase-II and III)

Phase-I Similipal Tiger Reserve adjoining area:

Baseline data on tigers and prey

- Equipment

- Camera traps
- Range finders
- Compass
- Digital camera
- 2 laptops
- 3 Vehicles
- Microscope

Staff

- Four staff (2 + 2)
- Five field asst.

Field running cost

Workshop/training – tiger monitoring and related study/survey methods

Cattle grazing

- Assess the impact (and extent) of cattle on the habitat and environment (water security)
- Identify potential alternative sources of livelihood; get the govt. to initiate programs on reduction of scrub cattle.

Poaching

- Assessment of existing anti-poaching capabilities with gaps including crime map/database at landscape level
- Identify mechanisms to close gaps (redeployment of staff and infrastructure support)
    1. Establishing additional anti-poaching squads (or camps) – Karanjia Division (new - Chheligodhuli.) Baripada Division – (Sarat, Baghachua, Kalamgadia, Sripadmanjari). – including communications and personnels and camping kits, etc.)
    2. Wireless network (5 base sets; 20 walkie talkies with spare batteries, 5 charging stations)
    3. Transport – pickup (Mahindra)- 3 Nos. and 11 motorcycles

Intelligence network (TRAFFIC involve) – anti-poaching specialist group

- Get govt. to agree
- Training
- Transport
- Funds
- Forensic support

Interstate Workshop (WCB, TRAFFIC, FD, PD, WWF)

Basic training for Safety; rest of landscape upgraded training

Habitat management

- Baseline information on vegetation and monitoring
- Water
    1. Estimate the water potential of the area
    2. Improvements in the water availability for animals.

Weeds

- Gather baseline data on weeds (extent, impact, etc.) – main lantana and supporting data on other species
- Highlight issues to govt.
- Test options for containing weed in weed free areas – work with the FD in Similipal in their existing weed removal by monitoring and another site outside in the buffer.
- and removal methods infested areas (Eupatorium and lantana – all processing machines like bricket and lantana wood panels, baskets – TA to organize this).

Document – Landscape Vision

- Preparing a framework
- Preparing a working document
- Consultation process
- Workshop to finalize vision and completion of vision document with complete framework for conservation within the landscape

Threats – from developmental projects/new houses in revenue villages.

- Identify, map and evaluate all development threats within the conservation landscape
- Reports and advocacy on existing threats
    1. Satkosia-Thakurmunda- Dangadiha Road
    2. Podadiha- Dangadiha corridor road.
    3. Jashipur-Cheligodhuli- Manada Road

Communicating/Advocacy supporting the Salandi, Khairi/ Deo watersheds in adjoining area

- Brochure (watershed argument)
- Two posters
- Built a communication strategy for watershed

7.2 TIGER POPULATION ESTIMATION FRAME WORK: CORRIDORS

Sampling For Tiger, Leopard and Other Carnivores Encounter Rate

The same procedure will be followed as described in Chapter 12 of Buffer plan.

Sampling For Ungulates Encounter Rate

The same procedure will be followed as described in Chapter 12 of Buffer plan.

Sampling for Vegetation, Human Disturbance and Ungulate Pellets

The same procedure will be followed as described in Chapter 12 of Buffer plan.

Phase II

Described in Chapter 12 of Buffer plan.

Phase III

Described in Chapter 12 of Buffer plan.

7.3 ESTIMATION OF TIGER POPULATIONS USING CAPTURE RECAPTURES FRAME WORK

Described in Chapter 12 of Buffer plan.

Estimating tiger population using photographic capture-recaptures

Described in Chapter 12 of Buffer plan.

Estimating ungulate density by distance sampling

Described in Chapter 12 of Buffer plan.

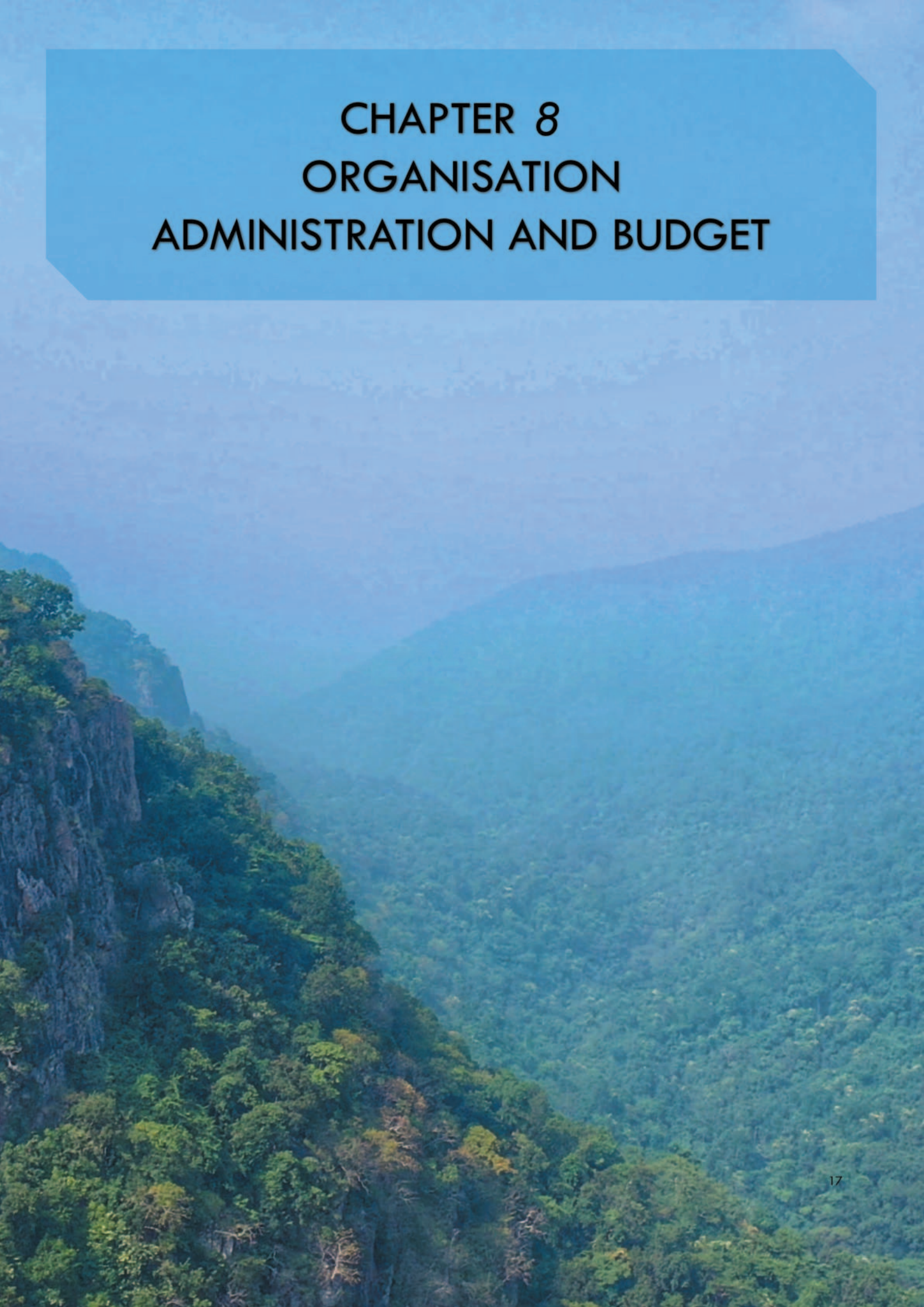
7.4 HABITAT ASSESSMENT FRAMEWORK

Described in Chapter 12 of Buffer plan.

7.5 ANALYSIS AND REPORTING FRAMEWORK

Described in Chapter 12 of Buffer plan.

CHAPTER 8
ORGANISATION ADMINISTRATION AND BUDGET



CHAPTER

08

ORGANIZATION, ADMINISTRATION AND BUDGET

8.1 COORDINATION COMMITTEE FOR EFFECTIVE IMPLEMENTATION AND MANAGEMENT AND LINKAGES WITH TIGER STEERING COMMITTEE AND TIGER CONSERVATION FOUNDATION.

An adjoining area co-ordination committee will be formed with the following members:

Regional Chief Conservator of Forests & Field Director, Similipal Tiger Reserve,	Chairperson
Deputy Director, Similipal South WL Division, Baripada	Convener
Deputy Director, Similipal North WL Division, Jashipur,	Member
Divisional Forest Officers, Baripada / Karanjia / Rairangpur/Keonjhar WL/Balasore WL,	Members

The respective DFOs will have regularly liaise with the various line agencies/departments and the EDCs. The summary of these meetings shall be reduced to writing and shall be furnished to the Field Director during the monthly Core-Buffer co-ordination meeting.

8.2 EDC COORDINATION.

EDCs /VSSs in the adjoining areas will be involved by regular meeting by the forester and range officer concerned every month. The people will be made aware of the importance of the corridor

8.3 STAFF DEPLOYMENT, PROTECTION STRATEGY AND LINKAGES WITH TIGER CELL AND BUFFER ZONE STRIKING FORCE.

Deployment of staff will be as per the details mentioned in previous para.

8.4 SCHEDULE OF OPERATIONS.

Schedule of operation is merged with and would be done as per the core plan.

ANNEXURE

ANNEXURE I

NOTIFICATION OF SIMILIPAL RESERVE FOREST

GOVERNMENT OF ORISSA
DEVELOPMENT (FOREST) DEPARTMENT

NOTIFICATION

Bhubaneswar, the 30th November, 1959

No.- 12F/139/(M/2) 59-41376/D. In pursuance of Sub-Section (3) of section 20-A of the Indian Forest Act. 1927 (XVI of 1927) as amended subsequently in its application to the State of Orissa by Orissa Act XI of 1954, the State Government do hereby certify that the documents mentioned in the schedule hereto annexed had been prepared under the authority of the ruler of Mayurbhanj State before the date of merger and have been under the authority of the State Government continued to be recognized maintained and acted upon thereafter.

Schedule

1. The MayurbhanjForest Manual.
2. Working Plan for the Similipal and Notto reserves MayurbhanjState for the year 1947-48 to 1966-77.
3. Register of reserve forests of Western Division.
4. Register of reserve forests of Northern Division.
5. Register of reserve forests of Southern Division.

By Order of the Governor,
G.C. Das
Secretary to Government.

Memo No. 51377 / dt- 30.11.59

Copy forwarded to the Chief Conservator of Forests, with reference to his letter no. 20492/3F-429/57 dt.14.11.58. The documents except the Mayurbhanj Forest Manual are returned herewith.

Sd/-
Under Secretary to Government.

ANNEXURE II

NOTIFICATION OF SIMILIPAL RESERVE FOREST IN MAYURBHANJ FOREST MANUAL

Appendix IV of Mayurbhanj Forest Manual
Notification under Sections 19 and 28 of IndianForest Act.

The Chief of Mayurbhanj is pleased to declare under section 19 of the Indian Forest Act as amended by Act V of 1980, the following areas as Reserved Forests.

The boundary is as follows:

NORTH: A straight line from Kanchinda across the hill to Kotas thence along the foot of the hills dividing Bamanghati and Similipal Pergannah adjoining the villages of Alapani, Tamarband, and Cheligudri.

WEST: From Cheligudri along the foot of the hills to Jamboni and Rajupal and thence along the bed of t

he Khairibhandan river to Kaliani, thence along the foot of the hills dividing Panchpir and Similipal adjacent to the villages of Kumrabadi, Kantinkna, Bargoria, Barakamra, Mirginondi, Kuspoda, Bishpur, Kendumundi, Godabindha, and Mithwani.

SOUTH: Thence along the foot of the hills adjoining the villages of Barbil, Kirkichipal and Dongadiha, and thence along the main road to Kulialam village boundary and thence along the foot of the range of hills dividing Similipal and the Pergannahs of Podadiha, and Kaptipada up to Taldiha.

EAST: Thence along the foot of the hill range dividing Similipal and the Pergannahs of Khunta, Nuagaon, thence along the foot of the range of hills near Kendna, Kakorpani, Kankulia, Lulung, Chondro pahar of Baldiha pirh and continuing on along the foot of the hills to Kusumbond and thence on to Kanchinda the starting point.

ANNEXURE III

PRELIMINARY NOTIFICATION OF SIMILIPAL NATIONAL PARK

Government of Orissa
Forest, F. & A.H. Department

NOTIFICATION

Bhubaneswar, dated the 6th Aug. 1980

No.8F(T)-44/80. 18703/FFAH. Whereas it appears to the State Government, that the northen area of Similipal Reserve Forest situated in the Mayurbhanj district as specified in the Schedule annexed hereto, by reason of the ecological, faunal, floral, geomorphological and zoological associations and importance, need be constituted as a National Park for the purpose of protecting, propagating and developing wild life therein and its environment.

Now, therefore, in exercise of the powers conferred by sub-Section (1) of Section 35 of the Wild Life (Protection) Act, 1972 (53 of 1972), the State Government do hereby declare its intention to constitute the said area as the North Similipahar National Park. Accordingly it is hereby notified for the information of all persons likely to be affected thereby that any person claiming any right in or over the land specified in the said Schedule may prefer his claim within a period of two months from the date of issue of proclamation by the Collector, Mayurbhanj as required by sub-Section (3) thereof. Claims prefered within the aforesaid period shall be taken up for disposal by the State Government. The limits of the area which is intended to be declared as National Park are indicated in the Schedule enclosed.

By order of the Governor
Premananda Tripathy
SECRETARY TO GOVERNMENT.

M.No. 18704 /FFAH, Bhubaneswar, dated the 6th Aug.1980.
Copy forwarded to the Director, Printing, Stationary and publications, Orissa, Cuttack for favour of publication in the next issue of Orissa Gazette. This is statutory. He is requested to supply 200 copies of the said notification to this Department.

Under Secretary to Government.

M.No. 18705/FFAH. dt.6.8.80
Copy forwarded to the P.S. to Chief Secretary/ Revenue Divisional Commissioner, Central Divn., Cuttack/ All Departments of Government/ All Heads of Departments/ Collector, Mayurbhanj/Field Director, S.T.R., Baripada/ C.F., Angul/D.F.O.Baripada/ Karanjia/C.W.L.W., M.D., S.F.D.C., Cuttack for information.

Under Secretary to Government.

M.No. 18706/FFAH. dt.6.8.80
Copy forwarded to the Director, Project Tiger, Government of India, Ministry of Agriculture and Irrigation(Department of Agriculture) New Delhi for information with reference to his letter No.J-11o/25/ 22/ 8-FHY(PT) dt.19.5.80.

Under Secretary to Government.

Patra.

Schedule (North Similipahar National Park)

The boundary of the North Similipal National Park is described below in a clockwise manner starting from the peak of Baraghati Parbat 3 Km. to the north of Chahala. Starting from the top of Baraghati Parbat the boundary proceeds downhill in south-east direction to cross the Chahala-Talabandh road then in a southerly arch along the spur close to the eastern side of Chahala-Talabandh road till it reaches Makraghati. From Makraghati it takes an easterly direction on the ridge forming the water shed lying between Kairakacha nala and Kuam nala to the top of the Makraghati hill. Thereafter it takes a south-easterly direction downhill over a distance of 2.5 Km., and then proceeds due east till it crosses the Kairakacha nala and then takes forward up the hill along its tributary nala from the east south east to reach the saddle between two north-eastern peaks of the hill range to the south-east of the Kairakacha nala. From this saddle the boundary moves north-north-east ~~of the Kairakacha nala from this saddle~~ over a short distance to the second peak where from it descends straight down in north-western direction over a distance of 3 Km, to the mid- slope. It then takes the arch of that spur in north-easterly direction till it reaches the confluence of Kairakacha nala and its tributory from the eastern face of that spur. From the confluence it takes east-south-east direction to meet the Koljhari-Talbandh footpath and then proceeds a short distance along the footpath. Further on after leaving the footpath it moves north-east on the ridge leading towards Charabandha village. At the last peak of this ridge where the ridge takes a north-west turn to the peak of Charabandha Buru the boundary line turns sharply straight down hill in the east-south-east direction to reach the boundary of Charabandha-Dantia village enclosure in the Similipal Reserve Forests. Thereafter the boundary line follows all along the village boundary in a southerly direction and then in the north-easterly direction to leave the village boundary opposite to where it had joined the same on the western side. It then continues uphill in the north-eastern direction over a distance of 2 Kms where it turns east and then south-east down the slope to meet the villa boundary of Kusumtota in Chakdipir. Therefrom it takes the southern boundary of Kusumtota and proceeding to the east it crosses river Burhabalang. After crossing river Burhabalang it continues on the periphery of Purnapani, Burudih, Kukurbhuka and Bhaduakacha in a sequential direction of east north-east, north north-east and finally south-east to leave the village boundary close to the trijunction of village Bhaduakacha, Phuljhara and Similipal Reserve Forest wherefrom it takes due south-east toward the upper reaches of the nala that enters the Chakdipir enclosure in the Similipal Reserve Forests at the aforesaid trijunction. The boundary line of the North Similipal National Park continues then to climb steeply up till it reaches the first peak on the ridge. There it takes a turn to the north-north-east along the ridge over a distance of 2 kms. to the next peak where it turns east south

draining the northern face of Kusumbani hill. After meeting Kadkai nadi the boundary line courses along the bed of the said river in a 'Z' curve and thereafter, leaving the river bed it takes a north through north-east direction to the top of Murmurani ghati on the Nigirda-Hatigadia footpath. From Murmurani ghati the boundary line proceeds in the south-east through southerly direction along the ridge that divides the water-shed between Kadkai and Boramgandha nala and thereafter, in the easterly through south-east direction along the water-shed lying between Munibasa and Boramgandha nala to meet the Palpala River about a kilometre to the west of Lulung Forest Rest House. Proceeding downstream along the river, the North-Similipal National Park boundary line joins Similipal Reserve Forest boundary line close to the Lulung Forest Rese House. After joining the reserve forest boundary line, the North Similipal National Park boundary line follows it in a north-easterly direction by the side of river Palpala to the point, where it is forded. There it takes a sharp south-easterly turn coinciding with the reserve forest boundary line to cross the river Palpala and the Lulung-Rithabata road. Coinciding with the reserve forest boundary line, it continues thereafter in general easterly direction to pass in between Sitakund fall and Govindchandrapur village to the southern outskirts of village Lalpani. There it skirts the same village in a northerly loop coinciding with the reserve forest boundary line and continues north to village Lakshmiposi. From Lakshmiposi the North Similipal National Park boundary moves coinciding with the reserve forest boundary in south-east and southerly direction on the fringe of village Goripokhari and Kakurpani. A little over a kilometre to the south of Kakurpani, the joint boundary lines of the North Similipal National Park and the Similipal Reserve Forests from a north west through south west through easterly loop, and then together they follow generally a southern direction with the villages Digdiga, Kondjharan, Besarpani and Chekamara lying to their east. At Chekamara together they turn to the west and after covering about 2 km, they proceed north, north-west through 1.5 km, where they take an acute turn south, south-west to the north-western corner of village Chandanchaturi. At this point the North Similipal National Park boundary leaves the Similipal reserve forest boundary, climbs up the steep slope in a north-north-west through north-west direction to the top of Sunpokhari hill. From this hill top, the North Similipal National Park boundary line continues along the ridge and its main spur in north-north-western direction till it reaches Palpala nadi. Thereafter it follows that the river in the upstream direction bypassing the Kachudahan Forest Rest House to its north and crossing the Gopinathpur Lulung road 4 times in its course till it reaches, near village Gopinathpur the boundary of enclosed Similipalgarh village complex in the central region of Similipal reserve forest. From here, the North Similipal National Park boundary follows the boundary of aforesaid village complex first in the northern direction and then in the western direction touching in its course the village Nigirda and Kukurbhuka. Continuing its course with the boundary of the enclosed villages, it then takes the north through west direction to reach the river Burhabalang where it turns south and moves upstream along the river over a distance of 1 km. After that the

Contd. ..3...

oint boundary line leaves the river and take a south-western course ov a
istance of about 3 Kms, to a point due north-west of the Nawana Forest Rest
ouse. There, the North Similipal National Park boundary line leaves the
illage enclosure boundary line and climbs up the hill in south westerly direc
ion. On reaching the ridge situated due west of village Nawana, the National
ark boundary follows that ridge which divides the watersheds of river Balanga
nd Bangiar river and further on the watersheds of Bangiar and Bhandan river.
rom the hill top at the far north side of this hill, the boundary line descend
orth down the slope to reach the Barheipani, Hatnabeda-Uski village complex
nclosure boundary. It then follows the aforesaid villages enclosure boundary
ine winding its course generally in the eastern direction to cross the Nawana
arheipani road and then proceeds in the north through north-west direction,
ong the said boundary to the east of village Ulidihi. Thereafter, it leaves
e village boundary and then climbs in a north-east direction up the hill to
e ridge. Along the ridge, it follows the dividing line between the water-shed
Burhabalang and Bhandan all through first in the north-western direction, th
e north with the northerly turn to the second peak where it turns in a right
gle to the west and then from the third peak to the far west of this ridge it
seconds down the spur to Jaradiha abandoned camp site. From Jaradiha it goes
st south west direction and after crossing the Jaradiha nala it climbs upto
trijunction point bench mark on Brundaban hill turning in its course due
th-west to reach that hill. From Brundaban peak, the boundary line descends
th-west along the spur and crossing Chahala-Jamuani road it climbs up the
osite spur taking 'S' curve more towards the north to the highest peak, situa
south of Daldali. From this peak the boundary line follows the northern spur
the slope to Daldali and from Daldali it climbs north-north-east to the
l top where it turns east along the ridge and finally moves north-east to
h Baraghati, the starting point of this boundary description of North
lipal National Park.

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Government of Orissa
Forest Fisheries and A.H. Department
....
NOTIFICATION

No.19525 /FFAH. Dated Bhubaneswar the 11th June 1986
8F(T)8/85

Whereas the portion of Similipal Wildlife Sanctuary in the district of Mayurbhanj lying between 86°0' to 86°40' E longitude and 21°40' to 22°0' N latitude consisting of compartment numbers Balanga east 9,16 (part),17,18,21, 22,23,24, Palpala 14,15,16,17,18 and 19 : East Deo 1,2,5,6,7 (part),9,10 and 11 (part), Sanjo 7,8,9 (part), 13,14,15 and 17 (part): Tk-1,2,3,4,5 (part) 7 (part),Sl.6(part),11 (part). West Deo 15,17 (part) 18,20,21,22,2324,25,26, 27,28,30,31 and 32 Khadkhei 14,17,18,19,20,21,22,23,25,26,27 of Similipal R.F. covering an area of 542.7 sq.kms. as per details furnished in schedule by reason of its ecological, fauna, floral geomorphological and zoological association and importance needs to be constituted as a National Park for purpose of protecting, propagating, developing wildlife therein and its environments.

Now, therefore, in exercise of the power conferred by sub-section(I) of Section 35 of the Wildlife (Protection)Act, 1972 (Act 53 of 1972), the State Government do hereby intend to constitute the above area as the National Park to be named as " the Similipal National Park" in addition to the area already notified in G.O.No.8F(T)-44/80-18703/FFAH dated the 6th August, 1980. Accordingly it is hereby notified for the information of all persons likely to be affected thereby that any person claiming any right in or over the land specified in the said Schedule may prefer his claim within a period of two months from the date of issue of proclamation by the Collector, Mayurbhanj as required by Sub-section(3) thereof. Claims preferred within the aforesaid period shall be taken up for disposal by the State Government The limits of the area which is intended to be declared as National Park are indicated in the Schedule annexed hereto.

By order of the Governor
S.L.Chatterjee
Secretary to Government

Memo No. 19526 / FFAH dated, the Bhubaneswar 11th June,86

Copy forwarded to the Director, Printing, Stationery and Publications, Orissa, Cuttack for favour of publication in the next issue of Orissa Gazette. This is statutory. He is requested to supply 200 copies of the said notification to this Department.

Deputy Secretary to Government

Memo No. 1927 / dt. 11th June, 86

Copy forwarded to the Private Secretary to Chief Secretary / Revenue Divisional Commissioner, Central Division, Cuttack / All Departments of Government / Chief Conservator of Forests, Orissa / All Heads of Departments / Collector, Mayurbhanj / Addl. Chief Conservator of Forests (Wild Life) Orissa / Field Director, Similipal Tiger Reserve, Baripada / Conservator of Forest, Angul / Divisional Forest Officer, Baripada / Karanjia / Managing Director, Similipahar Forest Development Corporation, Baripada for information.

Deputy Secretary to Government

Memo No.1928 / dt. 11th June, 1986

Copy forwarded to the Director, Project Tiger, Government of India, Ministry of Environment and Forest (Department of Forest and Wild Life) (Project Tiger Section, Shastri Bhawan, New Delhi for information.

Deputy Secretary to Government

Memo No. 1929 / dt. 11th June, 86

Copy forwarded to Guard file (25 copies) for information.

Deputy Secretary to Government

n.s./

ANNEXURE IV

GAZETTE NOTIFICATION OF SIMILIPAL NATIONAL PARK

SCHEDULE

The extended c re of Similipal Tiger Reserve named as South Similipal National Park constitute the following compartments covering an area of 542·7 Sq. Kms.

Compt. No. [BLE—24, 23, 22, 21, BLW—16 (Part), 17, 18. 9, p—15, 16, 19, 18, 17, 14 ED—1, 2, 5, 6, 9, 10, 11 (part), 7 (p) SJ—13, 15, 17 (p) 14, 7, 8, 9 (p), TK—1, 2, 3, 4, 5, (p), 7 (P) SI—6 (p) 11 (p). Dec—15, 17 (p), 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32. Kh. 14, 17, 18, 19, 20, 21, 22, 23. 25, 26, 27].

BOUNDARY DESCRIPTION

The boundary line of the extended core starts from the trijunction point of compartment No. P—12, p—15, Sj—4 on Sunpekhari bill of the North Similipal National Park. From there it follows the common line between compartment No. P—14, and Sj—4 and proceed south west direction till Gurusadar Pahar (GT—station with bonth mark 897 Mts.). Then it follow towards south along the common compartment line between P. 15 and Sj—4. Then it follows common compartment line between P-16 and Sj-4, P-16 and Sj-5, P-19 Sj-6 and reaches the G. T. point on Murari peak (959 mt.). From Murari peak it follows the common compartment line between P-19, Sj-6 till it reaches peak of Baidyanath Parbat. Then it turns west and follows the compartment line between P. 18 and Sj. 10 and reaches Balpani Dand. Then it decends to Balpani nala and reaches Kharighati peak and then proceeds south ward and crosses Dhundubasa nala at the head of Dhundubasa fall. From there it ascends the peak and proceed south along the common compartment line of Sj-8 Sj-9, then Sj-14 and Sj-15 reaches the peak (916 mt.). From this peak it decends to Chaturipani nala towards south and crosses the nala on fall head and ascends to the peak (882 m.). Then the line proceeds towards south and reaches Baniabasa-Jenabil forest road. It follows the common compartment line between ED-2 and Sj-17 ED-2 and ED-3, ED-6 and ED-3 till it reaches East Deo nadi at the junction of Hatisal and Banispada nalas. From this junction it follows south wards on the water shed line of Banispada nala and Paladar nadi and passes through Tangpahar 884 m. and Mankada pabar ridge till it reaches trijunction of compartment No. E-11, E-13 and TK-1, It proceeds further south along the common compartment line of ED-13 and TK-1 till it reaches trijunction point of ED-13, TK-5 and TK-6. From this point the core line proceeds south along the ridge, then turns west and crossed the main nala in compartment No. TK-4. It then proceeds south west and passes on the head of Chinguria fall. From Chinguria fall proceeds west wards and passes through Panasia Huli in compartment No. TK-7. It proceeds further west wards on the ridge, crosses Deodar nadi in compartment No. Sl. 11, then crosses Niamdar nadi, passess over the ridge in compartment No. Sl. 6 proceeds west and crosses Nekarancha nadi in the same compartment. From Nekarancha nala it runs west and follows the water shed between Deo nala and Chemrakha nadi, Deo nala and Joran an Chanchali nadi in between compartment No Sl. and WD-26, TL and west Deo 26 and pa s over Namo pahar, follows common line of TL-7-WD-23, TL-5 and WD-23. Then it crosses west Deo nadi at the junction of compartment line west Deo 23 and W. Deo 17. It runs north wards and crosses W. Deo nadi and climbs up the hill (PH-907 mtr.) it further runs north along the western boundary of compartment W. Deo 18, Deo-15, Khariar 18 and joins village boundary of Kabatghai villages. It follows the western boundary of Kabatghai village, runs along Khairi nala and then reaches village boundary of Badkasira village. It runs east ward on Pitalsil nala till it reaches western boundary of Khejuri village. It then follows north wards along the western boundary of compartment No. KH-13, KH-14, BLW-18, BLW-16 and meets western boundary of village Gharbashi. It then follows the southern village boundary of Astakumar, Garh Similipal, Saruda Budhabalanga, Makabadi, Gopinathpur and meets the north Similipal National Park at Palpala nala. It then runs along the southern boundary of North Similipal National Park till it reaches the starting point.

MINING AND GEOLOGY DEPARTMENT

N TIFICATION

The 18th June 1986

S. R. O. No. 586/86—In exercise of the powers conferred by sub-section (1) of section 15 of the Mines and Minerals (Regulation and Development) Act, 1957 (67 of 1957), the State Government do hereby make the following rules to amend the Orissa Minor Minerals Concession Rules, 1983, namely:—

1. (1) These rules may be called the Orissa Minor Minerals Concession (Amenedment) Rules, 1986.

(2) They shall come into force on the date of their publication in the *Orissa Gazette*.

2. In the Orissa Minor Minerals Concession Rules, 1983 (hereinafter referred to as the said rules) in rule 10 and sub-rule (2) of rule 14, the following proviso shall be inserted, namely:—

"Provided that where any such application is refused or deemed to have been refused for no fault of the applicant, the application fee shall be refunded."

3. In the said rules, in sub-rule (4) of rule 24, the following proviso shall be inserted, namely:—

"Provided that where any such application is rejected for no fault of the applicant, the application fee shall be refunded."

[No. 7203-M.G.]

By order of the Governor

P. C [illegible]

Additional Secretary to Government

ANNEXURE V

NOTIFICATION OF SIMILIPAL TIGER RESERVE

Copy kept in Guard file.

Government of Orissa
Forest & Environment Department

NOTIFICATION
Dated Bhubaneswar, The 31st December 2007

No.8F(T)-9/2007/ 20801/F&E, In exercise of the powers conferred by Section 38V of the Chapter IVB of the Wildlife (Ptoection) Act, 1972 and with prior in principle approval of National Tiger Conservation Authority, State Government do hereby notify the area described in the Schedules A, B1, B2 as the **Similipal Tiger Reserve**, and the area described in Schedules C1 and C2 as the **"Core Area or Critical Tiger Habitat of Similipal Tiger Reserve"**.

SCHEDULE - A:
LOCATION AND AREA OF THE TIGER RESERVE

The Similipal Tiger Reserve is located in the district of Mayurbhanj and the geo-coordinates of the extreme points on the Tiger Reserve boundary are between $20^0$17'N to $22^0$34' N latitudes, and $85^0$40'E to $87^0$10' E longitudes. The area of the Tiger Reserve is as follows:

Core area (Critical Tiger Habitat):	1194.75sq. kms.
Buffer area:	1555.25sq. kms.
	Total 2750.00sq. kms.

SCHEDULE – B1:
DESCRIPTION OF THE OUTER BOUNDARY OF SIMILIPAL TIGER RESERVE

Similipal Tiger Reserve comprises of area of 2750sq.kms, and covers Similipal RF and the surrounding contiguous Reserve Forests and proposed Reserve Forest blocks, 64 villages inside Similipal RF, 5 villages inside Satkosia RF and 3 villages inside Tungru RF, with the boundary of the Tiger Reserve described hereunder and the list of forest blocks comprising the Tiger Reserve given in Schedule-B2.

Boundary description of Similipal Tiger Reserve

The boundary of the Similipal Tiger Reserve starts from pillar No.1 of Similipal RF near village Majhigaon on the western bank of River Budhabalanga and follows the Similipal RF boundary till it reaches the northern boundary of Baldiha RF and proceeds along the boundary of Baldiha RF till it meets the Similipal RF boundary. Then it runs along Similipal RF boundary up

to common pillar of Lulung-Purunapani RF and Similipal RF at Pillar No.526 from where it proceeds along eastern and southern boundary of Lulung-Purunapani RF up to Pillar No.596 of Similipal RF on the northern bank of Palpala River. Thereafter the boundary runs along Similipal RF boundary up to Pillar No.1381 of Similipal RF where it meets Noto RF on its eastern boundary near village Manabhanga. Then it proceeds along eastern and southern boundary of Noto RF up to junction of Noto RF and Satkosia RF near village Noto. The boundary then runs along the eastern and southern boundary of Satkosia RF till intersects the road leading to Kadalipal and further proceeds southward along the road till it touches the road connecting both the hamlets of Dudhiabahali on the northern side of Noda RF, and takes a turn east ward along the said road till it crocess tributary of Ghagranala. From there the boundary follows the course of the tributary downstream till it touches the eastern boundary of Noda RF and runs along the eastern, southern and western boundary of Noda RF up to village Dudhiabahali where it touches a tributary of Ghantia nallah and thereafter runs upstream till it touches the southern boundary of Satkosia RF. Then it runs clock wise along the boundary of Satkosia RF common point of Goudiabahali VF with Satkosia RF. Then it turns towards west till touches Goudiabahali RF in its south from where it runs clockwise along Gaudiabahali RF till touches the southern bank of Salandi River and run up stream along the bank of the said river up to the meeting point of Gaudiabahali VF from where it follows the VF boundary till it reaches Satkosia RF boundary near village Khudisila. From Khudisila it follows the course of Satkosia RF boundary up to western boundary of Noto RF in a clockwise direction, up to the junction of Noto RF and Similipal RF on Podadiha-Dangadiha road i.e., pillar No.1458 of Similipal RF. From pillar no. 1458 the boundary runs westward along the boundary of Similipal RF, outer boundary of Dangadiha RF, Bhejidiha RF, Mankadabeda RF up to the meeting point of Badbil RF with Similipal RF at pillar no.1585. Thereafter the boundary line runs along Badbil RF in clockwise direction up to tributary of Gobra nallah and follows the tributary along the downstream up to meeting point of the tributary with Baliabeda-Jamkhejuri road and boundary of Bhadubeda RF and goes clockwise along the boundary of the RF till it meets another tributary of Gobra nallah on the northern side of the RF. Then it runs in north-east direction of the said tributary till it touches Badbil RF boundary in the south and follows the boundary of Badbil RF up to the meeting point of Thakurmunda-Baliabeda road and Handiphuta RF, from where it takes a turn towards the west and runs along the boundary line of Handiphuta RF encompassing Taramara RF and again reaches Handiphuta RF and runs along the boundary of Handiphuta RF till it touches the boundary of Badbil RF at the intersecting point of Thakurmunda-Baliabeda road at

the southern side of village Mankadbeda. From Mankadabeda it runs towards north along the boundary line of Badbil RF till it touches Similipal RF boundary on the southern side of Purunapani village at pillar no.1603. Then the boundary traverses the boundary of Similipal RF encompassing Ghorabindha RF, Asankudar RF and Dangapani RF up to Salaibeda RF. Then it goes southward along the Salaibeda RF up to the meeting point of a nallah in the extreme south and follows the nallah downstream up to the meeting point of Chheratangar RF from where it goes westward along the Chheratangar RF up to the point of intersection of a nallah near village Saleibeda from where it goes along Salaibeda VF boundary up to the meeting point of VF boundary and dry nallah with the boundary of Salaibeda RF and then it goes along the western boundary of Salaibeda RF in northern direction and covers the rest of the boundary till touches the Similipal RF at pillar no.1823. Then the boundary line further proceeds along Similipal RF boundary up to meeting point of Similipal RF boundary and Kendumundi RF boundary on Kendumundi-Ranibhol road. From there it proceeds towards south and encircle Kendumundi RF till it again meets with Similipal RF at pillar no. 1899 on the northern aspects of Dindarani parvat. Thereafter proceeds up to crossing of Bhirol nadi in north-east side of Bisipur village and touches the boundary of Bisipur RF. After encompassing Bisipur RF the boundary continues to run along Similipal RF boundary up to village Rugudihi where it meets the southern boundary of Mahubhandar RF. Then encompassing Mahubhandar RF in clock-wise direction the boundary line touches Similipal RF boundary at pillar No.3581 near village Purunabalichua and continues to follow the boundary of Similipalr RF upto village Makuna at pillar No.3690. Thereafter, the boundary proceeds along the boundary of Bidhubhandar demarcated Forests near village Dantuani and outskirts the villages Chuakankar, Deopata and Rajabasa up to the crossing point of river Dangadakhal. Then the boundary follows the upstream of the said river up to Dudhkundi village and follows the boundary of Tunguru RF outskirting the villages Dudhkundi, Khadambeda, Argalabindha, Kesargadia, Sunajudia, Gargadi, Edelbeda, Paunsia, Nuagaon, Dalki, Baliam, Sapaghera and Tunguru up to Tunguru village. From Tunguru village it proceeds in eastern direction along the footpath up to Tunguru RF and proceeds along the boundary of Tunguru RF up to village Bhejidiha. Then it touches the Sadar Sub-Division boundary and continues along the Sub-Division boundary in northward direction till it touches the boundary of Sarali RF near village Hatisal. Thereafter, the boundary follows the road in a westerly direction up to village Jhumkapadi; and again follows the road in a northerly direction, and then in north-east direction up to Loda village. Here the boundary encircles the village and follows upstream of the dry tributary of Katra nallah up to peak of Sarali pahad. Then the boundary follows the

downstream of the said nallah in south-west direction where it touches the boundary of Sarali RF near village Jamudihi and follows the boundary in westward direction up to crossing of another dry tributary of Katra nallah and touches Kanpat RF. The boundary runs along the boundary of Kanpat RF in western direction outskirting the village Daleidihi, Saranda, Bara Bantha, Marudihi, Kahubera, Khejuri and Luhasila. From Luhasila it runs in north-east direction along the foot path till it touches boundary of Kanpat RF. From where it proceeds along the boundary of Kanpat RF excluding the villages Marhaikacha, Kaduani, Arjunpani, Bhadupani, Tandipani, Kumardubi, Kakudiruma till it reaches the tributary of Bankbahal Nadi and proceeds along the boundary of Kanpat RF. From there it follows in north-west direction along the boundary line of Kanpat RF excluding the villages Betajharan, Baradihi, Badajharan, Madansila, up to a dry tributary of Bankbahal Nadi and follows upstream of the dry tributary till it reaches the ridge near the village Baigankudar and proceeds along the ridges till it crosses a foot path at village Badbil. Then it proceeds along the footpath which leads to village Bhasanakacha till it crosses a tributary of Bagdoba nallah and follows the upstream of the nallah up to village Chhatarmanda till it touches Kanpat RF. The boundary then follows along the boundary of Kanpat RF excluding the village Bhimkhand, Dumurikudar, Pahadpur and crosses Katrajhar nallah and continues to run out skirting the villages Budhamara, Kumardungri, Dhantanagar and continues up to Sarali RF. Then the boundary goes along Sarali RF till it reaches inter-state boundary of Orissa-Jharkhand near village Kankadbeda. Thereafter, the boundary proceeds along the State boundary in eastern direction up to crossing of Kodia nallah near village Batikacha and touches the boundary of Kanpat RF excluding the village Dumurkudar, Chirudihi, crosses Katra nallah near village Kulapata and touches the boundary of Sarali RF from where it runs along the boundary of Sarali RF up to a foot path. From the footpath , the boundary runs along the boundary of Kukuda-anda forest up to the crossing of SukhilaKatra nadi after crossing the villages Kukuda-anda and Pradhansahi. Then it follows the upstream of SukhilaKatra nadi up to Hatisal village outskirting the villages Duarsuni, Hatichhad, Tarna and Bhejidihi and then runs along the boundary of Tunguru RF up to crossing of Dongidakhal nallah and follows the down stream of nallah till it touches Bidubhandar forest. Then the boundary follows along the boundary of Bidubhandar forest in clockwise direction excluding the villages Nitei, Mundakata, Dighi, Mahulbarei, Baghiabeda, Kitabeda, Shimsahi, Bandhasahi, Bhagirathipur and touches Similipal RF boundary at pillar No.3708. After that it follows the boundary of Similipal RF outskirting the villages Kumarghutu, Kumbhirmundi, Ghatkuanri, Burudihi, Talabandha, Kadamdiha and Kusumnala up to Majhigaon where it meets pillar no.1 of Similpal RF.

SCHEDULE – B2:

LIST OF FOREST BLOCKS INCLUDED IN SIMILIPAL TIGER RESERVE

Name of the forest block	Area (km^2)
Similipal RF, including the 64 villages situated inside the RF block	2271.78
Lulung-Purunapani RF	2.23
Baldiha RF	1.10
Noto RF	77.07
Bhejidiha-I RF	1.60
Bhejidiha-II RF	0.18
Nada RF	3.52
Satkosia-1 RF	137.33
Satkosia-2 RF	2.08
Satkosia-3 RF	3.54
Gouriabahali RF	1.82
Mankadabeda(Manikbeda) RF	2.08
Dangadiha RF	0.97
Badbil RF	9.43
Bhadubeda RF	1.11
Handiphuta RF	3.06
Taramara RF	6.50
Ghorabindha RF	1.68
Dangapani RF	1.05
Salaibasa RF	1.26
Cheratanagar RF	8.00
Kendumundi-I RF	1.48
Kendumundi-II RF	6.48
Bisipur-I RF	4.21
Bisipur-II RF	0.74
Tungru RF-I	6.10
Tungru RF-3	4.46
Tungru RF-4	4.65
Tungru RF-5	9.12
Tungru RF	12.24
Kanpat RF	46.40
Sarali RF	20.29
Mahubhandar RF	10.49
Bidhubhandar proposed RF and non- RF land of 8 villages situated within Satkosia and Tungru RF blocks	85.95
Total	**2750.00sq.km**

SCHEDULE – C1
DESCRIPTION OF THE BOUNDARY OF THE CORE AREA / CRITICAL TIGER HABITAT OF SIMILIPAL TIGER RESERVE

The core area or Critical Tiger Habitat of Similipal Tiger Reserve covers 1194.75km^2 in Similipal RF as per the boundary described hereunder, which is constituted of reserve forest blocks mentioned in Schedule-C2.

Description of the boundary of the core area / critical tiger habitat of Similipal Tiger Reserve

The boundary line of the core area starts from the trijunction point of compartment no.P12, P15, SJ4 on Sunpokhari hill of the North Similipal National Park. From there it follows the common line between compartment no.P15 and SJ4 and proceeds south west direction till Gurusadar pahad (GT station with bench mark 897mts.). Then it follows common compartment line between P16 and SJ4, P16 and SJ5, P19 and SJ6 and reaches the GT point on Murari peak (959 mts.). From Murari peak it follows the common compartment line between P19 and SJ6 till it reaches the peak of Baidyanath Parbat. Then it turns west and follows the compartment line between P18 and SJ10 and reaches Belpani danda. Thereafter it descends the Belpani nala and reaches Khairighati peak. Then proceeds southward and crosses Dhundubasa nala at the head of Dhundubasa fall. From there it ascends the peak and proceed south along the common compartment line of SJ8 and SJ9 till it reaches the common point of compartment no. SJ8,9, 14 and 16. From there it proceeds down stream up to 1250mts along a tributary of Sanjo nala and ascends the peak up to a bench mark 745mtr in northward direction bisecting SL17. After that it descends down along a dry nala in eastward direction till it reaches trijunction point of SJ16, SJ17 and SJ18. From there it proceeds along the common compartment line of SJ17 and SJ18, ED3 and SJ18, ED3 and ED4, ED3 and ED8. Then follows the southern boundary of ED3 in westward direction till it reaches east Deo river at the junction of Hatisal and Banspada nala. From this junction it follows southward on the watershed line of Banspada nala and Paldar nadi and passes through Tangi pahad (884mtr.) and Mankaria pahad ridge till it reaches junction point of compartment no. ED7(P1), ED7(P2), ED11(P1) and ED11(P2). From there it proceeds along the eastern and southern boundary of ED11(P2) and common boundary of compartment no.TK1 and ED13, TK5 and TK6, TK5 and TK9 till it meets Thakthaki nala then it proceeds southwest

direction and climbs the peak and thereafter descends along a dry nala, crosses Nochhipur – Bhanjabasa foot path and climbs another hill along a dry nala till it reaches the peak at the trijunction point of TK7, TK8 and TK10 bisecting compartment no.TK8. Then it proceeds southward in clockwise direction along the common boundary of TK7 and TK10, TK7 and TK11. From their it follows the eastern boundary of SL18 till Kenduchua hudi (GT bench mark 787 mts.) and continuing along a dry nala leads to Salandi river in westward direction and reaches Podadiaha-Dangadiha road which is the extreme southern boundary bisecting SL18. Then it runs westward along the common boundary of SL10 and SL17, SL13 and SL17, SL13 and SL16, SL13 and SL15 till it meets the eastern boundary of SL-12 which is the extreme point of the south-western boundary of the core area. Then it ascends north ward along the common boundary of SL-13 and SL-12, SL-8 and SL-7, SL-8 and SL-4, SL5 and SL4 making a loop from where it further goes towards west along SL-2 and SL-4, SL1 and SL4, SL1 and SL3, TL-9 and TL-10 till it reaches a tributary of Sim nadi. From there it follows along the down stream of the said tributary till the junction point of TL9, TL8 and TL7 bisecting TL9 and follows the common boundary of TL8 and TL7, TL7 and TL6 till it touches the eastern boundary of TL5 from there it follows Bisipur-Dolapahad foot path in westward direction bisecting TL5, TL4, TL3. Then it proceeds northward direction and then follows the common boundary of TL3 and TL2 in northwest direction upto a tributary of Virol nadi and follows the downstream of a dry nala till it confluences with Virol nadi. Thereafter the boundary line climbs up western side of a hillock and continues to run along the ridges upto the bench mark 720mt. From the bench mark it descends down in north direction keeping Bhalughar pahad towards right along a dry nala and touches the common boundary of WD10 and TL1 and thus bisecting TL1 and then continues in eastward direction along the common boundary of WD11 and TL1, WD11 and TL2, WD12 and WD19, WD12 and WD17, WD13 and WD17, WD13 and WD18 upto common point of WD13, WD-17 and WD-18 from where it rises towards north along the boundary of WD13 and WD14 upto trijunction point of WD13, WD14 and WD8. Then the line takes sudden 'U' turn towards west and runs along the ridges up to 3rd peak in northward bisecting WD8 and again takes a 'U' turn towards GT bench mark 835mtr and follows the common boundary of WD8 and WD16 in northern direction. Thereafter it follows the common boundary of compartment WD16 and WD9 up to a waterfall. From there it follows 100mtr along a foot path leading to Ramjodi village and then continues to run along the peaks nearer to Ramjodi and Pahadpur villages in northwest direction and finally touches the common boundary of WD9 and WD7 bisecting WD9 and 7. Again it proceeds along the said compartment line till it reaches a 'U' shape turn and follows a

dry nala along the down stream up to confluence with Kula nala. Again the boundary runs along the stream of Kula nala in northward and then along a dry nala in westward direction bisecting compartment no.WD7 and WD5 till it reaches Khejuri village. After that it proceeds along the outer line of Khejuri village outskirting it from core area along compartment no.WD3 and then it runs in southeast direction along the common boundary of WD3 and WD2, WD3 and WD1, KH7 and KH5 up to a trijunction point of compartment KH5, KH6 and KH7. Thereafter it runs in southward direction, then eastward along the common boundary of KH6 and KH7, KH6 and KH8 up to river Khairi. The boundary line then goes along the up streams of the said river and cuts KH2 into two parts and meets KH1 in it southeast compartment line. From there it runs along the common line of KH2, BH14 and KH3 up to village Nangighosra from where it goes along the village line of Nangighosra, Gudgudia, Kumari, Saharpat out skirting the villages and then passes inside KH10, 15,16,17,19 and touches the common boundary of KH13 and Kh19. Then it runs anticlockwise along the balance length of KH13, KH19 till it meets the southern boundary of KH12. From where it runs towards east along the southern and eastern boundary of KH12 till it join the common point of KH12, BH18, BLW16 and BLW18. Then the line runs inside BLW16, 17,18, BLE23,22,21 and P14 up to the common line of P14, 10 and BLE20 near village Gopinathpur. From there it goes along the western line of P10, P6 and southern line of BLE19 upto a point 400mtrs from the village boundary and ascends northward inside BLE19 till it touches Gitilpidi-Joranda forest road on the southern line of BLE17 from where it proceeds in northern direction inside BLE17 along the said road up to the common point of BLE17, 16 and 13 near Joranda waterfall. Then it proceeds westward along a dry nala to join the foot path for Joranda fall to Barehipani fall and continuous to runs along the said path till it meets the eastern bank of river Budhabalanga. Thereafter the line proceeds down streams of the said river up to the common point of BLW14 and 15 keeping Barehipani waterfall towards right side. From there it runs along the common line of BLW14 and 15 and takes a turn towards north inside BLW14 and meets the southern line of compartment no,BH7. Then it changes it course in westward direction inside BH7 and BH6 till it meets bank of river Bhandan near village Asanbani and follows the northern boundary of village and runs along the southern line of BH6 and BH5 up to the northern bank of river Bhandan, from where it crosses the western line of BH5, southern and western line of BH4. Thereafter it bisects BH3 and proceeds first in northward direction along common boundary of BH2 and BH3 then in westward direction along common boundary of KD10 and BH2, KD9 and BH1, KD9 and KD8. From there the line bisects KD9, KD6 and KD7 till meets the bijunction of compartment line of KD5 and KD7 and southwest corner and moves

in eastward direction along common boundary of KD5, KD7, BLW5 and BLW7 after that the line passes through BLW7, BLW8, BLW12, BLW13, BLW10, BLE4 and BLE5 till meets the common line of BLE3, BLE10 and BLE9. From there the line goes in southward direction along the western line of BLE9 up to common point of BLE8, BLE10 and BLE11 (P2). Then the line turns towards east along the northern line of P1 and P2 and descends down towards south along the eastern line of P2 till it meets the northern bank of river Palpala. From there the boundary goes almost in southward direction following upstream of a dry nala and then through the peak of Kalipahad. Thereafter it follows another dry nala along down stream leading to Sitakund nala and continues to run along the common boundary of P12 and P13, P12 and SJ3, P12 and SJ4 where it finally meets the starting point.

SCHEDULE – C2

CONSTITUTION OF THE CRITICAL TIGER HABITAT OR CORE AREA OF SIMILIPAL TIGER RESERVE

Sl. No.	Compartment No.	Area in km^2	Sl. No.	Compartment No.	Area in km^2
1	BH-3(P2)	7.06	33	BLW-8(P2)	5.72
2	BH-4	7.05	34	ED-1	11.06
3	BH-5	4.81	35	ED-10	11.16
4	BH-6(P2)	7.37	36	ED-11(P-1)	5.83
5	BH-7(P2)	4.99	37	ED-11(P-2)	5.51
6	BLE-13	9.17	38	ED-2	4.93
7	BLE-14	8.35	39	ED-3	7.78
8	BLE-15	7.55	40	ED-5	6.57
9	BLE-16(P2)	6.46	41	ED-6	11.89
10	BLE-17(P2)	5.02	42	ED-7(P-1)	1.82
11	BLE-18	10.93	43	ED-9	8.05
12	BLE-19(P2)	8.64	44	KD-10	10.89
13	BLE-21(P2)	7.56	45	KD-11	11.5
14	BLE-22(P2)	7.24	46	KD-6(P2)	6.47
15	BLE-23(P2)	7.43	47	KD-7(P2)	6.79
16	BLE-24	6.06	48	KD-9(P2)	10.13
17	BLE-4(P2)	8.44	49	KH-10(P2)	7.95
18	BLE-5(P2)	9.39	50	KH-14	10.63
19	BLE-6	10.57	51	KH-15(P2)	9.17
20	BLE-7	8.76	52	KH-16(P2)	9

21	BLE-8	6.92		53	KH-17(P2)	10.55
22	BLE-9	6.61		54	KH-18	14.9
23	BLW-10(P2)	0.15		55	KH-19(P2)	8.29
24	BLW-11	14.18		56	KH-2(P2)	12.09
25	BLW-12(P2)	10.64		57	KH-20	10.9
26	BLW-13(P2)	8.81		58	KH-21	10.48
27	BLW-14(P2)	8.33		59	KH-22	16.67
28	BLW-16(P2)	1.15		60	KH-23(P-1)	4.25
29	BLW-17(P2)	5.11		61	KH-23(P-2)	5.35
30	BLW-18(P2)	11.27		62	KH-24	11.23
31	BLW-19	9.68		63	KH-25	10.8
32	BLW-7(P2)	1.48		64	KH-26	11.06
Sl. No.	**Compartment No.**	**Area in km^2**		**Sl. No.**	**Compartment No.**	**Area in km^2**
65	KH-27	11.66		106	TK-2	7.18
66	KH-7	10.92		107	TK-3	11.14
67	KH-8	11.96		108	TK-4	7.18
68	KH-9	11.71		109	TK-5(P-1)	8.92
69	P-1	10.61		110	TK-5(P-2)	2.23
70	P-10	12.21		111	TK-7(P-1)	4.23
71	P-11	14.59		112	TK-7(P-2)	5.17
72	P-12	9.29		113	TK-8(P2)	2.93
73	P-14(P2)	13.46		114	TL-1(P2)	3.3
74	P-15	8.06		115	TL-2(P2)	6.35
75	P-16	10.05		116	TL-3(P2)	4.2
76	P-17	8.85		117	TL-4(P2)	5.35
77	P-18	10.2		118	TL-5(P2)	7.39
78	P-19	10.86		119	TL-7	7.54
79	P-2	8.7		120	TL-9(P2)	4.68
80	P-6(P-1)	6.91		121	WD-14	6.66
81	P-6(P-2)	6.55		122	WD-15	7.91
82	P-7	9.53		123	WD-16	8.48
83	P-8(P2)	5.03		124	WD-17(P-1)	2.5
84	SJ-13	10.14		125	WD-17(P-2)	9.82
85	SJ-14	8.27		126	WD-18	13.35
86	SJ-15	9.63		127	WD-19	9.7
87	SJ-16(P2)	5.75		128	WD-20(P-1)	6.15
88	SJ-17(P-1)	10.43		129	WD-20(P-2)	3.9
89	SJ-17(P-2)	0.88		130	WD-21	11.48
90	SJ-7	9.46		131	WD-22	7.57
91	SJ-8	7.91		132	WD-23	10.72

92	SJ-9(P-1)	5.37		133	WD-24	7.57
93	SL-1	8.55		134	WD-25	7.59
94	SL-10	15.26		135	WD-26	10.95
95	SL-11(P-1)	4.53		136	WD-27	12.78
96	SL-11(P-2)	5.72		137	WD-28	10.64
97	SL-13	12.95		138	WD-29	9.38
98	SL-18(P2)	4.02		139	WD-3	9.41
99	SL-2	4.85		140	WD-30	8.61
100	SL-5	9.84		141	WD-31	11.24
101	SL-6(P-1)	9.26		142	WD-32	11.43
102	SL-6(P-2)	3.98		143	WD-5(P2)	5.11
103	SL-8	9.32		144	WD-7(P2)	6.08
104	SL-9	6.55		145	WD-8(P2)	2.04
105	TK-1	8.12		146	WD-9(P2)	7.35
					Total	**1194.75**

BY ORDER OF THE GOVERNOR

H. S. CHAHAR
PRINCIPAL SECRETARY TO GOVERNMENT

Memo No.20802/F&E., Dated- 31.12.2007

Copy forwarded to the Director, Printing, Stationary & Publication, Orissa , Cuttack with a request to publish the Notification in the next issue of Orissa Gazette.

500 (five hundred) copies of the Gazette Notification may please be sent to this Department for reference & use.

Additional Secretary to Government
31.12.07

Memo No20803/F&E., Dated-31.12.2007

Copy forwarded to P.C.C.F(O)/ PCCF (WL) & CWLW, Orissa/ C.F. & F.D.,STR , Baripada/ All Conservator of Forests/ All D.F.Os for information and necessary action.

Additional Secretary to Government
31.12.07

Memo No.20804/F&E., Dated-31.12.2007

Copy forwarded to Dr. Rajesh Gopal, Member Secretary, National Tiger Conservation Authority, Bikaner House, Annex-V, Shahjahan Road, New Delhi-110011 for information and necessary action.

Additional Secretary to Government
31.12.07

Memo No20805/F&E., Dated-31.12.2007

Copy forwarded to all Departments of Government/ All R.D.Cs/ All Heads of Departments/ All Collectors for information.

Additional Secretary to Government
31-12-07

Memo No.20806/F&e., Dated-31.12.2007

Copy to All Sections of Forest & Environment Department/G.F. (20 copies) for information.

Additional Secretary to Government
31.12.07

ANNEXURE VI
NOTIFICATION OF SIMILIPAL WILLIFE SANCTUARY

The Orissa Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 869 CUTTACK, TUESDAY, MAY 6, 2008 / BAISAKHA 16, 1930

FOREST AND ENVIRONMENT DEPARTMENT.

NOTIFICATION

The 23rd April 2008

No. 6484 / 8F(WL)2/2008 / F&E, Whereas the State Government in exercising the powers conferred by sub-section(1) of section 18 of the Wildlife(Protection) Act, 1972 (53 of 1972), have declared the whole of the Similipal Reserve Forest area situated in Mayurbhanj District as Similipal Sanctuary vide notification no.30467/FFAH, dt. the 3rd December 1979,

Whereas, under section-19 to 25 of the said Act, the Collector and District Magistrate, Mayurbhanj has duly enquired into, and determined the existence, nature and extent of the rights of persons within the limits of the said sanctuary,

Now therefore, in exercise of the powers conferred under Section 26A of the Wildlife (Protection) Act, 1972 (53 of 1972), the State Government do hereby declare the area as described in Schedules A & B to be a sanctuary known as " SIMILIPAL WIDLIFE SANCTUARY" with effect from the date of publication of this notification in *Orissa Gazettee*.

Schedule "A"

Location : 86°04' to 86°37' East longitude
21°30' to 22°08' North latitude.

Area of sanctuary:

(i)Area of Similipal reserve forest - (as computed through GIS)	2271.78 Sq.Kms
(ii) Less-Area of Royati land in 57 villages situated within the sanctuary	34.83 Sq.Kms.
Area of the Sanctuary :	**2306.61 Sq.Kms.**

Schedule 'B'

Boundary description of Similipal sanctuary

The Sanctuary boundary is coincident with Similipal Reserve Forest, which is described, as below in a clockwise direction.

The boundary line starts from a point situated on the eastern side of National Highway No.-6, 275 km from Calcutta and 11 km from Jashipur. It then proceeds in general south-east, north-east and east direction skirting village Dumuria, Bankati, Majurbeka and Tamalbandh and encircling Chheligudri and Barapahar hill to meet Kalika nala at a point where the nala emerges from the Reserve Forest boundary line. The boundary line then follows sequentially to northwest, northeast and southeast around the hill skirting Andharjhari, Burhikhamari, Jambani, Tambajhari, Raikarkacha villages respectively. From Bankidihi the boundary line runs in a winding north-east direction bordering villages Kasipani, Talakbadi, Rangamatia, Rugridihi, Osadala, Ghorabandha and Ektali to meet Sankbcha nadi around Kuarighatia, Tuarburu and Dalaburu hill making three 'U' loops at Kasipani, Rangamatia and Osadala villages. The point where Sankocha nala crosses the Reserve Forest boundary marks the northernmost limit of the Sanctuary.

After crossing the above nadi the boundary line proceeds in south-east, south and in a winding south-west direction respectively around Kalighati and Sundia parbat and on the western side of Bangriposi-Talbandh railway line to the Talbandh village enclave adjoining the village boundaries of Bhagirathipur, Chandbil, Kanchinda, Kamarghutu, Kumirmundi, Hatibari, Sarbatia, Domuhani, Chatkuari, Kitabera, Sarjamdih, Uperbera, Baliadhipa, Burudih and Talbandh villages to a point due 3 km north-east from Baraghati peak. From this point the Sanctuary boundary line takes a sharp turn and proceeds in a winding north-east direction encircling the Talbandh enclave to meet Burhabalang river at distance of 8 km passing through the village boundaries of Kadamdih, Rengalbera, Salghati, Majhigaon. After crossing river Burhabalang, the boundary line continues in the same direction on the foothills of Baldia parbat on the southern and eastern sides of Sorispal, Betjharan and on the southern side of Chaturahi and Ghatiduba villages. Thereafter it makes a 'U' loop on the northeastern side of Baldiha parbat and again continues in the northeast direction around Petua parbat up to Hatrabeda village. Here the boundary line takes a sharp southerly direction surrounding Petua parbat. Thereafter it sequentially follows southwest, south, south southeast and south east directions making an area on the foothills of Bankjora and Ghoragada parbat touching the village boundaries of Masinabhilla, Rajabasa and Hathigadia to reach Borangandha nala. After crossing Borangadha nala, the boundary line runs due east then in a general north east and east directions bordering the villages Hatidapand, Kundalabani and Gendapokhari on the foothill of Chattan

buru. From Gendapokhari village, it proceeds in south-southeast and southwest directions along the foothills skirting Modrajori and Alubani villages to meet Boram khal. Crossing Boram khal the Sanctuary boundary goes south and southeast on the foothills of Kanialucha pahar and Chandripahar. On the foothill of the eastern spur it makes a sharp turn and proceeds in a general southwest direction bypassing Jhinei and Tatajori villages to meet Purunapani nala draining to western portion of Chandripahar and eastern portion of Champagarh pahar. After crossing Purunapani nala, it runs along the foothills of Champagarh pahar in south-west and south directions for a short distance and then makes a sharp western turn at right angles to meet Lulung village boundary. It then proceeds in south-southwest and southeast direction to meet river Palpala to the south of Lulung Forest Rest House. The Sanctuary boundary then takes a northeastern direction by the side of river Palpala where it is forded Lulung-Pithabata road. There it takes a sharp south easternly turn to cross the river and the road. It continues thereafter in general eastern direction to pass in between Sitakund fall and Govindchandrapur village to the southern outskirts of village Lalpani. There it forms a northerly loop and continues north to village Lakshmiposhi. From Lakshmiposhi the Sanctuary boundary moves in south – east and south-southeast direction on the fringe of village Goripokhari, the latter marking the eastern most limit of the Sanctuary.

A little over a Kilometer to the south of Kukurpani, the boundary line forms a inward north-western loop and then it takes a general southern direction with villages Digdiga, Kendujharan, Besarpani and Chekamara lying to east. At Chekamara, it turns to the west and after covering about 2 km it proceeds north northwest through 1.3 km. Where it takes an acute turn south south-west to the north-west corner of village Chandanchaturi. From Chandanchaturi it follows the foothills of Gurusadar pahar towards northwest direction to meet the Garisa nala draining the eastern face of Gurusadar pahar. After crossing the Garisa nala it courses the foothills in a winding southeast direction skirting the village Champagarh upto Purnachandrapur village. From this point it turns along the foothills of Murari and Baidyanath parbat in south-southwest and south-west direction by passing village Agnikumari, Sonpokhari and Sapanchua to meet Asakpara nala draining the southern part of the last mentioned. From this point the Sanctuary boundry goes round the foothills of Betjharna parbat and Kansasura pahar first in the north-east then in south, then in west and finally in north-west direction bordering villages Rangamatia, Debak, Nuagaon, Mahuldiha and Baniabasa and crossing Sanjo river once to the western limit of Sanjo valley. The boundary line retreats in general southeast and south-southeast directions around Bankasala hill up to Kanhaidihi village. It then follows in west, south and finally in west direction around Indurgaura hill bordering villages Phulbari and Jamudiha to meet river East Deo near Balma village. After crossing the river the boundary line Sharply turns to south-east, south and south west directions around Kobi pahar to meet Kantiali nala, a tributary of East Deo and draining Bhairimundi and kobipahar hills, touching

Manikapur village on its way. The Sanctuary boundary line then proceeds due east for short distance there after making a sharp turn to south, south- east and south south-west on the western side of Badadangua, Anantapur, Patharkhani, Beguniapotta, Chitrabania, and Karatia Sahi to meet Balunala. Passing Balinala it arches round the hill in east west direction near Junapahar villages to meet Thakthakinala. From here the boundary line courses along the foothills in a general southerly direction to meet Udala-Thakurmunda road due north of Kadamsole village. From this point the boundary line runs to the north of the road up to Manabhanga village the trijunction point of Similipal reserve forests, Noto Reserve Forests and Manabhanga village crossing Kushabhadra nala through its mid-way. The boundary line then follows Udala-Thakurmunda road, which separates Similipal reserve forest to its north and Noto reserve forest to its south in a general southwest direction touching Banjhikusum Up to village Dangadiha where, it comes close to river Salandi. it then leaves the road , crosses the river Salandi, and then follows sequentially west, south-west, south south-west and finally west to meet the southern limit of the boundary near Patrapada village. From here, the Sanctuary boundary runs generally west direction up to 5 km. Turning sharply due north skirting Kirkichipal village to its west to meet Kantiali nala. From this point the boundary line goes southwest, south and west along the foothills of Baldia hill. Thereafter it goes around Baldia hill first in north north-west then followed by a general winding direction of north east and north to meet Gobarjhora nala touching the village boundaries of Purunapani, Keshdiha, Chamarasahi, Mandajhari. Here onwards the boundary line takes a general southwest direction up to Ghorabindha village and surrounding the main spur of Ghorabindha parbat it precedes in a winding northeast direction up to Ranibhol village meeting the eastern tributary of the Sim nadi. Here on the Sanctuary continues in a winding northwest direction along the foothills of Asankudar and Jamburu hills by passing Asankudar, Khaparkhia, and Badmahuldiha up to Ranibhol (Kendumundi) village where it meets Tel nadi. Crossing the river Tel it follows the foothills Sequentially west, northwest and east directions by passing Kendumundi village at the main spur of Dindarani parbat and forming a loop around it. Thereafter boundary line takes a sharp turn to general northwest along the foothills and bending to north for a short distance around the western spur of Meghuri pahar it crosses Bhirol nala near Bispur village. it proceeds further on in a general general north-west direction up to Thakurjharan village and then leads north and finally north east around the hill to a point near Meludihi village . From this point it takes to northwest and north direction to meet West Deo riverat its eastern bank near Gopalpur village. The Sanctuary boundary then proceeds to east, then takes a winding south east turn to enter Dudhiani villages enclave near Devigarh village surrounding Devigarh pahar and by-passing villages Thakurmapatna, Samohandrapur and San Ramachandrapur. At San Ramchandrapur it rebounds first in north north-west and then in a general direction of south east around the hills to meet river Deo touching Rangamatia, Khalpara and Burigaon villages. At Burigaon it follows the village boundary along the foothills and crossing river

Deo thrice takes a northwest through north-northwest direction to join the Northern boundary of Dudhigni village on the eastern bank of Kalanala. It then follows a wavy east through south east direction along the foothills and looping round Burudihi and Ramjhori villages finally follows a winding north west through south west direction to a point meeting the western bank of Kala nala where the boundary line had met its eastern bank earlier touching Paharpur and Jalda villages. From here the boundary line arches round the hill first in the west and then in north direction winding in its course to emerge final in south west direction to meet Barakamara village boundary. It goes along the foothills thereafter up to Udibasa village making two loops first near Barakamara village and second near Hatibari village due south west around two spurs radiating from Kadiburu hill enclosing Purunapani village in the trough. From Udibasa the boundary line arches around Guntipat pahar, the third spur from Kadiburu making a westward loop adjoining Paharmark and Anantasahi villages making the western most limit of the sanctuary. It then precedes in a winding north then northeast through north-northeast direction adjoining villages Bariadihi, Kalaitumba, Kanchikna, Kumdabari, Tilabari and Puragarh villages. From Puragarh village the boundary line enters the Kaliani enclave in a winding southwest direction followed by southward direction touching villages Kaliani, Olakudar, Utras and Tamaksila. From Tamaksila the boundary lines follows the foot hills to east for a short distance, crosses river Khairi and proceeds in winding north direction touching the village Kadagharuan. From this point it goes in a zigzag manner generally due west up to village Dhalabani on the northern bank of the river Khairi to a point due north where it had entered the Kaliani enclave. The boundary goes to a winding north around Nachuani buru hill touching villages Bhalupani and Chadripahadi. From Chadripahadi the Sanctuary boundary enters the Jamuani enclave arching round Nachuani buru on its northern bank touching villages Karanjabali, Pudagarh, Mohanpur, Tingria, and Palagoda. From Palogada the boundary line courses along the southern bank of river Bhandan upstream, crosses it near Rajupal village and then goes on its northern side first to west then in north north east direction touching villages Kundagarh, Bhadusol and Jamuani to a point where it meet Hatimundi nala, a tributary of Bhandan. After crossing Hatimundi ma;a mear San-jhili village it proceeds in a sequential direction of west, north west and west on the northern bank of the river Bhandan touching Bada jhili and Tulsibani village, the later marking the beginning of Jamuani enclave. From Tulsibani the boundary line proceeds to north east and after crossing Gohira nala twice near Murgaghutu village runs in a winding north east and then north west directions inwardly arching round the villages Naikabeda, Akbrasal, Ichhaghutu, Bada sialinai, Chheligoduri and Dhangrimuta to join by the side of National Highway 6 the starting point of this description sanctuary Similipal Tiger Reserve boundary.

SCHEDULE-C

Revenue villages existing within Similipal sanctuary where rights have been admitted in respect of rayati land holdingsland available, and population as per 2001 census.

Sl No.	Name of Revenue Village	Total land Available in the village as per ROR (in Ac)	Total Rayati land available in the village as per ROR (in Ac)	Total Govt. land available in the village as per ROR (in Ac)	Total population of the village
(1)	(2)	(3)	(4)	(5)	(6)
1	Asanbani	412.94	48.80	364.14	150
2	Badakasira	241.60	115.72	125.88	230
3	Bad-Uski	334.34	241.73	92.61	241
4	Barigan	336.09	177.36	158.73	182
5	Bharadachua	88.91	64.98	23.93	90
6	Bilapaka	209.34	127.73	81.61	267
7	Chandikhaman	143.97	103.20	40.77	158
8	Gudgudia	394.87	176.10	218.77	526
9	Khediadunguri	350.02	36.87	313.15	110
10	Khejuria	423.61	212.15	211.46	418
11	Kolha	397.45	200.65	196.80	227
12	Kundabil	451.95	196.47	255.48	372
13	Kuanribil	656.46	311.68	344.78	346
14	Kumari	417.22	198.80	218.42	293
15	Kusumi	321.12	137.01	184.11	231
16	Nenjaghosara	278.12	169.44	108.68	85
17	Nuniagoda	275.07	157.57	117.50	182
18	Rautola	381.74	182.20	199.54	259
19	Sankasira	252.32	69.59	182.73	184
20	San-Uski	202.76	152.91	49.85	233
21	Saharpat	365.73	170.78	194.95	298
22	Astakuanr	1069.69	417.69	652.00	445
23	Balarampur	884.00	229.15	654.85	324
24	Bandirabasa	239.32	135.66	103.66	240
25	Barehipani	1340.43	1071.25	269.18	473
26	Barsia	890.84	287.70	603.14	403

(1)	(2)	(3)	(4)	(5)	(6)
27	Budhabalanga	787.09	83.61	703.48	249
28	Chakunda Kacha	63.83	22.27	41.56	29
29	Similipal	1001.09	190.78	810.31	417
30	Gopinathpur	1177.17	118.08	1059.09	217
31	Haladia	293.24	119.86	173.38	132
32	Jajadihi	115.48	33.09	82.39	126
33	Kiajhari	156.30	100.70	55.60	185
34	Kukurbhuka	2160.39	94.31	2066.08	300
35	Kolajhari	176.72	97.72	79.00	78
36	Lembujharan	379.76	104.49	275.27	123
37	Makabadi	659.83	193.43	466.40	241
38	Nawana	1333.69	244.50	1089.19	1043
39	Nikhirda	752.32	92.53	659.79	60
40	Phulbaria	124.23	113.01	11.22	80
41	Raipal	321.72	162.01	159.71	148
42	Saruda	438.14	69.53	368.61	139
43	Charbandh	288.92	226.90	62.02	449
44	Dantiakaacha	107.29	46.00	61.29	89
45	Ahalapani	176.91	100.86	76.05	113
46	Amdapani	197.28	129.66	67.62	182
47	Barubeda	418.24	170.43	247.81	162
48	Basilakacha	43.28	22.41	20.87	578
49	Bhaduakacha	138.34	42.83	95.51	23
50	Chakidi	140.15	90.55	49.60	155
51	Jamutalia	199.45	127.56	71.89	107
52	Jerkani	149.97	69.23	80.74	88
53	Khadjjhati	72.67	34.92	37.75	78
54	Kukurbhuka	192.35	107.53	84.82	147
55	Kusumtota	213.58	77.77	135.81	65
56	Phuljhara	187.38	37.14	150.24	138
57	Purunapani	122.47	86.55	35.92	242
	Total	**23949.19**	**8603.45**	**15345.74**	**13150**

8

GEO CO-ORDINATES OF BOUNDARY PILLARS OF SIMILIPAL SANCTUARY

Pillar No	Latitude(North)			Longitude(East)		
	Deg	Min	Sec	Deg	Min	Sec
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	22	02	39.8	86	23	48.7
2	22	02	41.5	86	23	53.2
3	22	02	39.0	86	23	57.8
4	22	02	36.8	86	23	59.8
5	22	02	35.5	86	24	02.1
6	22	02	33.3	86	24	04.8
7	22	02	36.3	86	24	11.3
8	22	02	40.3	86	24	11.3
9	22	02	41.8	86	24	12.6
10	22	02	44.3	86	24	13.6
11	22	02	50.0	86	24	16.0
12	22	02	51.0	86	24	17.3
13	22	02	52.6	86	24	23.2
14	22	02	55.1	86	24	27.0
15	22	02	58.1	86	24	30.9
16	22	03	02.1	86	24	36.5
17	22	03	00.8	86	24	44.1
18	22	03	00.2	86	24	46.6
19	22	03	03.7	86	24	54.8
20	22	03	10.9	86	25	00.8
21	22	03	16.3	86	25	08.6
22	22	03	17.0	86	25	09.4
23	22	03	17.2	86	25	10.7
24	22	03	18.5	86	25	12.2
25	22	03	20.9	86	25	13.6
26	22	03	22.8	86	25	15.0
27	22	03	24.3	86	25	16.7
28	22	03	25.3	86	25	18.8
29	22	03	26.1	86	25	21.8
30	22	03	27.3	86	25	24.5
31	22	03	29.0	86	25	32.6
32	22	03	30.8	86	25	35.8
33	22	03	33.3	86	25	33.4
34	22	03	33.7	86	25	34.3
35	22	03	33.4	86	25	37.2
36	22	03	34.5	86	25	39.8
37	22	03	35.7	86	25	41.0
38	22	03	37.2	86	25	42.9
39	22	03	38.4	86	25	44.0
40	22	03	39.9	86	25	43.8
41	22	03	40.9	86	25	43.4
42	22	03	42.4	86	25	43.2
43	22	03	44.0	86	25	44.2
44	22	03	44.3	86	25	45.3
45	22	03	45.1	86	25	46.4
46	22	03	45.4	86	25	47.9
47	22	03	46.9	86	25	49.6

(1)	(2)	(3)	(4)	(5)	(6)	(7)
48	22	03	45.2	86	25	51.0
49	22	03	43.5	86	25	53.8
50	22	03	45.6	86	25	55.1
51	22	03	45.9	86	25	57.7
52	22	03	47.3	86	25	59.4
53	22	03	48.2	86	26	02.0
54	22	03	49.1	86	26	04.9
55	22	03	50.4	86	26	07.9
56	22	03	50.7	86	26	10.5
57	22	03	50.7	86	26	12.7
58	22	03	51.3	86	26	15.3
59	22	03	51.3	86	26	17.3
60	22	03	51.6	86	26	18.9
61	22	03	52.0	86	26	20.9
62	22	03	52.3	86	26	22.9
63	22	03	53.5	86	26	24.1
64	22	03	54.7	86	26	26.9
65	22	03	56.8	86	26	26.6
66	22	03	52.9	86	26	33.0
67	22	03	57.5	86	26	32.6
68	22	03	57.7	86	26	34.6
69	22	03	57.7	86	26	38.0
70	22	03	58.0	86	26	40.4
71	22	03	58.2	86	26	42.8
72	22	03	58.1	86	26	44.8
73	22	04	00.6	86	26	49.9
74	22	04	03.1	86	26	53.2
75	22	04	02.5	86	22	57.7
76	22	04	02.9	86	26	59.7
77	22	04	01.2	86	27	02.1
78	22	03	59.3	86	27	05.6
79	22	03	54.9	86	27	07.6
80	22	03	50.4	86	27	09.2
81	22	03	47.6	86	27	08.4
82	22	03	42.2	86	27	08.7
83	22	03	36.8	86	27	11.7
84	22	03	32.8	86	27	17.8
85	22	03	41.6	86	27	24.6
86	22	03	45.2	86	27	23.9
87	22	03	48.9	86	27	20.5
88	22	03	53.8	86	27	24.0
89	22	03	54.3	86	27	28.2
90	22	03	55.8	86	27	31.2
91	22	04	01.4	86	27	36.5
92	22	04	04.0	86	27	31.1
93	22	04	06.8	86	27	41.6
94	22	04	06.7	86	27	42.7
95	22	04	08.8	86	27	45.6
96	22	04	10.7	86	27	49.1
97	22	04	12.5	86	27	51.5
98	22	04	14.1	86	27	55.5
99	22	04	16.7	86	27	58.4

(1)	(2)	(3)	(4)	(5)	(6)	(7)
100	22	07	16.8	86	27	59.6
101	22	04	19.2	86	28	04.8
102	22	04	20.6	86	28	07.9
103	22	04	22.1	86	28	09.8
104	22	04	24.6	86	28	11.7
105	22	04	24.7	86	28	15.9
106	22	04	25.9	86	28	19.4
107	22	04	25.7	86	28	22.0
108	22	04	24.9	86	28	25.5
109	22	04	26.5	86	28	28.3
110	22	04	21.4	86	28	32.8
111	22	04	22.7	86	28	34.4
112	22	04	20.3	86	28	34.3
113	22	04	16.7	86	28	34.1
114	22	04	12.5	86	28	33.8
115	22	04	06.5	86	28	33.2
116	22	04	04.3	86	28	33.8
117	22	04	1.1	86	28	34.6
118	22	03	53.4	86	28	35.0
119	22	03	53.3	86	28	35.4
120	22	03	55.1	86	28	35.6
121	22	03	52.3	86	28	35.9
122	22	03	49.9	86	28	34.8
123	22	03	46.4	86	28	34.7
124	22	03	44.0	86	28	35.2
125	22	03	41.7	86	28	35.0
126	22	03	37.7	86	28	33.7
127	22	03	35.9	86	28	34.6
128	22	03	32.1	86	28	35.0
129	22	03	28.7	86	28	35.5
130	22	03	22.5	86	28	37.3
131	22	03	19.6	86	28	38.2
132	22	03	16.1	86	28	37.7
133	22	03	13.1	86	28	36.4
134	22	03	10.7	86	28	32.7
135	22	03	08.6	86	28	29.2
136	22	03	06.3	86	28	23.6
137	22	03	02.5	86	28	20.5
138	22	03	00.0	86	28	15.7
139	22	02	57.7	86	28	11.5
140	22	02	55.7	86	28	07.8
141	22	02	51.8	86	28	09.4
142	22	02	45.8	86	28	08.2
143	22	02	40.8	86	28	06.3
144	22	02	38.5	86	28	01.1
145	22	02	36.2	86	27	51.4
146	22	02	31.3	86	27	50.0
147	22	02	29.5	86	27	53.9
148	22	02	27.5	86	27	58.2
149	22	02	24.3	86	27	59.5
150	22	02	19.5	86	27	59.7
151	22	02	14.2	86	27	57.0

(1)	(2)	(3)	(4)	(5)	(6)	(7)
152	22	02	09.9	86	27	59.1
153	22	02	05.2	86	28	00.6
154	22	02	01.0	86	28	05.1
155	22	01	55.4	86	28	12.8
156	22	01	51.9	86	28	12.4
157	22	01	51.8	86	28	16.8
158	22	01	48.5	86	28	23.0
159	22	01	48.7	86	28	21.9
160	22	01	45.6	86	28	23.3
161	22	01	41.0	86	28	25.8
162	22	01	36.0	86	28	24.7
163	22	01	30.5	86	28	23.6
164	22	01	24.2	86	28	28.8
165	22	01	22.8	86	28	28.3
166	22	01	20.3	86	28	30.5
167	22	01	18.5	86	28	32.6
168	22	01	17.7	86	28	34.9
169	22	01	16.7	86	28	37.5
170	22	01	19.3	86	28	39.7
171	22	01	22.6	86	28	40.7
172	22	01	21.2	86	28	44.0
173	22	01	21.7	86	28	48.4
174	22	01	21.6	86	28	52.2
175	22	01	19.9	86	28	55.5
176	22	01	19.4	86	28	58.5
177	22	01	18.8	86	29	00.1
178	22	01	18.4	86	29	02.3
179	22	01	17.7	86	29	04.2
180	22	01	15.9	86	29	08.4
181	22	01	14.7	86	29	10.6
182	22	61	13.8	86	29	12.7
183	22	01	12.3	86	29	16.1
184	22	01	10.8	86	29	19.5
185	22	01	09.3	86	29	23.6
186	22	01	06.4	86	29	28.3
187	22	01	04.1	86	29	32.7
188	22	01	01.2	86	29	36.5
189	22	00	58.7	86	29	38.6
190	22	00	56.0	86	29	40.9
191	22	00	50.2	86	29	46.2
192	22	00	45.2	86	29	53.3
193	22	00	42.2	86	29	57.9
194	22	00	39.8	86	30	01.5
195	22	00	37.0	86	30	06.0
196	22	00	34.6	86	30	06.3
197	22	00	31.4	86	30	07.0
198	22	00	25.1	86	30	04.8
199	22	00	22.2	86	30	08.0
200	22	00	19.4	86	30	11.4
201	22	00	16.5	86	30	15.4
202	22	00	13.8	86	30	18.1

(1)	(2)	(3)	(4)	(5)	(6)	(7)
203	22	00	11.7	86	30	18.1
204	22	00	7.1	86	30	22.4
205	22	00	5.1	86	30	24.3
206	22	00	5.6	86	30	27.1
207	22	00	02.6	86	30	29.7
208	22	00	02.6	86	30	32.3
209	21	59	57.5	86	30	32.3
210	21	59	53.3	86	30	38.2
211	21	59	53.3	86	30	40.3
212	21	59	50.7	86	30	42.6
213	21	59	50.3	86	30	46.4
214	21	59	50.4	86	30	49.1
215	21	59	50.0	86	30	53.5
216	21	59	49.8	86	30	54.7
217	21	59	49.6	86	30	56.7
218	21	59	49.6	86	30	59.3
219	21	59	49.4	86	31	01.4
220	21	59	49.5	86	31	03.3
221	21	59	48.6	86	31	07.3
222	21	59	48.6	86	31	09.7
223	21	59	48.6	86	31	15.6
224	21	59	48.6	86	31	18.6
225	21	59	48.6	86	31	22.1
226	21	59	48.2	86	31	24.6
227	21	59	47.8	86	31	28.3
228	21	59	46.8	86	31	32.8
229	21	59	46.0	86	31	36.3
230	21	59	45.8	86	31	36.8
231	21	59	44.7	86	31	41.7
232	21	59	43.9	86	31	42.4
233	21	59	43.3	86	31	44.5
234	21	59	42.6	86	31	46.5
235	21	59	41.9	86	31	48.1
236	21	59	41.4	86	31	50.2
237	21	59	41.3	86	31	52.6
238	21	59	42.0	86	31	54.7
239	21	59	43.1	86	31	57.8
240	21	59	44.1	86	32	01.1
241	21	59	44.7	86	32	03.5
242	21	59	45.1	86	32	05.0
243	21	59	45.6	86	32	06.7
244	21	59	46.3	86	32	08.0
245	21	59	46.8	86	32	09.3
246	21	59	47.0	86	32	10.7
247	21	59	47.5	86	32	12.6
248	21	59	46.7	86	32	13.7
249	21	59	47.5	86	32	14.9
250	21	59	47.1	86	32	16.4
251	21	59	47.0	86	32	17.6
252	21	59	46.5	86	32	19.2
253	21	59	46.8	86	32	20.6

(1)	(2)	(3)	(4)	(5)	(6)	(7)
254	21	59	47.3	86	32	21.7
255	21	59	47.4	86	32	22.6
256	21	59	48.1	86	32	23.2
257	21	59	49.9	86	32	24.3
258	21	59	51.2	86	32	25.5
259	21	59	52.1	86	32	26.4
260	21	59	53.4	86	32	27.2
261	21	59	54.3	86	32	27.3
262	21	59	58.0	86	32	28.4
263	21	59	57.1	86	32	29.1
264	21	59	58.4	86	32	30.7
265	22	00	01.5	86	32	32.2
266	22	00	04.0	86	32	34.9
267	22	00	06.0	86	32	37.8
268	22	00	08.8	86	32	40.9
269	22	00	10.1	86	32	43.1
270	22	00	12.6	86	32	44.3
271	22	00	15.4	86	32	45.9
272	22	00	18.9	86	32	47.9
273	22	00	23.0	86	32	50.2
274	22	00	24.1	86	32	51.1
275	22	00	27.0	86	32	54.1
276	22	00	32.3	86	32	58.3
277	22	00	35.5	86	33	00.8
278	22	00	37.6	86	33	02.8
279	22	00	40.6	86	33	05.4
280	22	00	42.6	86	33	06.9
281	22	00	44.5	86	33	08.9
282	22	00	46.1	86	33	11.5
283	22	00	47.6	86	33	16.3
284	22	00	49.2	86	33	20.6
285	22	00	49.9	86	33	23.2
286	22	00	50.4	86	33	24.6
287	22	00	50.7	86	33	25.7
288	22	00	51.8	86	33	29.7
289	22	00	52.0	86	33	33.2
290	22	00	53.1	86	33	35.3
291	22	00	54.3	86	33	38.1
292	22	00	54.5	86	33	40.4
293	22	00	55.2	86	33	42.1
294	22	00	55.4	86	33	43.5
295	22	00	56.2	86	33	44.3
296	22	00	57.3	86	33	45.1
297	22	00	58.1	86	33	45.6
298	22	00	59.3	86	33	46.2
299	22	01	00.9	86	33	47.7
300	22	01	02.3	86	33	49.1
301	22	01	03.6	86	33	51.1
302	22	01	05.6	86	33	51.8
303	22	01	09.0	86	33	54.8
304	22	01	10.0	86	33	55.5
305	22	01	11.2	86	33	56.5

(1)	(2)	(3)	(4)	(5)	(6)	(7)
306	22	01	12.8	86	33	57.7
307	22	01	13.5	86	33	57.9
308	22	01	14.0	86	33	58.3
309	22	01	15.6	86	33	59.0
310	22	01	16.5	86	33	59.4
311	22	01	17.5	86	33	59.9
312	22	01	18.4	86	34	00.7
313	22	01	19.9	86	34	01.3
314	22	01	20.7	86	34	02.1
315	22	01	22.0	86	34	02.9
316	22	01	23.2	86	34	03.6
317	22	01	23.6	86	34	05.0
318	22	01	25.5	86	34	05.8
319	22	01	27.1	86	34	07.1
320	22	01	28.2	86	34	08.2
321	22	01	29.6	86	34	09.0
322	22	01	30.7	86	34	10.0
323	22	01	31.6	86	34	10.5
324	22	01	32.4	86	34	10.9
325	22	01	33.7	86	34	11.4
326	22	01	34.3	86	34	12.3
327	22	01	35.0	86	34	12.9
328	22	01	36.2	86	34	13.5
329	22	01	36.7	86	34	14.3
330	22	01	37.9	86	34	15.5
331	22	01	40.0	86	34	17.8
332	22	01	42.3	86	34	19.5
333	22	01	43.2	86	34	21.7
334	22	01	45.7	86	34	22.1
335	22	01	46.0	86	34	25.7
336	22	01	47.2	86	34	26.4
337	22	01	47.1	86	34	28.9
338	22	01	47.1	86	34	30.0
339	22	01	47.4	86	34	31.5
340	22	01	47.5	86	34	32.7
341	22	01	47.3	86	34	33.4
342	22	01	47.1	86	34	34.0
343	22	01	47.1	86	34	35.2
344	22	01	47.1	86	34	36.4
345	22	01	47.3	86	34	37.9
346	22	01	47.0	86	34	39.6
347	22	01	47.0	86	34	42.7
348	22	01	46.7	86	34	44.9
349	22	01	46.6	86	34	46.6
350	22	01	46.6	86	34	48.9
351	22	01	46.3	86	34	50.9
352	22	01	45.3	86	34	54.7
353	22	01	44.3	86	34	57.3
354	22	01	44.4	86	35	01.5
355	22	01	45.3	86	35	03.6
356	22	01	45.6	86	35	05.5
357	22	01	48.2	86	35	06.9

(1)	(2)	(3)	(4)	(5)	(6)	(7)
358	22	01	49.0	86	35	09.0
359	22	01	48.8	86	35	10.1
360	22	01	48.8	86	35	11.4
361	22	01	48.5	86	35	12.5
362	22	01	47.8	86	35	13.9
363	22	01	47.0	86	35	14.5
364	22	01	45.9	86	35	15.1
365	22	01	44.5	86	35	15.6
366	22	01	43.2	86	35	16.4
367	22	01	42.4	86	35	16.7
368	22	01	41.5	86	35	17.2
369	22	01	40.7	86	35	17.7
370	22	01	39.7	86	35	18.5
371	22	01	38.1	86	35	19.3
372	22	01	37.0	86	35	19.9
373	22	01	36.1	86	35	21.0
374	22	01	35.1	86	35	21.4
375	22	01	33.8	86	35	22.0
376	22	01	32.5	86	35	22.2
377	22	01	30.8	86	35	23.0
378	22	01	30.1	86	35	22.2
379	22	01	28.7	86	35	22.2
380	22	01	27.8	86	35	21.4
381	22	01	26.9	86	35	20.8
382	22	01	24.8	86	35	19.1
383	22	01	22.8	86	35	18.4
384	22	01	21.5	86	35	18.8
385	22	01	20.5	86	35	20.6
386	22	01	18.8	86	35	22.7
387	22	01	16.6	86	35	24.3
388	22	01	13.2	86	35	26.2
389	22	01	10.1	86	35	28.1
390	22	01	07.2	86	35	29.9
391	22	01	04.3	86	35	31.1
392	22	01	02.0	86	35	31.9
393	22	00	59.6	86	35	32.5
394	22	00	57.2	86	35	32.8
395	22	00	55.1	86	35	33.5
396	22	00	52.5	86	35	33.6
397	22	00	50.2	86	35	33.6
398	22	00	47.6	86	35	33.5
399	22	00	45.0	86	35	33.2
400	22	00	42.0	86	35	32.2
401	22	00	39.0	86	35	31.4
402	22	00	35.8	86	35	28.3
403	22	00	34.2	86	35	25.4
404	22	00	33.1	86	35	22.8
405	22	00	31.0	86	35	20.2
406	22	00	29.5	86	35	18.8
407	22	00	25.9	86	35	16.8
408	22	00	23.8	86	35	16.7
409	22	00	21.7	86	35	16.8

(1)	(2)	(3)	(4)	(5)	(6)	(7)
410	22	00	18.8	86	35	16.9
411	22	00	15.3	86	35	16.5
412	22	00	12.1	86	35	16.4
413	22	00	09.5	86	35	16.1
414	22	00	05.5	86	35	16.4
415	22	00	02.6	86	35	16.1
416	22	00	00.3	86	35	12.8
417	21	59	57.2	86	35	11.8
418	21	59	55.6	86	35	11.2
419	21	59	54.4	86	35	10.7
420	21	59	53.1	86	35	09.5
421	21	59	52.5	86	35	08.4
422	21	59	52.2	86	35	04.8
423	21	59	51.6	86	35	02.1
424	21	59	51.8	86	35	00.8
425	21	59	52.5	86	34	57.3
426	21	59	52.5	86	34	54.9
427	21	59	53.3	86	34	53.1
428	21	59	53.5	86	34	51.1
429	21	59	52.0	86	34	49.7
430	21	59	51.4	86	34	48.6
431	21	59	49.8	86	34	45.5
432	21	59	48.8	86	34	42.3
433	21	59	47.1	86	34	41.8
434	21	59	45.7	86	34	41.4
435	21	59	43.2	86	34	42.5
436	21	59	40.2	86	34	43.7
437	21	59	36.7	86	34	44.6
438	21	59	33.4	86	34	43.9
439	21	59	33.0	86	34	47.3
440	21	59	32.1	86	34	51.0.
441	21	59	31.2	86	34	53.4
442	21	59	29.5	86	34	54.6
443	21	59	27.5	86	34	55.3
444	21	59	26.0	86	34	55.9
445	21	59	21.7	86	34	58.2
446	21	59	18.8	86	35	01.0
447	21	59	18.0	86	35	02.9
448	21	59	17.6	86	35	06.1
449	21	59	16.3	86	35	08.5
450	21	59	15.2	86	35	15.4
451	21	59	14.9	86	35	16.3
452	21	59	14.8	86	35	17.3
453	21	59	13.9	86	35	21.2
454	21	59	13.2	86	35	24.3
455	21	59	12.9	86	35	26.8
456	21	59	12.3	86	35	29.0
457	21	59	11.8	86	35	31.2
458	21	59	11.6	86	35	34.5
459	21	59	11.0	86	35	37.5
460	21	59	0.7	86	35	42.3
461	21	59	05.9	86	35	44.0

(1)	(2)	(3)	(4)	(5)	(6)	(7)
462	21	59	0.4	86	35	46.0
463	21	59	04.5	86	35	49.3
464	21	59	04.5	86	35	51.4
465	21	59	05.7	86	35	56.2
466	21	59	02.6	86	35	57.8
467	21	59	01.1	86	35	58.3
468	21	58	59.3	86	35	59.2
469	21	58	56.1	86	36	00.7
470	21	58	35.5	86	36	02.4
471	21	58	52.5	86	36	05.5
472	21	58	51.7	86	36	07.9
473	21	58	50.6	86	36	10.5
474	21	58	47.2	86	36	14.3
475	21	58	45.5	86	36	16.1
476	21	58	44.7	86	37	17.5
477	21	58	44.0	86	36	20.1
478	21	58	43.2	86	36	22.7
479	21	58	42.4	86	36	28.5
480	21	58	42.1	86	36	31.1
481	21	58	40.9	86	36	34.1
482	21	58	40.5	86	36	36.7
483	21	58	39.9	86	36	40.5
484	21	58	39.0	86	36	44.5
485	21	58	37.6	86	36	47.6
486	21	58	34.5	86	36	48.7
487	21	58	32.2	86	36	51.7
488	21	58	21.7	86	36	52.1
489	21	58	26.3	86	36	52.2
490	21	58	24.3	86	36	50.7
491	21	58	21.4	86	36	48.6
492	21	58	19.4	86	36	47.4
493	21	58	15.7	86	36	45.2
494	21	58	12.6	86	36	43.6
495	21	58	11.2	86	36	41.0
496	21	58	09.2	86	36	37.8
497	21	58	10.6	86	36	31.4
498	21	58	11.5	86	36	27.2
499	21	58	11.9	86	36	23.6
500	21	58	10.3	86	36	21.6
501	21	58	08.5	86	36	18.9
502	21	58	06.2	86	36	16.1
503	21	58	04.5	86	36	13.6
504	21	58	02.1	86	36	10.8
505	21	58	00.6	86	36	08.0
506	21	57	58.3	86	36	05.3
507	21	57	56.1	86	36	02.1
508	21	57	57.1	86	35	59.6
509	21	57	58.1	86	35	56.8
510	21	57	58.3	86	35	56.9
511	21	57	59.8	86	35	48.9
512	21	57	56.7	86	35	49.2
513	21	57	54.5	86	35	45.7

(1)	(2)	(3)	(4)	(5)	(6)	(7)
514	21	57	52.6	86	35	45.9
515	21	57	48.5	86	35	43.7
516	21	57	43.8	86	35	46.9
517	21	57	41.9	86	35	38.4
518	21	57	39.1	86	35	35.9
519	21	57	38.2	86	35	32.0
520	21	57	35.5	86	35	29.9
521	21	57	30.0	86	35	29.2
522	21	57	29.1	86	35	27.3
523	21	57	26.7	86	35	26.6
524	21	57	21.6	86	35	23.5
525	21	57	18.5	86	35	21.8
526	21	57	14.0	86	35	19.3
527	21	57	13.9	86	35	17.3
528	21	57	14.0	86	35	14.1
529	21	57	14.5	86	35	09.2
530	21	57	14.7	86	35	05.8
531	21	57	14.8	86	35	03.4
532	21	57	13.9	86	35	00.8
533	21	57	12.8	86	34	57.9
534	21	57	11.9	86	34	54.9
535	21	57	11.0	86	34	52.5
536	21	57	10.4	86	34	50.3
537	21	57	09.5	86	34	46.6
538	21	57	08.8	86	34	45.5
539	21	57	07.6	86	34	41.2
540	21	57	06.4	86	34	36.9
541	21	57	04.9	86	34	33.3
542	21	57	03.8	86	34	29.7
543	21	57	02.4	86	34	26.0
544	21	57	01.9	86	34	23.5
545	21	57	00.4	86	34	19.5
546	21	56	54.9	86	34	18.3
547	21	56	52.2	86	34	18.4
548	21	56	48.9	86	34	18.1
549	21	56	47.3	86	34	17.4
550	21	56	47.1	86	34	16.2
551	21	56	46.1	86	34	14.1
552	21	56	47.0	86	34	10.9
553	21	56	48.0	86	34	08.6
554	21	56	48.3	86	34	06.1
555	21	56	48.3	86	34	02.7
556	21	56	49.9	86	33	59.2
557	21	56	48.7	86	33	56.3
558	21	56	50.2	86	33	50.1
559	21	56	50.7	86	33	49.8
560	21	56	51.3	86	33	47.5
561	21	56	51.7	86	33	44.1
562	21	56	52.0	86	33	43.5
563	21	56	51.0	86	33	39.7
564	21	56	52.5	86	33	38.4
565	21	56	53.8	86	33	34.8

(1)	(2)	(3)	(4)	(5)	(6)	(7)
566	21	56	52.6	86	33	31.6
567	21	56	51.3	86	33	28.9
568	21	56	52.0	86	33	26.1
569	21	56	51.6	86	33	22.6
570	21	56	51.9	86	33	20.2
571	21	56	52.0	86	33	17.8
572	21	56	52.0	86	33	15.6
573	21	56	49.1	86	33	14.9
574	21	56	46.1	86	33	11.1
575	21	56	44.3	86	33	08.9
576	21	56	41.0	86	33	05.9
577	21	56	35.2	86	33	00.4
578	21	56	32.7	86	32	58.5
579	21	56	30.6	86	32	57.2
580	21	56	29.2	86	32	56.5
581	21	56	26.9	86	32	54.0
582	21	56	23.8	86	32	51.7
583	21	56	15.2	86	32	49.4
584	21	56	12.3	86	32	47.2
585	21	56	05.1	86	32	49.7
586	21	56	02.6	86	32	51.6
587	21	56	00.3	86	32	52.0
588	21	56	00.6	86	32	54.7
589	21	56	00.5	86	32	58.9
590	21	56	02.7	86	33	03.3
591	21	56	07.5	86	33	11.8
592	21	56	14.1	86	33	15.6
593	21	56	19.7	86	33	18.1
594	21	56	18.0	86	33	21.5
595	21	56	18.2	86	33	23.1
596	21	56	10.3	86	33	31.9
597	21	56	10.1	86	33	33.2
598	21	56	05.6	86	33	36.9
599	21	56	01.9	86	33	41.5
600	21	56	03.5	86	33	46.0
601	21	56	05.6	86	33	50.9
602	21	56	04.4	86	33	54.5
603	21	56	01.8	86	34	01.0
604	21	55	58.4	86	34	05.4
605	21	55	56.7	86	34	11.1
606	21	55	57.5	86	34	22.8
607	21	55	52.1	86	34	27.4
608	21	55	53.0	86	34	31.1
609	21	55	50.8	86	34	38.7
610	21	55	50.0	86	34	39.9
611	21	55	43.6	86	34	44.3
612	21	55	39.5	86	34	45.8
613	21	55	38.0	86	34	53.6
614	21	55	37.0	86	34	59.4
615	21	55	33.3	86	35	02.0
616	21	55	27.0	86	35	09.8
617	21	55	29.1	86	35	17.0

(1)	(2)	(3)	(4)	(5)	(6)	(7)
618	21	55	32.8	86	35	18.2
619	21	55	40.8	86	35	26.1
620	21	55	44.6	86	35	29.6
621	21	55	51.3	86	35	27.9
622	21	55	58.5	86	35	29.3
623	21	55	59.4	86	35	28.4
624	21	56	00.1	86	35	28.1
625	21	56	05.1	86	35	25.4
626	21	56	08.2	86	35	25.2
627	21	56	09.2	86	35	24.5
628	21	56	20.8	86	35	25.1
629	21	56	21.7	86	35	28.0
630	21	56	35.0	86	35	29.2
631	21	56	38.6	86	35	29.0
632	21	56	43.5	86	35	28.5
633	21	56	46.5	86	35	28.8
634	21	56	48.6	86	35	30.9
635	21	56	58.6	86	35	44.7
636	21	56	58.0	86	35	45.9
637	21	56	55.0	86	35	47.0
638	21	56	53.0	86	35	50.9
639	21	56	50.1	86	35	53.8
640	21	56	41.0	86	35	59.8
641	21	56	42.2	86	36	04.5
642	21	56	41.8	86	36	06.2
643	21	56	39.3	86	36	10.5
644	21	56	38.1	86	36	12.9
645	21	56	38.5	86	36	18.3
646	21	56	35.7	86	36	21.09
647	21	56	32.1	86	36	22.6
648	21	56	28.9	86	36	24.8
649	21	56	24.5	86	36	25.4
650	21	56	18.6	86	36	25.3
651	21	56	13.8	86	36	25.1
652	21	56	06.0	86	36	27.4
653	21	55	57.4	86	36	30.5
654	21	55	48.4	86	36	34.7
655	21	55	43.3	86	36	35.6
656	21	55	39.0	86	36	36.2
657	21	55	36.1	86	36	37.8
658	21	55	34.7	86	36	41.9
659	21	55	31.4	86	36	48.2
660	21	55	26.3	86	36	52.1
661	21	55	23.4	86	36	53.2
662	21	55	18.8	86	36	53.0
663	21	55	13.5	86	36	52.6
664	21	55	09.7	86	36	52.5
665	21	55	03.8	86	36	50.0
666	21	55	00.5	86	36	50.0
667	21	54	58.6	86	36	49.4
668	21	54	53.9	86	36	46.7
669	21	54	51.1	86	36	45.0

(1)	(2)	(3)	(4)	(5)	(6)	(7)
670	21	54	47.4	86	36	39.1
671	21	54	45.1	86	36	36.7
672	21	54	38.5	86	36	36.9
673	21	54	35.6	86	36	35.5
674	21	54	32.5	86	36	32.8
675	21	54	30.6	86	36	28.7
676	21	54	33.9	86	36	28.1
677	21	54	39.7	86	36	27.7
678	21	54	43.3	86	36	25.3
679	21	54	45.9	86	36	24.4
680	21	54	46.8	86	36	20.3
681	21	54	48.8	86	36	13.3
682	21	54	50.1	86	36	08.5
683	21	54	46.1	86	36	09.0
684	21	54	41.2	86	36	09.9
685	21	54	40.3	86	36	09.4
686	21	54	36.6	86	36	06.0
687	21	54	30.5	86	36	04.3
688	21	54	27.8	86	36	02.6
689	21	54	23.9	86	35	57.6
690	21	54	22.9	86	35	54.0
691	21	54	18.6	86	35	49.7
692	21	54	18.4	86	35	53.6
693	21	54	18.5	86	35	57.8
694	21	54	18.6	86	36	1.2
695	21	54	14.6	86	36	6.1
696	21	54	8.9	86	36	8.8
697	21	53	59.4	86	36	8.6
698	21	53	56.6	86	36	8.2
699	21	53	52.8	86	36	5.8
700	21	53	51.2	86	36	4.9
701	21	53	47.5	86	36	2.3
702	21	53	43.4	86	36	1.5
703	21	53	42.1	86	36	0.9
704	21	53	39.6	86	35	56.6
705	21	53	36.9	86	35	55.9
706	21	53	35.6	86	35	52.3
707	21	53	31.1	86	35	51.3
708	21	53	26.1	86	35	50.6
709	21	5.	22.9	86	35	49.2
710	21	53	19.3	86	35	48.3
711	21	53	16.7	86	35	46.7
712	21	53	11.4	86	35	44.8
713	21	53	3.7	86	35	44.4
714	21	52	58.2	86	35	50.9
715	21	52	53.3	86	35	52.8
716	21	52	50.1	86	35	55.8
717	21	52	47.0	86	35	56.0
718	21	52	43.5	86	35	56.7
719	21	52	41.3	86	35	55.2
720	21	52	37.0	86	35	53.6
721	21	52	34.6	86	35	50.5

(1)	(2)	(3)	(4)	(5)	(6)	(7)
722	21	52	30.0	86	35	47.0
723	21	52	29.6	86	35	46.2
724	21	52	26.0	86	35	44.7
725	21	52	23.9	86	35	42.5
726	21	52	21.8	86	35	40.2
727	21	52	19.5	86	35	39.9
728	21	52	17.1	86	35	39.8
729	21	52	16.1	86	35	38.6
730	21	52	13.3	86	35	35.6
731	21	52	12.7	86	35	37.6
732	21	52	11.3	86	35	40.4
733	21	52	10.0	86	35	42.9
734	21	52	7.3	86	35	43.7
735	21	52	5.9	86	35	45.2
736	21	52	5.5	86	35	46.3
737	21	52	5.0	86	35	47.3
738	21	52	4.3	86	35	48.7
739	21	52	3.9	86	35	53.5
740	21	52	3.1	86	35	55.5
741	21	52	2.4	86	35	57.4
742	21	52	1.4	86	36	2.0
743	21	52	0.9	86	36	2.3
744	21	52	0.0	86	36	2.1
745	21	51	57.2	86	35	59.9
746	21	51	54.4	86	35	57.8
747	21	51	50.6	86	35	55.1
748	21	51	46.1	86	35	54.6
749	21	51	44.9	86	35	53.0
750	21	51	41.3	86	35	48.2
751	21	51	38.6	86	35	46.8
752	21	51	35.3	86	35	44.2
753	21	51	32.8	86	35	45.8
754	21	51	27.9	86	35	46.5
755	21	51	24.9	86	35	46.6
756	21	51	23.1	86	35	48.7
757	21	51	20.0	86	35	48.5
758	21	51	14.7	86	35	47.2
759	21	51	9.2	86	35	50.6
760	21	51	6.0	86	35	53.8
761	21	51	3.3	86	35	52.2
762	21	51	1.6	86	35	50.7
763	21	51	0.4	86	35	46.7
764	21	51	1.3	86	35	43.5
765	21	51	3.5	86	35	38.6
766	21	51	5.0	86	35	34.2
767	21	51	5.5	86	35	31.1
768	21	51	5.7	86	35	27.4
769	21	51	5.6	86	35	23.3
770	21	51	6.3	86	35	20.1
771	21	51	5.6	86	35	17.4
772	21	51	3.3	86	35	17.3
773	21	51	3.6	86	35	16.0

(1)	(2)	(3)	(4)	(5)	(6)	(7)
774	21	51	1.4	86	35	14.7
775	21	50	59.7	86	35	11.4
776	21	50	58.3	86	35	9.5
777	21	50	57.4	86	35	4.1
778	21	50	54.9	86	35	2.9
779	21	50	53.1	86	35	1.2
780	21	50	52.8	86	34	57.8
781	21	50	52.3	86	34	54.1
782	21	50	49.3	86	34	51.7
783	21	50	47.8	86	34	47.3
784	21	50	46.2	86	34	43.1
785	21	50	48.4	86	34	39.3
786	21	50	51.2	86	34	38.3
787	21	50	56.7	86	34	36.5
788	21	51	0.4	86	34	35.8
789	21	51	3.1	86	34	31.1
790	21	51	7.4	86	34	31.8
791	21	51	10.4	86	34	32.1
792	21	51	13.7	86	34	31.4
793	21	51	17.0	86	34	30.1
794	21	51	20.4	86	34	28.8
795	21	51	23.4	86	34	28.0
796	21	51	24.4	86	34	27.6
797	21	51	23.0	86	34	25.4
798	21	51	21.2	86	34	23.8
799	21	51	19.7	86	34	22.7
800	21	51	16.0	86	34	21.3
801	21	51	12.6	86	34	18.6
802	21	51	9.0	86	34	14.8
803	21	51	4.8	86	34	12.9
804	21	51	0.0	86	34	12.4
805	21	50	56.2	86	34	12.0
806	21	50	53.6	86	34	11.0
807	21	50	50.6	86	34	9.3
808	21	50	50.0	86	34	6.1
809	21	50	50.3	86	34	3.1
810	21	50	50.3	86	33	58.7
811	21	50	50.7	86	33	54.7
812	21	50	50.6	86	33	52.4
813	21	50	49.6	86	33	48.7
814	21	50	48.5	86	33	46.1
815	21	50	48.3	86	33	43.1
816	21	50	48.2	86	33	42.7
817	21	50	49.1	86	33	38.5
818	21	50	49.8	86	33	37.0
819	21	50	50.2	86	33	36.9
820	21	50	53.0	86	33	35.1
821	21	50	56.5	86	33	33.6
822	21	50	57.8	86	33	34.9
823	21	51	0.3	86	33	31.8
824	21	51	1.1	86	33	27.6
825	21	51	3.2	86	33	26.1

(1)	(2)	(3)	(4)	(5)	(6)	(7)
826	21	51	5.9	86	33	19.7
827	21	51	7.8	86	33	11.7
828	21	51	6.3	86	33	9.9
829	21	51	2.7	86	33	8.1
830	21	50	57.0	86	33	6.8
831	21	50	55.4	86	33	7.6
832	21	50	52.1	86	33	8.2
833	21	50	48.5	86	33	9.2
834	21	50	44.0	86	33	11.2
835	21	50	42.6	86	33	14.9
836	21	50	39.8	86	33	17.7
837	21	50	37.9	86	33	19.5
838	21	50	33.5	86	33	19.7
839	21	50	30.5	86	33	20.1
840	21	50	28.3	86	33	20.9
841	21	50	26.0	86	33	22.6
842	21	50	25.3	86	33	24.8
843	21	50	25.2	86	33	29.2
844	21	50	25.6	86	33	35.2
845	21	50	25.7	86	33	37.2
846	21	50	26.5	86	33	39.1
847	21	50	26.9	86	33	40.5
848	21	50	28.0	86	33	43.1
849	21	50	28.6	86	33	45.4
850	21	50	27.1	86	33	47.4
851	21	50	22.1	86	33	50.5
852	21	50	18.7	86	33	54.8
853	21	50	18.4	86	33	54.9
854	21	50	17.7	86	33	55.8
855	21	50	11.0	86	33	54.3
856	21	50	6.2	86	33	52.3
857	21	50	2.1	86	33	51.6
858	21	50	1.3	86	33	52.6
859	21	50	2.7	86	33	53.9
860	21	50	3.5	86	33	58.5
861	21	50	4.8	86	34	2.5
862	21	50	6.7	86	34	6.2
863	21	50	8.2	86	34	8.5
864	21	50	8.1	86	34	9.4
865	21	50	8.8	86	34	12.7
866	21	50	8.4	86	34	13.4
867	21	50	8.2	86	34	15.0
868	21	50	7.4	86	34	16.1
869	21	50	6.2	86	34	17.1
870	21	50	3.8	86	34	18.3
871	21	50	0.5	86	34	19.6
872	21	49	57.0	86	34	20.5
873	21	49	55.3	86	34	21.2
874	21	49	53.5	86	34	22.4
875	21	49	51.3	86	34	25.8
876	21	49	50.5	86	34	28.5
877	21	49	50.5	86	34	31.2

(1)	(2)	(3)	(4)	(5)	(6)	(7)
878	21	49	51.9	86	34	35.0
879	21	49	52.8	86	34	37.8
880	21	49	52.8	86	34	40.7
881	21	49	56.4	86	34	44.8
882	21	49	57.5	86	34	49.6
883	21	49	59.5	86	34	54.2
884	21	49	59.9	86	34	59.8
885	21	49	58.8	86	35	3.5
886	21	49	57.8	86	35	5.8
887	21	49	56.2	86	35	8.2
888	21	49	53.9	86	35	12.9
889	21	49	51.3	86	35	14.3
890	21	49	49.1	86	35	17.1
891	21	49	45.1	86	35	16.8
892	21	49	42.7	86	35	13.8
893	21	49	43.3	86	35	12.3
894	21	49	39.3	86	35	11.5
895	21	49	35.3	86	35	9.4
896	21	49	28.9	86	35	10.6
897	21	49	23.5	86	35	10.5
898	21	49	20.9	86	35	10.6
899	21	49	20.9	86	35	8.0
900	21	49	19.9	86	35	9.4
901	21	49	12.3	86	35	8.2
902	21	49	7.9	86	35	6.9
903	21	49	4.3	86	35	5.4
904	21	49	1.2	86	35	1.8
905	21	48	58.7	86	35	1.5
906	21	48	56.3	86	34	58.4
907	21	48	56.7	86	34	53.9
908	21	48	56.2	86	34	49.1
909	21	48	54.9	86	34	45.8
910	21	48	53.7	86	34	44.2
911	21	48	52.2	86	34	43.2
912	21	48	49.5	86	34	40.3
913	21	48	46.7	86	34	37.0
914	21	48	45.6	86	34	33.0
915	21	48	45.6	86	34	31.0
916	21	48	45.7	86	34	27.4
917	21	48	47.5	86	34	21.9
918	21	48	48.4	86	34	19.2
919	21	48	49.0	86	34	18.3
920	21	48	50.3	86	34	17.4
921	21	48	52.2	86	34	13.9
922	21	48	52.8	86	34	13.5
923	21	48	54.1	86	34	13.7
924	21	48	55.6	86	34	13.8
925	21	48	57.3	86	34	13.2
926	21	48	58.7	86	34	12.2
927	21	48	59.0	86	34	10.8
928	21	48	57.9	86	34	8.3
929	21	48	57.1	86	34	7.0

(1)	(2)	(3)	(4)	(5)	(6)	(7)
930	21	48	54.9	86	34	2.9
931	21	48	53.6	86	33	56.7
932	21	48	54.1	86	33	53.8
933	21	48	54.5	86	33	52.0
934	21	48	53.7	86	33	49.0
935	21	48	53.6	86	33	46.8
936	21	48	52.1	86	33	44.6
937	21	48	50.2	86	33	43.9
938	21	48	48.2	86	33	42.3
939	21	48	46.8	86	33	40.7
940	21	48	45.1	86	33	41.4
941	21	48	42.9	86	33	38.1
942	21	48	40.2	86	33	38.3
943	21	48	33.0	86	33	33.5
944	21	48	33.9	86	33	39.1
945	21	48	34.2	86	33	42.3
946	21	48	31.0	86	33	44.6
947	21	48	26.4	86	33	45.0
948	21	48	24.3	86	33	42.6
949	21	48	21.8	86	33	39.7
950	21	48	20.0	86	33	38.9
951	21	48	18.1	86	33	37.3
952	21	48	16.5	86	33	37.3
953	21	48	17.5	86	33	32.1
954	21	48	17.6	86	33	28.4
955	21	48	17.6	86	33	24.3
956	21	48	16.8	86	33	19.6
957	21	48	15.2	86	33	17.5
958	21	48	11.4	86	33	14.0
959	21	48	7.1	86	33	11.4
960	21	48	3.6	86	33	10.3
961	21	47	53.8	86	33	9.0
962	21	47	56.9	86	33	7.2
963	21	47	56.3	86	33	5.0
964	21	47	56.4	86	33	2.7
965	21	47	57.1	86	32	58.8
966	21	47	58.4	86	32	55.6
967	21	47	59.1	86	32	53.3
968	21	48	3.5	86	32	53.0
969	21	48	7.5	86	32	53.3
970	21	48	10.1	86	32	51.9
971	21	48	13.9	86	32	49.4
972	21	48	18.1	86	32	47.4
973	21	48	19.7	86	32	46.4
974	21	48	22.5	86	32	39.4
975	21	48	23.3	86	32	37.2
976	21	48	24.5	86	32	33.9
977	21	48	24.3	86	32	31.7
978	21	48	21.0	86	32	28.8
979	21	48	18.5	86	32	26.5
980	21	48	15.9	86	32	24.3
981	21	48	13.7	86	32	21.4

(1)	(2)	(3)	(4)	(5)	(6)	(7)
982	21	48	13.0	86	32	19.9
983	21	48	12.5	86	32	16.9
984	21	48	12.4	86	32	14.4
985	21	48	10.9	86	32	13.9
986	21	48	11.6	86	32	10.0
987	21	48	10.5	86	32	7.1
988	21	48	8.1	86	32	5.3
989	21	48	6.0	86	32	2.6
990	21	48	5.0	86	32	1.0
991	21	48	5.1	86	31	58.4
992	21	48	5.8	86	31	56.9
993	21	48	0.3	86	31	53.7
994	21	47	58.7	86	31	51.9
995	21	47	56.2	86	31	51.3
996	21	47	53.9	86	31	51.2
997	21	47	49.6	86	31	51.0
998	21	47	47.2	86	31	51.2
999	21	47	44.2	86	31	53.0
1000	21	47	43.1	86	31	53.8
1001	21	47	41.1	86	31	54.5
1002	21	47	38.5	86	31	54.8
1003	21	47	37.7	86	31	54.0
1004	21	47	35.3	86	31	51.6
1005	21	47	34.0	86	31	50.4
1006	21	47	31.7	86	31	50.7
1007	21	47	29.2	86	31	49.8
1008	21	47	25.0	86	31	49.1
1009	21	47	22.7	86	31	47.3
1010	21	47	20.9	86	31	44.3
1011	21	47	17.3	86	31	42.2
1012	21	47	12.7	86	31	37.6
1013	21	47	9.9	86	31	34.8
1014	21	47	8.7	86	31	33.0
1015	21	47	5.7	86	31	29.1
1016	21	47	4.7	86	31	26.6
1017	21	47	1.2	86	31	24.6
1018	21	47	0.3	86	31	23.7
1019	21	46	57.6	86	31	23.1
1020	21	46	56.5	86	31	22.1
1021	21	46	55.2	86	31	20.0
1022	21	46	53.8	86	31	17.9
1023	21	46	52.6	86	31	15.5
1024	21	46	51.2	86	31	14.3
1025	21	46	49.8	86	31	13.5
1026	21	46	48.9	86	31	11.1
1027	21	46	50.6	86	31	9.0
1028	21	46	48.4	86	31	7.4
1029	21	46	47.8	86	31	5.2
1030	21	46	45.4	86	31	4.3
1031	21	46	41.0	86	31	4.8
1032	21	46	38.5	86	31	6.9
1033	21	46	33.4	86	31	9.5

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1034	21	46	34.6	86	31	15.2
1035	21	46	32.8	86	31	21.1
1036	21	46	31.7	86	31	23.2
1037	21	46	29.1	86	31	27.5
1038	21	46	28.3	86	31	31.3
1039	21	46	26.8	86	31	32.2
1040	21	46	23.9	86	31	32.9
1041	21	46	20.6	86	31	34.8
1042	21	46	15.5	86	31	37.4
1043	21	46	14.5	86	31	40.1
1044	21	46	11.9	86	31	43.5
1045	21	46	9.1	86	31	49.2
1046	21	46	8.4	86	31	51.6
1047	21	46	5.0	86	31	52.1
1048	21	46	1.7	86	31	52.5
1049	21	45	58.0	86	31	52.9
1050	21	45	55.2	86	31	52.9
1051	21	45	53.9	86	31	52.9
1052	21	45	51.1	86	31	53.4
1053	21	45	48.7	86	31	54.3
1054	21	45	45.8	86	31	54.9
1055	21	45	45.1	86	31	54.8
1056	21	45	43.9	86	31	54.8
1057	21	45	43.0	86	31	54.8
1058	21	45	39.6	86	31	54.1
1059	21	45	37.8	86	31	53.7
1060	21	45	35.8	86	31	53.0
1061	21	45	32.5	86	31	52.9
1062	21	45	28.1	86	31	53.5
1063	21	45	25.7	86	31	53.5
1064	21	45	23.8	86	31	53.7
1065	21	45	20.1	86	31	53.5
1066	21	45	16.3	86	31	53.3
1067	21	45	14.0	86	31	51.1
1068	21	45	9.8	86	31	48.9
1069	21	45	7.9	86	31	47.5
1070	21	45	5.1	86	31	45.6
1071	21	45	2.1	86	31	44.2
1072	21	44	59.2	86	31	42.4
1073	21	44	55.5	86	31	41.8
1074	21	44	50.6	86	31	37.3
1075	21	44	50.0	86	31	35.2
1076	21	44	51.0	86	31	31.4
1077	21	44	54.5	86	31	22.3
1078	21	44	53.1	86	31	18.7
1079	21	44	51.3	86	31	13.6
1080	21	44	52.8	86	31	8.8
1081	21	44	49.3	86	31	3.1
1082	21	44	45.7	86	30	59.4
1083	21	44	42.2	86	30	59.4
1084	21	44	36.3	86	30	56.8
1085	21	44	32.1	86	30	55.0

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1086	21	44	29.6	86	30	53.3
1087	21	44	27.7	86	30	51.6
1088	21	44	27.1	86	30	50.3
1089	21	44	26.9	86	30	48.8
1090	21	44	28.3	86	30	42.7
1091	21	44	30.0	86	30	36.0
1092	21	44	30.5	86	30	32.1
1093	21	44	34.2	86	30	27.2
1094	21	44	35.5	86	30	23.6
1095	21	44	38.2	86	30	18.9
1096	21	44	40.7	86	30	16.1
1097	21	44	42.5	86	30	14.0
1098	21	44	45.2	86	30	9.0
1099	21	44	48.3	86	30	4.1
1100	21	44	49.0	86	30	0.6
1101	21	44	50.3	86	29	57.9
1102	21	44	54.7	86	29	52.4
1103	21	44	57.5	86	29	49.4
1104	21	44	59.8	86	29	46.3
1105	21	45	4.3	86	29	39.6
1106	21	45	5.6	86	29	36.9
1107	21	45	7.6	86	29	29.5
1108	21	45	9.7	86	29	25.4
1109	21	45	10.2	86	29	21.5
1110	21	45	15.0	86	29	14.9
1111	21	45	13.8	86	29	9.0
1112	21	45	21.2	86	29	0.3
1113	21	45	29.1	86	28	55.9
1114	21	45	31.2	86	28	53.2
1115	21	45	35.5	86	28	51.0
1116	21	45	39.8	86	28	48.3
1117	21	45	44.9	86	28	44.4
1118	21	45	49.3	86	28	41.0
1119	21	45	51.1	86	28	41.1
1120	21	45	54.9	86	28	39.8
1121	21	45	58.2	86	28	36.8
1122	21	46	4.1	86	28	32.6
1123	21	46	6.2	86	28	25.9
1124	21	46	6.5	86	28	22.2
1125	21	46	6.6	86	28	18.9
1126	21	46	6.0	86	28	16.5
1127	21	46	7.1	86	28	14.7
1128	21	46	7.3	86	28	5.4
1129	21	46	4.5	86	28	2.6
1130	21	46	3.0	86	28	2.5
1131	21	45	59.9	86	28	7.5
1132	21	45	56.3	86	28	11.1
1133	21	45	54.0	86	28	17.2
1134	21	45	51.4	86	28	21.2
1135	21	45	49.2	86	28	27.4
1136	21	45	47.2	86	28	34.6
1137	21	45	45.1	86	28	40.5

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1138	21	45	40.8	86	28	43.3
1139	21	45	36.9	86	28	45.8
1140	21	45	29.6	86	28	50.6
1141	21	45	24.7	86	28	53.7
1142	21	45	18.1	86	28	56.3
1143	21	45	16.1	86	28	58.9
1144	21	45	11.8	86	29	1.9
1145	21	45	7.4	86	29	6.9
1146	21	45	2.1	86	29	13.1
1147	21	44	56.7	86	29	15.6
1148	21	44	51.7	86	29	17.1
1149	21	44	45.6	86	29	18.3
1150	21	44	41.1	86	29	18.2
1151	21	44	37.1	86	29	19.5
1152	21	44	31.1	86	29	27.2
1153	21	44	28.7	86	29	39.2
1154	21	44	28.0	86	29	40.9
1155	21	44	26.6	86	29	43.9
1156	21	44	24.4	86	29	44.8
1157	21	44	23.3	86	29	50.5
1158	21	44	17.3	86	29	56.0
1159	21	44	12.4	86	30	0.7
1160	21	44	9.2	86	30	3.5
1161	21	44	8.0	86	30	9.0
1162	21	44	4.1	86	30	17.6
1163	21	44	0.9	86	30	18.4
1164	21	43	58.5	86	30	20.3
1165	21	43	55.8	86	30	21.5
1166	21	43	54.1	86	30	21.7
1167	21	43	49.5	86	30	22.2
1168	21	43	44.7	86	30	23.1
1169	21	43	40.0	86	30	22.7
1170	21	43	35.6	86	30	24.4
1171	21	43	29.1	86	30	26.9
1172	21	43	27.1	86	30	28.3
1173	21	43	23.9	86	30	29.0
1174	21	43	20.5	86	30	30.2
1175	21	43	15.7	86	30	31.8
1176	21	43	8.8	86	30	34.1
1177	21	43	7.4	86	30	34.3
1178	21	43	4.7	86	30	36.4
1179	21	43	2.5	86	30	37.2
1180	21	43	0.1	86	30	38.7
1181	21	42	57.4	86	30	40.7
1182	21	42	52.9	86	30	43.9
1183	21	42	46.8	86	30	46.2
1184	21	42	43.8	86	30	46.2
1185	21	42	41.3	86	30	45.8
1186	21	42	37.7	86	30	46.8
1187	21	42	35.7	86	30	46.1
1188	21	42	32.1	86	30	46.0
1189	21	42	30.2	86	30	46.9

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1190	21	42	29.2	86	30	46.6
1191	21	42	23.6	86	30	47.4
1192	21	42	20.5	86	30	47.6
1193	21	42	16.7	86	30	45.4
1194	21	42	12.0	86	30	45.2
1195	21	42	7.7	86	30	43.4
1196	21	42	4.1	86	30	41.5
1197	21	41	58.6	86	30	38.3
1198	21	41	54.0	86	30	38.3
1199	21	41	50.3	86	30	35.4
1200	21	41	49.5	86	30	33.8
1201	21	41	53.6	86	30	26.5
1202	21	41	54.4	86	30	22.7
1203	21	41	53.7	86	30	14.7
1204	21	41	55.2	86	30	9.5
1205	21	41	58.4	86	30	2.2
1206	21	41	59.5	86	29	57.1
1207	21	41	56.4	86	29	51.0
1208	21	41	55.9	86	29	47.9
1209	21	41	56.7	86	29	43.9
1210	21	41	55.8	86	29	36.3
1211	21	41	54.6	86	29	30.7
1212	21	41	52.2	86	29	27.9
1213	21	41	49.1	86	29	27.2
1214	21	41	45.4	86	29	24.5
1215	21	41	42.7	86	29	21.5
1216	21	41	38.2	86	29	17.2
1217	21	41	33.8	86	29	14.7
1218	21	41	31.3	86	29	11.1
1219	21	41	24.2	86	29	10.5
1220	21	41	21.2	86	29	11.1
1221	21	41	9.7	86	29	10.7
1222	21	41	4.1	86	29	11.2
1223	21	41	1.0	86	29	10.8
1224	21	40	57.4	86	29	10.4
1225	21	40	52.2	86	29	6.4
1226	21	40	48.0	86	29	5.0
1227	21	40	42.5	86	29	0.7
1228	21	40	40.5	86	28	54.5
1229	21	40	42.5	86	28	50.0
1230	21	40	38.6	86	28	40.1
1231	21	40	34.4	86	28	32.1
1232	21	40	33.8	86	28	22.3
1233	21	40	33.4	86	28	19.3
1234	21	40	37.5	86	28	11.3
1235	21	40	32.8	86	28	11.4
1236	21	40	29.0	86	28	3.6
1237	21	40	22.8	86	28	4.8
1238	21	40	15.0	86	28	6.7
1239	21	40	10.0	86	28	8.2
1240	21	40	6.7	86	28	10.5
1241	21	40	2.1	86	28	14.1

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1242	21	39	57.8	86	28	17.3
1243	21	39	55.1	86	28	17.4
1244	21	39	46.8	86	28	26.4
1245	21	39	42.5	86	28	28.7
1246	21	39	36.5	86	28	32.9
1247	21	39	31.5	86	28	38.3
1248	21	39	23.4	86	28	39.8
1249	21	39	17.7	86	28	42.2
1250	21	39	10.4	86	28	42.6
1251	21	39	3.3	86	28	44.1
1252	21	39	0.3	86	28	44.1
1253	21	38	52.4	86	28	43.4
1254	21	38	42.6	86	28	44.0
1255	21	38	32.1	86	28	45.0
1256	21	38	28.3	86	28	44.6
1257	21	38	21.2	86	28	38.8
1258	21	38	17.7	86	28	36.9
1259	21	38	13.3	86	28	34.9
1260	21	38	9.8	86	28	24.7
1261	21	38	2.1	86	28	20.3
1262	21	37	57.7	86	28	18.0
1263	21	37	52.0	86	28	13.3
1264	21	37	50.5	86	28	11.1
1265	21	37	48.4	86	28	9.8
1266	21	37	46.4	86	28	7.3
1267	21	37	46.9	86	28	5.2
1268	21	37	48.7	86	27	1.1
1269	21	37	49.0	86	27	57.9
1270	21	37	49.2	86	27	54.6
1271	21	37	50.0	86	27	46.8
1272	21	37	51.6	86	27	39.4
1273	21	37	52.8	86	27	36.5
1274	21	37	54.0	86	27	33.3
1275	21	37	52.6	86	27	31.2
1276	21	37	49.5	86	27	30.1
1277	21	37	47.2	86	27	29.5
1278	21	37	44.2	86	27	28.2
1279	21	37	40.1	86	27	29.2
1280	21	37	38.3	86	27	29.9
1281	21	37	35.6	86	27	31.1
1282	21	37	28.7	86	27	34.4
1283	21	37	26.1	86	27	35.2
1284	21	37	23.8	86	27	35.9
1285	21	37	17.8	86	27	36.1
1286	21	37	15.4	86	27	39.3
1287	21	37	12.8	86	27	40.5
1288	21	37	10.8	86	27	41.4
1289	21	37	2.7	86	27	44.3
1290	21	36	59.3	86	27	46.2
1291	21	36	54.3	86	27	49.5
1292	21	36	49.8	86	27	53.0
1293	21	36	42.5	86	27	50.7

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1294	21	36	34.0	86	27	49.9
1295	21	36	26.2	86	27	47.4
1296	21	36	21.2	86	27	45.6
1297	21	36	16.7	86	27	41.1
1298	21	36	9.9	86	27	36.8
1299	21	36	6.0	86	27	31.0
1300	21	35	59.2	86	27	30.3
1301	21	35	50.4	86	27	29.5
1302	21	35	48.6	86	27	23.5
1303	21	35	47.2	86	27	17.7
1304	21	35	43.8	86	27	10.6
1305	21	35	45.2	86	27	7.7
1306	21	35	45.5	86	27	3.5
1307	21	35	44.8	86	27	1.6
1308	21	35	42.1	86	26	59.7
1309	21	35	33.5	86	26	55.1
1310	21	35	29.5	86	26	52.3
1311	21	35	26.1	86	26	50.0
1312	21	35	22.2	86	26	48.4
1313	21	35	18.5	86	26	44.9
1314	21	35	16.7	86	26	44.2
1315	21	35	12.5	86	26	43.7
1316	21	35	7.1	86	26	42.7
1317	21	34	57.2	86	26	42.3
1318	21	34	48.2	86	26	38.3
1319	21	34	41.0	86	26	33.5
1320	21	34	33.2	86	26	30.8
1321	21	34	29.0	86	26	29.2
1322	21	34	23.2	86	26	27.4
1323	21	34	20.0	86	26	25.9
1324	21	34	18.8	86	26	24.4
1325	21	34	21.1	86	26	21.9
1326	21	34	23.5	86	26	9.6
1327	21	34	20.9	86	26	9.7
1328	21	34	18.6	86	26	6.0
1329	21	34	15.5	86	26	8.6
1330	21	34	11.5	86	26	6.7
1331	21	34	5.0	86	26	0.7
1332	21	34	6.9	86	25	57.4
1333	21	34	6.4	86	25	54.0
1334	21	34	8.3	86	25	45.1
1335	21	34	18.0	86	25	35.3
1336	21	34	19.4	86	25	29.3
1337	21	34	19.2	86	25	24.7
1338	21	34	16.3	86	25	22.0
1339	21	34	12.1	86	25	18.9
1340	21	34	5.5	86	25	14.3
1341	21	34	2.6	86	25	10.8
1342	21	34	6.4	86	25	7.7
1343	21	34	9.0	86	25	4.9
1344	21	34	13.3	86	25	4.2
1345	21	34	16.4	86	25	4.2

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1346	21	34	18.6	86	25	0.2
1347	21	34	12.8	86	24	56.1
1348	21	34	6.5	86	24	53.2
1349	21	34	0.5	86	24	48.9
1350	21	33	56.3	86	24	45.8
1351	21	33	51.7	86	24	42.7
1352	21	33	48.4	86	24	41.4
1353	21	33	45.0	86	24	39.7
1354	21	33	37.2	86	24	41.0
1355	21	33	32.7	86	24	47.0
1356	21	33	31.0	86	24	47.5
1357	21	33	25.2	86	24	45.1
1358	21	33	20.1	86	24	43.8
1359	21	33	19.5	86	24	46.3
1360	21	33	19.2	86	24	50.4
1361	21	33	14.9	86	24	50.8
1362	21	33	14.5	86	24	51.4
1363	21	33	10.5	86	24	56.6
1364	21	33	6.2	86	25	0.5
1365	21	32	58.7	86	25	1.2
1366	21	32	55.5	86	25	1.5
1367	21	32	54.3	86	25	1.6
1368	21	32	51.4	86	25	2.1
1369	21	32	45.1	86	25	3.1
1370	21	32	43.1	86	24	58.8
1371	21	32	39.8	86	24	51.7
1372	21	32	36.9	86	24	45.5
1373	21	32	35.6	86	24	43.3
1374	21	32	35.7	86	24	40.5
1375	21	32	41.5	86	24	31.9
1376	21	32	41.6	86	24	27.5
1377	21	32	40.6	86	24	23.5
1378	21	32	38.0	86	24	19.2
1379	21	32	29.6	86	24	13.3
1380	21	32	24.4	86	24	7.4
1381	21	32	20.8	86	24	11.1
1382	21	32	18.8	86	24	8.4
1383	21	32	18.4	86	24	2.3
1384	21	32	20.3	86	23	57.3
1385	21	32	16.8	86	23	52.3
1386	21	32	16.7	86	23	50.4
1387	21	32	14.2	86	23	48.1
1388	21	32	14.5	86	23	45.3
1389	21	32	16.2	86	23	36.2
1390	21	32	14.2	86	23	30.3
1391	21	32	14.2	86	23	23.6
1392	21	32	8.5	86	23	19.8
1393	21	32	8.4	86	23	14.9
1394	21	32	5.3	86	23	0.1
1395	21	32	4.5	86	23	0.5
1396	21	32	3.7	86	22	56.8
1397	21	32	2.9	86	22	49.4

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1398	21	32	1.5	86	22	44.7
1399	21	31	59.3	86	22	33.9
1400	21	31	58.2	86	22	30.5
1401	21	31	59.1	86	22	27.6
1402	21	32	1.2	86	22	23.9
1403	21	31	56.3	86	22	16.8
1404	21	31	51.2	86	22	11.0
1405	21	31	49.2	86	21	52.7
1406	21	31	52.1	86	21	56.6
1407	21	31	53.2	86	21	57.7
1408	21	31	59.3	86	22	3.2
1409	21	32	0.1	86	22	6.7
1410	21	32	2.6	86	22	8.2
1411	21	32	6.3	86	22	10.3
1412	21	32	12.8	86	22	11.2
1413	21	32	14.5	86	22	15.1
1414	21	32	22.2	86	22	19.5
1415	21	32	26.3	86	22	24.3
1416	21	32	34.0	86	22	30.2
1417	21	32	34.4	86	22	26.7
1418	21	32	33.6	86	22	24.6
1419	21	32	32.0	86	22	21.9
1420	21	32	29.1	86	22	18.1
1421	21	32	27.9	86	22	16.4
1422	21	32	26.7	86	22	13.4
1423	21	32	24.1	86	22	10.4
1424	21	32	22.3	86	22	8.4
1425	21	32	20.3	86	22	7.3
1426	21	32	17.0	86	22	5.1
1427	21	32	15.7	86	22	2.5
1428	21	32	11.1	86	21	58.9
1429	21	32	2.3	86	21	51.7
1430	21	32	4.0	86	21	47.0
1431	21	32	3.0	86	21	44.5
1432	21	32	0.2	86	21	36.4
1433	21	31	53.1	86	21	26.7
1434	21	31	48.6	86	21	18.0
1435	21	31	47.7	86	21	14.7
1436	21	31	45.6	86	21	12.4
1437	21	31	46.8	86	21	10.0
1438	21	31	44.8	86	21	7.4
1439	21	31	42.0	86	21	5.7
1440	21	31	38.6	86	21	4.3
1441	21	31	35.1	86	21	1.3
1442	21	31	32.2	86	20	59.6
1443	21	31	22.0	86	20	54.4
1444	21	31	19.4	86	20	53.7
1445	21	31	19.1	86	20	52.5
1446	21	31	16.0	86	20	50.4
1447	21	31	12.7	86	20	49.2
1448	21	31	8.8	86	20	47.8
1449	21	31	7.8	86	20	46.0

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1450	21	31	8.6	86	20	44.2
1451	21	31	5.7	86	20	40.0
1452	21	31	5.4	86	20	37.4
1453	21	31	3.2	86	20	29.8
1454	21	31	1.9	86	20	27.2
1455	21	30	59.7	86	20	24.6
1456	21	30	58.6	86	20	22.9
1457	21	30	55.1	86	20	17.7
1458	21	30	54.8	86	20	15.0
1459	21	30	54.6	86	20	9.4
1460	21	30	54.1	86	20	9.3
1461	21	30	52.9	86	20	1.7
1462	21	30	58.4	86	19	59.3
1463	21	30	58.4	86	19	55.8
1464	21	30	58.7	86	19	54.3
1465	21	30	58.1	86	19	50.5
1466	21	30	58.6	86	19	48.3
1467	21	31	0.7	86	19	40.2
1468	21	31	0.4	86	19	38.9
1469	21	30	59.6	86	19	32.8
1470	21	31	0.3	86	19	30.9
1471	21	31	1.6	86	19	28.4
1472	21	31	2.7	86	19	21.0
1473	21	30	8.6	86	18	12.6
1474	21	30	6.6	86	18	11.6
1475	21	30	2.8	86	18	9.5
1476	21	30	1.7	86	18	9.1
1477	21	29	59.9	86	18	9.9
1478	21	29	59.2	86	18	5.3
1479	21	29	57.8	86	18	2.0
1480	21	29	51.9	86	18	0.4
1481	21	29	46.6	86	18	0.2
1482	21	29	38.6	86	18	0.4
1483	21	29	32.4	86	17	54.4
1484	21	29	28.9	86	17	51.0
1485	21	29	31.8	86	17	45.4
1486	21	29	33.3	86	17	37.9
1487	21	29	35.9	86	17	32.3
1488	21	29	37.3	86	17	28.6
1489	21	29	39.2	86	17	26.2
1490	21	29	40.3	86	17	23.6
1491	21	29	42.1	86	17	20.4
1492	21	29	43.7	86	17	16.2
1493	21	29	45.4	86	17	8.8
1494	21	29	46.5	86	17	3.0
1495	21	29	47.4	86	17	1.2
1496	21	29	46.8	86	16	58.4
1497	21	29	46.1	86	16	54.8
1498	21	29	46.9	86	16	51.2
1499	21	29	47.7	86	16	47.4
1500	21	29	45.8	86	16	36.4
1501	21	29	45.2	86	16	31.2

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1502	21	29	43.6	86	16	25.5
1503	21	29	42.2	86	16	12.3
1504	21	29	40.9	86	16	8.0
1505	21	29	40.3	86	16	2.9
1506	21	29	37.7	86	15	55.0
1507	21	29	37.2	86	15	52.7
1508	21	29	40.6	86	15	48.7
1509	21	29	48.4	86	15	48.3
1510	21	29	50.4	86	15	45.6
1511	21	29	55.9	86	15	44.7
1512	21	30	0.3	86	15	42.6
1513	21	30	1.9	86	15	42.9
1514	21	30	5.8	86	15	42.3
1515	21	30	16.0	86	15	45.1
1516	21	30	22.2	86	15	45.7
1517	21	30	31.4	86	15	43.3
1518	21	30	35.2	86	15	42.2
1519	21	30	39.8	86	15	40.5
1520	21	30	41.5	86	15	40.0
1521	21	30	47.0	86	15	37.7
1522	21	30	49.4	86	15	37.0
1523	21	30	55.8	86	15	34.9
1524	21	31	0.8	86	15	33.4
1525	21	31	4.4	86	15	32.7
1526	21	31	28.4	86	15	25.0
1527	21	31	28.9	86	15	23.9
1528	21	31	24.3	86	15	17.8
1529	21	31	21.2	86	15	12.6
1530	21	31	18.7	86	15	8.1
1531	21	31	16.7	86	15	2.3
1532	21	31	11.9	86	14	55.5
1533	21	31	8.1	86	14	53.3
1534	21	31	1.8	86	14	49.9
1535	21	30	58.4	86	14	41.3
1536	21	30	51.6	86	14	41.1
1537	21	30	44.4	86	14	35.3
1538	21	30	39.8	86	14	29.8
1539	21	30	32.9	86	14	21.6
1540	21	30	32.6	86	14	16.3
1541	21	30	34.0	86	14	10.5
1542	21	30	33.4	86	14	5.3
1543	21	30	31.9	86	14	3.3
1544	21	30	30.7	86	14	2.6
1545	21	30	24.5	86	14	3.0
1546	21	30	18.2	86	14	2.4
1547	21	30	7.6	86	14	0.2
1548	21	29	55.6	86	13	56.7
1549	21	29	51.8	86	13	50.9
1550	21	29	42.3	86	13	48.0
1551	21	29	41.8	86	13	42.8
1552	21	29	40.9	86	13	38.1
1553	21	29	43.5	86	13	36.5

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1554	21	29	46.5	86	13	28.3
1555	21	29	48.1	86	13	18.3
1556	21	29	58.7	86	13	10.3
1557	21	29	58.1	86	13	3.9
1558	21	29	51.8	86	12	58.2
1559	21	29	46.3	86	12	52.5
1560	21	29	46.6	86	12	42.9
1561	21	29	46.4	86	12	43.2
1562	21	29	50.5	86	12	36.7
1563	21	29	51.1	86	12	33.9
1564	21	29	47.3	86	12	26.7
1565	21	29	47.4	86	12	26.5
1566	21	29	48.3	86	12	19.2
1567	21	29	49.2	86	12	18.4
1568	21	30	0.5	86	12	18.1
1569	21	30	9.4	86	12	18.5
1570	21	30	13.5	86	12	16.6
1571	21	30	19.6	86	12	13.4
1572	21	30	24.6	86	12	12.0
1573	21	30	28.5	86	12	10.1
1574	21	30	35.5	86	12	5.0
1575	21	30	45.6	86	12	3.0
1576	21	30	46.1	86	12	2.4
1577	21	31	0.1	86	12	1.1
1578	21	31	3.6	86	12	3.1
1579	21	31	5.2	86	12	18.2
1580	21	31	8.7	86	12	19.8
1581	21	31	15.2	86	12	22.4
1582	21	31	21.8	86	12	24.6
1583	21	31	26.1	86	12	26.3
1584	21	31	30.5	86	12	29.4
1585	21	31	29.8	86	12	36.9
1586	21	31	34.5	86	12	41.5
1587	21	31	33.2	86	12	43.4
1588	21	31	29.8	86	12	48.5
1589	21	31	32.7	86	12	52.8
1590	21	31	36.3	86	12	56.6
1591	21	31	40.8	86	13	0.4
1592	21	31	42.8	86	13	1.4
1593	21	31	42.4	86	13	5.6
1594	21	31	42.9	86	13	10.1
1595	21	31	43.4	86	13	13.3
1596	21	31	41.8	86	13	20.3
1597	21	31	36.4	86	13	28.8
1598	21	31	37.1	86	13	34.0
1599	21	31	35.3	86	13	37.7
1600	21	31	38.0	86	13	39.5
1601	21	31	41.8	86	13	44.1
1602	21	31	43.8	86	13	47.2
1603	21	31	43.4	86	13	51.0
1604	21	31	43.0	86	14	0.9
1605	21	31	42.4	86	14	8.7

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1606	21	31	43.8	86	14	14.1
1607	21	31	47.0	86	14	21.7
1608	21	31	47.8	86	14	23.7
1609	21	31	49.2	86	14	25.8
1610	21	31	50.5	86	14	27.3
1611	21	31	51.6	86	14	31.2
1612	21	31	53.5	86	14	34.9
1613	21	31	55.7	86	14	37.5
1614	21	31	56.8	86	14	39.6
1615	21	31	58.4	86	14	42.0
1616	21	31	58.8	86	14	42.7
1617	21	31	58.6	86	14	42.6
1618	21	32	2.6	86	14	42.5
1619	21	32	5.4	86	14	42.3
1620	21	32	9.7	86	14	40.4
1621	21	32	16.1	86	14	37.5
1622	21	32	19.8	86	14	34.5
1623	21	32	25.7	86	14	33.6
1624	21	32	31.2	86	14	30.9
1625	21	32	34.8	86	14	31.6
1626	21	32	41.6	86	14	33.8
1627	21	32	43.6	86	14	35.0
1628	21	32	49.5	86	14	38.6
1629	21	32	51.6	86	14	41.4
1630	21	32	58.2	86	14	41.3
1631	21	33	3.9	86	14	40.5
1632	21	33	7.7	86	14	44.0
1633	21	33	13.1	86	14	46.3
1634	21	33	17.7	86	14	48.7
1635	21	33	19.1	86	14	49.0
1636	21	33	24.6	86	14	49.3
1637	21	33	24.8	86	14	43.2
1638	21	33	20.0	86	14	41.4
1639	21	33	18.0	86	14	35.1
1640	21	33	16.1	86	14	33.9
1641	21	33	15.5	86	14	24.2
1642	21	33	15.3	86	14	21.9
1643	21	33	16.5	86	14	20.6
1644	21	33	17.6	86	14	20.1
1645	21	33	23.9	86	14	21.6
1646	21	33	26.7	86	14	16.9
1647	21	33	36.2	86	14	8.2
1648	21	33	40.2	86	14	13.9
1649	21	33	41.0	86	14	15.6
1650	21	33	42.0	86	14	20.0
1651	21	32	41.62	86	14	33.82
1652	21	32	43.62	86	14	35.06
1653	21	32	49.55	86	14	38.63
1654	21	32	51.62	86	14	41.41
1655	21	32	58.24	86	14	41.30
1656	21	33	3.95	86	14	40.53
1657	21	33	7.75	86	14	43.99

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1658	21	33	13.15	86	14	46.31
1659	21	33	19.12	86	14	49.00
1660	21	33	17.76	86	14	48.72
1661	21	33	24.68	86	14	49.30
1662	21	33	24.82	86	14	43.19
1663	21	33	20.03	86	14	41.39
1664	21	33	18.06	86	14	35.11
1665	21	33	16.13	86	14	33.94
1666	21	33	15.55	86	14	24.21
1667	21	33	15.34	86	14	21.91
1668	21	33	16.49	86	14	20.63
1669	21	33	17.61	86	14	20.15
1670	21	33	23.92	86	14	21.59
1671	21	33	26.71	86	14	16.90
1672	21	33	36.23	86	14	8.25
1673	21	33	40.25	86	14	13.90
1674	21	33	41.03	86	14	15.62
1675	21	33	42.07	86	14	20.01
1676	21	33	36.85	86	14	31.23
1677	21	33	36.63	86	14	37.74
1678	21	33	39.38	86	14	45.67
1679	21	33	42.08	86	14	51.24
1680	21	33	42.39	86	14	56.92
1681	21	33	43.52	86	15	3.03
1682	21	33	47.95	86	15	9.89
1683	21	33	47.29	86	15	16.89
1684	21	33	51.51	86	15	19.21
1685	21	33	53.04	86	15	20.92
1686	21	33	58.58	86	15	20.92
1687	21	34	2.77	86	15	22.14
1688	21	34	8.04	86	15	25.81
1689	21	34	13.68	86	15	29.51
1690	21	34	20.59	86	15	36.81
1691	21	34	27.68	86	15	36.29
1692	21	34	30.84	86	15	35.49
1693	21	34	35.04	86	15	31.31
1694	21	34	40.31	86	15	30.26
1695	21	34	42.91	86	15	26.45
1696	21	34	56.56	86	15	24.56
1697	21	35	3.86	86	15	25.94
1698	21	35	17.11	86	15	25.80
1699	21	35	17.05	86	15	17.41
1700	21	35	8.19	86	15	4.02
1701	21	35	4.07	86	14	59.57
1702	21	35	2.05	86	14	55.87
1703	21	35	4.20	86	14	44.49
1704	21	35	3.76	86	14	40.62
1705	21	35	4.15	86	14	39.02
1706	21	35	2.69	86	14	36.73
1707	21	35	0.93	86	14	32.15
1708	21	34	58.16	86	14	30.08
1709	21	34	56.50	86	14	28.77

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1710	21	34	56.23	86	14	26.79
1711	21	34	54.60	86	14	25.16
1712	21	34	53.43	86	14	24.33
1713	21	34	53.07	86	14	22.77
1714	21	34	50.88	86	14	19.80
1715	21	34	51.02	86	14	19.15
1716	21	34	50.63	86	14	17.71
1717	21	34	49.15	86	14	12.04
1718	21	34	51.92	86	14	8.58
1719	21	34	53.43	86	14	7.73
1720	21	34	55.24	86	14	5.39
1721	21	34	57.33	86	14	3.71
1722	21	35	0.37	86	13	58.77
1723	21	35	3.22	86	13	56.75
1724	21	35	4.90	86	13	55.16
1725	21	35	5.10	86	13	53.82
1726	21	35	5.37	86	13	48.78
1727	21	35	6.46	86	13	44.28
1728	21	35	7.53	86	13	42.16
1729	21	35	6.68	86	13	38.28
1730	21	35	6.24	86	13	37.31
1731	21	35	4.70	86	13	34.61
1732	21	35	2.39	86	13	13.31
1733	21	34	57.23	86	13	27.62
1734	21	34	55.08	86	13	22.99
1735	21	34	53.23	86	13	21.43
1736	21	34	50.48	86	13	18.02
1737	21	34	47.66	86	13	14.96
1738	21	34	44.83	86	13	12.33
1739	21	34	42.16	86	13	7.87
1740	21	34	38.89	86	13	4.44
1741	21	34	35.80	86	13	0.66
1742	21	34	37.19	86	12	56.77
1743	21	34	38.11	86	12	53.19
1744	21	34	36.97	86	12	51.19
1745	21	34	32.20	86	12	44.59
1746	21	34	26.86	86	12	37.82
1747	21	34	26.52	86	12	32.00
1748	21	34	27.74	86	12	27.50
1749	21	34	29.74	86	12	24.45
1750	21	34	26.67	86	12	18.40
1751	21	34	23.55	86	12	13.91
1752	21	34	21.17	86	12	2.91
1753	21	34	20.75	86	12	0.08
1754	21	34	19.14	86	11	55.92
1755	21	34	20.48	86	11	53.80
1756	21	34	25.21	86	11	47.05
1757	21	34	29.23	86	11	46.49
1758	21	34	32.44	86	11	39.92
1759	21	34	34.29	86	11	36.41
1760	21	34	38.60	86	11	35.39
1761	21	34	45.42	86	11	37.82

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1762	21	34	52.55	86	11	37.39
1763	21	34	54.16	86	11	42.67
1764	21	35	3.24	86	11	47.21
1765	21	35	3.18	86	11	48.36
1766	21	35	9.76	86	11	50.29
1767	21	35	12.17	86	11	51.31
1768	21	35	16.37	86	11	58.02
1769	21	35	17.72	86	12	1.31
1770	21	35	17.23	86	12	2.35
1771	21	35	29.47	86	12	6.12
1772	21	35	26.98	86	12	8.17
1773	21	35	30.26	86	12	11.67
1774	21	35	28.17	86	12	15.44
1775	21	35	30.70	86	12	17.30
1776	21	35	27.61	86	12	21.47
1777	21	35	40.91	86	12	31.28
1778	21	35	46.93	86	12	30.71
1779	21	35	48.57	86	12	31.65
1780	21	35	48.16	86	12	35.74
1781	21	35	47.13	86	12	47.54
1782	21	35	51.43	86	12	48.72
1783	21	35	51.35	86	12	52.20
1784	21	35	55.04	86	12	49.87
1785	21	35	56.22	86	12	52.12
1786	21	36	7.06	86	10	50.70
1787	21	36	7.39	86	12	46.03
1788	21	36	15.17	86	12	44.51
1789	21	36	21.23	86	12	38.90
1790	21	36	33.18	86	12	49.14
1791	21	36	35.52	86	12	40.01
1792	21	36	27.49	86	12	25.27
1793	21	36	29.21	86	12	24.12
1794	21	36	28.39	86	12	22.12
1795	21	36	32.73	86	12	17.21
1796	21	36	31.67	86	12	15.37
1797	21	36	44.49	86	12	7.71
1798	21	36	46.02	86	12	6.48
1799	21	36	52.82	86	12	5.95
1800	21	36	57.27	86	12	5.84
1801	21	36	55.31	86	12	2.88
1802	21	37	0.14	86	11	55.96
1803	21	37	4.44	86	11	49.49
1804	21	37	8.30	86	11	43.24
1805	21	37	9.94	86	11	43.03
1806	21	37	9.17	86	11	35.09
1807	21	37	8.47	86	11	34.52
1808	21	37	10.19	86	11	28.09
1809	21	37	11.66	86	11	20.10
1810	21	37	11.54	86	11	15.11
1811	21	37	18.67	86	11	14.49
1812	21	37	26.81	86	11	13.22
1813	21	37	26.36	86	11	9.46

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1814	21	37	35.45	86	11	8.68
1815	21	37	44.30	86	11	4.46
1816	21	37	43.07	86	11	2.05
1817	21	37	47.25	86	10	56.56
1818	21	37	42.29	86	10	49.56
1819	21	37	45.77	86	10	45.87
1820	21	37	49.58	86	10	40.92
1821	21	37	53.10	86	10	34.94
1822	21	37	57.07	86	10	30.35
1823	21	37	53.51	86	10	24.91
1824	21	37	55.15	86	10	17.90
1825	21	38	0.83	86	10	12.42
1826	21	38	5.04	86	10	1.00
1827	21	38	11.23	86	10	11.44
1828	21	38	12.21	86	10	6.53
1829	21	38	16.67	86	10	3.29
1830	21	38	20.28	86	10	5.46
1831	21	38	22.77	86	10	7.18
1832	21	38	26.75	86	10	9.80
1833	21	38	30.59	86	10	7.02
1834	21	38	34.57	86	10	3.74
1835	21	38	36.29	86	10	0.39
1836	21	38	42.84	86	9	55.72
1837	21	38	48.00	86	9	51.30
1838	21	38	52.15	86	9	48.27
1839	21	38	56.28	86	9	45.44
1840	21	39	3.00	86	9	47.28
1841	21	39	7.30	86	9	45.44
1842	21	39	15.65	86	9	44.13
1843	21	39	20.36	86	9	37.45
1844	21	39	25.85	86	9	38.77
1845	21	39	26.62	86	9	36.68
1846	21	39	29.37	86	9	41.22
1847	21	39	26.21	86	9	46.05
1848	21	39	28.96	86	9	48.55
1849	21	39	22.53	86	9	56.58
1850	21	39	27.15	86	10	2.10
1851	21	39	29.83	86	10	1.20
1852	21	39	33.36	86	9	56.05
1853	21	39	49.24	86	9	55.49
1854	21	39	46.94	86	9	48.24
1855	21	39	41.58	86	9	49.55
1856	21	39	42.93	86	9	41.55
1857	21	39	47.52	86	9	38.60
1858	21	39	49.16	86	9	32.17
1859	21	39	56.86	86	9	31.60
1860	21	39	58.94	86	9	29.72
1861	21	39	57.72	86	9	27.05
1862	21	39	59.85	86	9	25.38
1863	21	39	58.99	86	9	23.16
1864	21	40	0.50	86	9	18.13
1865	21	40	6.93	86	9	20.50

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1866	21	40	19.38	86	9	25.46
1867	21	40	24.21	86	9	15.83
1868	21	40	22.94	86	9	15.38
1869	21	40	24.37	86	9	10.02
1870	21	40	30.60	86	9	10.80
1871	21	40	37.03	86	9	15.30
1872	21	40	40.38	86	9	7.19
1873	21	40	43.50	86	9	7.48
1874	21	40	49.76	86	9	6.46
1875	21	40	51.69	86	9	0.32
1876	21	40	57.58	86	8	53.15
1877	21	40	55.78	86	8	50.04
1878	21	40	59.30	86	8	41.48
1879	21	41	1.68	86	8	39.64
1880	2	41	0.16	86	8	36.48
1881	21	41	9.26	86	8	28.22
1882	21	41	8.44	86	8	26.75
1883	21	41	11.68	86	8	23.92
1884	21	41	10.37	86	8	22.04
1885	21	41	12.13	86	8	19.29
1886	21	41	6.60	86	8	14.46
1887	21	41	3.28	86	8	9.42
1888	21	40	57.30	86	8	6.27
1889	21	41	1.56	86	7	55.05
1890	21	40	58.90	86	7	49.61
1891	21	40	58.44	86	7	44.96
1892	21	40	48.04	86	7	41.24
1893	21	40	42.35	86	7	43.20
1894	21	40	47.59	86	7	30.88
1895	21	40	51.49	86	7	21.88
1896	21	40	52.92	86	7	18.31
1897	21	40	57.51	86	7	20.16
1898	21	40	59.64	86	7	16.39
1899	21	40	55.34	86	7	12.58
1900	21	40	56.34	86	7	9.00
1901	21	41	3.61	86	7	7.38
1902	21	41	6.97	86	7	6.81
1903	21	41	7.38	86	7	6.03
1904	21	41	8.77	86	7	5.05
1905	21	41	11.59	86	7	3.94
1906	21	41	14.58	86	7	2.63
1907	21	41	17.29	86	7	1.16
1908	21	41	22.23	86	7	1.20
1909	21	41	27.96	86	7	1.93
1910	21	41	33.69	86	6	59.97
1911	21	41	35.91	86	7	0.99
1912	21	41	38.81	86	7	2.88
1913	21	41	41.19	86	7	4.36
1914	21	41	41.23	86	7	5.75
1915	21	41	45.25	86	7	6.57
1916	21	41	47.25	86	7	7.14
1917	21	41	46.88	86	7	9.68

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1918	21	41	46.47	86	7	13.16
1919	21	41	46.19	86	7	15.37
1920	21	41	46.27	86	7	19.26
1921	21	41	45.90	86	7	22.09
1922	21	41	45.41	86	7	23.97
1923	21	41	44.92	86	7	26.68
1924	21	41	43.36	86	7	29.91
1925	21	41	43.12	86	7	35.19
1926	21	41	42.26	86	7	39.08
1927	21	41	41.85	86	7	41.74
1928	21	41	41.68	86	7	45.18
1929	21	41	40.54	86	7	47.77
1930	21	41	40.29	86	7	50.92
1931	21	41	37.71	86	7	53.71
1932	21	41	42.79	86	7	58.83
1933	21	41	44.51	86	8	0.87
1934	21	41	46.19	86	8	4.56
1935	21	41	48.11	86	8	7.96
1936	21	41	50.97	86	8	9.33
1937	21	41	53.30	86	8	10.39
1938	21	41	55.43	86	8	12.15
1939	21	42	0.72	86	8	15.47
1940	21	42	2.89	86	8	16.70
1941	21	42	4.87	86	8	13.85
1942	21	42	5.40	86	8	11.06
1943	21	42	7.00	86	8	8.89
1944	21	42	8.39	86	8	6.39
1945	21	42	10.07	86	8	4.10
1946	21	42	11.55	86	8	1.77
1947	21	42	12.43	86	7	59.07
1948	21	42	17.07	86	7	55.91
1949	21	42	19.57	86	7	55.71
1950	21	42	21.74	86	7	54.31
1951	21	42	24.04	86	7	50.67
1952	21	42	25.47	86	7	47.64
1953	21	42	26.16	86	7	40.31
1954	21	42	28.66	86	7	40.31
1955	21	42	28.17	86	7	37.94
1956	21	42	30.10	86	7	34.70
1957	21	42	31.53	86	7	31.22
1958	21	42	34.11	86	7	30.07
1959	21	42	36.77	86	7	28.40
1960	21	42	38.82	86	7	27.54
1961	21	42	40.99	86	7	26.31
1962	21	42	40.95	86	7	24.83
1963	21	42	45.74	86	7	24.10
1964	21	42	48.32	86	7	24.83
1965	21	42	50.24	86	7	25.08
1966	21	42	54.17	86	7	25.57
1967	21	42	58.39	86	7	25.98
1968	21	42	58.84	86	7	27.00
1969	21	43	2.11	86	7	27.58

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1970	21	43	4.57	86	7	28.11
1971	21	43	7.19	86	7	29.34
1972	21	43	8.71	86	7	24.83
1973	21	43	9.93	86	7	24.50
1974	21	43	11.49	86	7	22.05
1975	21	43	13.05	86	7	18.65
1976	21	43	13.74	86	7	15.82
1977	21	43	16.49	86	7	13.45
1978	21	43	18.29	86	7	10.34
1979	21	43	18.98	86	7	7.80
1980	21	43	20.81	86	7	4.96
1981	21	43	21.34	86	7	4.19
1982	21	43	23.27	86	7	0.62
1983	21	43	24.50	86	6	58.54
1984	21	43	22.73	86	6	57.51
1985	21	43	20.07	86	6	55.38
1986	21	43	20.81	86	6	52.27
1987	21	43	22.32	86	6	49.98
1988	21	43	22.90	86	6	48.26
1989	21	43	23.84	86	6	44.20
1990	21	43	25.44	86	6	42.03
1991	21	43	26.51	86	6	39.63
1992	21	43	27.65	86	6	36.52
1993	21	43	28.84	86	6	34.76
1994	21	43	32.16	86	6	34.52
1995	21	43	32.61	86	6	31.94
1996	21	43	33.43	86	6	28.50
1997	21	43	35.64	86	6	26.29
1998	21	43	37.48	86	6	24.57
1999	21	43	39.16	86	6	21.29
2000	21	43	40.84	86	6	18.82
2001	21	43	42.39	86	6	16.74
2002	21	43	44.48	86	6	13.84
2003	21	43	45.22	86	6	11.46
2004	21	43	46.98	86	6	8.39
2005	21	43	48.29	86	6	6.06
2006	21	43	51.36	86	6	0.77
2007	21	43	52.79	86	5	58.11
2008	21	43	54.28	86	5	55.28
2009	21	43	56.98	86	5	52.29
2010	21	43	57.39	86	5	50.32
2011	21	43	59.85	86	5	47.01
2012	21	44	3.08	86	5	45.00
2013	21	44	5.41	86	5	44.71
2014	21	44	8.94	86	5	44.63
2015	21	44	11.88	86	5	40.66
2016	21	44	15.08	86	5	39.51
2017	21	44	17.86	86	5	38.49
2018	21	44	20.32	86	5	37.59
2019	21	44	22.86	86	5	37.18
2020	21	44	25.60	86	5	38.16
2021	21	44	28.22	86	5	39.47

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2022	21	44	30.97	86	5	39.15
2023	21	44	34.00	86	5	40.74
2024	21	44	36.62	86	5	42.87
2025	21	44	36.09	86	5	45.53
2026	21	44	35.95	86	5	44.61
2027	21	44	35.16	86	5	51.43
2028	21	44	34.70	86	5	54.31
2029	21	44	34.06	86	5	56.89
2030	21	44	33.43	86	5	59.97
2031	21	44	32.60	86	6	3.76
2032	21	44	34.90	86	6	4.40
2033	21	44	38.05	86	6	5.67
2034	21	44	41.06	86	6	6.72
2035	21	44	43.33	86	6	5.93
2036	21	44	45.46	86	6	1.30
2037	21	44	46.93	86	5	59.71
2038	21	44	48.72	86	5	57.14
2039	21	44	50.73	86	5	55.24
2040	21	44	52.92	86	5	52.88
2041	21	44	54.17	86	5	51.03
2042	21	44	56.64	86	5	49.73
2043	21	44	59.38	86	5	47.84
2044	21	45	2.14	86	5	46.61
2045	21	45	6.42	86	5	43.87
2046	21	45	10.90	86	5	45.59
2047	21	45	9.12	86	5	48.06
2048	21	45	12.21	86	5	50.22
2049	21	45	12.81	86	5	50.98
2050	21	45	14.71	86	5	51.62
2051	21	45	13.90	86	5	52.68
2052	21	45	16.44	86	5	52.66
2053	21	45	15.90	86	5	54.01
2054	21	45	20.61	86	5	57.50
2055	21	45	22.16	86	5	59.66
2056	21	45	25.03	86	6	1.53
2057	21	45	26.64	86	6	4.05
2058	21	45	29.05	86	6	5.48
2059	21	45	31.24	86	6	6.61
2060	21	45	33.82	86	6	8.18
2061	21	45	37.13	86	6	7.57
2062	21	45	40.03	86	6	7.47
2063	21	45	43.72	86	6	6.70
2064	21	45	48.90	86	6	5.69
2065	21	45	48.90	86	6	5.58
2066	21	45	51.35	86	6	4.04
2067	21	45	54.23	86	6	4.65
2068	21	45	56.72	86	6	3.76
2069	21	46	0.05	86	6	3.42
2070	21	46	3.13	86	6	3.02
2071	21	46	5.84	86	6	2.07
2072	21	46	8.44	86	6	0.90
2073	21	46	11.14	86	6	0.07

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2074	21	46	13.62	86	5	58.79
2075	21	46	16.75	86	5	57.70
2076	21	46	20.63	86	5	57.65
2077	21	46	23.13	86	5	57.92
2078	21	46	25.68	86	5	58.89
2079	21	46	28.62	86	5	58.37
2080	21	46	32.05	86	5	57.58
2081	21	46	34.03	86	5	57.59
2082	21	46	35.83	86	5	55.62
2083	21	46	36.63	86	5	52.09
2084	21	46	37.94	86	5	52.10
2085	21	46	39.73	86	5	47.03
2086	21	46	41.43	86	5	44.53
2087	21	46	42.92	86	5	42.28
2088	21	46	44.82	86	5	34.36
2089	21	46	46.38	86	5	36.87
2090	21	46	48.53	86	5	33.96
2091	21	46	49.85	86	5	31.40
2092	21	46	51.23	86	5	29.02
2093	21	46	52.86	86	5	26.51
2094	21	46	56.14	86	5	24.81
2095	21	46	58.87	86	5	22.32
2096	21	47	0.61	86	5	20.69
2097	21	47	3.57	86	5	18.51
2098	21	47	4.45	86	5	16.63
2099	21	47	5.51	86	5	14.71
2100	21	47	7.10	86	5	12.82
2101	21	47	10.43	86	5	9.82
2102	21	47	12.94	86	5	6.10
2103	21	47	15.16	86	5	8.72
2104	21	47	18.14	86	5	10.14
2105	21	47	21.24	86	5	11.92
2106	21	47	23.93	86	5	12.27
2107	21	47	27.43	86	5	13.05
2108	21	47	29.72	86	5	13.71
2109	21	47	33.22	86	5	15.06
2110	21	47	35.97	86	5	15.51
2111	21	47	38.74	86	5	16.15
2112	21	47	40.86	86	5	16.74
2113	21	47	44.65	86	5	18.73
2114	21	47	47.70	86	5	18.42
2115	21	47	51.08	86	5	18.73
2116	21	47	51.77	86	5	16.43
2117	21	47	55.33	86	5	16.41
2118	21	47	57.84	86	5	15.61
2119	21	48	10.18	86	5	14.39
2120	21	48	10.21	86	5	16.50
2121	21	48	10.34	86	5	20.71
2122	21	48	10.86	86	5	22.99
2123	21	48	10.86	86	5	25.34
2124	21	48	9.89	86	5	37.03
2125	21	48	10.57	86	5	41.62

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2126	21	48	14.00	86	5	41.78
2127	21	48	18.79	86	5	40.20
2128	21	48	19.04	86	5	44.86
2129	21	48	16.80	86	5	46.63
2130	21	48	10.37	86	5	51.61
2131	21	48	4.95	86	5	57.06
2132	21	48	1.35	86	5	56.90
2133	21	47	57.14	86	5	56.29
2134	21	47	53.48	86	5	55.11
2135	21	47	52.55	86	5	55.01
2136	21	47	48.47	86	6	0.82
2137	21	47	46.32	86	6	4.19
2138	21	47	43.08	86	6	6.12
2139	21	47	38.84	86	6	7.69
2140	21	47	35.56	86	6	7.02
2141	21	47	33.12	86	6	6.41
2142	21	47	26.57	86	6	4.29
2143	21	47	26.34	86	6	4.71
2144	21	47	20.50	86	6	7.37
2145	21	47	20.28	86	6	0.69
2146	21	47	14.46	86	6	3.23
2147	21	47	10.22	86	6	8.66
2148	21	47	9.04	86	6	12.99
2149	21	47	5.63	86	6	13.41
2150	21	47	0.14	86	6	14.81
2151	21	46	59.50	86	6	14.02
2152	21	46	54.49	86	6	14.28
2153	21	46	52.43	86	6	14.50
2154	21	46	51.47	86	6	16.37
2155	21	46	55.48	86	6	21.54
2156	21	46	56.77	86	6	26.77
2157	21	47	3.51	86	6	32.87
2158	21	47	2.26	86	6	35.18
2159	21	46	55.93	86	6	37.30
2160	21	46	48.55	86	6	39.78
2161	21	46	46.75	86	6	46.84
2162	21	46	42.16	86	6	49.15
2163	21	46	37.56	86	6	55.90
2164	21	46	31.65	86	7	3.32
2165	21	46	29.66	86	7	6.91
2166	21	46	24.17	86	7	10.70
2167	21	46	23.79	86	7	18.12
2168	21	46	19.13	86	7	16.39
2169	21	46	10.75	86	7	21.04
2170	21	46	7.83	86	7	22.71
2171	21	46	4.13	86	7	20.98
2172	21	46	1.98	86	7	23.19
2173	21	45	56.36	86	7	27.72
2174	21	45	51.77	86	7	31.13
2175	21	45	45.99	86	7	34.56
2176	21	45	43.48	86	7	36.68
2177	21	45	43.74	86	7	37.20

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2178	21	45	42.07	86	7	40.41
2179	21	45	47.79	86	7	46.51
2180	21	45	50.61	86	7	45.71
2181	21	45	53.66	86	7	45.29
2182	21	45	59.03	86	7	50.20
2183	21	46	13.86	86	7	46.32
2184	21	46	19.48	86	7	46.06
2185	21	46	28.51	86	7	44.10
2186	21	46	39.02	86	7	41.91
2187	21	46	47.49	86	7	40.38
2188	21	46	54.80	86	7	40.71
2189	21	46	56.96	86	7	40.95
2190	21	47	0.30	86	7	41.27
2191	21	47	4.91	86	7	43.80
2192	21	47	6.72	86	7	45.96
2193	21	47	11.30	86	7	49.62
2194	21	47	15.95	86	7	55.20
2195	21	47	15.75	86	7	56.88
2196	21	47	13.46	86	8	8.08
2197	21	47	13.18	86	8	9.29
2198	21	47	5.72	86	8	12.38
2199	21	47	1.50	86	8	15.15
2200	21	46	56.61	86	8	16.87
2201	21	46	50.26	86	8	25.18
2202	21	46	47.85	86	8	24.58
2203	21	46	43.84	86	8	32.69
2204	21	46	47.37	86	8	34.86
2205	21	46	48.61	86	8	33.85
2206	21	46	50.70	86	8	34.58
2207	21	46	54.36	86	8	38.71
2208	21	46	52.64	86	8	42.28
2209	21	46	50.47	86	8	48.27
2210	21	46	44.65	86	8	47.78
2211	21	46	41.64	86	8	49.23
2212	21	46	40.07	86	8	49.39
2213	21	46	33.55	86	8	56.42
2214	21	46	33.76	86	8	56.83
2215	21	46	28.93	86	9	1.52
2216	21	46	22.56	86	9	8.47
2217	21	46	20.83	86	9	9.12
2218	21	46	9.80	86	9	15.33
2219	21	46	7.77	86	9	14.75
2220	21	46	4.97	86	9	14.23
2221	21	46	1.69	86	9	19.50
2222	21	46	0.32	86	9	22.70
2223	21	45	59.74	86	9	23.81
2224	21	45	58.97	86	9	30.01
2225	21	45	58.34	86	9	33.61
2226	21	45	57.62	86	9	39.31
2227	21	45	56.99	86	9	44.29
2228	21	45	57.74	86	9	50.05
2229	21	45	49.96	86	9	51.00

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2230	21	45	47.66	86	9	57.98
2231	21	45	46.71	86	10	1.78
2232	21	45	42.66	86	10	8.06
2233	21	45	36.55	86	10	13.81
2234	21	45	30.08	86	10	9.91
2235	21	45	27.30	86	10	14.66
2236	21	45	25.40	86	10	8.93
2237	21	45	21.35	86	10	7.88
2238	21	45	17.72	86	10	7.38
2239	21	45	12.62	86	10	12.83
2240	21	45	21.64	86	10	26.90
2241	21	45	22.36	86	10	30.26
2242	21	45	25.53	86	10	35.81
2243	21	45	30.37	86	10	40.53
2244	21	45	30.16	86	10	42.84
2245	21	45	31.23	86	10	45.39
2246	21	45	32.98	86	10	46.11
2247	21	45	34.88	86	10	37.05
2248	21	45	36.93	86	10	35.78
2249	21	45	39.01	86	10	30.70
2250	21	45	40.99	86	10	24.89
2251	21	45	48.36	86	10	14.67
2252	21	45	55.30	86	10	3.57
2253	21	46	6.52	86	9	49.89
2254	21	46	7.36	86	9	40.51
2255	21	46	20.39	86	9	37.81
2256	21	46	23.21	86	9	33.15
2257	21	46	25.08	86	9	31.90
2258	21	46	35.88	86	9	29.44
2259	21	46	46.36	86	9	30.30
2260	21	46	48.82	86	9	34.66
2261	21	46	48.23	86	9	37.24
2262	21	46	46.48	86	9	44.10
2263	21	46	40.27	86	9	48.61
2264	21	46	43.59	86	9	57.85
2265	21	46	54.48	86	9	51.06
2266	21	47	0.67	86	9	49.99
2267	21	47	12.02	86	9	47.35
2268	21	47	18.71	86	9	45.72
2269	21	47	25.65	86	9	45.16
2270	21	47	26.18	86	9	38.44
2271	21	47	29.47	86	9	30.88
2272	21	47	36.02	86	9	29.09
2273	21	47	45.29	86	9	26.22
2274	21	47	58.00	86	9	24.23
2275	21	48	2.80	86	9	32.64
2276	21	48	4.82	86	9	36.00
2277	21	48	3.22	86	9	48.55
2278	21	48	1.79	86	9	53.48
2279	21	48	4.69	86	10	2.71
2280	21	48	7.49	86	10	13.27
2281	21	48	2.44	86	10	21.62

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2282	21	47	52.46	86	10	33.16
2283	21	47	51.19	86	10	37.60
2284	21	47	42.97	86	10	40.11
2285	21	47	43.17	86	10	43.54
2286	21	47	57.87	86	10	53.69
2287	21	47	58.19	86	11	0.62
2288	21	47	52.76	86	11	8.34
2289	21	47	44.67	86	11	7.18
2290	21	47	37.90	86	11	16.94
2291	21	47	32.58	86	11	22.42
2292	21	47	30.34	86	11	24.31
2293	21	47	21.24	86	11	26.99
2294	21	47	18.12	86	11	19.90
2295	21	47	18.31	86	11	12.79
2296	21	47	22.12	86	11	3.81
2297	21	47	16.42	86	10	55.31
2298	21	47	11.26	86	10	51.00
2299	21	47	12.64	86	10	42.59
2300	21	47	19.04	86	10	33.25
2301	21	47	19.26	86	10	24.11
2302	21	47	15.45	86	10	18.60
2303	21	47	14.56	86	10	21.84
2304	21	47	9.78	86	10	33.36
2305	21	47	6.25	86	10	36.73
2306	21	46	57.24	86	10	50.02
2307	21	46	50.10	86	10	51.19
2308	21	46	45.56	86	10	58.52
2309	21	46	48.33	86	11	3.40
2310	21	46	52.71	86	11	5.07
2311	21	47	4.14	86	11	14.42
2312	21	47	6.12	86	11	15.87
2313	21	47	16.20	86	11	20.03
2314	21	47	21.93	86	11	31.30
2315	21	47	15.63	86	11	34.01
2316	21	47	12.36	86	11	36.18
2317	21	47	0.83	86	11	41.76
2318	21	47	6.24	86	11	56.66
2319	21	47	6.89	86	11	56.22
2320	21	47	18.49	86	11	53.74
2321	21	47	25.99	86	11	50.31
2322	21	47	30.54	86	11	45.53
2323	21	47	34.41	86	11	41.69
2324	21	47	39.36	86	11	38.81
2325	21	47	45.71	86	11	25.54
2326	21	47	47.81	86	11	23.64
2327	21	47	54.43	86	11	8.13
2328	21	47	59.89	86	11	3.85
2329	21	48	5.09	86	11	1.17
2330	21	48	12.01	86	11	2.94
2331	21	48	11.67	86	10	50.89
2332	21	48	11.91	86	10	33.55
2333	21	48	14.45	86	10	29.44

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2334	21	48	16.29	86	10	30.76
2335	21	48	24.06	86	10	33.38
2336	21	48	28.20	86	10	26.15
2337	21	48	26.91	86	10	23.67
2338	21	48	23.04	86	10	16.75
2339	21	48	19.51	86	10	11.39
2340	21	48	20.73	86	10	9.38
2341	21	48	23.38	86	10	4.84
2342	21	48	24.16	86	10	4.39
2343	21	48	26.23	86	10	4.19
2344	21	48	33.25	86	10	3.27
2345	21	48	38.68	86	10	4.12
2346	21	48	43.81	86	10	2.36
2347	21	48	55.89	86	9	53.33
2348	21	48	48.83	86	9	41.96
2349	21	48	44.39	86	9	31.24
2350	21	48	38.37	86	9	32.71
2351	21	48	29.90	86	9	33.92
2352	21	48	23.28	86	9	35.21
2353	21	48	16.70	86	9	31.71
2354	21	48	14.80	86	9	29.44
2355	21	48	14.29	86	9	29.37
2356	21	48	7.16	86	9	27.81
2357	21	48	4.86	86	9	26.76
2358	21	47	58.88	86	9	21.94
2359	21	47	58.54	86	9	20.51
2360	21	47	58.95	86	9	19.77
2361	21	48	0.72	86	9	17.32
2362	21	48	5.47	86	9	12.06
2363	21	48	11.27	86	9	5.82
2364	21	48	7.61	86	8	57.00
2365	21	48	3.77	86	8	46.85
2366	21	48	2.75	86	8	45.80
2367	21	47	53.79	86	8	37.89
2368	21	47	55.08	86	8	31.78
2369	21	47	55.93	86	8	27.50
2370	21	47	56.81	86	8	25.10
2371	21	48	0.92	86	8	14.13
2372	21	47	55.46	86	8	10.23
2373	21	47	58.68	86	8	4.05
2374	21	47	56.44	86	8	2.05
2375	21	47	50.64	86	7	53.43
2376	21	47	52.16	86	7	48.17
2377	21	47	54.10	86	7	41.01
2378	21	47	53.15	86	7	37.58
2379	21	47	59.87	86	7	23.06
2380	21	47	57.70	86	7	17.59
2381	21	47	57.70	86	7	14.71
2382	21	47	57.97	86	7	10.88
2383	21	47	57.90	86	7	8.74
2384	21	48	0.92	86	7	6.97
2385	21	48	4.25	86	7	5.99

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2386	21	48	9.20	86	7	3.85
2387	21	48	19.58	86	7	3.88
2388	21	48	21.28	86	6	59.61
2389	21	48	24.37	86	6	59.78
2390	21	48	38.45	86	7	0.39
2391	21	48	45.04	86	7	0.97
2392	21	48	49.04	86	7	5.78
2393	21	48	51.28	86	7	8.16
2394	21	49	4.72	86	7	8.70
2395	21	49	13.24	86	7	6.36
2396	21	49	14.09	86	7	1.20
2397	21	49	9.27	86	6	59.07
2398	21	48	58.58	86	6	54.08
2399	21	48	52.57	86	6	48.99
2400	21	48	50.10	86	6	44.39
2401	21	48	48.36	86	6	40.30
2402	21	48	38.28	86	6	35.99
2403	21	48	35.13	86	6	37.75
2404	21	48	28.51	86	6	41.08
2405	21	48	22.50	86	6	44.40
2406	21	48	19.48	86	6	41.99
2407	21	48	15.75	86	6	36.50
2408	21	48	15.14	86	6	34.12
2409	21	48	14.66	86	6	29.27
2410	21	48	20.60	86	6	21.87
2411	21	48	23.52	86	6	20.55
2412	21	48	25.15	86	6	20.41
2413	21	48	25.01	86	6	18.65
2414	21	48	22.27	86	6	15.46
2415	21	48	26.24	86	6	10.26
2416	21	48	29.97	86	6	9.18
2417	21	48	39.10	86	6	4.70
2418	21	48	48.09	86	6	8.30
2419	21	48	51.11	86	6	15.32
2420	21	48	55.12	86	6	17.90
2421	21	48	55.97	86	6	17.09
2422	21	48	55.12	86	6	13.39
2423	21	48	57.70	86	6	5.31
2424	21	48	58.95	86	6	1.61
2425	21	49	0.89	86	6	1.78
2426	21	49	6.01	86	6	1.41
2427	21	49	9.78	86	6	1.47
2428	21	49	12.15	86	6	5.78
2429	21	49	21.76	86	6	4.87
2430	21	49	21.04	86	6	1.98
2431	21	49	23.32	86	5	59.61
2432	21	49	21.35	86	5	56.25
2433	21	49	22.13	86	5	44.61
2434	21	49	16.67	86	5	38.30
2435	21	49	18.60	86	5	36.29
2436	21	49	13.54	86	5	34.63
2437	21	49	9.17	86	5	33.17

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2438	21	49	4.25	86	5	29.03
2439	21	48	54.68	86	5	27.67
2440	21	48	51.42	86	5	26.69
2441	21	48	49.28	86	5	26.49
2442	21	48	48.16	86	5	24.08
2443	21	48	47.48	86	5	23.06
2444	21	48	46.84	86	5	21.70
2445	21	48	47.55	86	5	15.46
2446	21	48	49.25	86	5	13.79
2447	21	48	50.16	86	5	9.48
2448	21	48	49.64	86	5	5.54
2449	21	48	49.51	86	5	5.00
2450	21	48	50.55	86	5	3.82
2451	21	48	51.73	86	5	2.52
2452	21	48	52.66	86	5	1.05
2453	21	48	54.17	86	4	58.38
2454	21	48	55.73	86	4	57.53
2455	21	48	57.84	86	4	56.62
2456	21	48	59.36	86	4	53.44
2457	21	49	0.60	86	4	53.66
2458	21	49	1.43	86	4	52.52
2459	21	49	5.14	86	4	48.35
2460	21	49	8.02	86	4	47.71
2461	21	49	12.43	86	4	46.53
2462	21	49	14.86	86	4	46.19
2463	21	49	19.58	86	4	45.67
2464	21	49	21.66	86	4	45.72
2465	21	49	25.54	86	4	47.82
2466	21	49	30.34	86	4	49.42
2467	21	49	32.29	86	4	48.61
2468	21	49	34.03	86	4	48.63
2469	21	49	37.23	86	4	52.17
2470	21	49	36.52	86	4	58.63
2471	21	49	38.06	86	5	0.01
2472	21	49	41.72	86	5	3.29
2473	21	49	43.04	86	5	6.12
2474	21	49	41.12	86	5	8.92
2475	21	49	39.35	86	5	14.38
2476	21	49	42.43	86	5	16.69
2477	21	49	42.27	86	5	18.80
2478	21	49	42.07	86	5	22.83
2479	21	49	41.95	86	5	25.18
2480	21	49	43.28	86	5	25.91
2481	21	49	46.54	86	5	28.01
2482	21	49	50.82	86	5	27.91
2483	21	49	52.62	86	5	25.62
2484	21	49	56.55	86	5	25.10
2485	21	49	58.84	86	5	24.63
2486	21	50	4.34	86	5	28.66
2487	21	50	4.89	86	5	22.51
2488	21	50	5.44	86	5	19.77
2489	21	50	7.75	86	5	18.19

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2490	21	50	8.54	86	5	16.51
2491	21	50	8.64	86	5	13.72
2492	21	50	8.78	86	5	8.80
2493	21	50	8.96	86	5	4.42
2494	21	50	6.55	86	5	4.52
2495	21	50	6.98	86	5	1.48
2496	21	50	8.94	86	4	58.81
2497	21	50	8.33	86	4	57.82
2498	21	50	8.64	86	4	55.67
2499	21	50	9.10	86	4	56.48
2500	21	50	7.58	86	4	51.49
2501	21	50	6.96	86	4	52.49
2502	21	50	5.90	86	4	51.89
2503	21	50	8.60	86	4	45.25
2504	21	50	12.71	86	4	42.80
2505	21	50	15.94	86	4	39.73
2506	21	50	18.43	86	4	39.04
2507	21	50	23.45	86	4	41.11
2508	21	50	25.82	86	4	39.81
2509	21	50	28.37	86	4	40.49
2510	21	50	35.54	86	4	43.06
2511	21	50	37.23	86	4	43.29
2512	21	50	40.95	86	4	46.40
2513	21	50	42.15	86	4	49.11
2514	21	50	42.57	86	4	49.11
2515	21	50	44.37	86	4	51.11
2516	21	50	45.85	86	4	52.69
2517	21	50	44.76	86	4	57.60
2518	21	50	48.08	86	5	0.08
2519	21	50	49.87	86	5	4.98
2520	21	50	51.14	86	5	8.88
2521	21	50	51.94	86	5	9.19
2522	21	50	50.33	86	5	11.51
2523	21	50	47.91	86	5	14.07
2524	21	50	40.57	86	5	17.52
2525	21	50	36.21	86	5	18.89
2526	21	50	33.35	86	5	20.10
2527	21	50	30.70	86	5	26.63
2528	21	50	34.06	86	5	27.03
2529	21	50	37.57	86	5	30.11
2530	21	50	37.96	86	5	36.18
2531	21	50	35.79	86	5	43.90
2532	21	50	36.11	86	5	46.61
2533	21	50	34.23	86	5	49.91
2534	21	50	32.33	86	5	53.60
2535	21	50	33.92	86	5	55.25
2536	21	50	34.85	86	5	57.62
2537	21	50	39.15	86	5	53.24
2538	21	50	45.59	86	5	52.57
2539	21	50	52.53	86	5	51.38
2540	21	51	3.44	86	5	57.64
2541	21	51	10.19	86	5	57.16

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2542	21	51	16.88	86	5	57.06
2543	21	51	19.82	86	5	43.05
2544	21	51	23.85	86	5	43.21
2545	21	51	29.55	86	5	44.06
2546	21	51	35.06	86	5	49.69
2547	21	51	35.75	86	5	51.17
2548	21	51	38.64	86	5	59.41
2549	21	51	37.35	86	6	2.24
2550	21	51	34.86	86	6	6.42
2551	21	51	39.96	86	6	9.58
2552	21	51	49.78	86	6	12.75
2553	21	51	55.76	86	6	15.15
2554	21	51	57.84	86	6	16.09
2555	21	52	3.94	86	6	18.77
2556	21	52	6.46	86	6	18.67
2557	21	52	5.89	86	6	22.79
2558	21	52	4.38	86	6	28.08
2559	21	52	9.23	86	6	33.84
2560	21	52	15.93	86	6	30.00
2561	21	52	20.37	86	6	32.30
2562	21	52	23.11	86	6	35.51
2563	21	52	26.38	86	6	36.04
2564	21	52	27.58	86	6	36.23
2565	21	52	29.97	86	6	36.80
2566	21	52	31.20	86	6	37.39
2567	21	52	34.37	86	6	34.56
2568	21	52	37.52	86	6	35.51
2569	21	52	43.66	86	6	40.38
2570	21	52	48.47	86	6	41.42
2571	21	52	52.69	86	6	42.59
2572	21	52	54.20	86	6	45.01
2573	21	52	57.98	86	6	51.34
2574	21	52	57.91	86	6	53.79
2575	21	52	55.68	86	6	54.17
2576	21	52	58.45	86	6	57.25
2577	21	53	0.93	86	6	58.70
2578	21	53	3.14	86	6	57.41
2579	21	53	3.33	86	6	54.10
2580	21	53	5.18	86	6	50.86
2581	21	53	9.08	86	6	50.52
2582	21	53	8.71	86	6	49.80
2583	21	53	11.33	86	6	48.52
2584	21	53	23.67	86	6	49.90
2585	21	53	14.55	86	6	52.63
2586	21	53	12.55	86	6	58.59
2587	21	53	11.35	86	7	2.91
2588	21	53	14.09	86	7	6.31
2589	21	53	17.90	86	7	3.11
2590	21	53	19.37	86	7	0.97
2591	21	53	21.58	86	6	58.31
2592	21	53	24.27	86	6	54.15
2593	21	53	24.87	86	6	54.31

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2594	21	53	27.92	86	6	54.72
2595	21	53	30.94	86	6	55.90
2596	21	53	31.46	86	6	56.20
2597	21	53	30.75	86	6	58.20
2598	21	53	30.39	86	7	0.31
2599	21	53	29.88	86	7	2.52
2600	21	53	29.58	86	7	3.56
2601	21	53	31.26	86	7	7.30
2602	21	53	33.77	86	7	11.82
2603	21	53	35.24	86	7	15.41
2604	21	53	36.93	86	7	19.45
2605	21	53	38.38	86	7	23.80
2606	21	53	44.34	86	7	27.11
2607	21	53	46.04	86	7	22.79
2608	21	53	45.63	86	7	21.50
2609	21	53	47.65	86	7	18.42
2610	21	53	45.00	86	7	14.61
2611	21	53	46.94	86	7	13.06
2612	21	53	47.05	86	7	11.60
2613	21	53	48.84	86	7	12.59
2614	21	53	50.09	86	7	11.69
2615	21	53	52.57	86	7	13.25
2616	21	53	58.17	86	7	11.30
2617	21	53	56.27	86	7	8.52
2618	21	53	56.82	86	7	5.60
2619	21	53	57.58	86	7	4.12
2620	21	54	1.55	86	7	4.28
2621	21	54	4.47	86	7	3.81
2622	21	54	8.65	86	7	6.13
2623	21	54	10.45	86	7	8.33
2624	21	54	11.39	86	7	11.43
2625	21	54	13.28	86	7	15.64
2626	21	54	9.94	86	7	16.26
2627	21	54	0.86	86	7	19.39
2628	21	54	0.68	86	7	21.32
2629	21	54	0.75	86	7	23.80
2630	21	54	4.50	86	7	26.22
2631	21	54	5.37	86	7	33.11
2632	21	54	7.58	86	7	35.43
2633	21	54	15.02	86	7	35.43
2634	21	54	19.59	86	7	39.02
2635	21	54	19.80	86	7	43.86
2636	21	54	23.46	86	7	48.65
2637	21	54	27.34	86	7	55.80
2638	21	54	28.33	86	7	57.13
2639	21	54	30.24	86	8	0.72
2640	21	54	27.33	86	8	3.30
2641	21	54	23.47	86	8	14.37
2642	21	54	25.07	86	8	16.00
2643	21	54	28.05	86	8	11.42
2644	21	54	31.55	86	8	7.09
2645	21	54	34.25	86	8	5.21

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2646	21	54	38.76	86	8	4.53
2647	21	54	43.53	86	8	5.42
2648	21	54	45.70	86	8	8.80
2649	21	54	49.28	86	8	11.21
2650	21	54	45.30	86	8	14.41
2651	21	54	42.35	86	8	17.59
2652	21	54	41.96	86	8	18.61
2653	21	54	40.27	86	8	21.86
2654	21	54	39.45	86	8	26.99
2655	21	54	42.66	86	8	31.09
2656	21	54	51.09	86	8	40.71
2657	21	54	53.09	86	8	46.76
2658	21	54	56.06	86	8	53.94
2659	21	54	58.86	86	9	0.19
2660	21	54	58.69	86	9	1.43
2661	21	54	59.88	86	9	4.10
2662	21	54	50.29	86	9	5.02
2663	21	54	50.63	86	9	7.16
2664	21	54	51.32	86	9	15.20
2665	21	54	51.52	86	9	15.57
2666	21	54	50.46	86	9	26.70
2667	21	54	40.78	86	9	24.60
2668	21	54	41.94	86	9	29.90
2669	21	54	41.08	86	9	34.42
2670	21	54	40.53	86	9	38.40
2671	21	54	34.04	86	9	41.82
2672	21	54	36.46	86	9	47.54
2673	21	54	38.66	86	9	55.38
2674	21	54	38.47	86	9	59.20
2675	21	54	37.45	86	10	0.52
2676	21	54	35.99	86	10	1.51
2677	21	54	32.09	86	10	3.19
2678	21	54	31.32	86	10	0.99
2679	21	54	24.39	86	9	59.91
2680	21	54	23.18	86	9	56.42
2681	21	54	18.64	86	9	54.61
2682	21	54	16.77	86	9	59.39
2683	21	54	22.10	86	10	3.60
2684	21	54	25.76	86	10	5.88
2685	21	54	32.12	86	10	10.37
2686	21	54	35.50	86	10	15.18
2687	21	54	36.10	86	10	16.97
2688	21	54	34.15	86	10	17.68
2689	21	54	32.91	86	10	18.10
2690	21	54	26.78	86	10	16.78
2691	21	54	24.08	86	10	19.03
2692	21	54	20.34	86	10	21.70
2693	21	54	20.53	86	10	24.78
2694	21	54	21.61	86	10	25.83
2695	21	54	22.19	86	10	30.23
2696	21	54	24.58	86	10	28.52
2697	21	54	24.33	86	10	38.81

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2698	21	54	24.58	86	10	40.10
2699	21	54	13.14	86	10	40.16
2700	21	54	10.66	86	10	43.93
2701	21	54	9.01	86	10	45.49
2702	21	54	6.45	86	10	43.27
2703	21	54	5.38	86	10	45.80
2704	21	54	4.03	86	10	52.21
2705	21	54	7.63	86	10	57.51
2706	21	54	11.07	86	11	0.51
2707	21	54	13.58	86	11	2.71
2708	21	54	11.35	86	11	7.28
2709	21	54	10.33	86	11	10.64
2710	21	54	3.37	86	11	12.59
2711	21	53	50.11	86	11	10.39
2712	21	53	49.09	86	11	10.42
2713	21	53	44.47	86	11	12.31
2714	21	53	38.56	86	11	9.62
2715	21	53	33.20	86	11	7.91
2716	21	53	30.72	86	11	9.37
2717	21	53	27.78	86	11	10.47
2718	21	53	25.44	86	11	12.42
2719	21	53	26.43	86	11	12.64
2720	21	53	30.69	86	11	16.08
2721	21	53	31.63	86	11	18.50
2722	21	53	31.60	86	11	19.74
2723	21	53	33.69	86	11	24.11
2724	21	53	33.86	86	11	27.69
2725	21	53	34.08	86	11	32.78
2726	21	53	53.56	86	11	22.39
2727	21	54	1.25	86	11	26.61
2728	21	54	8.09	86	11	27.17
2729	21	54	12.99	86	11	26.33
2730	21	54	18.55	86	11	30.45
2731	21	54	26.14	86	11	29.89
2732	21	54	35.05	86	11	38.45
2733	21	54	40.26	86	11	42.23
2734	21	54	46.48	86	11	44.04
2735	21	54	51.35	86	11	45.79
2736	21	54	54.29	86	11	40.79
2737	21	54	59.07	86	11	42.11
2738	21	55	7.57	86	11	41.48
2739	21	55	12.97	86	11	37.48
2740	21	55	16.60	86	11	39.76
2741	21	55	16.25	86	11	34.98
2742	21	55	19.09	86	11	32.67
2743	21	55	16.81	86	11	26.71
2744	21	55	11.85	86	11	21.02
2745	21	55	9.19	86	11	20.52
2746	21	55	9.10	86	11	17.21
2747	21	55	8.91	86	11	14.46
2748	21	55	11.50	86	11	12.30
2749	21	55	12.07	86	11	10.55

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2750	21	55	9.58	86	11	5.72
2751	21	55	9.97	86	11	4.49
2752	21	55	6.76	86	11	3.68
2753	21	55	5.54	86	11	1.40
2754	21	55	8.35	86	10	58.34
2755	21	55	4.38	86	10	55.03
2756	21	55	4.94	86	10	54.12
2757	21	55	5.60	86	10	44.50
2758	21	55	5.88	86	10	41.41
2759	21	55	7.60	86	10	35.97
2760	21	55	5.88	86	10	32.47
2761	21	55	5.38	86	10	30.57
2762	21	55	8.72	86	10	27.63
2763	21	55	11.38	86	10	31.29
2764	21	55	17.31	86	10	21.17
2765	21	55	21.81	86	10	16.82
2766	21	55	20.53	86	10	13.86
2767	21	55	17.91	86	10	10.95
2768	21	55	19.78	86	10	7.08
2769	21	55	15.75	86	10	4.98
2770	21	55	15.28	86	10	0.33
2771	21	55	14.28	86	9	59.52
2772	21	55	10.66	86	9	52.52
2773	21	55	11.91	86	9	44.96
2774	21	55	11.69	86	9	38.49
2775	21	55	19.72	86	9	36.53
2776	21	55	24.94	86	9	34.68
2777	21	55	27.62	86	9	33.37
2778	21	55	29.47	86	9	33.59
2779	21	55	30.31	86	9	27.31
2780	21	55	30.56	86	9	26.03
2781	21	55	33.56	86	9	25.90
2782	21	55	37.18	86	9	27.28
2783	21	55	38.43	86	9	27.03
2784	21	55	38.81	86	9	25.87
2785	21	55	35.99	86	9	22.25
2786	21	55	35.40	86	9	21.09
2787	21	55	37.68	86	9	20.59
2788	21	55	40.96	86	9	21.87
2789	21	55	44.37	86	9	20.44
2790	21	55	40.34	86	9	15.72
2791	21	55	35.46	86	9	12.00
2792	21	55	38.49	86	9	10.57
2793	21	55	39.40	86	9	6.69
2794	21	55	40.81	86	9	4.19
2795	21	55	42.24	86	9	4.72
2796	21	55	45.49	86	9	4.38
2797	21	55	48.87	86	9	3.97
2798	21	55	51.18	86	9	4.07
2799	21	55	58.42	86	9	7.97
2800	21	56	1.07	86	9	3.58
2801	21	55	55.46	86	8	56.10

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2802	21	55	57.89	86	8	53.38
2803	21	56	2.08	86	8	51.89
2804	21	56	9.17	86	8	51.70
2805	21	56	13.14	86	8	50.95
2806	21	56	15.42	86	8	53.85
2807	21	56	18.26	86	8	58.23
2808	21	56	18.76	86	9	2.66
2809	21	56	17.32	86	9	5.88
2810	21	56	15.45	86	9	9.29
2811	21	56	11.39	86	9	11.32
2812	21	56	12.77	86	9	13.71
2813	21	56	13.47	86	9	19.56
2814	21	56	17.52	86	9	18.81
2815	21	56	22.58	86	9	19.52
2816	21	56	24.27	86	9	16.80
2817	21	56	25.07	86	9	13.40
2818	21	56	29.19	86	9	12.63
2819	21	56	28.93	86	9	14.99
2820	21	56	31.23	86	9	14.53
2821	21	56	32.59	86	9	17.88
2822	21	56	35.05	86	9	20.34
2823	21	56	34.46	86	9	23.48
2824	21	56	36.78	86	9	22.52
2825	21	56	39.15	86	9	22.63
2826	21	56	47.16	86	9	23.12
2827	21	56	52.48	86	9	22.52
2828	21	56	58.29	86	9	25.86
2829	21	56	58.12	86	9	25.63
2830	21	56	58.84	86	9	22.22
2831	21	56	59.51	86	9	17.96
2832	21	57	1.44	86	9	9.05
2833	21	57	7.25	86	9	9.21
2834	21	57	10.69	86	9	6.33
2835	21	57	14.45	86	8	58.53
2836	21	57	18.74	86	8	59.38
2837	21	57	20.22	86	9	3.71
2838	21	57	21.65	86	9	8.49
2839	21	57	21.57	86	9	17.68
2840	21	57	24.33	86	9	23.74
2841	21	57	25.05	86	9	24.52
2842	21	57	23.72	86	9	25.79
2843	21	57	18.54	86	9	30.79
2844	21	57	20.84	86	9	38.80
2845	21	57	18.85	86	9	45.54
2846	21	57	15.98	86	9	53.92
2847	21	57	23.45	86	9	54.23
2848	21	57	30.36	86	9	57.51
2849	21	57	30.69	86	9	59.11
2850	21	57	31.14	86	10	5.45
2851	21	57	27.44	86	10	9.94
2852	21	57	29.91	86	10	14.32
2853	21	57	26.92	86	10	18.01

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2854	21	57	22.27	86	10	23.63
2855	21	57	27.66	86	10	26.60
2856	21	57	35.24	86	10	30.10
2857	21	57	40.61	86	10	32.91
2858	21	57	40.03	86	10	39.61
2859	21	57	40.26	86	10	42.53
2860	21	57	40.76	86	10	44.79
2861	21	57	38.77	86	10	49.11
2862	21	57	34.35	86	10	59.21
2863	21	57	39.57	86	11	4.57
2864	21	57	41.30	86	11	6.64
2865	21	57	42.17	86	11	12.08
2866	21	57	43.37	86	11	17.28
2867	21	57	40.34	86	11	21.39
2868	21	57	39.12	86	11	22.32
2869	21	57	37.27	86	11	22.22
2870	21	57	34.28	86	11	26.83
2871	21	57	29.06	86	11	29.40
2872	21	57	17.33	86	11	28.78
2873	21	57	11.65	86	11	27.30
2874	21	57	9.66	86	11	32.18
2875	21	57	8.16	86	11	33.72
2876	21	57	3.95	86	11	38.61
2877	21	57	0.84	86	11	42.10
2878	21	56	59.72	86	11	44.61
2879	21	56	59.37	86	11	46.31
2880	21	56	57.62	86	11	49.21
2881	21	56	51.64	86	12	1.94
2882	21	56	47.26	86	12	3.03
2883	21	56	41.02	86	12	2.71
2884	21	56	38.36	86	12	8.87
2885	21	56	36.85	86	12	8.20
2886	21	56	33.07	86	12	8.42
2887	21	56	31.78	86	12	6.66
2888	21	56	27.60	86	12	5.24
2889	21	56	26.29	86	12	9.49
2890	21	56	25.29	86	12	13.72
2891	21	56	28.22	86	12	16.90
2892	21	56	32.65	86	12	19.93
2893	21	56	35.93	86	12	20.53
2894	21	56	37.84	86	12	23.93
2895	21	56	40.05	86	12	28.51
2896	21	56	36.95	86	12	34.37
2897	21	56	32.20	86	12	34.32
2898	21	56	27.70	86	12	34.12
2899	21	56	24.35	86	12	37.60
2900	21	56	23.21	86	12	38.66
2901	21	56	24.45	86	12	42.50
2902	21	56	23.05	86	12	43.99
2903	21	56	12.47	86	12	44.39
2904	21	56	12.67	86	12	52.12
2905	21	56	11.94	86	12	54.50

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2906	21	56	12.37	86	13	4.59
2907	21	56	14.01	86	13	11.23
2908	21	56	15.20	86	13	16.97
2909	21	56	16.89	86	13	20.92
2910	21	56	17.06	86	13	25.20
2911	21	56	13.16	86	13	30.09
2912	21	56	11.22	86	13	32.46
2913	21	56	6.85	86	13	36.86
2914	21	56	5.26	86	13	42.57
2915	21	56	6.45	86	13	47.82
2916	21	56	5.06	86	13	53.88
2917	21	56	2.40	86	13	54.90
2918	21	55	59.59	86	13	56.59
2919	21	55	55.58	86	13	59.47
2920	21	55	59.47	86	14	1.39
2921	21	56	0.59	86	14	6.53
2922	21	55	59.34	86	14	9.04
2923	21	55	56.71	86	14	13.86
2924	21	55	56.21	86	14	17.77
2925	21	55	55.79	86	14	19.43
2926	21	55	55.57	86	14	20.10
2927	21	55	54.87	86	14	20.92
2928	21	55	51.66	86	14	23.38
2929	21	55	48.23	86	14	24.40
2930	21	55	43.88	86	14	24.97
2931	21	55	39.56	86	14	25.52
2932	21	55	35.76	86	14	28.93
2933	21	55	34.79	86	14	32.93
2934	21	55	33.27	86	14	34.42
2935	21	55	32.45	86	14	39.22
2936	21	55	30.54	86	14	43.64
2937	21	55	31.36	86	14	45.13
2938	21	55	31.31	86	14	49.90
2939	21	55	32.33	86	14	54.00
2940	21	55	33.17	86	14	55.25
2941	21	55	36.58	86	15	4.49
2942	21	55	35.61	86	15	10.71
2943	21	55	35.76	86	15	11.65
2944	21	55	36.45	86	15	12.97
2945	21	55	39.48	86	15	14.88
2946	21	55	41.75	86	15	11.30
2947	21	55	42.82	86	15	10.41
2948	21	55	44.88	86	15	8.77
2949	21	55	42.89	86	14	59.82
2950	21	55	48.14	86	14	57.24
2951	21	55	50.40	86	14	57.73
2952	21	55	55.02	86	14	57.43
2953	21	55	57.03	86	14	57.98
2954	21	56	0.74	86	14	56.61
2955	21	56	1.61	86	14	52.31
2956	21	55	59.47	86	14	50.08
2957	21	56	0.21	86	14	47.39

(1)	(2)	(3)	(4)	(5)	(6)	(7)
2958	21	56	2.35	86	14	45.30
2959	21	56	6.15	86	14	42.62
2960	21	56	3.72	86	14	40.38
2961	21	56	1.95	86	14	38.30
2962	21	55	58.67	86	14	35.71
2963	21	56	0.46	86	14	31.39
2964	21	56	2.35	86	14	26.86
2965	21	56	4.54	86	14	22.94
2966	21	56	7.12	86	14	18.44
2967	21	56	9.98	86	14	12.79
2968	21	56	12.59	86	14	8.84
2969	21	56	15.00	86	14	5.09
2970	21	56	17.98	86	13	59.80
2971	21	56	19.60	86	13	57.68
2972	21	56	17.56	86	13	55.00
2973	21	56	19.08	86	13	51.52
2974	21	56	20.25	86	13	48.76
2975	21	56	19.55	86	13	46.62
2976	21	56	18.36	86	13	45.45
2977	21	56	17.14	86	13	44.61
2978	21	56	16.54	86	13	43.39
2979	21	56	15.70	86	13	43.49
2980	21	56	15.47	86	13	41.18
2981	21	56	15.23	86	13	38.82
2982	21	56	16.29	86	13	38.00
2983	21	56	17.84	86	13	36.61
2984	21	56	21.24	86	13	33.03
2985	21	56	22.33	86	13	32.46
2986	21	56	28.05	86	13	30.24
2987	21	56	32.57	86	13	28.48
2988	21	56	37.27	86	13	30.64
2989	21	56	40.18	86	13	31.98
2990	21	56	42.76	86	13	33.77
2991	21	56	45.62	86	13	34.39
2992	21	56	45.95	86	13	33.80
2993	21	56	45.37	86	13	30.79
2994	21	56	45.77	86	13	26.07
2995	21	56	46.22	86	13	24.13
2996	21	56	48.11	86	13	20.48
2997	21	56	48.85	86	13	20.10
2998	21	56	51.59	86	13	20.20
2999	21	56	57.06	86	13	19.90
3000	21	56	59.53	86	13	21.51
3000	21	56	59.55	86	13	21.51
3001	21	57	1.74	86	13	22.98
3002	21	57	2.79	86	13	24.01
3003	21	57	5.75	86	13	25.16
3004	21	57	10.55	86	13	28.48
3005	21	57	12.48	86	13	30.04
3006	21	57	13.79	86	13	30.97
3007	21	57	14.77	86	13	34.28
3008	21	57	18.47	86	13	35.00

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3009	21	57	19.24	86	13	36.50
3010	21	57	22.76	86	13	36.96
3011	21	57	24.09	86	13	37.73
3012	21	57	26.74	86	13	37.03
3013	21	57	31.14	86	13	37.50
3014	21	57	34.43	86	13	37.81
3015	21	57	36.22	86	13	36.80
3016	21	57	37.92	86	13	36.60
3017	21	57	45.17	86	13	31.59
3018	21	57	41.65	86	13	26.45
3019	21	57	39.95	86	13	25.11
3020	21	57	40.28	86	13	22.39
3021	21	57	42.16	86	13	21.69
3022	21	57	45.24	86	13	20.51
3023	21	57	44.63	86	13	18.51
3024	21	57	42.91	86	13	16.81
3025	21	57	43.57	86	13	13.98
3026	21	57	47.84	86	13	10.08
3027	21	57	44.52	86	13	6.99
3028	21	57	43.39	86	13	3.52
3029	21	57	40.82	86	13	0.72
3030	21	57	35.15	86	12	54.53
3031	21	57	34.25	86	12	51.47
3032	21	57	33.92	86	12	46.81
3033	21	57	34.44	86	12	42.57
3034	21	57	36.19	86	12	35.91
3035	21	57	38.73	86	12	33.60
3036	21	57	39.27	86	12	31.62
3037	21	57	41.04	86	12	26.15
3038	21	57	41.63	86	12	23.86
3039	21	57	43.28	86	12	19.39
3040	21	57	46.31	86	12	18.90
3041	21	57	49.16	86	12	18.41
3042	21	57	51.32	86	12	17.08
3043	21	57	54.74	86	12	17.39
3044	21	57	54.64	86	12	11.09
3045	21	57	57.34	86	12	8.11
3046	21	58	3.79	86	12	1.74
3047	21	58	5.56	86	11	58.81
3048	21	58	8.64	86	11	52.79
3049	21	58	14.79	86	11	47.96
3050	21	58	17.41	86	11	47.50
3051	21	58	18.82	86	11	46.34
3052	21	58	21.08	86	11	42.64
3053	21	58	24.16	86	11	38.92
3054	21	58	23.86	86	11	35.68
3055	21	58	21.95	86	11	34.34
3056	21	58	18.54	86	11	31.85
3057	21	58	15.30	86	11	28.28
3058	21	58	12.63	86	11	24.24
3059	21	58	10.70	86	11	21.31
3060	21	58	11.83	86	11	19.46

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3061	21	58	15.50	86	11	17.64
3062	21	58	14.14	86	11	13.99
3063	21	58	12.91	86	11	10.21
3064	21	58	13.11	86	11	8.23
3065	21	58	10.80	86	11	6.77
3066	21	58	7.92	86	11	13.58
3067	21	58	6.74	86	11	11.52
3068	21	58	7.26	86	11	9.44
3069	21	58	5.28	86	11	6.92
3070	21	58	7.67	86	11	2.84
3071	21	58	6.95	86	11	0.09
3072	21	58	5.35	86	10	57.36
3073	21	58	5.15	86	10	55.51
3074	21	58	5.82	86	10	52.15
3075	21	58	6.74	86	10	48.75
3076	21	58	7.36	86	10	46.13
3077	21	58	8.44	86	10	41.87
3078	21	58	9.13	86	10	39.73
3079	21	58	10.29	86	10	35.00
3080	21	58	10.75	86	10	31.61
3081	21	58	9.72	86	10	30.89
3082	21	58	6.77	86	10	26.78
3083	21	58	6.84	86	10	22.80
3084	21	58	7.67	86	10	19.17
3085	21	58	8.57	86	10	14.73
3086	21	58	10.78	86	10	14.63
3087	21	58	16.64	86	10	14.29
3088	21	58	18.85	86	10	14.78
3089	21	58	20.52	86	10	12.70
3090	21	58	21.72	86	10	8.82
3091	21	58	20.75	86	10	4.30
3092	21	58	19.26	86	10	2.01
3093	21	58	18.23	86	9	59.03
3094	21	58	17.38	86	9	55.63
3095	21	58	16.07	86	9	52.32
3096	21	58	15.20	86	9	48.90
3097	21	58	13.68	86	9	44.33
3098	21	58	11.75	86	9	42.68
3099	21	58	9.57	86	9	41.06
3100	21	58	6.54	86	9	38.91
3101	21	58	2.96	86	9	36.31
3102	21	58	3.84	86	9	30.40
3103	21	58	4.71	86	9	29.45
3104	21	58	8.75	86	9	27.11
3105	21	58	10.08	86	9	26.60
3106	21	58	11.93	86	9	24.90
3107	21	58	13.14	86	9	25.21
3108	21	58	14.35	86	9	26.65
3109	21	58	16.30	86	9	32.51
3110	21	58	17.89	86	9	34.31
3111	21	58	18.54	86	9	35.02
3112	21	58	20.08	86	9	36.21

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3113	21	58	22.06	86	9	35.80
3114	21	58	23.91	86	9	35.67
3115	21	58	27.27	86	9	36.64
3116	21	58	30.49	86	9	38.47
3117	21	58	32.23	86	9	39.73
3118	21	58	32.98	86	9	41.32
3119	21	58	34.37	86	9	42.99
3120	21	58	38.35	86	9	44.25
3121	21	58	41.36	86	9	45.46
3122	21	58	48.99	86	9	48.18
3123	21	58	49.86	86	9	53.30
3124	21	58	50.84	86	9	53.91
3125	21	58	50.97	86	9	57.28
3126	21	58	51.48	86	9	59.72
3127	21	58	49.73	86	10	1.01
3128	21	58	45.65	86	10	8.90
3129	21	58	43.64	86	10	10.23
3130	21	58	41.28	86	10	9.54
3131	21	58	39.17	86	10	10.28
3132	21	58	36.94	86	10	11.64
3133	21	58	34.78	86	10	13.70
3134	21	58	32.90	86	10	15.78
3135	21	58	36.60	86	10	17.25
3136	21	58	38.89	86	10	17.97
3137	21	58	40.48	86	10	18.61
3138	21	58	42.74	86	10	20.46
3139	21	58	43.85	86	10	22.41
3140	21	58	44.93	86	10	24.11
3141	21	58	44.39	86	10	27.32
3142	21	58	43.54	86	10	31.61
3143	21	58	43.13	86	10	35.54
3144	21	58	44.72	86	10	38.11
3145	21	58	48.01	86	10	37.86
3146	21	58	49.14	86	10	39.60
3147	21	58	49.99	86	10	45.21
3148	21	58	47.50	86	10	48.60
3149	21	58	48.48	86	10	50.89
3150	21	58	49.27	86	10	53.17
3151	21	58	49.14	86	10	55.33
3152	21	58	49.45	86	10	59.13
3153	21	58	55.39	86	11	2.84
3154	21	59	0.12	86	11	5.79
3155	21	59	2.58	86	11	9.90
3156	21	59	5.69	86	11	16.79
3157	21	59	8.75	86	11	20.72
3158	21	59	10.27	86	11	21.29
3159	21	59	12.73	86	11	21.90
3160	21	59	16.87	86	11	22.70
3161	21	59	19.44	86	11	22.29
3162	21	59	28.56	86	11	17.97
3163	21	59	32.34	86	11	15.09
3164	21	59	33.86	86	11	12.83

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3165	21	59	37.53	86	11	11.44
3166	21	59	36.94	86	11	8.44
3167	21	59	38.77	86	11	2.53
3168	21	59	39.08	86	11	1.81
3169	21	59	42.18	86	10	59.88
3170	21	59	43.98	86	10	57.31
3171	21	59	43.93	86	10	46.11
3172	21	59	43.98	86	10	45.80
3173	21	59	48.94	86	10	43.69
3174	21	59	46.50	86	10	40.17
3175	21	59	45.96	86	10	36.16
3176	21	59	46.37	86	10	30.28
3177	21	59	46.66	86	10	29.53
3178	21	59	47.56	86	10	25.83
3179	21	59	49.15	86	10	21.28
3180	21	59	49.41	86	10	18.40
3181	21	59	48.66	86	10	13.32
3182	21	59	49.68	86	10	7.61
3183	21	59	51.79	86	10	3.08
3184	21	59	53.66	86	9	58.84
3185	21	59	59.98	86	9	58.79
3186	22	0	1.50	86	9	58.61
3187	22	0	4.56	86	9	56.86
3188	22	0	10.73	86	9	53.01
3189	22	0	14.86	86	9	59.49
3190	22	0	17.69	86	9	56.71
3191	22	0	19.85	86	9	51.39
3192	22	0	25.48	86	9	46.41
3193	22	0	28.77	86	9	37.18
3194	22	0	33.06	86	9	33.89
3195	22	0	38.53	86	9	31.19
3196	22	0	37.25	86	9	30.63
3197	22	0	42.15	86	9	28.21
3198	22	0	42.57	86	9	28.31
3199	22	0	45.57	86	9	27.03
3200	22	0	48.68	86	9	26.93
3201	22	0	50.53	86	9	25.51
3202	22	0	52.31	86	9	24.43
3203	22	0	56.91	86	9	22.89
3204	22	0	59.86	86	9	23.89
3205	22	1	3.48	86	9	24.51
3206	22	1	7.52	86	9	24.61
3207	22	1	9.63	86	9	27.85
3208	22	1	10.17	86	9	30.50
3209	22	1	11.09	86	9	33.81
3210	22	1	10.09	86	9	36.90
3211	22	1	12.04	86	9	39.52
8212	22	1	11.99	86	9	42.29
3213	22	1	9.86	86	9	43.94
3214	22	1	8.03	86	9	44.91
3215	22	1	6.57	86	9	48.49
3216	22	1	7.75	86	9	54.53

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3217	22	1	4.95	86	10	0.10
3218	22	1	0.63	86	9	55.96
3219	22	1	1.04	86	10	1.72
3220	22	1	2.64	86	10	9.61
3221	22	0	59.27	86	10	9.61
3222	22	0	58.91	86	10	11.33
3223	22	0	57.47	86	10	17.24
3224	22	0	54.93	86	10	18.84
3225	22	0	53.82	86	10	22.23
3226	22	0	52.49	86	10	27.60
3227	22	0	49.25	86	10	29.12
3228	22	0	41.44	86	10	29.01
3229	22	0	40.38	86	10	32.40
3230	22	0	42.26	86	10	32.20
3231	22	0	41.33	86	10	33.10
3232	22	0	41.56	86	10	41.45
3233	22	0	42.44	86	10	41.37
3234	22	0	47.27	86	10	43.17
3235	22	0	48.37	86	10	43.15
3236	22	0	49.68	86	10	46.23
3237	22	0	49.61	86	10	47.49
3238	22	0	49.48	86	10	50.37
3239	22	0	49.27	86	10	51.99
3240	22	0	50.56	86	10	51.94
3241	22	0	53.69	86	10	55.30
3242	22	0	56.62	86	10	57.54
3243	22	0	58.29	86	11	0.65
3244	22	0	59.42	86	11	3.45
3245	22	0	57.37	86	11	8.05
3246	22	0	59.73	86	11	9.59
3247	22	1	1.40	86	11	14.47
3248	22	1	1.51	86	11	20.90
3249	22	1	1.76	86	11	24.60
3250	22	1	1.84	86	11	29.28
3251	22	1	6.26	86	11	30.23
3252	22	1	5.33	86	11	32.87
3253	22	1	4.56	86	11	35.08
3254	22	1	0.66	86	11	35.47
3255	22	0	56.96	86	11	35.47
3256	22	0	53.69	86	11	33.54
3257	22	0	50.17	86	11	36.19
3258	22	0	36.81	86	11	37.68
3259	22	0	36.76	86	11	43.23
3260	22	0	35.14	86	11	47.60
3261	22	0	39.92	86	11	45.70
3262	22	0	44.85	46	11	46.49
3263	22	0	50.20	86	11	49.42
3264	22	0	53.72	86	11	53.82
3265	22	0	59.48	86	11	57.13
3266	22	1	1.89	86	11	56.57
3267	22	1	3.41	86	11	58.49
3268	22	1	6.18	86	11	59.83

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3269	22	1	6.36	86	12	5.61
3270	22	1	3.05	86	12	10.39
3271	22	1	3.15	86	12	13.66
3272	22	1	5.80	86	12	17.77
3273	22	1	6.57	86	12	21.49
3274	22	1	5.28	86	12	26.68
3275	22	1	1.97	86	12	29.02
3276	22	1	1.81	86	12	35.24
3277	22	1	3.25	86	12	37.17
3278	22	1	8.86	86	12	42.13
3279	22	1	9.47	86	12	45.73
3280	22	1	9.88	86	12	45.52
3281	22	1	9.88	86	12	49.71
3282	22	1	9.37	86	12	53.18
3283	22	1	7.96	86	12	57.34
3284	22	1	7.34	86	13	0.04
3285	22	1	9.27	86	13	4.10
3286	22	1	9.50	86	13	7.11
3287	22	1	14.84	86	13	5.80
3288	22	1	16.90	86	13	2.64
3289	22	1	18.72	86	12	58.91
3290	22	1	20.88	86	12	53.77
3291	22	1	23.84	86	12	55.11
3292	22	1	23.94	86	12	53.41
3293	22	1	26.36	86	12	52.61
3294	22	1	30.31	86	12	51.33
3295	22	1	32.27	86	12	50.69
3296	22	1	38.07	86	12	50.10
3297	22	1	40.57	86	12	51.69
3298	22	1	42.55	86	12	53.64
3299	22	1	45.19	86	12	55.75
3300	22	1	48.20	86	12	57.91
3301	22	1	52.05	86	13	0.91
3302	22	1	54.57	86	13	2.61
3303	22	1	57.68	86	13	4.23
3304	22	1	57.09	86	13	8.21
3305	22	1	56.68	86	13	12.09
3306	22	1	56.27	86	13	17.28
3307	22	1	56.17	86	13	20.52
3308	22	1	59.20	86	13	21.86
3309	22	2	2.49	86	13	23.25
3310	22	2	4.77	86	13	23.61
3311	22	2	7.65	86	13	23.73
3312	22	2	11.84	86	13	23.32
3313	22	2	17.21	86	13	26.05
3314	22	2	18.27	86	13	27.74
3315	22	2	19.47	86	13	28.69
3316	22	2	22.61	86	13	31.03
3317	22	2	24.69	86	13	33.47
3318	22	2	29.29	86	13	39.28
3319	22	2	29.26	86	13	54.88
3320	22	2	27.08	86	13	57.53

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3321	22	2	24.69	86	13	59.28
3322	22	2	20.14	86	14	1.31
3323	22	2	16.39	86	14	2.72
3324	22	2	17.37	86	14	2.41
3325	22	2	16.72	86	14	6.55
3326	22	2	16.00	86	14	8.14
3327	22	2	13.25	86	14	9.53
3328	22	2	8.55	86	14	8.35
3329	22	2	5.93	86	14	7.16
3330	22	2	5.52	86	14	5.73
3331	22	1	58.71	86	14	6.34
3332	22	1	56.22	86	14	5.85
3333	22	1	55.14	86	14	7.81
3334	22	1	53.98	86	14	10.79
3335	22	1	56.94	86	14	14.18
3336	22	1	58.40	86	14	14.57
3337	22	2	1.05	86	14	16.52
3338	22	2	5.16	86	14	18.91
3339	22	2	9.91	86	14	19.65
3340	22	2	13.23	86	14	20.35
3341	22	2	13.20	86	14	23.84
3342	22	2	11.89	86	14	33.63
3343	22	2	11.87	86	14	38.64
3344	22	2	8.29	86	14	45.12
3345	22	2	1.66	86	14	45.45
3346	22	2	0.95	86	14	47.49
3347	22	2	4.49	86	14	50.75
3348	22	2	8.89	86	14	57.61
3349	22	2	8.01	86	15	4.68
3350	22	2	6.78	86	15	10.10
3351	22	2	5.39	86	15	12.98
3352	22	2	3.57	86	15	15.50
3353	22	2	3.77	86	15	19.04
3354	22	2	0.56	86	15	30.14
3355	22	2	3.18	86	15	29.14
3356	22	2	4.93	86	15	31.02
3357	22	2	5.49	86	15	27.03
3358	22	2	7.60	86	15	25.24
3359	22	2	9.66	86	15	28.42
3360	22	2	15.44	86	15	31.09
3361	22	2	22.15	86	15	30.63
3362	22	2	25.20	86	15	27.50
3363	22	2	23.12	86	15	21.61
3364	22	2	22.81	86	15	19.07
3365	22	2	15.23	86	15	15.50
3366	22	2	13.69	86	15	11.33
3367	22	2	9.48	86	15	4.68
3368	22	2	11.17	86	14	56.86
3369	22	2	14.51	86	15	0.57
3370	22	2	18.32	86	15	3.57
3371	22	2	22.81	86	14	54.94
3372	22	2	23.61	86	14	54.83

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3373	22	2	28.03	86	14	53.73
3374	22	2	28.83	86	14	54.48
3375	22	2	32.17	86	14	56.84
3376	22	2	35.54	86	14	58.64
3377	22	2	39.36	86	14	59.92
3378	22	2	43.84	86	15	3.11
3379	22	2	44.58	86	15	2.52
3380	22	2	50.88	86	15	7.74
3381	22	2	54.55	86	15	4.93
3382	22	2	55.53	86	15	3.67
3383	22	2	57.87	86	15	2.83
3384	22	3	0.15	86	15	0.28
3385	22	3	5.09	86	14	58.25
3386	22	3	9.07	86	14	58.92
3387	22	3	13.34	86	14	58.12
3388	22	3	15.75	86	14	59.51
3389	22	3	19.84	86	14	59.49
3390	22	3	22.33	86	14	57.35
3391	22	3	25.98	86	14	59.59
3392	22	3	29.76	86	14	59.87
3393	22	3	33.33	86	15	0.26
3394	22	3	39.34	86	15	0.59
3395	22	3	42.38	86	14	59.92
3396	22	3	46.95	86	14	59.49
3397	22	3	50.11	86	14	58.00
3398	22	3	53.40	86	14	59.36
3399	22	3	56.48	86	14	59.92
3400	22	4	3.42	86	14	58.00
3401	22	4	10.59	86	14	57.61
3402	22	4	11.49	86	14	58.90
3403	22	4	17.51	86	15	5.22
3404	22	4	20.23	86	15	10.20
3405	22	4	19.46	86	15	13.39
3406	22	4	18.12	86	15	17.24
3407	22	4	17.74	86	15	19.99
3408	22	4	19.54	86	15	22.02
3409	22	4	22.47	86	15	29.42
3410	22	4	20.64	86	15	32.97
3411	22	4	18.05	86	15	40.24
3412	22	4	18.66	86	15	45.25
3413	22	4	19.41	86	15	45.05
3414	22	4	20.26	86	15	52.24
3415	22	4	21.98	86	15	52.78
3416	22	4	23.78	86	15	54.15
3417	22	4	27.60	86	15	56.33
3418	22	4	28.07	86	15	57.49
3419	22	4	31.64	86	15	59.13
3420	22	4	34.03	86	16	0.06
3421	22	4	35.16	86	15	59.88
3422	22	4	36.11	86	16	3.22
3423	22	4	41.07	86	16	3.83
3424	22	4	44.21	86	16	5.40

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3425	22	4	47.98	86	16	7.61
3426	22	4	49.73	86	16	9.62
3427	22	4	52.35	86	16	12.62
3428	22	4	54.25	86	16	15.30
3429	22	4	57.18	86	16	18.51
3430	22	4	59.50	86	16	21.46
3431	22	5	0.19	86	16	24.11
3432	22	4	59.65	86	16	27.96
3433	22	4	59.93	86	16	31.61
3434	22	4	59.19	86	16	34.62
3435	22	4	54.69	86	16	41.20
3436	22	4	52.04	86	16	43.90
3437	22	4	57.16	86	16	47.08
3438	22	4	48.55	86	16	49.83
3439	22	4	43.95	86	16	54.79
3440	22	4	44.90	86	16	54.74
3441	22	4	42.64	86	16	59.55
3442	22	4	42.54	86	17	5.51
3443	22	4	43.72	86	17	5.90
3444	22	4	45.54	86	17	11.11
3445	22	4	46.11	86	17	14.17
3446	22	4	47.29	86	17	15.61
3447	22	4	47.32	86	17	19.52
3448	22	4	49.73	86	17	24.32
3449	22	4	55.10	86	17	29.20
3450	22	4	57.62	86	17	31.57
3451	22	5	2.73	86	17	34.63
3452	22	5	5.97	86	17	33.14
3453	22	5	15.20	86	17	41.49
3454	22	5	17.28	86	17	40.90
3455	22	5	21.85	86	17	43.62
3456	22	5	29.36	86	17	49.20
3457	22	5	26.53	86	17	55.13
3458	22	5	25.30	86	17	55.60
3459	22	5	25.09	86	17	58.60
3460	22	5	23.96	86	18	6.90
3461	22	5	23.09	86	18	14.74
3462	22	5	20.65	86	18	20.70
3463	22	5	18.28	86	18	24.20
3464	22	5	14.17	86	18	26.84
3465	22	5	9.75	86	18	26.38
3466	22	5	5.56	86	18	23.04
3467	22	5	2.43	86	18	20.37
3468	22	5	59.06	86	18	18.13
3469	22	4	56.80	86	18	13.53
3470	22	4	52.17	86	18	15.18
3471	22	4	50.78	86	18	15.82
3472	22	4	43.54	86	18	11.14
3473	22	4	41.84	86	18	10.14
3474	22	4	37.09	86	18	5.77
3475	22	4	37.86	86	18	3.72
3476	22	4	34.41	86	18	2.64

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3477	22	4	32.20	86	17	59.91
3478	22	4	31.46	86	17	58.86
3479	22	4	29.38	86	17	54.85
3480	22	4	26.73	86	17	51.05
3481	22	4	22.59	86	17	45.52
3482	22	4	18.40	86	17	44.80
3483	22	4	7.15	86	17	44.70
3484	22	4	8.23	86	17	44.29
3485	22	4	2.21	86	17	52.90
3486	22	4	1.96	86	17	53.93
3487	22	3	57.92	86	17	59.04
3488	22	3	56.64	86	18	3.33
3489	22	4	2.11	86	18	6.08
3490	22	4	5.14	86	18	6.41
3491	22	4	8.49	86	18	7.78
3492	22	4	14.14	86	18	9.01
3493	22	4	19.79	86	18	8.32
3494	22	4	24.96	86	18	8.65
3495	22	4	28.27	86	18	10.55
3496	22	4	30.48	86	18	18.03
3497	22	4	38.63	86	18	18.21
3498	22	4	41.22	86	18	19.08
3499	22	4	46.24	86	18	23.43
3500	22	4	47.39	86	18	26.43
3501	22	4	48.06	86	18	30.93
3502	22	4	50.86	86	18	37.20
3503	22	4	51.66	86	18	42.47
3504	22	4	55.10	86	18	45.04
3505	22	4	59.16	86	18	44.47
3506	22	5	2.53	86	18	43.70
3507	22	5	7.80	86	18	40.18
3508	22	5	7.85	86	18	42.32
3509	22	5	9.42	86	18	42.16
3510	22	5	12.06	86	18	41.52
3511	22	5	14.22	86	18	42.62
3512	22	5	18.80	86	18	47.61
3513	22	5	19.54	86	18	50.13
3514	22	5	18.92	86	18	57.71
3515	22	5	17.20	86	19	1.51
3516	22	5	16.82	86	19	6.11
3517	22	5	13.84	86	19	9.48
3518	22	5	9.52	86	19	15.11
3519	22	5	5.56	86	19	18.55
3520	22	5	7.39	86	19	25.90
3521	22	5	11.06	86	19	27.60
3522	22	5	15.33	86	19	26.13
3523	22	5	19.93	86	19	26.28
3524	22	5	22.62	86	19	27.70
3525	22	5	24.42	86	19	27.57
3526	22	5	28.07	86	19	27.57
3527	22	5	32.65	86	19	28.08
3528	22	5	33.85	86	19	28.47

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3529	22	5	34.27	86	19	28.21
3530	22	5	35.78	86	19	32.04
3531	22	5	36.94	86	19	32.48
3532	22	5	38.63	86	19	35.43
3533	22	5	40.18	86	19	37.62
3534	22	5	42.00	86	19	41.29
3535	22	5	43.77	86	19	44.76
3536	22	5	40.87	86	19	45.02
3537	22	5	40.33	86	19	49.64
3538	22	5	39.53	86	19	53.63
3539	22	5	39.97	86	19	59.31
3540	22	5	35.86	86	20	0.28
3541	22	5	32.11	86	20	5.06
3542	22	5	35.65	86	20	7.38
3543	22	5	28.46	86	20	19.71
3544	22	5	21.73	86	20	24.62
3545	22	5	10.26	86	20	29.35
3546	22	5	4.61	86	20	37.73
3547	22	4	57.47	86	20	35.16
3548	22	4	56.08	86	20	39.65
3549	22	4	59.60	86	20	44.92
3550	22	5	6.67	86	20	51.60
3551	22	5	7.23	86	20	59.08
3552	22	5	15.69	86	20	48.52
3553	22	5	19.93	86	20	43.84
3554	22	5	24.63	86	20	38.57
3555	22	5	31.62	86	20	34.51
3556	22	5	33.88	86	20	30.25
3557	22	5	36.50	86	20	27.29
3558	22	5	44.96	86	20	27.52
3559	22	5	48.45	86	20	28.81
3560	22	5	52.67	86	20	30.50
3561	22	5	58.50	86	20	33.07
3562	22	6	0.20	86	20	32.66
3563	22	6	8.24	86	20	28.22
3564	22	6	12.35	86	20	24.49
3565	22	6	13.89	86	20	19.04
3566	22	6	17.85	86	20	16.70
3567	22	6	23.22	86	20	13.47
3568	22	6	25.35	86	20	14.88
3569	22	6	27.67	86	20	15.65
3570	22	6	30.70	86	20	16.01
3571	22	6	35.07	86	20	22.59
3572	22	6	38.92	86	20	22.13
3573	22	6	42.96	86	20	29.50
3574	22	6	43.96	86	20	31.07
3575	22	6	45.17	86	20	43.64
3576	22	6	46.94	86	20	46.08
3577	22	6	48.35	86	20	52.37
3578	22	6	48.17	86	20	55.89
3579	22	6	47.89	86	20	57.69
3580	22	6	46.50	86	21	0.06

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3581	22	6	42.85	86	21	3.40
3582	22	6	38.72	86	21	3.68
3583	22	6	35.35	86	21	8.54
3584	22	6	30.80	86	21	11.80
3585	22	6	30.03	86	21	14.35
3586	22	6	23.17	86	21	17.12
3587	22	6	18.29	86	21	18.38
3588	22	6	13.56	86	21	17.04
3589	22	6	13.74	86	21	24.91
3590	22	6	10.27	86	21	29.76
3591	22	6	6.57	86	21	32.44
3592	22	6	6.54	86	21	35.60
3593	22	6	8.21	86	21	37.53
3594	22	6	4.64	86	21	42.23
3595	22	6	4.82	86	21	43.90
3596	22	6	2.51	86	21	49.83
3597	22	6	2.51	86	21	52.04
3598	22	6	2.79	86	21	54.43
3599	22	6	7.55	86	21	56.54
3600	22	6	8.11	86	22	1.37
3601	22	6	9.73	86	22	2.09
3602	22	6	11.99	86	22	5.77
3603	22	6	12.92	86	22	7.67
3604	22	6	12.43	86	22	8.70
3605	22	6	14.25	86	22	12.42
3606	22	6	14.48	86	22	16.12
3607	22	6	13.04	86	22	15.43
3608	22	6	12.40	86	22	15.69
3609	22	6	7.44	86	22	18.39
3610	22	6	3.59	86	22	30.62
3611	22	6	1.15	86	22	38.53
3612	22	5	57.68	86	22	44.57
3613	22	5	52.02	86	22	46.50
3614	22	5	43.44	86	22	43.88
3615	22	5	37.30	86	22	40.90
3616	22	5	34.81	86	22	37.02
3617	22	5	30.75	86	22	34.42
3618	22	5	26.27	86	22	30.72
3619	22	5	26.09	86	22	24.91
3620	22	5	21.78	86	22	22.34
3621	22	5	20.18	86	22	24.50
3622	22	5	18.98	86	22	26.12
3623	22	5	17.25	86	22	27.48
3624	22	5	13.84	86	22	28.74
3625	22	5	9.88	86	22	27.35
3626	22	5	8.11	86	22	26.63
3627	22	5	3.97	86	22	27.69
3628	22	4	59.88	86	22	34.11
3629	22	5	2.09	86	22	35.60
3630	22	5	2.53	86	22	37.61
3631	22	5	0.86	86	22	41.23
3632	22	5	5.84	86	22	42.16

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3633	22	5	10.93	86	22	39.61
3634	22	5	13.94	86	22	36.89
3635	22	5	19.62	86	22	39.43
3636	22	5	22.16	86	22	41.72
3637	22	5	26.97	86	22	39.38
3638	22	5	27.33	86	22	41.13
3639	22	5	28.36	86	22	43.54
3640	22	5	31.80	86	22	48.32
3641	22	5	37.02	86	22	50.51
3642	22	5	40.10	86	22	51.79
3643	22	5	46.68	86	22	58.83
3644	22	5	55.08	86	23	3.64
3645	22	6	0.14	86	23	4.67
3646	22	6	4.18	86	23	6.13
3647	22	6	8.52	86	23	10.50
3648	22	6	22.37	86	23	23.89
3649	22	6	23.12	86	23	26.74
3650	22	6	24.45	86	23	29.06
3651	22	6	27.23	86	23	32.86
3652	22	6	27.62	86	23	36.71
3653	22	6	28.00	86	23	41.90
3654	22	6	28.69	86	23	46.07
3655	22	6	29.34	86	23	50.64
3656	22	6	32.55	86	23	52.88
3657	22	6	33.63	86	23	57.22
3658	22	6	34.71	86	24	0.02
3659	22	6	34.61	86	24	3.90
3660	22	6	36.56	86	24	7.32
3661	22	6	37.53	86	24	10.53
3662	22	6	36.89	86	24	12.49
3663	22	6	34.66	86	24	17.14
3664	22	6	33.35	86	24	18.22
3665	22	6	30.78	86	24	24.82
3666	22	6	30.03	86	24	27.06
3667	22	6	28.44	86	24	29.16
3668	22	6	24.99	86	24	31.58
3669	22	6	24.94	86	24	33.61
3670	22	6	26.84	86	24	36.87
3671	22	6	29.52	86	24	38.03
3672	22	6	34.17	86	24	40.34
3673	22	6	37.15	86	24	43.76
3674	22	6	37.15	86	24	46.54
3675	22	6	41.62	86	24	48.33
3676	22	6	44.11	86	24	50.39
3677	22	6	47.17	86	24	51.39
3678	22	6	49.07	86	24	54.76
3679	22	6	52.54	86	25	4.52
3680	22	6	55.75	86	25	9.38
3681	22	6	57.30	86	25	13.44
3682	22	6	58.76	86	16	25.22
3683	22	7	0.41	86	25	20.46
3684	22	7	0.92	86	25	23.16

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3685	22	6	59.71	86	25	28.89
3686	22	7	0.20	86	25	31.40
3687	22	7	3.21	86	25	30.89
3688	22	7	7.76	86	25	33.90
3689	22	7	8.30	86	25	36.72
3690	22	7	10.43	86	25	45.05
3691	22	7	12.69	86	25	48.72
3692	22	7	12.77	86	25	50.47
3693	22	7	12.77	86	25	53.50
3694	22	7	12.43	86	25	56.36
3695	22	7	9.48	86	25	59.21
3696	22	7	5.80	86	26	3.40
3697	22	7	4.06	86	26	6.07
3698	22	7	2.77	86	26	9.93
3699	22	7	1.90	86	26	11.73
3700	22	7	0.02	86	26	14.81
3701	22	6	57.94	86	26	18.10
3702	22	6	55.47	86	26	18.92
3703	22	6	52.52	86	26	21.77
3704	22	6	48.48	86	26	28.04
3705	22	6	46.35	86	26	30.41
3706	22	6	41.60	86	26	35.86
3707	22	6	38.87	86	26	38.84
3708	22	6	37.18	86	26	42.87
3709	22	6	33.68	86	26	37.32
3710	22	6	27.64	86	26	34.52
3711	22	6	26.54	86	26	26.58
3712	22	6	17.34	86	26	22.08
3713	22	6	13.25	86	26	20.41
3714	22	6	14.38	86	26	23.91
3715	22	6	9.93	86	26	30.12
3716	22	6	7.19	86	26	32.90
3717	22	6	1.58	86	26	26.81
3718	22	5	54.59	86	26	31.46
3719	22	5	43.36	86	26	35.37
3720	22	5	35.81	86	26	33.00
3721	22	5	30.15	86	26	25.52
3722	22	5	26.09	86	26	22.67
3723	22	5	23.09	86	26	17.71
3724	22	5	20.67	86	26	13.09
3725	22	5	19.05	86	26	9.64
3726	22	5	14.94	86	26	4.91
3727	22	5	4.94	86	25	59.80
3728	22	5	2.48	86	25	58.26
3729	22	4	57.67	86	25	53.30
3730	22	4	55.59	86	25	52.68
3731	22	4	56.18	86	25	40.94
3732	22	4	47.91	86	25	34.80
3733	22	4	43.36	86	25	29.61
3734	22	4	41.15	86	25	19.87
3735	22	4	45.05	86	25	14.55
3736	22	4	42.15	86	25	11.51

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3737	22	4	40.27	86	25	5.37
3738	22	4	43.46	86	25	2.08
3739	22	4	36.73	86	24	56.71
3740	22	4	30.87	86	24	52.47
3741	22	4	24.37	86	24	45.10
3742	22	4	22.29	86	24	42.27
3743	22	4	17.33	86	24	40.70
3744	22	4	11.08	86	24	41.88
3745	22	4	9.18	86	24	32.79
3746	22	4	6.71	86	24	30.53
3747	22	4	3.86	86	24	28.03
3748	22	4	0.24	86	24	21.76
3749	22	3	59.59	86	24	18.50
3750	22	3	58.13	86	24	13.44
3751	22	3	59.26	86	24	11.61
3752	22	4	3.29	86	24	9.02
3753	22	3	59.34	86	24	1.10
3754	22	3	55.17	86	23	52.80
3755	22	3	47.70	86	23	44.29
3756	22	3	42.02	86	23	35.17
3757	22	3	37.21	86	23	33.66
3758	22	3	33.90	86	23	29.18
3759	22	3	31.27	86	23	20.09
3760	22	3	28.27	86	23	13.53
3761	22	3	27.70	86	22	57.34
3762	22	3	23.69	86	22	53.33
3763	22	3	25.98	86	22	45.11
3764	22	3	26.60	86	22	36.37
3765	22	3	29.86	86	22	25.12
3766	22	3	23.11	86	22	22.29
3767	22	3	13.89	86	22	22.34
3768	22	3	12.17	86	22	20.80
3769	22	3	9.34	86	22	13.45
3770	22	3	6.10	86	22	7.05
3771	22	3	2.37	86	22	1.17
3772	22	2	58.60	86	22	1.61
3773	22	2	57.36	86	22	24.32
3774	22	2	57.39	86	22	27.23
3775	22	2	55.67	86	22	33.32
3776	22	2	54.15	86	22	38.10
3777	22	2	54.97	86	22	46.63
3778	22	2	55.56	86	22	57.71
3779	22	2	53.23	86	22	58.63
3780	22	2	48.73	86	22	56.99
3781	22	2	49.55	86	22	50.20
3782	22	2	46.57	86	22	49.51
3783	22	2	48.73	86	22	39.18
3784	22	2	48.27	86	22	35.89
3785	22	2	38.94	86	22	17.49
3786	22	2	37.16	86	22	12.32
3787	22	2	33.64	86	22	3.28
3788	22	2	31.79	86	21	56.80

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3789	22	2	29.17	86	21	53.79
3790	22	2	27.91	86	21	48.68
3791	22	2	28.32	86	21	38.28
3792	22	2	30.43	86	21	39.30
3793	22	2	44.67	86	21	25.73
3794	22	2	43.18	86	21	15.91
3795	22	2	41.74	86	21	13.63
3796	22	2	39.63	86	21	7.72
3797	22	2	35.91	86	20	59.49
3798	22	2	29.97	86	20	48.16
3799	22	2	30.43	86	20	40.01
3800	22	2	29.02	86	20	40.35
3801	22	2	27.63	86	20	35.72
3802	22	2	28.32	86	20	31.59
3803	22	2	29.89	86	20	27.34
3804	22	2	36.29	86	20	17.61
3805	22	2	31.97	86	20	13.60
3806	22	2	21.49	86	20	18.43
3807	22	2	20.25	86	20	16.68
3808	22	2	10.21	86	20	26.88
3809	22	2	6.79	86	20	27.04
3810	22	2	2.88	86	20	13.80
3811	22	2	2.60	86	20	10.18
3812	22	2	1.91	86	20	7.84
3813	22	1	59.18	86	20	3.29
3814	22	1	56.54	86	19	56.04
3815	22	1	54.94	86	19	50.85
3816	22	1	47.41	86	19	47.46
3817	22	1	46.20	86	19	46.07
3818	22	1	41.81	86	19	42.60
3819	22	1	38.86	86	19	36.62
3820	22	1	28.91	86	19	41.27
3821	22	1	26.06	86	19	50.01
3822	22	1	23.77	86	19	58.72
3823	22	1	28.06	86	20	2.31
3824	22	1	26.96	86	20	9.64
3825	22	1	24.26	86	20	12.36
3826	22	1	26.80	86	20	17.81
3827	22	1	26.26	86	20	23.52
3828	22	1	23.80	86	20	33.20
3829	22	1	28.22	86	20	44.64
3830	22	1	18.76	86	20	47.78
3831	22	1	17.73	86	20	51.09
3832	22	1	21.12	86	20	49.06
3833	22	1	26.73	86	20	48.49
3834	22	1	30.79	86	20	56.41
3835	22	1	34.26	86	21	2.47
3836	22	1	40.27	86	21	12.14
3837	22	1	41.35	86	21	17.76
3838	22	1	49.08	86	21	24.37
3839	22	1	48.67	86	21	32.00
3840	22	1	52.86	86	21	45.34

(1)	(2)	(3)	(4)	(5)	(6)	(7)
3841	22	1	53.99	86	21	45.[illegible]
3842	22	1	54.30	86	21	46.78
3843	22	1	54.30	86	21	50.48
3844	22	1	54.58	86	21	52.48
3845	22	1	55.48	86	21	53.54
3846	22	1	56.92	86	21	56.41
3847	22	1	56.10	86	21	59.34
3848	22	1	58.69	86	22	12.35
3849	22	2	0.65	86	22	12.35
3850	22	2	2.63	86	22	15.15
3851	22	2	3.35	86	22	26.43
3852	22	2	2.24	86	22	32.85
3853	22	2	0.06	86	22	35.42
3854	22	2	0.47	86	22	45.47
3855	22	2	4.58	86	22	50.46
3856	22	2	9.72	86	22	57.88
3857	22	2	23.08	86	23	6.01
3858	22	2	22.67	86	23	12.40
3859	22	2	23.82	86	23	15.10
3860	22	2	24.61	86	23	22.91
3861	22	2	28.29	86	23	24.51
3862	22	2	30.19	86	23	29.16
3863	22	2	29.21	86	23	30.24
3864	22	2	30.42	86	23	34.61
3865	22	2	34.04	86	23	41.44

By order of the Governor

H. S. CHAHAR

Principal Secretary to Government

Printed and published by the Director,Printing, Stationery and Publication, Orissa, Cuttack-10
Ex. Gaz.206—193+500

ANNEXURE VII

NOTIFICATION OF SIMILIPAL BIOSPHERE RESERVE

सत्यमेव जयते

Telegram: PARYAVARAN

Telephone:
टेलेक्स (द्विभाषीय)
Telex (bi-lingual) : W-66185 DOE IN
Fax : 4360678

भारत सरकार
पर्यावरण एवं वन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
पर्यावरण भवन, सी० जी० ओ० कॉम्प्लेक्स
PARYAVARAN BHAWAN, C.G.O. COMPLEX
लोदी रोड, नई दिल्ली-110003
LODI ROAD, NEW DELHI-110003

No.16/2/85-MAB-CSC

22 June, 1994.

To

The Chief Secretary
Government of Orissa
Bhubaneswar.

Sub : ESTABLISHMENT OF BIOSPHERE RESERVE AT SIMILIPAL IN ORISSA

Sir,

The Government of India has identified potential sites for designating as Biosphere Reserve for preserving the biological diversity with the following broad objectives :

.. conservation of representative samples of ecosystems,

.. provision of long-term conservation of genetic diversity in-situ,

.. promotion of basic and applied research work and its monitoring; and

.. dissemination of experience for education and training.

2. One of these is Similipal forests in Orissa which represents the Mahanadian bio-geographic region. The matter has been considered in detail by the Government of India in consultation with the Government of Orissa and it is on the request of the Government of Orissa, it has been decided to designate Similipal area as a Biosphere Reserve. The Biosphere Reserve will be deemed to have come into being immediately after the issue of this Notification.

3. In accordance with the guidelines on the subject, the State Government is requested to prepare a Project Document for the setting up the Similipal Biosphere Reserve. Proposed team of experts for preparing the Project Document is given in Annexure-I.

4. The size of the buffer zone and transitional area is 1354.30 sq.km and 77.07 sq.kms respectively. The boundary and zonation of the buffer zone in the Biosphere Reserves is given in Annexure-II. The details of the area to be earmarked for manipulation activities such as Forestry, Agriculture, Eco restoration, Agroforestry etc., willbe worked out by the Project authorities.

5. The following will be the important aspects of the Similipal Biosphere Reserve :

a. The core and the buffer areas and manipulation activities which may be permitted in the buffer zone will be in conformity with the general guidelines for Biosphere Reserves and will be determined accordingly by the State Management Council. A detailed map will subsequently be submitted by the Government of Orissa.

b. The core zone of the Biosphere Reserve will be kept absolutely undisturbed. The Biosphere Reserve, by itself will not affect the rights of the tribal and other people of the area.

c. The constitution of the Biosphere Reserve by itself will not, in any way, change the status of legal ownership of the land and forests.

d. There will be a Biosphere Reserve Management Council with the composition given in **Annexure-III**.

e. The Government of India will provide financial assistance for approved items of expenditure included in the Action and Management Plan to be prepared by the Government of Orissa. This may broadly come under the following heads :

.. Survey
.. Protection
.. Conservation
.. Eco-restoration
.. Eco-development
.. Education and Awareness

f. There will be a Research Committee as per the composition shown in **Annexure-IV**.

g. The subjects of research and the institutions for the purpose are to be identified by the State Government.

h. The Government of Orissa will set up a local Committee for coordination of the activities of the various departments in the Biosphere Reserve area.

i. The Director, Project Tiger, (i.e., Field Director) of Similipal Tiger Reserve, Orissa, will act as the Project Director for the Similipal Biosphere Reserve.

3. The funds will flow through the Chief Wildlife Warden of Orissa to get technical inputs in Project Development.

Yours faithfully,

(R.RAJAMANI)
Secretary to the Government of India.

Encl : As stated.

Copy to:

1. The Secretary
   Planning Commission
   Yojana Bhawan
   New Delhi.

2. Chief (Science)
   Planning Commission
   Yojana Bhawan
   New Delhi.

3. Secretary
   Department of Forests
   Government of Orissa
   Bhubaneswar.

4. Secretary
   Department of Environment
   Government of Orissa
   Bhubaneswar

5. Principal Chief Conservator of Forests
   Government of Orissa
   Bhubaneswar.

6. Chief Wildlife Warden
   Government of Orissa
   Bhubaneswar.

(R.RAJAMANI)
Secretary to the Government of India.

ANNEXURE - I

PROPOSED TEAM OF EXPERTS FOR PREPARING THE PROJECT DOCUMENTS

1. Shri.C.S.Dani
   (Former PCCF, Orissa)

2. Subject Matter Specialist (I)

3. Subject Matter Specialist (II)

4. Shri.P.C.Bhanj Deo
   Chairman,
   Indian Society of Wildlife Research and Ex-Maharaja
   of Mayurbhanj.

5. Chief Conservator of Forests (WL) and
   Chief Wildlife Warden, Orissa.

6. Field Director(Project Tiger) Similipal

ANNEXURE-II

ZONATION - SIMILIPAL BIOSPHERE RESERVE

GENERAL DESCRIPTION AND THE BOUNDARY :

Similipal Mussif is situated between 21°30'-22°08' N 86°05'-86°37' E. It covers the major ecosystem of North Indian tropical moist deciduous forest, moist peninsular valley forest and moist sal savannah, containing about 135 plant species. The endangered and threatened animal species include : Tiger, four-horned antelope, giant squirrel, panther, leopard, mouse deer and pangolin.

It has fifty-nine villages in the buffer area and two hundred villages in the fringe area. The population of the buffer area is 8643 and fringe area is 65,791 respectively.

ZONATION :

The size of the buffer zone will be 1354.30 sq.km.and the size of the transitional area 77.07 sq.km. The zonation of the Biosphere Reserve, however is subject to changes, which will be decided by the project formulation team in consultation with the State Government and Director, Project Tiger programme.

ANNEXURE-III

MANAGEMENT COUNCIL - SIMILIPAL BIOSPHERE RESERVE

1.	Chief Secretary Government of Orissa	..	Chairman
2.	Addl.Inspector General of Forests M/o Environment and Forests	..	Member
3.	Addl.Chief Secretary, Government of Orissa	..	Member
4.	Joint Secretary & Financial Adviser M/o Environment and Forests	..	Member
5.	Officer-in-charge of Biosphere Reserves Programme, M/o Environment and Forests	..	Member
6.	Secretary to the Govt. of Orissa Forest Department	..	Member
7.	Principal Chief Conservator of Forests Government of Orissa	..	Member
8.	Chief Conservator of Forests (WL) and Chief Wildlife Warden Government of Orissa	..	Member
9.	Representative of the Botanical Survey of India	..	Member
10.	Representative of the Zoological Survey of India	..	Member
11.	Director of Similipal Biosphere Reserve	..	Member Secretary

ANNEXURE-IV

COMPOSITION OF RESEARCH COMMITTEE ON SIMILIPAL BIOSPHERE RESERVE

1.	Chief Wildlife Warden Government of Orissa ..	Chairman
2.	Director Zoological Survey of India ..	Member
3.	Representative of Uthkal University ..	Member
4.	Director Botanical Survey of India ..	Member
5.	Representative of the M/o Environment and Forests ..	Member
6.	Director Wildlife Institute of India Dehradun. ..	Member
7.	Field Director, Project Tiger ..	Member Secretary

GOVERNMENT OF ORISSA
FOREST AND ENVIRONMENT DEPARTMENT.

3152
1/6/96

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NOTIFICATION

DATED BHUBANESWAR THE 20th MAY, 1996.

No.8F(T)-8/96. 11319 /F&E., Government of India, in the Ministry of Environment and Forests have designated Similipal Forest in Orissa as a Biosphere Reserve. The Biosphere Reserve will be managed on the basis of a project document, and will have Core Zone, Buffer Zone and Transitional Zone. Various manipulation activities, such as Forestry, Agriculture, Eco-restoration, Eco-development and Agro-forestry etc. may be permitted in the buffer zone area, in conformity with the general guidelines for Bio-sphere Reserve, and will be determined accordingly by the State Management Council. Although the Core Zone will be kept absolutely undisturbed, the Bio-sphere Reserve by itself will not affect the rights of the tribal and other people of the area. The Constitution of the Bio-sphere Reserve by itself will not in any way change the status of legal ownership of the land and forests. The Field Director, Project Tiger, Similipal Tiger Reserve will act as the Project Director for the Similipal Bio-sphere Reserve.

There will be a Bio-sphere Reserve Management Council to oversee implementation of the Bio-sphere Project document. Accordingly State Government have decided to constitute a Bio-sphere Reserve Management Council for Similipal with the following members.

1.	Chief Secretary, Government of Orissa.	-	Chairman
2.	Addl. Inspector General of Forests, Ministry of Environment and Forests.	-	Member
3.	Agricultural Production Commissioner.	-	Member
4.	Joint Secretary and Financial Adviser, Ministry of Environment and Forests.	-	Member
5.	Officer-in-charge of Biosphere Reserves Programme, Ministry of Environment and Forests.	-	Member
6.	Secretary to the Government of Orissa, Forest Department.	-	Member
7.	Principal Chief Conservator of Forests. Government of Orissa.	-	Member
8.	Principal Chief Conservator of Forests (...L) and Chief Wild Life Warden, Government of Orissa.	-	Member
9.	Representative of the Botanical Survey of India.	-	Member

(284)

10. Representative of the Zoological Survey of India. - Member

11. Field Director of Similipal Tiger Reserve, Baripada (Project Director, Similipal Biosphere Reserve). - Member Secretary

BY ORDER OF THE GOVERNOR

R. N. SENAPATI
PRINCIPAL SECRETARY TO GOVERNMENT.

Memo No. 11320 /F&E., Dated Bhubaneswar the 20th May, 1996.

Copy to Persons Concerned for information and necessary action.

DEPUTY SECRETARY TO GOVERNMENT.

Memo No. 11321 /F&E., Dated Bhubaneswar the 20th May, 1996.

Copy to Private Secretary to Chief Minister, Orissa/ Private Secretary to Minister, Forest, Orissa/Private Secretary to Minister, Environment, Orissa/Private Secretary to Chief Secretary, Orissa/Private Secretary to Agricultural Production Commissioner, Orissa for information.

DEPUTY SECRETARY TO GOVERNMENT.

Memo No. 11322 /F&E., Dated Bhubaneswar the 20th May, 1996.

Copy forwarded to the Secretary to Government of India, Ministry of Environment and Forests/Inspector General of Forests and Special Secretary to Government of India, Ministry of Environment and Forests, Paryavaran Bhawan, C.G.O. Complex, Lodi Road, New Delhi-110003 for favour of Information.

DEPUTY SECRETARY TO GOVERNMENT.

Memo No. 11323 /F&E., Dated Bhubaneswar the 20th May, 1996.

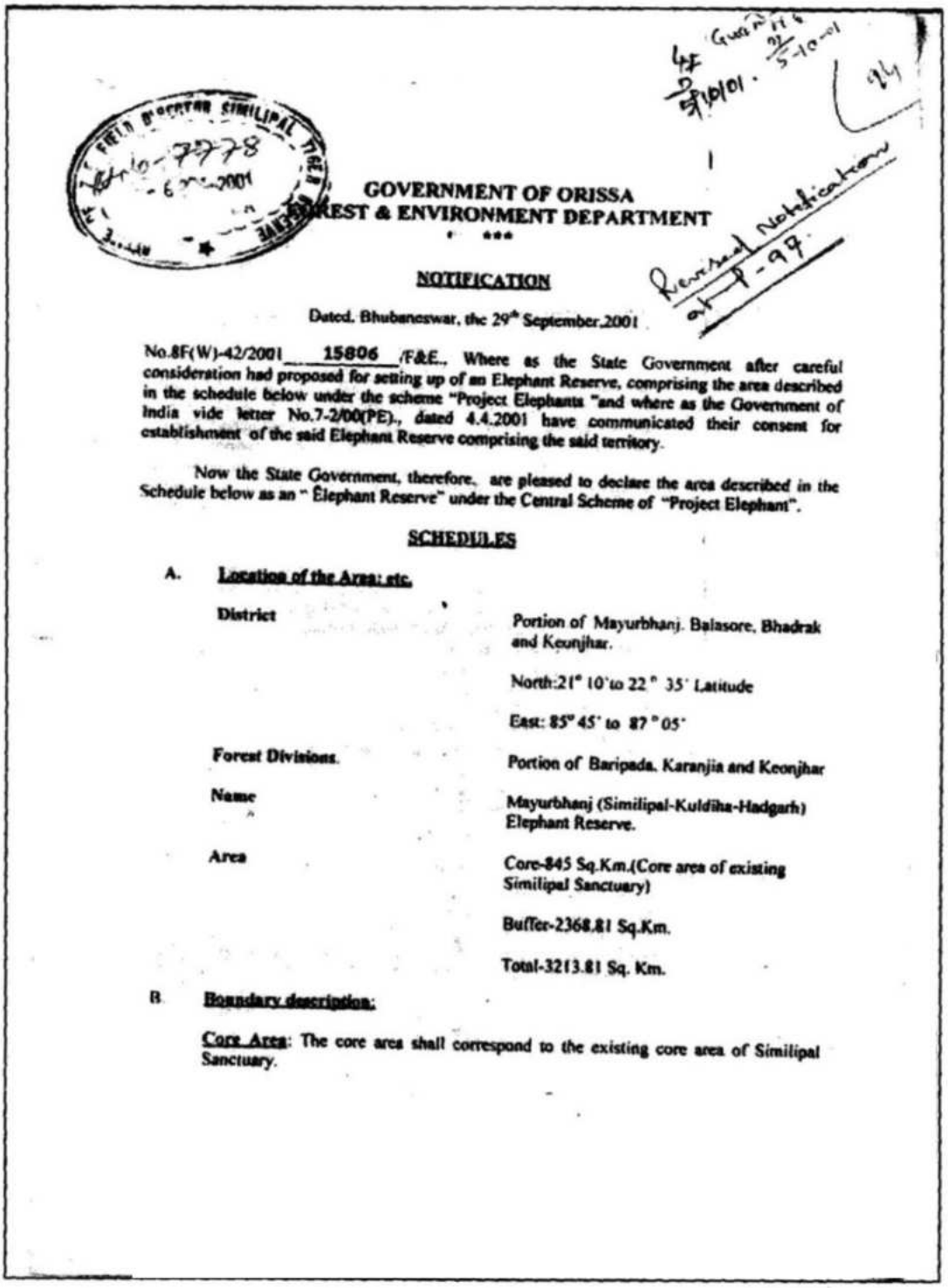
Copy to Guard File (10 Copies).

DEPUTY SECRETARY TO GOVERNMENT.

D. Nayak.

ANNEXURE VIII

NOTIFICATION OF MAYURBHANJ ELEPHANT RESERVE



GOVERNMENT OF ORISSA
FOREST & ENVIRONMENT DEPARTMENT

NOTIFICATION

Dated, Bhubaneswar, the 29th September,2001

No.8F(W)-42/2001 15806 /F&E., Where as the State Government after careful consideration had proposed for setting up of an Elephant Reserve, comprising the area described in the schedule below under the scheme "Project Elephants "and where as the Government of India vide letter No.7-2/00(PE)., dated 4.4.2001 have communicated their consent for establishment of the said Elephant Reserve comprising the said territory.

Now the State Government, therefore, are pleased to declare the area described in the Schedule below as an " Elephant Reserve" under the Central Scheme of "Project Elephant".

SCHEDULES

A. Location of the Area; etc.

District	Portion of Mayurbhanj, Balasore, Bhadrak and Keonjhar.
	North:21° 10' to 22° 35' Latitude
	East: 85° 45' to 87° 05'
Forest Divisions.	Portion of Baripada, Karanjia and Keonjhar
Name	Mayurbhanj (Similipal-Kuldiha-Hadgarh) Elephant Reserve.
Area	Core-845 Sq.Km.(Core area of existing Similipal Sanctuary)
	Buffer-2368.81 Sq.Km.
	Total-3213.81 Sq. Km.

B. Boundary description:

Core Area: The core area shall correspond to the existing core area of Similipal Sanctuary.

Buffer Zone:

The outer boundary of the Mayurbhanj (Similipal-Kuldiha-_Hadgarh) Elephant Range shall be starting from Taradiha Nalla at its Confluence with Baitarani River near Sarangi village. Then it proceeds along upstream of river Baitarani (enclosing within it the Santoshpur RF of Keonjhar Division) up to Dalki Suhi Village, i.e. the boundary of Thakurmunda Range of Karanjia Division(which is also the District boundary between Mayurbhanj and Keonjhar), then follows the district boundary in a northerly direction up to West Deo River near Mandua village, and then proceeds upstream along West Deo River up to its crossing point with Karanjia-Thakurmunda road. Then the boundary moves along the road up to Karanjia, then up to Singada Chhak, touches NH-6, the along NH-6 up to the crossing of Nanjura nalla from there it proceeds in north-west direction along Nanjura nalla up to the confluence of Khairi nalla, then proceeds along the downstream of Khairi nalla up to Panposi village. Then the boundary runs upstream in north direction along Dubajora nalla up to state boundary of Bihar-Orissa. Then the boundary of the Elephant Reserve proceeds along the Bihar-Orissa state boundary along eastern and northern direction up to north of Manbir Reserved Forest near village Manbir. Then it moves in eastern direction and encircles Manbir RF and Budheirana RF up to Edelbeda village. Then the boundary of the Elephant Reserve runs in an easterly direction along the boundary of the Badampahar Range up to Kanhu River near Kaduani village and further runs upstream along the Kanhu River up to the confluence of Pokharia Nalla in the north of Pokharia village, and then runs upstream of Pokharia Nalla up to boundary of Badanipahar RF near Kasiabeda village.Then the boundary runs along the north of Badampahar RF in an easterly direction up to Badampahar Forest Range Head Quarter then it proceeds up to Badampahar Railway Station land moves in a northerly direction along the Badampahar-Tatanagar Railway Line up to crossing of Barhai nalla near Bahalda Road railway station. Then the boundary proceeds westward along the downstream of Barhai nalla up to Dharamdihi village and then moves in north-west direction along the ridges of Churia hill, Sadam hill and Jerai, RF, where it touches Bihar-Orissa State border. Then the boundary runs north eastward along the Bihari_Orissa State border near Pandupani village up to the boundary of Baripada Division near Satabankara hilltop.

Baripada Division:

The boundary proceeds south and then eastward from Satabankara hill top along Bihar-Orissa State border up to Jamsola, and then along West Bengal-Orissa State border up to Santeliya. Then it proceeds southward along Gulfa Nalla up to Guhaldiha(near Bagra), then proceeds westward along Bagra-Baripada Road up to Munduri Bandha, then proceeds north-west along Munduri-Bankisol road up to Bankisol, then proceeds northward along Baripada-Deuli road up to Kuabuda chhak, then along Kuabuda-Chandua road up to Dardara village, then along Dardara-Kathasirsi road up to NH-5. From Kathsirsi it proceeds northward along NH-5 up to Kalabadia, then moves westwards to touch river Budhabalanga and then moves southward along Budhabalanga river up to the confluence of Sankiri nalla. Then it

proceeds upstream of Sankiri nalla and touches Similipal RF near Gendapokhari. Then it follows the boundary of Similipal RF in a southerly direction up to Nato RF, encircles boundary of Nato RF up to Purunapani village. Then it follows the road Purunapani-Sarat-Sarisua-Padmapokhari-Kaladahi up to Nilgiri. Then it proceeds southerly along the road Nilgiri-Santaragadia-Baulagadia-Bagudi, goes north and then touches the southern boundary of Debgiri RF up to Katikholia. Then it follows the boundary of Debgiri RF in South-west direction and continues along southern boundary of Kuldiha RF, Garsahi RF, Mahisadali PF, Gogua PF and Bandhalata PF to touch the boundary of Baula RF in Keonjhar Division.

Keonjhar Division:

Then the boundary proceeds along the boundary of Baula RF, crosses the Salandi River near Hadgarh. Then it proceeds along the road from Hadgarh to Baidyanathpur and encircles Baula RF along south west, south and north-east boundary up to the juction of Mayurbhanj-Keonjhar District boundary near Mirigichua village. Then the boundary proceeds in a westernly direction along the district boundary of Mayurbhanj-Keonjhar district up to the crossing of Taradiha nalla near Sarangi village.

By order of the Governor,

A.S. Sarangi 29.09.2001

Principal Secretary to Government

Memo No. 15807 /F&E., Dated, Bhubaneswar, the 29th September,2001

Copy forwarded to the Director, Printing Stationery and Publication, Orissa, Cuttack with a request to publish the Notification in the next issue of Orissa Gazette and will bear S.R.O. Number.

500 copies of the Gazette Notification may please be sent to this Department for reference and use.

29/9/2001

Joint Secretary to Government.

Memo No. 15808 /F&E.,Dated, Bhubaneswar the 29th September,2001

Copy forwarded to the Principal Chief Conservator of Forests, Orissa / Chief Conservator of Forests (Wildlife),Orissa and Chief Wildlife Warden, Orissa / Director, Social Forestry Project, Orissa /Chief Conservator of Forests(KL), Orissa/All Conservator of Forests / All Divisional Forest Officers for information and necessary action.

29/9/2001

Joint Secretary to Government.

Memo No. 15809 /F&E., Dated, Bhubaneswar the 29th September, 2001

Copy forwarded to Sri S.S.Bist, Inspector General of Forest- Director (PE). Ministry of Environment & Forests. Government of India, C.G.O.Complex, Lodhi Road, New Delhi-03 for favour of information with reference to his letter No.7-2/00(PE) dt.4.4.01.

29/9/2001

Joint Secretary to Government.

Memo No. 15810 /F&E., Dated .Bhubaneswar the 29th September, 2001

Copy forwarded to all Departments of Government/All Heads of Department/All Revenue Divisional Commissioners/ All the Collectors for favour of information.

29/9/2001

Joint Secretary to Government

Memo No. 15811 /F&E., Dated. Bhubaneswar the 29th September, 2001

Copy to all Sections /Guard File (30 copies) for information.

29/9/2001

Joint Secretary to Government.

Rao/

OFFICE OF THE CONSERVATOR OF FORESTS & FIELD DIRECTOR,
SIMILIPAL TIGER RESERVE, BARIPADA

Memo No 3250 (8) Dt 15/10/01

Copy forwarded to all the Asst. Conservator of Forests/all the Range officers of S.T.R., Baripada for their information & reference.

Conservator of Forests &
Field Director,
Similipal Tiger Reserve, Baripada

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Government of Orissa
Forest and Environment Department
-o-
CORRIGENDUM

No.8F(A)-42/2001/ 18639/F&E. The total area mentioned against the item 'area' under schedule 'A' (Location of the area etc.) appearing in the Forest & Environment Department Notification No.15806/F&E., dated 29.9.2001 may be corrected and read as 9043.74 Sq.Kms. instead of 5215.[illegible] Sq.Kms.

By Order of the Governor

A.S.Sarangi,
Principal Secretary to Government.

M.No. 18640/F&E., dated- 28.11.2001
Copy forwarded to the Director, Printing, Stationery & Publication [illegible], Cuttack with reference to this Department Memo No.15807/F&E., dt.29.9.2001 for publication of the Corrigendum in the next issue of Orissa Gazette and will bear S.R.O. Number. 200 copies of the Gazette Corrigendum may please be sent to this Department for reference and use.

Joint Secretary to Government.

M.No. 18641 F&E., dated- 28.11.2001
Copy forwarded to the Principal Conservator of Forest, Orissa/Chief Conservator of Forest(WL) & C.W.L.W., Orissa/Director, [illegible], Orissa/[illegible] (WL), Orissa/All Conservator of Forests/All Divisional Forest Officers for information & necessary action with reference to this Department M.No.15808/F&E., dt.29.9.2001.

Joint Secretary to Government.

M.No. 18642/F&E., dated- 28.11.2001
Copy forwarded to Sri [illegible], I.G. of Forest-Director(PT), Ministry of Environment & Forests, Govt. of India, CGO Complex, Lodhi Road, New Delhi-03 for favour of information with reference to this Deptt. M.No.15809/F&E., dt.29.9.2001.

Joint Secretary to Government.

M.No. 18643 /F&E., dated- 28.11.2001
Copy forwarded to All Departments of Govt./All Heads of Departments/All Revenue Divisional Commissioners/All Collectors for favour of information with reference to this Deptt. M.No.15810/F&E., dt.29.9.01.

Joint Secretary to Government.

M.No. 18644 /F&E., dated- 28.11.2001
Copy to all sections/Guard File [illegible] for information.

Joint Secretary to Government.

ANNEXURE IX

1 F. No. 3-1/2003-PT

REVISED GUIDELINES FOR THE ONGOING CENTRALLY SPONSORED SCHEME OF PROJECT TIGER

FEBRUARY, 2008

National Tiger Conservation Authority Ministry of Environment & Forests, Government of India

Ministry of Environment & Forests
National Tiger Conservation Authority

REVISED GUIDELINES FOR THE ONGOING CENTRALLY SPONSORED SCHEME OF PROJECT TIGER

(1) Introduction:

Project Tiger is an ongoing Centrally Sponsored Scheme of the Ministry of Environment and Forests. The revised guidelines incorporate the additional activities for implementing the urgent recommendations of the Tiger Task Force, constituted by the National Board for Wildlife, chaired by the Hon'ble Prime Minister. These, interalia, also include support for implementing the provisions of the Wild Life (Protection) Amendment Act, 2006, which has come into force with effect from 4.09.2006. The activities are as below:

i. Antipoaching initiatives

ii. Strengthening infrastructure within tiger reserves

iii. Habitat improvement and water development

iv. Addressing man-animal conflicts

v. Co-existence agenda in buffer / fringe areas with landscape approach

vi. Deciding inviolate spaces and relocation of villages from crucial tiger habitats within a timeframe by providing a better relocation package, apart from supporting States for settlement of rights of such people

vii. Rehabilitation of traditional hunting tribes living in and around tiger reserves

viii. Providing support to States for research and field equipments

ix. Supporting States for staff development and capacity building in tiger reserves.

x. Mainstreaming wildlife concerns in tiger bearing forests outside tiger reserves, and fostering corridor conservation in such areas through restorative strategy involving local people to arrest fragmentation of habitats.

xi. Providing safeguards / retrofitting measures in and around tiger reserves and tiger bearing forests for wildlife conservation.

xii. Strengthening the infrastructure of National Tiger Conservation Authority at the Centre.

xiii. Carrying out independent monitoring and the evaluation of tiger reserves.

xiv. Establishment and development of eight new tiger reserves.

xv. Provision of project allowance to all categories of staff working in tiger reserves.

xvi. Providing residential amenities to facilitate basic education to children of frontline

xvii. Field staff posted in tiger reserves.

xviii. Providing assistance to States for fostering ecotourism to benefit local people.

1.1 "Project Tiger" was launched in April, 1973 with the objective "to ensure maintenance of a viable population of Tigers in India for scientific, economic, aesthetic, cultural and ecological values, and to preserve for all

times, areas of biological importance as a national heritage for the benefit, education and enjoyment of the people".

1.2 The Project has been successfully implemented, and at present there are **28 Tiger Reserves** in **17 states**, covering an area of **37761 sq. km.** Apart from above 'in principle' approval for creation of eight new Tiger Reserves has been accorded. The selection of reserves was guided by the need to conserve unique ecosystem/ habitat types across the geographic distribution of tigers in the country.

1.3 Project Tiger is an ongoing Centrally Sponsored Scheme, which is continued, in the XIth five-year Plan. Conservation of endangered species and their habitat, strengthening and enhancing the Protected Area Network, control of poaching, monitoring, research and ensuring people's participation in Wildlife Conservation have been accorded high priority in the National Wildlife Action Plan and the Wildlife Conservation strategy, 2002.

2. Past funding pattern and major activities supported under the Scheme

During present plan period, 100% Central Assistance is being made available to States for expenditure on all non-recurring items; for recurring items, the Central Assistance is restricted to 50% of the expenditure, while the matching grant is provided by the Project States. The activities / field inputs under Project Tiger, interalia, include : (**Non recurring**) strengthening of protection, deployment of armed squads in tiger reserves, creating basic infrastructure for management, roads, wireless, civil works, habitat development, augmenting water resources, compensatory ameliorative measures for habitat restoration, eco-development, village relocation, use of Information Technology in crime detection, establishment of a digitized database in Tiger Reserves having collaborative linkage with Project Tiger Directorate in the GIS domain, monitoring and evaluation of tiger reserves, monitoring of habitat status, carrying out All India Estimation of Tigers, Co-predators and Prey animals in the GIS domain with the state of art technology, continuous monitoring of tiger populations in various tiger range states (tiger reserves and other forest areas outside tiger reserves), fostering wildlife viewing for tourists in Tiger Reserves, providing compensation to villagers for human deaths/livestock depredation by carnivores in tiger reserves, staff welfare measures, providing 'Project Allowance' to all categories of staff working in Tiger Reserves, establishment of veterinary facility, and fostering research / research projects relating to tiger conservation, replacement and purchase of new vehicles for existing and new Tiger Reserves to ensure staff mobility. (**Recurring**) creation / deployment of local work force for patrolling/barriers, habitat improvement, providing salt licks, water facility, fire protection measures, maintenance of various items, publicity and extension and legal assistance.

3. Constitution of the National Tiger Conservation Authority (NTCA)

The Govt. of India had launched "Project Tiger" to promote conservation of the tiger, since the significance of its conservation has ramifications beyond State boundaries. Management of forests and wildlife is primarily the responsibility of concerned States. The field implementation of the project, protection and management in the designated reserves is done by the project States, who also provide the matching grant to recurring items of expenditure, deploy field staff/officers, and give their salaries. The Project Tiger Directorate of the Ministry of Environment and Forests was mandated with the task of providing technical guidance and funding support.

3.1 The implementation of Project Tiger over the years has highlighted the need for a statutory authority with legal backing to ensure tiger conservation. On the basis of the recommendations of National Board for Wild Life chaired by the Hon'ble Prime Minister, a Task Force was set up to look into the problems of tiger conservation in the country. The recommendations of the said Task Force, interalia include strengthening of Project Tiger by giving it statutory and administrative powers, apart from creating the Wildlife Crime Control Bureau. It has also recommended that an annual report should be submitted to the Central Government for laying in Parliament, so that commitment to Project Tiger is reviewed from time to time, in addition to addressing the concerns of local people. Broadly the urgent recommendations of the said Task Force are as below:

- Reinvigorating the constitution of governance.
- Strengthening efforts towards protection of tiger, checking poaching, convicting wildlife criminals and breaking the international trade network in wildlife body parts and derivatives.
- Expanding the undisturbed areas for tiger by reducing human pressure.
- Repair the relationship with local people who share the tiger's habitat by fielding strategies for coexistence.
- Regenerate the forest habitats in the fringes of the tigers protective enclaves by investing in forest, water and grassland economies of the people.

3.2 The Tiger Reserves are faced with ecological disturbances and various other problems. Fragmentation of habitats occurs owing to overuse of forest habitats, apart from conflicting land uses leading to loss of habitat. There are also in some cases, significant village population with large number of cattle, which graze in the forests, leading to ecological degradation, apart from major sources of regular or intermittent disturbance, such as temples and commercial entities such as tea estates. This also leads to man-animal conflicts, resulting in tiger and prey mortality.

3.3 Several constraints affect field implementation of the project, viz. delayed release of Central Assistance given to the States for Field Units, staff vacancies, ageing of field staff, lack of capacity building initiatives, weak enforcement and monitoring of protection work etc. The events in the recent past have highlighted the fact that there is a need in the States for greater commitment and vigilance. The field administration managing the tiger reserves require capacity building and supervision.

3.4 There is also an urgent need to strengthen the system at the Central Government level (Project Tiger Directorate), which has the mandate to oversee and guide tiger conservation in the country. Involvement of Parliament is also required to ensure review and guidance. Likewise, involvement of Chief Ministers of States and strengthening the field administration, supervision of the project and building a participatory base by including interests of local people living in and around tiger reserves are extremely important.

3.5 Considering the urgency of the situation, Project Tiger has been converted into a statutory authority (NTCA) by providing enabling provisions in the Wild Life (Protection) Act, 1972 through an amendment, viz. Wild Life (Protection) Amendment Act, 2006. This forms one of the urgent recommendations of the Tiger Task Force appointed by the Prime Minister. The NTCA would address the ecological as well as administrative concerns for conserving tigers, by providing a statutory basis for protection of tiger reserves, apart from providing strengthened institutional mechanisms for the protection of ecologically sensitive areas and endangered species. The Authority would also ensure enforcing of guidelines for tiger conservation and monitoring compliance of the same, apart from placement of motivated and trained officers having good track record as Field Directors of tiger reserves. It would also facilitate capacity building of officers and staff posted in tiger reserves, apart from a time bound staff development plan.

3.6 The Wild Life (Protection) Amendment Act, 2006 has come into force with effect from the 4th of September, 2006, and the NTCA has also been constituted on the same date.

3.7 Despite three decades of Project Tiger and the efforts of the Centre and States, tiger continues to remain one of the most endangered large predators in the world. The causative factors are many, and to name a few, we may mention the important ones like loss of habitat due to agriculture expansion and development, revenge killings by people due to man- animal conflicts and above all, the demand for the body parts and derivatives of tiger in the illegal international market. These factors contribute to the decimation of our in-situ population in the wild. Therefore, continuance of a focused, species-specific, multifaceted, ecosystem project like 'Project Tiger' becomes important and crucial at this juncture to address the threats faced by the tiger and its habitat.

3.8 The three key imperatives in tiger conservation which necessitate a 'project mode' are: a focused approach to prioritize actions, in the interest of tiger conservation (within and outside the tiger reserves), eliciting the support of local stakeholder communities and ensuring the necessary infrastructure for protection and management. Considering the fact that conservation of tiger has ecological national significance transcending State boundaries, the Government of India provides funding support and technical guidance to States through the ongoing Centrally Sponsored Scheme of Project Tiger and other schemes for wildlife conservation. Tigers are present in the forests of seventeen states in our country at present, which also include their protected areas / tiger reserves.

3.9 The distribution of tigers and their density vary in States due to several ecological and human reasons, viz. the forest cover, terrain, natural prey availability, presence of undisturbed habitat and the quality of managerial efforts taken towards protection. Since tigers are at the top of the ecological "food -chain", their conservation results in the overall conservation of all other species of plants and animals occupying the ecosystem. We can say that tigers are indicators of the well being of the ecosystem. A healthy tiger population indicates that the other ecological components in its habitat are equally robust, since tigers need large amount of prey and good habitat. The investments made in a project of this kind are more than justified.

4. Ongoing activities and additionalities to be supported under the revised Centrally Sponsored Scheme of Project Tiger:

4.1 Anti-poaching activities (ongoing) (non recurring for antipoaching squad/Tiger Protection Force deployment, and recurring for wages towards patrolling camp labourers/watchers)

The antipoaching operations in Tiger Reserves are site specific. However, the following activities, interalia, would form part of the protection strategy in Tiger Reserves:

- Deployment of antipoaching squads
- Establishing and maintenance of existing patrolling camps/chowkis and deployment of camp labourers for patrolling.
- Organising vehicular patrolling by constituting squads (Tiger Protection Force), comprising of field staff, labourers and police/SAF/ex-army personnel, with wireless handset and paraphernalia for apprehending offenders, apart from prescribing a patrolling calendar for the squad.
- Establishing and maintenance of wireless network.
- Organising surprise raids jointly with the local police in railway stations, local trains, bus-stops, buses, catchers and cafeteria.
- Ensuring special site-specific protection measures, during monsoon as 'Operation Monsoon' – considering the terrain and accessibility of Protected Areas.
- Deployment of ex-army personnel / home guards.
- Deployment of local work force for patrolling, surveillance of water holes, manning barriers.
- Procurement of arms and ammunition.
- Procurement/maintenance of elephant squads.
- Rewards to informers.
- Legal support for defending court cases.
- Procurement of vehicles, boats.
- Procurement field gear, night vision device.

4.2 Strengthening of infrastructure within Tiger Reserves (ongoing) (non recurring for new civil works and recurring for maintenance)

The following activities, interalia, would form part of reinforcing the infrastructure of Tiger Reserves (including support to new tiger reserves):

- Civil Works (staff quarters, family hostels, office improvement, patrolling camp, house keeping buildings, museum, culverts).
- Maintenance / creation / upgradation of road network.
- Maintenance / creation of wireless tower.
- Maintenance / creation of fire watch tower.
- Maintenance / creation of bridges, dams, anicuts.
- Maintenance / creation of firelines / firebreaks.
- Maintenance / creation of earthen ponds.
- Procurement / maintenance of vehicles (Gypsy, Jeep, Truck, Tractor).
- Habitat improvement works.
- Procurement of hardware, software / GIS.
- Procurement of compass, range finder, GPS, camera traps.
- Procurement of satellite imageries for management planning.
- Map digitization facility for management planning.

4.3 Habitat improvement and water development (ongoing) (recurring)

These, interalia, may include: weed eradication, removal of gregarious plant growth from grasslands, grass improvement, water retention structures and the like. These initiatives would increase the forage and browse values of the habitat for wild animals.

4.4 Addressing man-animal conflict (ensuring uniform, timely compensation for human deaths due to wild animals, livestock depredation by carnivores, crop depredation* by wild ungulates) (compensation for crop loss is a new component) (non recurring)

This would involve:

- Payment of compensation for cattle lifting, death of human beings and crop depredation* due to wild animals.
- Creation of crop protection structures.
- Procurement / deployment of traps, cages to catch problematic animals.
- Procurement of tranquilizing equipments, rescue vehicles and drugs.

The above initiatives are extremely important to avoid as well as redress the "park-people" interface conflicts.

(* would be supported as per prevailing norms of the State, in the delineated buffer area as explained in Section 38V of the Wild Life (Protection) Act, 1972, as amended in 2006.)

4.5 Co-existence agenda in buffer / fringe areas (landscape approach/sectoral integration/ecologically sustainable development programme/livelihood options/eco-tourism) (new activity in case of tiger reserves where buffer has not been notified so far) (non recurring)

The fringe areas around Tiger Reserve have corridor value, and their ecological sustainability is important to prevent the area from becoming ecological sinks on account of over use of resources and unwise land use.

This calls for delineation of buffer zone around a tiger reserve to incorporate such fringe areas so that it can fulfill the following objectives:

- Providing ecologically viable livelihood options to local stakeholders for reducing their dependency on forests.
- Conserving the forest area through restorative inputs involving local people for providing habitat supplement to wild animals moving out of core areas.

A comparative assessment of the forest cover status of outer fringe areas of tiger reserves upto a radial distance of 10 kms has been done in collaboration with the Forest Survey of India. The States are required to delineate the fringe/buffer area around the core zones of tiger reserves, and submit a Tiger Conservation Plan as required under Section 38 V of the Wild Life (Protection) Amendment Act, 2006, to ensure wildlife conservation while addressing the livelihood issues relating to local people.

4.6 Rehabilitation package for traditional hunting tribes living around tiger reserves (new activity) (non recurring)

There is an urgent need to launch a rehabilitation and development programme for the denotified tribes and tribes involved in traditional hunting, living around tiger reserves and tiger corridors. The following denotified tribes / communities are involved in traditional hunting of wild animals : Behelias, Ambalgars, Badaks, Mongias, Bavariyas, Monglias, Pardhi, Boyas, Kaikads, Karwal Nat, Nirshikaris, Picharis, Valayaras, Yenadis, Chakma, Mizo, Bru, Solung and Nyishi. While this list is not exhaustive, around 5,000 such families are required to be taken up under a welfare programme (forming part of NTCA initiatives) during the Plan period. The rehabilitation / welfare package should be evolved in a site specific, consultative manner with livelihood options, to include : wages for such people towards their deployment in foot patrolling for protecting wildlife, providing agricultural land with irrigation, basic health care, housing and related community welfare inputs and basic education facilities. The experience gained in the past for settling denotified tribes by the Salvation Army is required to be considered dispassionately while structuring the programme.

4.7 Research and field equipments (ongoing) (non recurring)

The All India tiger estimation using the new methodology approved by the Tiger task Force has resulted in a permanent monitoring protocol for the field units. The format/protocol used for the Phase-I data collection in the new estimation process should be adopted for day-to-day field monitoring. Further, assistance would be provided for fostering field oriented research and to equip the staff with facilities like GPS, camera traps, night vision, range finder and related accessories including hardware and software. As decided in the 1st meeting of the National Tiger Conservation Authority, the tiger reserves are required to carry out the day to day monitoring of wild animals using the refined process in the GIS domain, which would enable "forecasting" vis-à-vis wildlife protection.

4.8 Staff development and capacity building (ongoing) (non recurring)

This would involve:

- Capacity building / training.
- Providing project allowance and special incentives.
- Specialized training in the use of GIS, antipoaching operations.
- Specialized training in jurisprudence and wildlife forensics.
- Study tours for appraisal of good practices in other reserves.
- Dissemination workshops.
- Specialized training in park interpretation.
- Specialized training in management planning.

The above inputs are extremely important for enhancing the skill of field staff. Several instances of poaching occur for want of specialized training in crime detection and related skills.

4.9 Deciding inviolate spaces for wildlife and relocation of villagers from core or critical tiger habitats in Tiger Reserves within a timeframe and settlement of rights (settlement of rights is a new activity) (non recurring)

The Wild Life (Protection) Act, 1972, as well as the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, require that rights of people (Scheduled Tribes and other traditional forest dwellers) recognized in forest areas within core/critical tiger/wildlife habitats of tiger reserves/ protected areas may be modified and resettled for providing inviolate spaces to tiger/wild animals. This requires payment of compensation (rights settlement in addition to the relocation package offered under the CSS at present). Chapter IV of the Wild Life (Protection) Act, 1972 (Section 24) provides for acquisition of rights in or over the land declared by the State Government under Section 18 (for constituting a Sanctuary) or Section 35 (for constituting a National Park). Sub-section 2 of Section 24 of the Wild Life (Protection) Act, authorizes the Collector to acquire such land or rights. Therefore, payment of compensation for the immovable property of people forms part of modifying / settling their rights which is a statutory requirement.

The ongoing study and the analysis of the available research data on tiger ecology indicate that the minimum population of tigresses in breeding age, which are needed to maintain a viable population of 80-100 tigers (in and around core) require an inviolate space of 800 -1000 sq km. Tiger being an "umbrella species", this will also ensure viable populations of other wild animals (co-predators, prey) and forest, thereby ensuring the ecological viability of the entire area / habitat. Thus, it becomes an ecological imperative to keep the core areas of tiger reserves inviolate for the survival of source populations of tiger and other wild animals.

Based on the recommendations of the Professional Agency, a new package for village relocation/rehabilitation has been proposed, with the following options / norms, which adequately covers the "National Rehabilitation and Resettlement Policy, 2007", while taking into consideration the difficulties / imperatives involved in relocating people living in forest areas:

The proposed package has two options:

Option I – Payment of the entire package amount (Rs. 10 lakhs per family) to the family in case the family opts so, without involving any rehabilitation / relocation process by the Forest Department.

Option II – Carrying out relocation / rehabilitation of village from protected area / tiger reserve by the Forest Department.

(i) In case of option I, a monitoring process involving the District Magistrate of concerned District(s) would be ensured so that the villagers rehabilitate themselves with the package money provided to them. In this regard, a mechanism involving handholding, preferably by external agencies should also be ensured, while depositing a considerable portion of the amount in the name of the beneficiary in a nationalized bank for obtaining income through interest generated.

(ii) In case of option II, the following package (per family) is proposed, at the rate of Rs. 10 lakhs per family:

(a)	Agriculture land procurement (2 hectare) and development	:	35% of the total package
(b)	Settlement of rights	. .	30% of the total package
(c)	Homstead land and house construction		20% of the total package
(d)	Incentive		5% of the total package

(e)	Community facilities commuted by the family (access, road, irrigation, drinking water, sanitation, electricity, telecommunication, community centre, religious places of worship, burial/ cremation ground)		10% of the total package

(iii) The relocation process would be monitored / implemented by the following two Committees:

(**State level Monitoring Committee**)

(a) Chief Secretary of the State	Chairman
(b) Secretaries of related departments	Members
(c) State Principal Chief Conservator of Forests	Member
(d) Non-official members of respective Tiger Conservation Foundation	Members
(e) Chief Wildlife Warden	Member-Secretary

(**District level Implementing Committee for ensuring convergence of other sectors**)

(a) District Collector	Chairman
(b) CEO	Member
(c) Representative officials from: - PWD, Social Welfare, Tribal Department, Health Department, Agriculture Department, Education Department, Power and Irrigation Departments	Members
(d) Deputy Director of the Tiger Reserve/PA	Member Secretary

(iv) The above cost norms are indicative in nature to facilitate flexibility for State/site specific situation, and may be modified to allow inter component as well as inter family adjustments by respective State Governments as per site specific requirements.

(v) The relocated village would be taken up on a priority basis for eco development as well as local development through convergence of District level schemes.

(vi) The labour oriented works involved in the relocation process would be preferably implemented through the villagers who are being relocated, so that they derive benefits out of the same apart from ensuring the field implementation to their satisfaction.

(vii) In case resettlement has been done on a forest land, the new settlement will be eligible for access to forest resources for their bonafide use through the village level committee and Gram Sabhas.

(viii) The District Administration would facilitate fair price shop, education, health center close to the relocated site.

(ix) "Handholding" after relocation would be ensured through the forest department with ongoing ecodevelopmental inputs through central assistance and district administration involving convergence of schemes. In this effort help of competent independent agencies may be sought wherever available.

(x) The relocated villagers would be given priority for livelihood options emanating from the protected area.

(xi) In case the cost of relocation including settlement of rights per family exceeds Rs. 10 lakhs, the State Government has to meet the extra cost.

The relocation process would be an open ended one, since the progress of relocation process would depend on performance by States.

4.10 Mainstreaming wildlife concerns in tiger bearing forests and fostering corridor conservation through restorative strategy involving locals to arrest fragmentation of habitats (new activity) (non recurring)

The forests connecting Tiger Reserves or Protected Areas have tigers and other wild animals in most of the States. At present, there is no Scheme for addressing wildlife concerns in such areas, where restorative as well as protective inputs are required. The Wild Life (Protection) Amendment Act, 2006, provides for addressing such corridor areas. This, interalia, would involve:

- Redressing man-animal conflict.
- Capturing problematic / aberrant wild animals.
- Monitoring of wild animals.
- Antipoaching operations.
- Habitat improvement measures.

The communities living in fringe areas of National Parks, Sanctuaries and Tiger Reserves suffer from frequent depredation of their crops on account of damage caused by wild herbivores like blue bull, black buck, wild pig and elephants. The situation becomes acute in certain pockets, since people depend on a single annual rain fed crop with low productivity. This is one of the major reasons for man-animal conflicts around our Tiger Reserves and Protected Areas, and is a serious bottleneck in enlisting the much needed local support for wildlife conservation.

Under Section 11 of Wild life (Protection) Act, the State Chief Wildlife Wardens and officers authorized on his behalf can permit killing of wild animals causing destruction to life and property, including standing crops. However, rural communities do not favor such killings due to religious sentiments attached to these animals. Trapping and translocation of such wild animals which gain a pest value is neither feasible nor cost effective. Therefore, the situation calls for adequately compensating the stakeholder communities around Tiger Reserves from this recurring loss. This would be supported as per prevailing norms of the State, in the delineated buffer area as explained in Section 38V of the Wild Life (Protection) Act, 1972, as amended in 2006.

4.11 Safeguards / Retrofitting measures in the interest of wildlife conservation (new activity) (non recurring)

Several Tiger Reserves are affected on account of heavily used infrastructure like roads, railway tracks and others. The high tension electric lines passing through many reserves cause mortality of wild animals due to electrocution by poachers. In the interest of wild animals several safeguards as well as retrofitting measures may be required, which would be supported on a site-specific basis.

4.12 Providing basic infrastructure/ Project Tiger Headquarter expenditure for consultancy, all India tiger estimation/continuous monitoring of tigers outside tiger reserves, strengthening of NTCA at the Center and establishing a monitoring lab in the Wildlife Institute of India. The following are envisaged (new activity) (non recurring):

- Creation of office space at Delhi for National Tiger Conservation Authority.
- Creation of GIS outstation laboratory at Wildlife Institute of India.
- Carrying out All India Tiger Estimation, monitoring.
- Support to research work.
- Contractual arrangement for special studies.

- International / National Workshops.
- Contractual arrangement for data entry, analysis.

4.13 Independent monitoring and evaluation of tiger reserves (ongoing) (non recurring)

The independent monitoring of tiger reserves was carried out using as many as 45 parameters by a panel of experts, based on IUCN format. The monitoring reports were peer reviewed by the IUCN and placed before the Parliament. This process would be continued during the XIth Plan period after further refinement.

4.14 Establishment and development of eight new Tiger Reserves (new activity) (recurring and non recurring as indicated for various activities)

'Project Tiger' has a holistic ecosystem approach. Though the focus is on the flagship species 'tiger', the project strives to maintain the stability of ecosystem by fostering other trophic levels in the food chain. This is essential to ensure an ecologically viable population of tiger, which is at the 'apex' of the ecological food chain. The community pressures on forests are ever on the increase in developing countries, and India is no exception. As a sequel, the tiger habitat has become fragile and weak at several places, warranting a focused conservation approach. Our protected areas / Tiger Reserves are analogous to "islands" in an ocean of the other-use patterns. Empirical evidences from 'island biogeography' indicate that "isolated" reserves lose their species rapidly owing to 'ecological insularization'. Further, apart from fragmentation, the situation is aggravated by degraded forest cover owing to biotic pressure, dislocated prey – predator ratio, absence of effective measures to ensure the desired level of protection and lack of eco developmental initiatives for the fringe dwelling stake holders to reduce their dependency on forest resources. Since 'Project Tiger' would go a long way in redressing the above situation, the Steering Committee of Project Tiger in its meeting held on 23.1.2003 recommended inclusion of new Tiger Reserve areas so as to increase the total area of Project Tiger from existing 37761 sq. kms. to 50,000 sq. kms. during the X Plan period. Accordingly, proposals for new Tiger Reserves were received from some States, on which 'in principle' approval has been accorded. The details are as below:

(i) Anamalai -Parambikulam Wildlife Sanctuaries	Tamil Nadu & Kerala
(ii) Udanti and Sita Nadi Wildlife Sanctuaries	Chattisgarh
(iii) Satkosia Wildlife Sanctuary	Orissa
(iv) KazirangaNational Park	Assam
(v) Achanakmar Wildlife Sanctuary	Chattisgarh
(vi) Dandeli Wildlife Sanctuary and AnshiNational Park	Karnataka
(vii) SanjayNational Park and Sanjay Dubri Wildlife Sanctuary	Madhya Pradesh
(viii) Mudumalai Wildlife Sanctuary	Tamil Nadu

ANNEXURE X

GUIDELINES ISSUED BY NATIONAL TIGER CONSERVATION AUTHORITY FOR TIGER RESERVES

F.No. PS(DIR) – PT Dated: 9th April, 2003

To,

Field Director

(All Tiger Reserves)

SUBJECT: Regulation of Tourist Visitation in Tiger Reserves

Sir,

As you are aware, there is considerable tourist influx (both inland and foreign) in many of our Protected Areas and Tiger Reserves, which necessitate regulation of such visitation in the interest of minimizing the biotic disturbance to wild animals and their habitat. It must be borne in mind, ecotourism should be fostered in the right perspective in these areas, so that there is no compromise or trade –off in wildlife interests, since our Tiger Reserves are ecotypical repositories of valuable gene pool. Hence, the following may be ensured in this regard:

• The tourist visitation should be regulated as per the **carrying capacity** of the area.

• In place of open gypsies and smaller vehicles, medium sized buses, with a closed body and sliding windows, may be used for park excursions. This will minimize the risk of close encounters with wild animals, apart from reducing the number of vehicles inside the park at any point in time .

• A minimum mandatory distance of at **least 500 meters** should be maintained between two vehicles plying on the same road.

• A minimum mandatory distance of **30 meters** should be maintained by tourist vehicles while spotting a tiger or any other wild animal.

• The route guides should be more professionally trained and penalty should be imposed on visitors in case they violate park rules.

Further, a model calculation of the Tourist Carrying Capacity is also appended for ready reference, which is fairly robust and can be computed in a site-specific manner by collecting some basic field data. It is requested, this computation may please be done for your Reserve and this Ministry may be apprised accordingly. Since a certain amount of risk is always involved in jungle excursions despite all precautions, a standardized 'Indemnity Bond' may also be prescribed indemnifying the park authorities from litigation / arbitration which may arise on account of accidents suffered by tourists during park round. All due formalities in this regard may be completed before the tourists are allowed entry into the Tiger Reserve. Under no circumstances tourist excursions should be allowed during the night. It goes without saying, apart from causing immense disturbance to wild animals, such ventures are extremely risky. It is also reiterated, no tourist facilities should be created in the 'core Zone' of a Tiger Reserve.

Yours Sincerely,
Dr Rajesh Gopal
(IGF& DIRECTOR, PT)

Copy to: All Chief Wildlife Wardens

To,

Chief Wildlife Wardens

(All States)

Sir,

As you are kindly aware, the guidelines for execution of Project Tiger has laid down mandatory provisions for State Governments to review, from time to time, the progress and implementation of the project with a view to evaluate its performance. In this regard, a directive was sent from this Ministry vide letter No. F.No. 1-6 / 2001-PT dated 10thSeptember, 2001, for constituting a 'Monitoring and Evaluation Committee' at the level of State Governments, in consultation with identified Institutes / Centres of excellence in states. The action taken in this regard from your end has not been communicated to this Ministry so far. For close monitoring at the level of Government of India, the formats for monthly, half yearly and annual reports are appended for ready reference. It is requested that the information sought in these formats may be sent to this Ministry as below:-

1. Monthly Report - by the 20th of the month following to which it relates.

2. Half Yearly Report - within 2 months of the expiry of the half year to which it relates. With the Second Half Yearly Report an analytical report should also be submitted which should contain a comprehensive assessment of the project, highlighting the problems, current issues and achievement of physical and financial targets and bottlenecks.

3. Annual Report - 1st week of June following the financial year being reported upon. It is requested that the Field Directors may please be directed for needful action and compliance in this regard.

Yours sincerely,
(Dr. Rajesh Gopal)
IGF & Director, Project Tiger

PROJECT TIGER MONTHLTY REPORT FOR THE MONTH OF .....

1. State

2. Tiger Reserve

3. Date of initiation

4. Plan Provision

5. Provision for the current year

Sl. No. Item of works Financial Achievements Cumulative Remarks

Target for during the progress till

The year month the end of

(Rs.) (Rs.) month

6. Works

6.1 Capital

6.1.1 Buildings

6.1.2 Communication

6.1.2.1 Roads

6.1.2.2 Wireless

6.1.3 Equipment, Scientific and others including arms and ammunitions

6.1.4 Water development works

6.1.5 Cost of shifting villages

6.1.6 Cost of shifting cattle

6.1.7 Miscellaneous – Tools

6.2 Works (Recurring)

6.2.1 Staff including special Protection staff

6.2.2 Habitat Manipulation

6.2.2.1 Details of works

6.2.2.2 Planning

6.2.2.3 Improvement of pasture land

6.2.3 Supplementary feeding

6.2.3.1 Artificial salt lick

6.2.4 Water facilities

6.2.4.1 Transportation of water

6.2.4.2 Running of pumping sets

6.2.4.3 Desilting of wells

6.2.4.4 Dugouts

6.2.4.5 Water trough

6.2.5 Fire protection

6.2.5.1 Water Tower

6.2.5.2 Layout of fire lines

6.2.5.3 Fire fighting squads

6.2.6 Maintenance

6.2.6.1 Buildings

6.2.6.2 Livestock

6.2.6.3 Motor Vehicles

6.2.6.4 Fire lines

6.2.7 Compensation to cattle owners

6.2.8 Veterinary care

6.2.9 Research

6.2.10 Training

6.2.10.1 Officers

6.2.10.2 Field staff

6.2.11 Publicity and extension

6.2.12 Unforeseen and miscellaneous

7. Difficulty - bottlenecks, Additional remarks

Field Director

PROJECT TIGER HALF YEARLY REPORT REPORT ENDING SEPTEMBER

1. State

2. Tiger Reserve

3. Date of initiation

4. Plan Provision

5. Provision for the current year

Sl. No. item of TARGETS

Works ----------

Physical Financial Remarks

Annual ½ Achievements Deficit Annual ½ AchievementsDeficitState

Yearly ending Sept. excess Yearly ending Sept. excess Sector

---

1 2 3 4 5 6 7 8 9 10

---

6. Works

6.1 Capital

6.1.1 Buildings

Sl. No. Item of

Works ----------

1 2 3 4 5 6 7 8 9 10

6.1.2 Communication

6.1.2.1 Roads

6.1.2.2 Wireless

6.1.3 Equipment, scientific and others including arms and ammunitions

6.1.4 Water development works

6.1.5 Cost of shifting villages

6.1.6 Cost of shifting cattle

6.1.7 Miscellaneous – Tools

6.2 Works (Recurring)

6.2.1 Staff including special Protection staff

6.2.2 Habitat Manipulation

6.2.2.1 Details of works

6.2.2.2 Planning

Sl. No. Item of

Works ----------

1 2 3 4 5 6 7 8 9 10

6.2.2.3 Improvement of pasture land

6.2.3 Supplementary feeding

6.2.4 Water facilities

6.2.4.1 Transportation of water

6.2.4.2 Running of pumping sets

6.2.4.3 Desilting of wells

6.2.4.4 Dugouts

6.2.4.5 Water trough

6.2.5 Fire protection

6.2.5.1 Water tower

6.2.5.2 Layout of fire lines

6.2.5.3 Fire fighting squads

6.2.6 Maintenance

6.2.6.1 Buildings

Sl. No. Item of

Works ----------

1 2 3 4 5 6 7 8 9 10

6.2.6.2 Livestock

6.2.6.3 Motor Vehicles

6.2.6.4 Fire lines

6.2.14 Compensation to cattle owners

6.2.15 Veterinary care

6.2.16 Research

6.2.17 Training

6.2.10.1 Officers

6.2.10.2 Field Staff

6.2.18 Publicity and extension

6.2.19 Unforeseen and miscellaneous

7. Manpower employed

8. Bottlenecks if any or additional remarks

9. No. of cases of illicit grazing, hunting, forest cutting and others Detected - Challenged Findings

10. No. of fires controlled - Area burnt Loss

11. Loss of any wild animal - Cause Action taken

12. A brief narrative about evaluation of the Field Director about progress of the Project.

Field Director Date

13. Remarks of the Chief Conservator of Forests

C.C.F. Date

PROJECT TIGER HALF YEARLY REPORT-II ENDING MARCH

1. State

2. Tiger Reserve

3. Date of initiation

4. Plan Provision

5. Provision for the current year

Sl. No. item of TARGETS

Works ----------

Physical Financial Remarks

½ Deficit Net to be Actual Cumulative Annual ½ Deficit Net to be Actual Cumulative Annual State Yearly of

excess achieved achieve- for the year target yearly or excess achieved achieve- for the year target Sector

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

---

6. Works

6.1 Capital

6.1.1 Buildings

6.1.2 Communication

Sl. No. Item of

Works ----------

1 2 3 4 5 6 7 8 9 10

6.1.2.1 Roads

6.1.2.2 Wireless

6.1.3 Equipment, scientific and others including arms and ammunitions

6.1.4 Water development works

6.1.5 Cost of shifting villages

6.1.6 Cost of shifting cattle

6.1.7 Miscellaneous – Tools

6.2 Works (Recurring)

6.2.1 Staff including special Protection staff

6.2.2 Habitat Manipulation

6.2.2.1 Details of works

6.2.2.2 Planning

6.2.2.3 Improvement of pasture land

Sl. No. Item of

Works ----------

1 2 3 4 5 6 7 8 9 10

6.2.3 Supplementary feeding

6.2.3.1 Artificial salt lick

6.2.4 Water facilities

6.2.4.1 Transportation of water

6.2.4.2 Running of pumping sets

6.2.4.3 Desilting of wells

6.2.4.4 Dugouts

6.2.4.5 Water trough

6.2.5 Fire protection

6.2.5.1 Water tower

6.2.12.1 Layout of fire lines

6.2.12.2 Fire fighting squads

6.2.13 Maintenance

6.2.13.1 Buildings

Sl. No. Item of

Works ----------

1 2 3 4 5 6 7 8 9 10

6.2.13.2 Livestock

6.2.13.3 Motor Vehicles

6.2.13.4Fire lines

6.2.7 Compensation to cattle owners

6.2.8 Veterinary care

6.2.9 Research

6.2.10 Training

6.2.10.1 Officers

6.2.10.2 Field Staff

6.2.11 Publicity and extension

6.2.12 Unforeseen and miscellaneous

7 Manpower employed

8 Bottlenecks if any or additional remarks

9 No. of cases of illicit grazing, hunting, forest cutting and others Detected - Challenged Findings

10 No. of fires controlled - Area burnt Loss

11 Loss of any wild animal - Cause Action taken

12 A brief narrative about evaluation of the Field Director about progress of the Project.

Field Director Date

13 Remarks of the Chief Conservator of Forests

C.C.F. Date

PROJECT TIGER ..... TIGER RESERVE ANNUAL REPORT

Introduction

Brief narrative of the Tiger Reserve

Background information

Objective – Justification

Narrative summary of targets proposed

Narrative summary of targets achieved

Highlight of project achievements, performance in the State Sector. Protection from poachers Mention cases detected. All over the from wood poachers and their results project area

from fire - Give narrative of fire accidents, loss and control measures applied both preventive and control.

from grazing of- Shifting of village domestic cattle Shifting of cattle from other human --

interference

Against diseases - Veterinary care provided

Accidents - Veterinary care provided

ConstructionBuildingCentralSectorState

Sector

Works Communication

Roads

Water

Facilities for animals - Water-Construction works State

Sector

and achievements

FoodCanopydevelopmentState

Sector

Artificial feeding

Salt Licks

Pasture Development

Shelter Canopy manipulation

Research

Progress of Research findings

Research Papers published Give brief summary

Brief of each scheme in the Appendix

New designs made

Training Narrative

Publicity and extension works Extensions, lectures, cinema shows

Men employed

Visitors - Scientists With brief of remarks remarks

V.I.P.s in the visitor's book

Tourists

Evaluation By the Field Director

By the Chief Conservator of Forests

Appendix (1) Statement of 11 half yearly report

(2) Photographs maps

Census results,

Other material

List of animals killed or poached

No. F.1-6/2001-PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 11th September, 2001

To
The All Field Directors of
Tiger Reserves.
Subject: Mortality Survey.

Sir,

The mortality survey in a habitat is important to ascertain the age/sex specific natural mortality of wild animals. You are therefore requested to kindly issue suitable instruction to the field staff to collect all evidences of such mortality (mandibles/skulls) found on the forest floor every six months. A compiled information in this regard with categorization (Cervid/Bovid/Field/Canid) may be subsequently sent to this office.

Yours sincerely,

DR. RAJESH GOPAL

IGF & DIRECTOR (PROJECT TIGER)

Copy To: The Chief Wildlife Wardens of States having Tiger Reserves for information and necessary action.

DR. RAJESH GOPAL

IGF & DIRECTOR (PROJECT TIGER)

No.1-18/2002 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 18th June, 2002

To
The Chief Wildlife Warden,
(All States)

Subject: Protection initiatives in Tiger Reserves/National Parks/Sanctuaries.

Sir,

As you are perhaps aware, many gangs of poachers have been recently apprehended from Protected Areas like Nagarhole (Karnataka) and Nagarjunsagar Srisailam (Andhra Pradesh). These miscreants hail from States like Rajasthan, Haryana, M.P. and travel along with their kith and kin in small groups. They sneak inside Tiger Reserves/National Parks/Sanctuaries and other forest areas and carry on their activities. Basic interrogation has revealed their linkages with some notorious poachers. This calls for a dispassionate the view of protection initiatives in our Protected Areas for reinforcing the same with site-specific strategies based on past experience. While no generalised approach can be prescribed for the entire country, certain broad points are highlighted below, which may be of use in evolving or improving the protection strategy in-vogue:-

(1) Review of the existing patrolling camps/chowkis in Protected Areas, so that each chowki/patrolling camp has, on an average, an area of 25-30 sq. km. under its jurisdiction to ensure the desired amount of legwork by beat guards and his camp followers posted in such patrolling camps/chowkis.

(2) Prescribing a daily schedule of patrolling keeping in mind the vulnerability of the area from protection point of view.

(3) Maintaining a monitoring/daily observation register in each patrolling camp/chowki in the local language preferably, in which the field personnel can record their daily observations based on patrolling.

(4) Adopting a regula supervision schedule for field officers, alongwith minimum patrolling to be done by them jointly with patrolling camp/chowki staff.

(5) Maintaining a system of “surprise checking” of chowkies/patrolling camps by senior officers.

(6) Keeping a record of the local village level market days in the peripheral areas, and deploying information/staff in civil dress to keep track of any untoward incident/transaction relating to wildlife.

(7) Organising vehicular patrolling by constituting squads comprising of field staff, labourers and police/SAF personnel (if necessary), with wireless handset and paraphernalia for apprehending offenders, apart from prescribing a patrolling calendar for the squad.

(8) Maintaining a list of vehicles passing through manned barriers, and surprise checks by senior officers at such points during every month.

(9) Evolving a monitoring system for collation of information regarding livestock depredation/human injury/loss of human life/large scale crop depredation by wild animals through wireless and prompt payment of compensation as per Citizens’ Charter.

(10) Wherever half eaten careasses of livestock on account of carnivore depredation are reported, such careasses should be incinerated in the presence of a gazetted officer to eliminate the possibility of poisoning for revenge killing by local people.

(11) In areas where more than three incidents of livestock de-predation are reported within a fortnight, continuous monitoring based on field evidences should be done by deploying trackers.

(12) Ensuring periodic monthly meetings with the neighboring district officials for exchanging wildlife crime dossiers to facilitate joint action.

(13) Exchange of crime dossiers with local police to facilitate their updation, apart from organising monthly review meetings with the Superintendent of Police.

(14) Periodic meetings with the District Judge to expedite the disposal of pending cases relating to wildlife offences.

(15) Organising surprise raids jointly with the local police in railway stations, local trains, bus-stops, buses, catchers and cafeteria.

(16) Ensuring special site-specific protection measures, during monsoon as 'Operation Monsoon' – considering the terrain and accessibility of Protected Areas.

(17) Organising inter-state meetings at least once in three months, specially to exchange wildlife crime data between border Parks/Tiger Reserves/Sanctuaries.

(18) The area should be constantly monitored to ascertain the presence of gaags and wandering pastoral people., apart from keeping an inventory of their temporary settlements.

(19) Wherever EDCs have been constituted, a village level crime register should be maintained at the EDC level to keep track of villagers involved in wildlife offences.

(20) At the range level, dossiers of perpetual offenders should be maintained, which may help in tracing new crimes to old offenders.

(21) Identifying pro-active local persons and imparting them the basics of wildlife crime detection so as to avail their services as and when required as informers.

(22) Preparing a monthly crime map of each Protected Area on a 1:50,000 scale indicating the locations of each crime with date. It should also highlight the recorded cases of live stock depredation by carnivores during the period.

(23) Patrolling camp/chowki staff should be instructed to collect field evidences like pugmarks, plaster cast of foot-prints on a regular basis, so that individual identities of carnivores like tiger can be fixed. This would serve as a continuous monitoring also.

(24) Laying out impression pads near water points in villages to ascertain the presence of carnivores in the area.

(25) Constituting a Defence Squads comprising of local, pro-active villagers at the EDC level, which can assist the PA staff in apprehending miscreants involved in wildlife poaching.

It is requested, keeping the above in mind, suitable directives may be issued to the field formations under intimation to this Ministry.

Yours sincerely,
(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 10th September, 2001

To
The Chief Wildlife Warden,
(All Tiger Range States)

Subject:MONITORING AND EVALUATION OF PROJECT TIGER INITIATIVES IN TIGER RESERVES – REG.

Sir,

As you are well aware, the Govt. of India (Project Tiger) provides allocation (100%) for the annual 'Monitoring and Evaluation' of initiatives executed under the Project. However, despite allocation, very few reports of monitoring and evaluation have been received from the field units, which is a matter of serious concern. It is therefore requested that this may be pursued in right earnestness and the task should be preferably entrusted to institutes like SFRI or other Centres of excellence in you State. Further, in constitution with such identified institutes, a 'Monitoring and Evaluation Committee' may also be constituted with representation from the Office of the Chief Wildlife Warden, field units and the office of the Regional Chief Conservator of Forests. An early action in this regard is desirable and the Govt. of India (Project Tiger) may be apprised of the same.

Yours sincerely,
(DR. RAJESH GOPAL)
IGF & DIRECTOR (PROJECT TIGER)

No.F.1-6/2001 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)
*****

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 10th September, 2001

To
The Chief Wildlife Warden,
(All Tiger Range States)

Subject: Monthly Report on mortality of tigers, co-predators and wild animals.
Reference: This office letter No. 1-6/2000-PT dated 23rd June, 2000.

Sir,

Further to the reference cited above, it is seen that monthly reports relating to the mortality of tigers, co-predators and other wild animals are not received regularly from the various field units, despite repeated reminders from this end. Consequently, considerable difficulty is experienced by this office in sending reply to Parliament Questions and assurances. You may please ensure necessary compliance in this regard so that the monthly report in the prescribed format reaches this office by the 15th of every month. A copy of the format is appended once again for the needful.

Yours sincerely,
(DR. RAJESH GOPAL)
IGF & DIRECTOR (PROJECT TIGER)

5 4
No.F.1-6/2001 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Date the 11th September, 2001
To

The All Field Directors of Tiger Reserves

Subject: Patrolling Strategy and AntiPoaching Initiatives.

Sir,

Effective 'Anti Poaching' measures and 'Patrolling Strategy' should be accorded topmost priority in a Tiger Reserve management. The need for a reliable, round the clock wireless system, strategically placed forest patrolling camps and an ever vigilant, motivated frontline staff requires no elaboration. However, in the recent past, in several tiger reserves, mortality of wild animals has not been timely detected by the field staff, which poorly reflects on the management and degree of protection. Since Govt. of India allocates considerable resources for antipoaching and patrolling under Project Tiger, this is a matter of serious concern. Therefore, the following initiatives should be ensured in the overall protection strategy of your Tiger Reserve.

Creation of Patrolling Camps at sensitive points with deployment of staff/labour as required. Listing of Staff/ Camps with duty allocation and route chart.Appropriately equipping the patrolling team with fire arms and mobile wireless sets. Special instructions to squads/parties covering several aspects viz.:

- Suvreillance : hotels, tourist points, vehicles, bus stand
- Surveillance : traditional hunters etc.
- Coordination with local police
- Networking
- Issue of Special 'Preliminary Offence Report' books
- Preparation of daily schedule
- Local Country side market checking
- Surprise checking of barriers.
- Preparation of monthly wildlife "crime maps" (preferably in the GIS domain using GPS or on a 1:50,000 scale map)
- Monitoring Cattle kill, human kill, injury
- Monitoring water points near habitation
- Preparation of crime gang dossiers.
- Monitoring/updating at the level of Field Director/Dy. Director through wireless.
- Maintenance of 'village level' crime registers through village committees.
- Taking note of offences registered in local police station.
- Using tape recorder/camera to record evidences.
- Registration of fire arm license holders as per the directives of the Hon'ble Apex Court.

While situations in field units would vary necessitating site-specific strategy, the success of Wildlife Protection and crime risk management depends on good surveillance, timely reporting and networking, prompt situation analysis and immediate action. You are required to send the 'crime map' on a 1:50,000 scale along with (floppy/hard copy) details of wildlife crime registered, criminally prosecuted and convicted every 3 months to the PT monitoring cell of this office.

Yours sincerely,
(DR. RAJESH GOPAL)
IGF & DIRECTOR (PROJECT TIGER)

No.F.1-6/2001 – PT
Government of India
Ministry of Environment & Forests
(PROJECT TIGER)
Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011

Date the 11th September, 2001

To

The All Field Directors,

All Tiger Reserves

Subject:- Disease surveillance and livestock immunization.

Sir,

As you are aware, wildlife disease may become one of the decimating factors causing high mortality among wild animals even in well established Protected Areas. Therefore, regular disease surveillance becomes important. Wild animals are prone to diseases which may be viral, bacterial, protozoan, mycotic, Helminth or ectoparasitic in nature. These diseases are mutually transferable between wild animals and livestock, and hence regula prophylactic immunization of nearby village cattle should be ensured by utilizing the services of local veterinary department. Further, seasonal pathological faecal matter analysis of major wild animal species (herbivores & carnivores, including departmental elephants) may be done, apart from blood tests with due permission as required under the Wildlife Protection Act, 1972.

Yours sincerely,

(Dr. Rajesh Gopal)

IGF & Director (Project Tiger)

No.F.1-6/2001 – PT

Government of India

Ministry of Environment & Forests

(PROJECT TIGER)

Annexe No. 5, Bikaner House

Shahjahan Road, New Delhi-110011

Date the 11th September, 2001

To

The All Field Directors

of Tiger Reserves

Subject: Physical Assault on Staff

Sir,

Any incidence of physical assault on field staff leading to death and other serious happenings may please be communicated to the Project Tiger Directorate through fax/email/ telephone at the earliest (within 24 hours), followed by a detailed report after ground truthing. Needless to add, this is essential to highlight the factual position to all concerned, and in the absence of such spot reports undue credence is given to hearsay accounts and stray media coverages which may not reflect the true picture.

Yours sincerely,

(Dr. Rajesh Gopal)

IGF & Director (Project Tiger)

Copy to: The Chief Wildlife Warden, _____

(Dr. Rajesh Gopal)

IGF & Director (Project Tiger)

No. 7-1/96-PT

GOVERNMENT OF INDIA

MINISTRY OF ENVIRONMENT & FORESTS

PROJECT TIGER

To,

1. Principal Secretary Forests of all States having presence of tigers

2. CWLW, AllStates having tiger.

3. Field Director, All Tiger Reserves.

4. All members of Steering Committee Project Tiger.

5. All members of the Committee.

In continuation to the guidelines issued by this Ministry vide letter of even number dated 28-04-1997, there was a detailed discussion of Officials, Conservationist, Statisticians, Scientists and Non-Govt. organizations on the issue of Tiger Estimation in the country. There was an unanimous agreement that different methods should be used for different situations depending upon site specific factors, for example in Sunderbans and large areas of North-East, getting precise number of tigers by use of pug mark methodology is impossible. Similarly each methodology for estimation is not applicable to all tiger habitats in the country. After careful consideration the decision taken on 4 – 4 – 1997 also enclosed with the new guideline and it is requested that a sincere effort must be made to implement the guidelines for estimation of tiger and other prey species and compliance reported to this Ministry for each financial year latest by 30th June of the next financial year.

Yours faithfully,

(P.K. Sen)

Director, Project Tiger

GUIDELINS FOR ESTIMATING TIGERS

DATED 22nd May 2001

1. The term census was not appropriate and thus the term "estimations" is to be adopted for the purpose of determining the trends in the wildlife populations. Therefore the annual exercise will be termed as "All India Wildlife Estimation".

2. There is a diversity in areas across the country in the terms of available resources, skills and ecological conditions. Therefore different approaches are to be adopted for different areas for conducting tiger estimation.

3. Different goals were identified for practicing managers, researchers and conservationist depending upon above consideration. Accordingly the following approaches are to be adopted:

(a) Spatial distribution maps (At a large scale) for all tiger population in the country are to be generated.

(b) In major protected areas with tiger population, simple but reliable indices of tiger densities are to be developed.

(c) In a few selected sites where sufficient resources and skilled manpower both from within and outside forest development is available, actual density study of tiger and prey species may be taken up and attempts be made to generate number of tiger population in the area for such specific sites only by more advanced technologies like camera trapping, digital photographs of pug marks, radiotelemetory or any other technology feasible.

4. It was decided no to attempt generation of tiger numbers where ecological factors and management / resource constraints, prevent the generation of invalid results.

5. A core group would be formed to oversee the results derived from tiger monitoring all over the country and assist the Ministry in arriving at a range of estimates for the purpose of informing the public and Parliament.

6. The consensus was reached that the guidelines issued by Project Tiger Division for monitoring of tiger and prey population on 04.04.1997, considering all the above aspects, will be followed. Therefore the proposed core group would ensure specific plan of action for proper implementation of the guidelines all over the country.

7. It was also agreed that the availability of maps of tiger habitats was a major constraint for management and research and special efforts to be made to be obtained them from FSI and other agencies.

8. All information collected from estimation should be readily available to managers, scientists and conservationist, in a central repository with Project Tiger Directorate.

9. Efforts will be made to put infrastructure in place in entire forest areas to carry out the tiger estimation as per plan elicited above expeditiously.

(P.K. Sen)

Director, Project Tiger

APPENDIX

No. 8(2) – 9 / 98-PT

GOVERNMENT OF INDIA

MINISTRY OF ENVIRONMENT & FORESTS

PROJECT TIGER

Annexe No.-5, Bikaner House,

Shahjahan Road, New Delhi-11

Dated the 29th January, 1998

To

(1) Forest Secretary,

Govt. of

(2) P.C.C.F.,

Govt. of

(3) Chief Wildlife Warden,

Govt. of

(4) Field Director,

SUBJECT :- GUIDELINES FOR IMPLEMENTATION OF THE INDIA ECODEVELOPMENT

PROJECT IN SEVEN PILOT PROTECTED AREAS.

Sir,

The Externally Aided India Eco-development Project is being implemented in your State. With a view to implementing the project in its right guidelines, a copy of which is circulated herewith for your information and guidance.

Yours faithfully,

(P.K. SEN)

DIRECTOR, PROJECT TIGER

MINISTRY OF ENVIRONMENT & FORESTS

PROJECT TIGER

SUBJECT: GUIDELINES FOR IMPLEMENTATION OF THE INDIA ECODEVELOPMENT PROJECT IN SEVEN PILOT PROTECTED AREAS.

Guidelines for implementation :

INTRODUCTION :

The main phase of India Eco-development Project (IEP) approved by the Cabinet Committee of Economics Affairs has become operational. The project is defined as a Centrally Sponsored Scheme with a IDA loan and GEF grant component. The IEP received criticism on some issues mostly on account of lack of full information on the project. Nevertheless, some bottlenecks in the project need to be removed by framing well defined guidelines so that the project achieves its objectives. The project has four components for which the following guidelines are issued:-

FIRST COMPONENT :

Improved P.A. Management :

The objective of the biodiversity conservation within the protected areas has to be ensured. Top priority may be accorded to habitat improvement so that maximum biomass is regenerated and made available to the herbivores for reaching optimum carrying capacity. In many of the states where externally aided forestry projects are in vogue, priorities are given to widening of the forest roads, construction of buildings, bridges and culverts which do not merge with the environment. Therefore, it is suggested that:

(a) No building should be constructed in isolation which is inconsonant with the surrounding.

(b) No widening of forest roads should be taken up; and

(c) Bridges and culvert, if at all necessary, should be constructed so as not to carry a load beyond eight tones.

(d) The fire watch towers should be so designed so that it is possible to lock access when not manned. The wireless and anti-poaching structures be carefully designed to prevent unauthorized access.

SECOND AND THIRD COMPONENTS

*****-DEVELOPMENT AND ECO-DEVELOPMENT SUPPORT COMPONENT**

Detailed discussions were held in the workshop organized by W.I.I., Dehradun on 25th and 26th of August, 1997. The selected Pas are seven pilot project sites whose success will decide India's future biodiversity conservation programme. Therefore, it is essential that only such activities are taken up which facilitate quantification of achievements. It was accepted in the workshop that two major issues are common not only in the seven selected sites covered by this project, rather they are prevalent in all the P.As. Therefore, it is expected that the P.A. Managers will priorities their activities so that our achievements through this project are visible to one and all. The identified common pressure points are: (a) grazing (b) fuelwood, fodder and small timber collection (c) low output from the existing resources of villagers and (d) no income generation during lean period for marginal and submarginal and landless villagers. Any other issue is site specific and therefore no common guideline can be issued on that. Though the staff appraisal report envisages implementation of eco-development work according to microplans which have to be formulated for each identified village but emphasis should be given to these issues while submitting the A.P.O. and executing eco-development activities. A few of the suggestions are noted below.

(a) Fuel & small timber: Plantation of indigenous fast growing fuel, small timber and fodder in:

(i) Community land

(ii) Village waste land
(iii) Private waste land
(iv) Other revenue waste land

(b) Grazing: (i) reduction in number of scrub cattle.
(ii) substitute them by improved or cross breed cattle.
(iii) Biogas plants.
(iv) Veterinary Care Units.
While raising such plantations application of chemical fertilizers and insecticides may preferably by avoided.

(c) Augmentation of output: -

(i) Adoption of soil and water conservation techniques
(ii) Small irrigation facilities earthen check dams, stop dams, ponds etc.

(d) Income generation:

(i) bee keeping
(ii) poultry
(iii) piggery
(iv) Tassar
(v) Sewing and knitting etc.

(e) Any other:

Such items as insisted by villagers which may be area specific. The suggested percentage of investment under these components is:

(a) - 40%
(b) - 20%
(c) - 25%
(d) - 10%
(e) - 5%

Only labour oriented earthen works should be taken up to cut down the expenditure on cement and steel items.

A close proximity with the District Administration will avoid duplicity of work; rather District Administration should be closely associated with this project so that the P.A. authorities may take up the case of additional development work in selected village through D.R.D.A. funds.

FOURTH COMPONENT PROJECT MANAGEMENT COMPONENT

All the investments should flow out of the approved Plan for the protected area. It is proposed to write new management plans for each PA and, therefore, special training for such officers have been suggested in the consultancy. The guidelines for new management plan have already been circulated by W.I.I. In situ training schedule for category of staff below Forest Ranger should be finalized with W.I.I., as well as training of management plan officers should be taken up with W.I.I. immediately under intimation to the Director, Project Tiger. Similarly the research component too have to be management plan oriented and, therefore while revising the Management Plan, utmost attention must be given to the research component which has substantial share in this project.

APPENDIX-

PS-DIR(PT)-2003 MISCE Dated: 29th May, 2003

To,

Chief Wildlife Wardens

(All States)

Subject: Habitat occupancy map of tigers.

Reference:

a) This Ministry's letter No. 7-1/96-PT dated 27th November, 2001, and subsequent

three reminders.

b) This Ministry's letter No. 4(5)-1/2001 – PT dated 12th June, 2002.

Sir,

Please refer to the correspondence cited above, wherein a State level Forest Map on a 1:250,000 scale was requested, depicting boundary delineation of forest divisions / Protected Areas, with the spatial presence of tigers plotted as "dots", corresponding to the estimation data sent from your end. This information is still awaited, due to which "vetting" of the figures by the core committee is held up. It is requested, the same may be expedited without any further delay. In addition, the Addl. DG (Wildlife) has desired that the Field Directors and Protected Area Managers should maintain seasonal Habitats Occupancy Maps of tiger for the tiger populations, pertaining to their own field units. The methodology to be followed is simple and based on available field data. For guidance, a brief write-up is annexed. This information is vital for a country level appraisal of tiger presence and therefore suitable directives may be issued to all concerned for doing the needful. Further follow-up work will be indicated as soon as the analysis of Habitat Occupancy Maps is carried out.

Yours sincerely,

(Dr. RAJESH GOPAL)

IGF & DIRECTOR (PT)

Copy to:

1. Addl. DG (Wildlife), Ministry of Environment & Forests,

New Delhi.

2. Principal Secretary / Forest Secretary of all respective

States.

(Dr. RAJESH GOPAL)

IGF & DIRECTOR (PT)

Preparing Seasonal Habitat Occupancy Maps (HOMs)

The documentation of presence or absence of a species through evidences and sightings in forest compartments on a map is a quick, simple, user friendly way of making a beginning to understand response of the species to the ecological conditions prevalent in an administrative management unit. It helps the forest managers in fine tuning the knowledge base relating to his/her area and notice the impacts of management

interventions in a very short time, within their tenures of service in the area. Tiger is an ecological indicator species. The tiger habitats may not be fully occupied by tiger populations all the time. What are the habitat occupancy dynamics of any particular species, or a group of animals species, in a Tiger Reserve or any other wildlife management unit is the basic knowledge that is needed to formulate management strategies and prescriptions. To start with understating of the Habitat Occupancy Dynamics of tigers we need the following material:-

1. A map of the total management unit, say a Tiger Reserve, showing compartments boundaries, major land based features including location of human habitations, roads, rivers and watercourses, etc. The scale of the map should be such that the entire management unit can be seen on a single sheet of quarter imperial drawing board size. An ammonia sheet map will be acceptable.

2. Tracings and plaster casts of 3 recent census exercise years, on which locations and date from where these were picked up.

3. Colour pens, each colour for a specific year. After reading the location and year in which any particular tracing or plaster cast was picked up, as indicated by the collector on it, place a dot, in colour coded for that particular year, in the compartment on the map where it was picked up. The objective of this action is only to indicate that a tiger (irrespective of its age or sex) had used that compartment during the census month in that particular year.

A single map showing the pattern of occupancy by tigers by colour dots during the three census years is the basic map to act as a bench mark for future work. Likewise single sheet will, in future, be needed for registering HOMs on seasonal basis. Each season will be given a separate colour code for the entire year. However, the perceived pinch-period for tigers prey base must be covered. This work, to cover occupancy by tigers

during the identified seasons, should be started w.e.f. 1st June, 2003 and taken up at 4 month intervals. For this purpose census exercise will not be needed. Reporting of presence of pugmarks, scats and other evidences, and sightings if any will suffice as data to be placed on Habitat Occupancy Map. If the management authority would like to proceed ahead, HOMs may also be prepared simultaneously for leopard, bear, gaur, and major tiger-prey species on separate sheets. An overview will be taken of the HOMs prepared as and when these are ready to decide about moving onto the next steps to be taken.

No.PS/Dir (PT)/2004-Misce. Dated the July 22, 2004

To

The Field Directors

(All Tiger Reserves)

Subject: Preventive measures/surveillance for Trypanosomiasis in wild, free ranging conditions.

Sir,

As you are aware, Trypanosomiasis (commonly known as Surra), is an acute, sub-acute or chronic disease caused by a protozoa (Trypanosoma evansi). The disease is characterized by fever, progressive emaciation, anemia, neural symptoms and death. While in dogs and cats the disease is acute and fatal, it may become chronic in ruminants. The disease is reportedly an enzootic one occurring in domestic animals. However, several references are available relating to free ranging wild animals also, and the outbreak has been observed during the onset of mansoon synchronizing with the breeding activities of files. In our country, the transmission of this disease occurs due to blood sucking flies belonging to genera Tabanus and Stomoxys which seve as vectors. The wild animal may get infection by feeding on an infected carcass/prey animal

or through the flies. The Tabanus fly lives along fresh water ponds or rivers, whereas Stomoxys breed on decomposing fecal or waste matter, especially from cattle shed. Since chances of infection of infection to in-situ population of wild animals exists, the following preventive measures are suggested:-

1. Population control of flies around cattle sheds by destroying their breeding area in peripheral villages of Tiger Reserves.

2. Control of disease in domestic animals in villages in and around Tiger Reserves.

3. Controlling the movement of nomadic and village cattle inside Tiger Reserves.

4. Surveillance of the disease and prophylactic treatment of sick and reservoir domestic animals at the periphery of Protected Areas/Tiger Reserves.

5. Periodical surveillance of diseases in wild and domestic animals at waterholes and grazing lands near peripheral villages.

6. Treatment of suspected animals particularly of threatened species.

7. Ensuring a regular monitoring system through wireless, involving the Ecodevelopment

Committees.

Yours sincerely,

(DR. RAJESH GOPAL)

IGF & DIRECTOR, PROJECT TIGER

Copy to: 1. Principal Secretary/Secretary, Forest Department (All States having Tiger Reserves)

2. Principal Chief Conservator of Forests (All States)

3. Chief Wildlife Wardens (All States having Tiger Reserves)

6 9

No. 7-1/ 96- PT

Government of India

Ministry of Environment & Forests

(Project Tiger)

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Annex No. 5, Bikaner House,

Shahjahan Road, New Delhi- 110 011.

Telefax: 3384428

E-mail: dirpt-r@hub.nic.in

Dated 27th Nov., 2001

To

Chief Wildlife Warden,

(All Tiger Range States)

SUBJECT: All India Estimation of Tiger/ Leopard/ Wild Animals.

Sir,

The All India Census of Tiger/ Leopard/ major wild animals (free ranging, as well as captive) is due in the current year. As done during 1997, apart from tiger and leopard, other major wild animals are also to be estimated viz. rhino, gaur, wild buffalo, brow antlered deer, hog deer, cheetal, wild pig, crocodile, barasingha, neelgai, black buck, barking deer, hog deer, elephant and the like. This list is by no means exhaustive, and hence other important faunal species found within your jurisdiction may also be taken into account during the estimation. As you are aware, detailed guidelines for estimating carnivores have been issued from this Directorate in the past. A copy of these guidelines are once again appended for ready reference. Further, guidelines have also been issued subsequently in 1997 for estimating tigers, followed by additional directives for refinement in 2001. Estimation of tiger population, based on pug marks and related evidences, still remains the most cost effective and time tested methodology suited to our conditions, which if carried out due care in a systematic manner, can lead to authentic results. Therefore, as indicated in the guidelines, considerable emphasis may be given on the training aspects, and preferably three or four "spearhead teams" consisting of 3 frontline staff (1 Range Officer/ Dy. Range Officer, 1 Forester, 1 Forest Guard) may be given intensive practice so that they are in a position to collect the pug/ impressions and supporting evidences from the field in a reliable manner. Instructions may also be issued to all field units for "preserving" the pug marks of tiger/ leopard by protecting them with stones or sticks encircled all around, so that they are not obliterated by vehicular or pedestrian movement. Such "preserved impressions" may be telecasted/ photographed only by the spearhead team so that the basis in telecasting/ photographing gets reflected throughout consequently leading to its destination. As per the directives issued subsequently, if the area permits further movement, results of such refinement may also be supplemented along with the pug marks data. Estimation of other wild animals may also be done using one of the following methods as per feasibility:-

i) Direct block counting (to be done on 2 days with a correction factor)

ii) Pellet/ dung density estimation

iii) Waterhole counts

iv) Transect counts(vehicular/ non-vehicular)

Considering the infrastructural limitations and terrain conditions for the various protected areas and forest areas, it is neither desirable not practical to advocate any single method of estimating the wild animals other than major carnivores like tiger/ leopard, therefore, necessary instructions/ field training may be imparted to the managerial staff in consultation with the Wildlife Institute of India or other resource persons readily available. Since livestock is also an important denizen of our right burdened forests, forming a sizeable component in the diet of major carnivores, the number of livestock depredated along with compensation disbursed by the field units during the year for such depredation may invariably indicated. Likewise, exgratia paid for loss of human life or injury may also be furnished field unit-wise. To ensure uniformity, transparency and desired standard in the entire exercise, it has been decided to constitute a "Supervisory Committee" at the State level consisting of the respective Chief Wildlife Warden, NGO/NGI of long standing association with wildlife, and a regional scientist. You are requested to kindly suggest a panel in this regard for the consideration of the Ministry. The time schedule for the estimation exercise is appended in the Annexure-A. For taking into account the transient animals (especially tigers), it is imperative that the estimation exercise should be coordinated with the neighboring States by tallying the evidences collected in the vicinity. As desired fit, suitable instructions may kindly be issued for such coordination meetings, and a "Coordination Committee" comprising of local officers may also be constituted under intimation to this Ministry. It is once again reiterated that the estimated figures should be supplemented with the continuous monitoring data along with the outcome of other refinement carried out, if any. A meeting would be shortly convened in this regard and you are requested to furnish the select list of NGOs/ NGIs/ Scientists at an early date.

Yours sincerely,

(Dr. Rajesh Gopal)

IGF&Director(PT)

No.PS-DIR(PT)/2005-MISCE. Dated the February 28, 2005.

To

Field Directors

(All Tiger Reserves)

Subject: Monitoring monthly frequency of pug-marks in the habitat

Sir,

During the recent deliberations in the All India meeting of field directors at Bandipur, the format for daily monitoring of wild animals and habitat parameters was circulated . It is reiterated, the field staff may be directed to record the day to day field monitoring data in the prescribed format to be maintained at nakas/ patrolling camps/chowkis w.e.f. 15-3-2005, which would be checked by the officials of this Ministry during their supervisory field visits. This would be in addition to the traditional tracking record being maintained in the reserve. *Further, the total number of tiger pug marks /scats /kills seen/collected in the reserve during the last seven days in a month should also be recorded and communicated to this ministry every month in the enclosed format every month*. **While counting pugmarks care should be taken to take note of only one pug mark from a track pertaining to a single animal**. This would facilitate continuous monitoring of tiger population in the habitat, so that reasons for any change in the relative abundance of such evidence in the habitat can be looked into as a part of the continuous monitoring strategy . This may please be accorded top most priority.

Yours sincerely,

Encl: As above.

(Dr. Rajesh Gopal)

IGF &Director, ProjectTiger

Copy to :

(1) Principal Chief Conservator of Forests (All Tiger Reserve States)

(2) The Chief Wildlife Wardens (All Tiger Reserve States)

DATA SHEET FOR TIGER MONITORING

Name of the recorder : _____ Date : _____

Forest Division _____ Forest Circle _____

Range _____

Days Number of Tiger Signs collected/seen

(Pugmark/Scat)

1

2

3

4

5

6

7

Total

1) Has any tigress with cubs been reported during the past 3 months?

Yes _____ No _____

a) Seen by staff, b/ Pug Marks, c/ Reported by local persons, d) Seen by Officials

How many cubs _____ approximate age of cubs _____

2) In case tigers are known to be present in the beat, but no sign was obtained during the sampling period then mention on what evidence was this conclusion made (pugmark, direct sighting, scat, other sign) _____

3) How many livestock predation events have been recorded in the past 3 months _____by tigers?

No.PS-DIR(PT)/2005-MISCE. Dated February 28, 2005.

To

Principal Chief Conservator of Forests

(All Tiger Reserve States)

Sir,

The All India estimation of tigers, co-predators and prey animals would be conducted from November, 2005 to February, 2006. This Ministry would be deputing a panel of experts/supervisors for assisting and overseeing the estimation work in States. While detailed guidelines in this regard would be sent in the near future, you are requested to maintain a monthly monitoring data of tigers seen in the various forest divisions and protected areas outside the Tiger Reserves, in the prescribed format annexed with this letter w.e.f. 01-04-2005. The number of evidences pertaining to tiger presence (pug marks, scats, kills) should be recorded during the last seven days in a month by field staff. **While counting pugmarks, care should be taken to take note of only one pug mark from a track pertaining to a single animal.** The total number of pug marks/scats/kills pertaining to tiger in the area should be compiled range-wise for each division, and the collated circle level information has to be maintained month-wise in the office of the Chief Wildlife Warden. The field staff may be directed to maintain the range level records for supervisory checks by the expert team of this Ministry. This may please be accorded top most priority, as the information is crucial to ascertain the status of tiger presence in areas outside the Tiger Reserves. All Conservators, Divisional Forest Officers and Protected Area Managers may be directed accordingly under intimation to this Ministry.

Yours sincerely,
Encl: As above.
(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

Copy to : 1. Forest Secretary (All Tiger Reserve States)

2. Chief Wildlife Warden (All Tiger Reserve States)

3. Field Director (All Tiger Reserve States)

(DR. RAJESH GOPAL)
IGF & DIRECTOR, PROJECT TIGER

NATIONAL TIGER CONSERVATION AUTHORITY
(A STATUTORY BODY UNDER THE MINISTRY OF ENVIRONMENT & FORESTS, GOVT. OF INDIA)

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Dr. RAJESH GOPAL
Addl. P.C.C.F. & Member Secretary

No. 1-16/93-PT (Part-I) **Dated the 12th August, 2010**

To,
Chief Wildlife Warden(s),
All Tiger Range States.

Ref: 1. **Directive of the Hon'ble Apex Court dated 25.11.2005 in I.A. No.1220 (Interim Report of CEC in I.A. No. 548) and I.A. No. 994 in W.P.C. No. 202/1995.**
2. **Section 38V of the Wildlife (Protection) Act, 1972.**
3. **Forest (Conservation) Act, 1980 and the Rules / Guidelines issued therein.**
4. **Letter No. PS-MS(NTCA)/2009-Misc. dated 22.4.2009.**
5. **Guidelines of CSS-PT No. 3(1)/2001-PT dated February, 2008.**
6. **Guidelines for preparation of Tiger Conservation Plan, Technical Document : NTCA/01/07.**

Sir,

Reference is invited to the directive of the Hon'ble Apex Court, and the statutory provisions contained in the Acts alongwith advisory/guidelines cited above.

In this context, the following is stated:

(i) The patrolling camps / chowkis / watch towers inside a tiger reserve (core as well as buffer) should not be used for accommodating tourists or facilitating tourism. As these structures have been constructed under Project Tiger, for the sole purpose of accommodating the frontline field staff (at places with wireless), it needs to be ensured that they are solely used for patrolling / antipoaching work.

(ii) Tourists should not be allowed to patrol the core / critical tiger habitat owing to the risk involved vis-à-vis the intensive legwork in a formidable terrain with wild animals. Further, exposing tourists to sensitive patrolling routes / paths / spatial presence of animals,

besides the patrolling strategy would make the habitat vulnerable by exposing such details which may be confidential for apprehending the offenders / poachers. Besides, there can be no method by which a poacher entering a wildlife habitat under the garb of a tourist can be identified. Likewise, there is no mechanism available to ensure that sensitive information pertaining to wildlife protection is not advertently/inadvertently passed on to miscreants / poachers. The frontline staff would also be burdened with the task of acting as "caretakers" for the tourists, besides attending to their possible health related emergencies. Needless to point out, patrolling is effective and successful only if it is organized discretely. Patrolling is a technical / specialized task requiring considerable physical fitness and a knowledge of a terrain which by and large, is done at odd hours. While the tourists would not be in a position to undertake this task, there is also a risk of patrolling strategy and related details getting exposed to poachers.

(iii) Under no circumstances forest produce material should be used for making a temporary / permanent construction to facilitate tourists in the core / critical tiger habitat.

(iv) It is reiterated that provisions under section 38V of the Wildlife (Protection) Act, 1972 should be implemented in letter and spirit for ensuring the inviolate status of the core / critical tiger habitat.

(v) The guidelines / advisories issued from the Project Tiger/NTCA may be strictly followed for organizing intelligence based patrolling in tiger reserves.

Yours sincerely,

(Dr. Rajesh Gopal)
APCCF & Member Secretary (NTCA)

Copy to:

1. APS to MEF.
2. PPS to Secretary (E&F).
3. PPS to DGF & SS, MoEF.

Copy for information to:

1. PS to Chief Secretary(s) of all tiger States.
2. Additional Chief Secretary(s)/ Principal Secretary(s) of all tiger States.
3. PCCF(s) of all tiger States.
4. Field Director(s), All Tiger Reserves.

No.4-29/86-FRY(PT)
Government of India
Department of Environment, Forests and Wildlife
(Wild Life II Sec.)
-o-o-

Annexe No.5, Bikaner House,
Shahjahan Road, New Delhi - 110011.
Dated, the 17/2/87

To,

The Forest Secretary,
Government of _____,
Department of Forests,
_____.

Subject:- Regulating wildlife tourism in Tiger Reserves - Guidelines regarding.

Sir,

I am directed to refer to the subject noted above and say that wildlife tourism has had a very intricate relationship with wildlife areas. Wildlife tourism has enabled the parks and sanctuaries to become "strong" entities in so far as the people visiting these have become committed to the cause of conservation and has also given to some extent an economic viability to the conservation efforts in the country. Tourism has, however, also been responsible for the degradation of a number of parks and sanctuaries by over and inappropriate usage directly or indirectly.

At the 24th Meeting of the Steering Committee of Project Tiger held on 19th May, 1981 under the chairpersonship of the then Prime Minister, a Sub-Committee was appointed to make recommendations to organise and regulate tourism in tiger reserves. The Sub-Committee's recommendations were placed before the Steering Committee in its 26th Meeting held on 25th August, 1986 and were accepted with certain modifications. On the basis of these, Government of India have formulated 'Guidelines for wildlife tourism in Tiger Reserves'. A copy of the Guidelines is enclosed for necessary action under intimation to this Department.

Yours faithfully,

(S.K. GOYAL)
DEPUTY DIRECTOR(PROJECT TIGER)
Tele.No.389645

(P.T.O.)

directions laid down by him. The officer in charge of such areas will not be in charge of the tourist complex that may exist or come up around such areas, but he must be consulted before they are established or extended.

4. Scope and extent of tourism would be incorporated in the management plan of each national park or sanctuary and should be revised periodically. Under the Wild Life (Protection) Act, 1972, there is a provision for framing rules for the management of park/sanctuary and in this regard provisions should be made for punishment for any act of vandalism that might occur amongst tourists/visitors.

5. A park interpretation centre adequately equipped with maps, guide books, audio-visual aids etc. should be set up at the edge of each reserve so as to provide nature education and park interpretation to the visitors.

6. The core area of the National Park/sanctuary (including that of tiger reserve) should be clearly demarcated and should be protected as a sanctum sanctorum. Any tourism now existing in such areas should be discontinued.

7. One or more tourism zones for each national park and sanctuary should be established and clearly demarcated in the buffer zone or elsewhere outside the core area. Such tourism zones should be adequately rich in its wildlife features so that its main floristic and faunal features may be seen and experienced by the visitors.

8. There will be a ceiling on the number of visitors allowed into the national park and wildlife sanctuary at any one time. There may also be a ceiling on the number of visitors in a given part of the area. This number is to be determined by the capacity of each national park/ wildlife sanctuary to provide viewing capability and transport and guide facilities.

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PROJECT TIGER

GUIDELINES FOR CONTROLLING WILDLIFE TOURISM IN TIGER RESERVES

1. All the residential accommodation and the infrastructure such as cafeteria, shops etc. should be outside the core area of the park. If such establishments are existing at the edge of the core of a park/ sanctuary or a tiger reserve, such as in the case of Kukki and Kisli in Kanha, the core area should be redefined to exclude such establishments which are right on the edge of the protected area. This portion would, however, continue to remain as part of the national park/ sanctuary or of the tiger reserve.

2. If such an establishment happens to be in the middle of the tiger reserve, we can not have a residential tourism zone carved out from the middle of such protected area. In such cases, they should be closed and if this is simply not possible, it be taken over by the Forest Department and the objective should be that these should be closed down in future and the residential facility should be set up outside the core area. One such case is the Corbett Tiger Reserve of U.P. where Dhikala Residential Complex is right in the centre of the national park. State Government has already decided to build up a residential complex at the edge of the national park. In all other similar cases, this should be followed.

3. No new residential accommodation would be allowed to be created within the core area of the Tiger Reserve, not even a forest rest house.

4. No new tourist residential accommodation either governmental, corporate or private would be allowed to come up within the buffer area of the Tiger Reserve.

5. In Tiger Reserves having core areas more than 300 Sq.km which is the prescribed minimum area as the Sanctum Sanctorum of a nature reserve, guided entry to the tourist would be permitted on the scheduled routes. The following restrictions will be imposed in such cases :

a) The zone and roads of the core area will be defined with the approval of the Government of India for permitting the movement of the tourists. In identifying the area where such movement of tourists

Contd....(2)

would be allowed within the core area, it would be ensured that 300 sq.km. of the core area would remain free of such tourist visitation.

The number and the type of vehicle, their timings, period of visit will be specified and restricted.

No vehicle will be allowed to move in a Tiger Reserve without an approved guide. Large Buses would not be allowed to travel in these areas. Mini buses that would travel at a given time and on a given route, would be the most preferred vehicle. If they are to be owned and operated by the Tourist Department, they will run strictly according to the regulations laid down and will have an approved guide. Private Cars will only be allowed with the special permission of the Field Director at the prescribed fee. All vehicles including government vehicles other than those directly connected with the park administration will have to pay the fee applicable to the private cars and will also have to acquire the same permission.

Walking on foot will be permitted, only on a well defined Nature Trails. Individuals will not be allowed to walk on foot nor groups larger than 20 members will be allowed on the walking train at a time. Visitors applying for permission to walk on foot will be required to give in writing that they will be solely responsible for any harm that may be caused due to the presence of wild animals in the area. However, armed guides will be provided to the groups permitted to walk on the train. The permission will be given entirely at the discretion of the Field Director.

Cooking of meals or carrying eatables, transistors and arms inside the core area will be totally prohibited.

(These guidelines are in supplement to the guidelines issued earlier vide Department of Environment, Forests and Wildlife letter No.4-29/86-FRY(PT)(Vol. II), dated 17/18 Feb.,87).

....

Name & Designation (With Stamp) Dated:	**Name & Designation (With Stamp) Dated:**	**Name & Designation (With Stamp) Dated:**

PART-B

GUIDELINES FOR TOURISM IN AND AROUND TIGER RESERVES

PREAMBLE.

Whereas, healthy natural ecosystems are critical to the ecological well-being of all living entities, and especially for the economic security of people. Tourism in the form of ecotourism has the potential to enhance public awareness, education, and wildlife conservation, while providing nature-compatible local livelihoods and greater incomes for a large number of people living around natural ecosystem which can help to contribute directly to the protection of wildlife or forest areas, while making the local community stakeholders and owners in the process.

Whereas, the Central Government considers it necessary to lay down a framework Guidelines on the selection, planning, development, implementation and monitoring of tourism in tiger reserves of the country with a view to recognise that tiger reserves and their landscapes are diverse, specific State Tourism and Ecotourism Strategies to be developed by the concerned State Governments and Tourism and Ecotourism Plans to be developed by the concerned Authorities.

These Guidelines are framed under section 38-O (c) of the Wild Life (Protection) Act, 1972, (WLPA), the provisions of the Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act, 2006, (FRA), Panchayat (Extension to Scheduled Areas) Act, 1996, (PESA) and Part IX of the Constitution of India, besides other laws in force. These Guidelines are in consonance with the Guidelines of the Centrally Sponsored Scheme of Project Tiger.

1. THE NEED FOR GUIDELINES.

1.1 The objective of these Guidelines is to move from wildlife tourism to ecotourism which is defined as 'responsible travel to natural areas that conserves the environment and improves the well-being of local people'. Given the conditions in India, it is proposed that ecotourism includes tourism that is community based and community driven. The aim should be to move towards a system of tourism around tiger reserves which is primarily community based tourism. Such tourism should be low-impact, educational and conserve the ecology and environment, while directly benefiting the economic wellbeing of local communities.

1.2 The primary objective of tiger reserves is to conserve tiger source populations that also act as an umbrella for biodiversity conservation. These areas provide a whole host of ecosystem services and opportunities for tourism.

Unplanned and unregulated tourism in such landscapes can destroy the very environment that attracts such tourism in the first place. Hence, there is a need to move towards a model of tourism that is responsible and compatible with these fragile landscapes.

1.3 Tourism, when practiced appropriately, is an important economic and educational activity. It has the scope to link to a wider constituency and build conservation support while raising awareness about the worth and fragility of such ecosystems in the public at large. It also promotes the non-consumptive use of wilderness areas, for the benefit of local communities living around and dependent on these fragile landscapes.

1.4 In the absence of proper planning and regulation, there has been a mushrooming of tourist facilities in recent years around tiger reserves which has led to the exploitation, degradation, disturbance and misuse of fragile ecosystems. It has also led to misuse of the term 'ecotourism', often to the detriment of the ecosystems and towards further alienation of local people and communities.

1.5 These Guidelines are applicable to areas in and around tiger reserves.

1.6 PRINCIPLES OF TOURISM IN AND AROUND TIGER RESERVES.

The persons who implement and participate in tourism activities shall, *inter alia*, practice the following principles, namely:—

(a) adopt low-impact wildlife tourism which protects ecological integrity of forest and wildlife areas, secure wildlife values of the destination and its surrounding areas;
(b) engage with Gram Sabhas as defined in the Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights), Act 2006 (FRA) and Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA) to facilitate decision making;
(c) ensure free participation and prior informed consent of Gram Sabhas and all other stake holders;
(d) develop mechanisms to generate revenues from wildlife tourism for the welfare and economic up-liftment of local communities;
(e) highlight the biodiversity richness, their values and their ecological services to people;
(f) highlight the heritage value of India's wilderness and tiger reserves;
(g) build environmental, cultural awareness and respect;
(h) facilitate the sustainability of tourism enterprises and activities;
(i) provide livelihood opportunities to local communities;
(j) promote sustainable use of indigenous materials for tourism activities;
(k) promote processes for forest dwellers to control and maintain their resources, culture and rights so as to minimize negative impacts.

2. GUIDELINES FOR DEVELOPING STATE TOURISM STRATEGY FOR TIGER RESERVES.

2.1 The following paragraphs provide the broad framework for each stakeholder.

2.2 Synergy and collaboration amongst the Central Government, and relevant State Government Departments, forest dwellers, local communities and civil society institutions are vital for ensuring successful implementation of the Guidelines.

2.1. State Governments.

2.1.1. The State-level Tourism and Ecotourism Strategy for Tiger Reserves shall be in tune with these guidelines. Ecologically sensitive land use policies related to tourism shall be specified by the State Government for the landscape surrounding tiger reserves. Adequate provisions shall be made to ensure that ecotourism does not get relegated to purely high-end, exclusive tourism, leaving out local communities. Relevant modifications in State rules and regulations should be carried out in order to ensure adherence to these standards by tourism developers and operators. All States-Governments shall notify the State-level Tourism and Ecotourism Strategy within one year from the date of notification of these Guidelines.

2.1.2. The State Governments shall endeavour to develop a State-level policy to favour ecotourism in place of wildlife tourism as a comprehensive plan to ensure that the primary objective of tiger conservation is not compromised and inter alia, include:

(i) maintaining integrity and connectivity of tiger reserves;
(ii) local community rights, participation and benefit-sharing;
(iii) sound environmental design and sustainable use of indigenous materials;
(iv) conservation education and training;
(v) adequate machinery for monitoring and evaluation of the impact of ecotourism activities on wildlife conservation and local communities;
(vi) capacity building of local communities in planning, providing and managing ecotourism facilities;
(vii) development of appropriate land use and water management planning and regulation for maintaining the ecological integrity of landscape in and around tiger reserves.

2.1.3. No new tourist infrastructure shall to be set up within the core or critical tiger habitat of tiger reserves, in violation of the provisions of the Wild Life (Protection) Act, 1972, and the directives of the Honourable Supreme Court.

2.1.4. The State Level Steering Committee under section 38U of the Wild Life (Protection) Act, 1972 shall review the implementation of the State-level Tourism and Ecotourism Strategy in Tiger Reserves.

2.1.5. The State Governments shall develop a system to ensure that gate receipts

from tiger reserves are utilised by their management for specific conservation purposes and shall not to go as revenue to the State Exchequer. This will ensure that resources generated from tourism can be earmarked for protection, conservation and local livelihood development, tackling human-wild animal conflict and welfare measures of field staff.

2.1.6. Since the tourism industry in and around tiger reserves is sustained primarily from the non-consumptive use of wildlife resources and the local communities are the ones that bear the brunt of conservation, the State Governments may charge a conservation fee from the tourism industry for eco-development and local community upliftment works. The conservation fee shall be decided on the number of beds in a facility, the duration of operation of the facility (seasonal or year round) and on a luxury classification system such as home stay (fee for which will not be charged up to a 6 bed facility), to high end (which will have the maximum quantum of the fee). The suggested fee structure may range between Rs. 500 to Rs. 3000 per room per month. The rate of conservation fee and tourist facility strata shall be determined by the State Government, and the fund thus collected shall be earmarked to address local livelihood development, human-wildlife conflict management and conservation through ecodevelopment and not go to the State Exchequer as specified in 2.1.5 above.

2.1.7 The fund shall be administered by the Tiger Conservation Foundations with the Tourism Industry having a say in how and where this fund is to be utilized, and mechanisms for which need to be worked out at specific tiger reserves. The fund shall be used for all the villages located within or adjacent to the tiger reserves. Every State Government shall notify the rate of local conservation fee within a year from the date of notification of these Guidelines. The rate of fee shall be revised periodically taking into consideration the cost of operation. The rationale for a local conservation fee should be clearly explained to the public at large, through clear signages at local tourist facilities. The State Government shall put in place a transparent mechanism for utilisation of these funds involving the tiger reserve management through the Tiger Conservation Foundations and Gram Sabhas.

2.1.8. A Local Advisory Committee (hereinafter referred to as LAC) shall be constituted for each tiger reserve by the State Government. The LAC shall have the following functions, namely:

(a) to review the tourism strategy with respect to the tiger reserve and make recommendations to the State Government;
(b) to ensure computation of reserve specific carrying capacity and its implementation through periodic reviews;
(c) to ensure site specific norms on buildings, and infrastructures in areas inside and close to tiger reserves, keeping in view the corridor value and ecological aesthetics;
(d) to advise local self Government and State Government on issues relating to development of tourism in and around tiger reserves;
(e) monitor regularly (at least half yearly) all tourist facilities in and around tiger reserves vis-à-vis environmental clearance, area of coverage, ownership, type of construction, number of employees, etc., for suggesting mitigation and retrofitting measures if needed;
(f) monitor regularly activities of tour operators to ensure that they do

2.2.2 The tourism plan shall, inter alia, include a monitoring mechanism, estimated carrying capacity (a suggested model mechanism to calculate carrying capacity, is provided in Annexure-I and Annexure-II, which may be modified on a site specific basis), tourism zones and demarcation of the area open to tourism on the basis of objective and scientific criteria.

2.2.3. The tourism plan should be consistent with the State Tourism and Ecotourism Strategy and shall also be approved by the LAC and the State Government.

2.2.4 The plan shall:

(i) identify (using landscape ecological principles and tools) and monitor the ecologically sensitive areas surrounding tiger reserves, in order to ensure the ecological integrity of corridor and buffer areas, and prevent corridor encroachment;
(ii) assess carrying capacity of the tiger reserve, at three levels: physical, real and effective and permissible carrying capacity of visitors and vehicles as well as residential facilities in and around the tiger reserve (in accordance with Annexure-I, Annexure-II). On the lines of the illustrative calculation provided for vehicular tourist visitation, carrying capacity needs to be computed on a site specific basis for tourist visitation involving elephant, boat and foot travel. Explore the possibility of technological tools (Global Positioning System, wireless, etc.) to manage traffic and spacing of tourist vehicles within tiger reserves;
(iii) set a ceiling level on number of visitors allowed to enter a tiger reserve at any given time, based on the carrying capacity of the habitat;
(iv) indicate the area open to tourism in the reserves to be designated as 'eco-tourism zone';
(v) ensure visitor entry into tiger reserves through vehicles registered with the tiger reserve management, accompanied by authorised guide;
(vi) develop a participatory community-based tourism strategy, in collaboration with local communities, to ensure long-term local-community benefit-sharing, and promotion of activities run by local communities.
(vii) develop codes and standards for privately-operated tourist facilities located in the vicinity of core or critical tiger habitats, eco-sensitive zones or buffer areas, with a view to, inter alia, ensure benefit and income to local communities;
(viii) develop monitoring mechanisms to assess impact of tourism activities on the wildlife and its habitat so as to minimize them;
(ix) develop generic guidelines for environmentally acceptable and culturally appropriate practices, and for all new constructions;
(x) set up lists of Do's and Don'ts for visitors;
(xi) provide for subsidized visits of students while fostering educational extension activities.

2.2.5. In the case of human animal conflicts, compensation shall be paid within the period as per Citizen's Charter, apart from immediate payment of ex gratia.

2.2.6. All tourism activities shall take place only in delineated 'tourism zones' indicated in the tourism plan. The vacant posts in tiger reserves shall be filled up since the staff is also required to manage some tourism in addition to their regular duties.

2.2.7. Tigers in India occur across varied habitats that range from high elevation mountain subtropical forests, tropical wet evergreen forests, mangrove swamps, tropical moist or dry deciduous forests and alluvial floodplain grasslands. The densities of large ungulates, the main prey of tigers, vary from 2 to over 60 animals per km^2 among these different habitats. Breeding tigress's are territorial, and the size of their territories adjust to prey density so as to successfully raise cubs. Male tiger territories cover the territories of two to four breeding tigress territories. Due to variation in habitat specific prey density, breeding tigress territories range from 20 to 200 km^2 in India. For a demographically viable population it is essential to have a core area that harbours a minimum of 20 to 25 breeding tigresses. For long-term genetic viability the minimum effective population size is believed to be about 500 individuals. Due to the variability in breeding tigress territory size and thus breeding tiger density, the core area needed can be generalized to be between 800-1200 km^2. This core and surrounding buffer can then sustain a population of about 75 to 100 individual tigers to attain demographic viability. However, genetic viability is possible only through corridor connectivity within the larger landscape where dispersing individual tigers ensure genetic mixing between different source populations (tiger reserves) in a metapopulation framework. Current tourism zones where only tourist visits are permitted and there are no consumptive uses, tiger density and recruitment does not seem to be impacted. For this reason permitting up to 20% of the core/ critical tiger habitat as a tourism zone should not have an adverse effect on the tiger biology needs, which is subject to adherence to all the prescriptions made in these Guidelines.

2.2.7.1. There is also a need for fostering the buffer and peripheral areas for carrying out the greater part of ecotourism to benefit local communities.

2.2.8. Conservation of the tiger, our National animal, is the paramount objective of tiger reserves and generating public support through regulated tourism is an invaluable tool for harnessing public and community support for tiger conservation. Regulated tourism results in enhanced awareness and is of educational value especially for the younger generation. Non-consumptive regulated, low-impact tourism, could be permitted within core or critical tiger habitat without in any way compromising the sprit of core/critical tiger habitat for tiger conservation. With this importance of tourism in tiger conservation in mind, it is recommended that a maximum of 20% of the core or critical tiger habitat usage (not exceeding the present usage) for regulated, low-impact tourist visitation may be permitted. In case the current usage exceeds 20% the Local Advisory Committee may decide on a timeframe for bringing down the usage to 20%. Such area may be demarcated as tourism zone and there should be strict adherence to site specific carrying capacity. Restoration of buffer forest areas shall be done through its unified control under the respective Field Directors of tiger reserves vis-à-vis the Guidelines of the Project Tiger and the National Tiger Conservation Authority. Further, no new tourism infrastructure shall be created in the core areas. Existing residential infrastructure inside core or critical tiger habitats shall be strictly regulated to adhere to low ecological impacts as decided

by the Local Advisory Committee on a site specific basis.

2.2.8.1. Any core area in a tiger reserve from which relocation has been carried out, shall not be used for tourism infrastructure.

2.2.9. Forest dwellers who have been relocated from core or critical tiger habitat to the Buffer shall be given priority in terms of livelihood generation activities related to community-based ecotourism in the tiger reserve. Tiger reserve management shall make a special effort in this regard, besides a periodic review to ensure its compliance.

2.2.10. Tourism infrastructure shall conform to environment-friendly, low-impact aesthetic architecture, including solar energy, waste recycling, rainwater harvesting, natural cross-ventilation, proper sewage disposal and merging with the surrounding habitat. Violations of these norms will be appropriately dealt with by the LAC. Any violation of the guidelines will be referred to the appropriate authorities under intimation to the NTCA, for taking action in accordance to the relevant provisions of the law.

2.2.11. The District Revenue and tiger reserve authorities shall ensure that all tourist facilities within a zone of influence (to be identified by the LAC) in the context of core/critical tiger habitats in tiger reserves must adhere to all environmental clearances, noise pollution norms, and are non-polluting, blending in with surroundings. Severe penalties must be imposed for non-compliance.

2.2.12. Permanent tourist facilities located inside core or critical tiger habitat, which are being used for wildlife tourism shall be phased out on a time frame decided by the LAC. Strict plans ensuring low impact adherence by these facilities shall be developed and approved by LAC for implementation. There shall be no privately run facilities such as catering, etc., inside the core or critical tiger habitat where night stay is permitted. Such existing facilities if any, are to be run by the Tiger Conservation Foundations.

2.2.13. All tourism facilities located within the zone of influence (as determined by the LAC) in the context of the tiger reserve shall adhere to pollution norms (noise, solid waste, air and water, etc.), under the respective laws or rules for the time being in force. Outdoor high intensity illumination shall not be utilized as it disturbs nocturnal wild animal activities.

2.2.14. There shall be a complete ban on burying, burning or otherwise disposing non- biodegradable or toxic waste in and around the tiger reserve. Proper plan for disposal for degradable waste shall be developed and strictly implemented.

2.2.15. Management of habitat to inflate animal abundance for tourism purposes shall not be practiced within the core or critical habitat. Visitors shall keep a minimum distance of more than 20 meter from all wildlife; cordoning, luring or feeding of any wildlife shall be prohibited. Minimum distance between vehicles while spotting wildlife shall be maintained at 50 meters. Vehicles shall not monopolize a wildlife sighting for more than 15 minutes.

2.2.16. To avoid the number of visitors and vehicles exceeding carrying capacity,

tiger reserve managers shall establish an advance booking system to control tourist and vehicle numbers. Rules of booking shall be transparent and, violators shall be penalized.

2.2.17. Tiger reserve authorities shall delineate an adequate and appropriate area for the visitor facility outside the protected area.

2.2.18. Tourism activities in a tiger reserves shall be under the overall guidance of the respective Tiger Conservation Foundations and the LACs.

2.3. Tourist facilities and Tour operators.

2.3.1. Tourism infrastructure must conform to environment-friendly, low-impact, low height aesthetic architecture; renewable including solar energy, waste recycling, water management, natural cross-ventilation, no use of asbestos, discharge of only treated sewage, no air pollution, minimal outdoor lighting, and merging with the surrounding landscape.

2.3.2. The use of battery operated vehicles shall be encouraged to minimize pollution wherever terrain permits.

2.3.3 A 'curriculum' shall be developed for training of guides and drivers in the art, craft and ethics of wildlife tourism, resulting in certification. All guides and drivers shall compulsorily go through a short course in interpretation and rules and regulations followed by an oral examination before being certified by the Tiger Conservation Foundation. Courses may be scheduled during the non-tourist season. All certified guides and drivers shall wear appropriately designed uniforms with name tags and badges. This will instil a sense of pride, discipline and accountability. Prior to every tourist season, certified guides and drivers shall go through a refresher course or workshop. These shall also build up their capacity to identify birds and provide natural history information on other species, to slowly wean them away from a tiger-centric obsession. A periodic assessment of their performance shall be reviewed by the LAC before reissuing their licences.

2.3.4. All tourist facilities falling within the zone of influence of a tiger reserve shall be reviewed regularly by the Local Advisory Committee vis-à-vis environmental clearance, area of coverage, ownership, type of construction, number of employees, etc., for suggesting mitigation and retrofitting measures if needed.

2.3.5. All tourist facilities, old and new shall aim to generate at least 50% of their total energy and fuel requirements from alternate energy sources that may include solar and biogas.

2.3.6. The use of wood as fuel shall be prohibited, except for campfires for which wood must be procured from State Forest Department or the Forest Development Corporation depots.

2.3.7. In order to allow free passage to wildlife, developments shall be sensitive to the conservation of flora and fauna, and the corridor value of the area in and around tiger reserves.

2.3.8. Tourist facilities and tour operators shall not cause disturbance to animals while taking visitors on nature trails.

2.3.9. Any violation of the guidelines shall be referred to the appropriate authorities under intimation to the National Tiger Conservation Authority, for taking action in accordance to the relevant provisions of the law.

2.4. Temple and Pilgrimage Boards.

2.4.1. Pilgrim sites located inside tiger reserves shall be in accordance with the Forest (Conservation) Act, 1980, Wild Life (Protection) Act, 1972 and the Environment (Protection) Act, 1986 to prevent any further expansion. This shall be periodically reviewed by the LAC.

2.4.2. All transit camps and places of stay for such pilgrimage shall be restricted to nominated days in a year. The protected area managers shall work with the temple authorities to develop a system for controlling the number of pilgrims so as to maintain the ecological integrity of the area. This mechanism shall be developed within three years of the notification of these Guidelines.

2.4.3. All rules relating to tourism facilities including noise, building design, use of alternate energy and free passage to wildlife shall apply to such pilgrim facilities.

2.4.4 Temple boards shall negotiate terms of revenue sharing with local communities and channel a minimum of 10 percent of gross revenue collected into development of local communities through the Gram Sabha.

2.4.5 The tourist operators, drivers and temple controlling authorities shall be given an exposure on the value of forest ecosystem and their ecological services and alongwith the do's and don'ts during visits to forests and tiger reserves.

2.5 These Guidelines shall be applicable to the tiger reserves notified under section 38V of the Wild Life (Protection) Act, 1972. The State Government shall lay down Guidelines on similar lines for tourism in other protected areas.

2.6 Contravention of any provision of these guidelines or conditions laid therein by any person or organization shall be liable of an offence under sub-section (2) of 38-O of the Wild Life (Protection) Act, 1972.

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NATIONAL TIGER CONSERVATION AUTHORITY

(STATUTORY BODY UNDER THE MINISTRY OF ENVIRONMENT & FORESTS, GOVT. OF INDIA)

Dr. RAJESH GOPAL
Member Secretary

Bikaner House, Annexe-V,
Shahjahan Road, New Delhi-110011
Tele Fax: 011-23384428
Email: dirpt-r@nic.in

OFFICE OF THE FIELD DIRECTOR Receipt 4176 01 MAY BARIPADA

No. PS-MS(NTCA)/2009-Misces. **Dated the 28th April, 2009**

To,

The Field Director(s)
(All Tiger Reserves)

Sub: Plying of diesel vehicles / mini-trucks / canters inside core / critical tiger habitats.

Sir,

As you are aware, the core / critical tiger habitats of tiger reserves notified under section 38V of the Wildlife (Protection) Act, 1972, are required to be kept inviolate for tiger conservation. However, tourism infrastructure is present in many core areas, and visitors are permitted in such tourism zones, and guidelines have been issued from this end for phasing out the tourism activities from such areas to the outer buffer zones. Till the desired tranquility is achieved in the core / critical tiger habitat, every care should be taken to ensure that minimum noise pollution is caused in such areas due to plying of canters / mini-trucks and other diesel vehicles transporting tourists. In this context, it is suggested that every effort should be made for promoting CNG run vehicles and vehicles using Bio-fuel, while reducing the use of diesel / other polluting vehicles. It is pertinent to add that the Hon'ble Apex Court has also strongly recommended the use of CNG vehicle in our urban landscape to reduce pollution.

Yours sincerely,

(Dr. Rajesh Gopal)
IGF & Member Secretary (NTCA)

Copy to:

1. The Chief Wildlife Warden, All Tiger Range States.

OFFICE OF THE CONSERVATOR OF FORESTS AND FIELD DIRECTOR,
SIMILIPAL TIGER RESERVE, BARIPADA.

Memo No._____/4F-33/09,Dated.

Copy forwarded to the Divisional Forest Officers, Baripada, Kairangpur and Karanjiam Divisions for information and taking necessary action.

Conservator of Forests &
Field Director,
Similipal Tiger Reserve,Baripad.

Hembram/4.05.09.

No. 15-37/2012-NTCA
Government of India
Ministry of Environment and Forests
National Tiger Conservation Authority
***

Annexe No. 5, Bikaner House
Shahjahan Road, New Delhi-110011
Telefax: 2338 988
E-mail: jdntca@gmail.com

Dated the 30th January, 2013

To,

1. The PCCF/HOFF(s),
   Tiger Range States.

2. The Chief Wildlife Warden(s)
   Tiger Range States.

Sir,

As you are aware, advisories have been issued by the Project Tiger / National Tiger Conservation Authority, time and again, for dealing with emergency arising due to straying of tigers in human dominated landscapes. Based on inputs from field officers experts vis-à-vis the said advisories, a Standard Operating Procedure has been developed after fine tuning to meet the present challenges.

In this context, I am directed to forward herewith a copy of the said Standard Operating Procedure (SOP) for dealing with emergency arising due to straying of tigers in human dominated landscapes, duly approved by the competent authority, for implementation.

The SOP may please be translated in vernacular and widely circulated amongst the field staff for guidance.

Yours faithfully.

Encl: As above

(S.P. Yadav
Deputy Inspector General (NTCA

Copy for information to:

STANDARD OPERATING PROCEDURE TO DEAL WITH EMERGENCY ARISING DUE TO STRAYING OF TIGERS IN HUMAN DOMINATED LANDSCAPES

MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

NATIONAL TIGER CONSERVATION AUTHORITY

STANDARD OPERATING PROCEDURE TO DEAL WITH EMERGENCY ARISING DUE TO STRAYING OF TIGERS IN HUMAN DOMINATED LANDSCAPES

1. **Title:** Standard Operating Procedure to deal with emergency arising due to straying of tigers in human dominated landscapes

2. **Subject:** Dealing with emergency arising due to straying of tigers in human dominated landscapes

3. **Reference:** Advisories of National Tiger Conservation Authority /Project Tiger on the subject

4. **Purpose:** To ensure that straying tigers are handled in the most appropriate manner to avoid casualty / injury to human beings, tiger, cattle and property.

5. **Short summary:** This Standard Operating Procedure (SOP) provides the basic, minimum steps which are required to be taken at the field level (tiger reserve or elsewhere) for dealing with incidents of tiger straying in human dominated landscapes.

6. **Scope:** The SOP applies to all forest field formations including tiger reserves besides other areas where such incidents occur.

7. **Responsibilities:** The Field Director would be responsible in the case of a tiger reserve / fringe areas. For a protected area (National Park / Wildlife Sanctuary), the concerned protected area manager would be responsible. In the case of other areas (revenue land/conservation reserve/community reserve/village/township) the Wildlife Warden, as per the Wildlife (Protection) Act, 1972, or Divisional Forest Officer/ Deputy Conservator of Forests (under whose jurisdiction the area falls), would be responsible. The overall responsibility at the State level would rest with the Chief Wildlife Warden of the concerned State.

8. **Suggested field actions to deal with strayed wild carnivores (tiger / leopard)**

(a) At the outset, constitute a Committee immediately for technical guidance and monitoring on day to day basis, as under:-

i. A nominee of the Chief Wildlife Warden
ii. A nominee of the National Tiger Conservation Authority
iii. A veterinarian
iv. Local NGO representative
v. A representative of the local Panchayat
vi. Field Director/ Protected Area Manager/ DFO I/C - Chairman

(b) Since it may not be always possible for experts from the Wildlife Institute of India to provide assistance, it is advised that some outside experts may be involved in the ongoing monitoring.

(c) Establish identity of the tiger by comparing camera trap photographs with National Repository of Camera Trap Photographs of Tigers (NRCTPT) / Reserve level photo database and find out the source area of the animal.

(d) Collect recent cattle / livestock depredation or human injury / fatal encounter data, if any, in the area. If it is an area historically prone to such incidences, detailed research work has to be carried out in order to assess the reasons for the frequent tiger emergencies in the area.

(e) In case of confirmed livestock depredation / human injury / fatal encounters or frequent straying of tiger near human settlements, set traps (automatic closure) with appropriate luring while avoiding disturbance, to trap the animal.

(f) Set up camera traps near kill site to confirm / establish the ID of the animal.

(g) Ensure unobtrusive guarding of the kill to allow feeding of the carcass (if not close to a human settlement) besides safeguarding from poisoning (for revenge killing).

(h) Create 'pressure impression pads (PIPs)' in the area to ascertain the daily movement of the animal, while plotting the same on a map (4"=1 mile scale or 1:50,000 scale).

(i) Proactively involve District Collector / DM and SSP / SP of the area to maintain law and order in the area, besides avoiding crowding by local mobs. Acquaint them with human-tiger conflict issues and guidelines of the NTCA to deal with the situation.

(j) In all instances of wild carnivores like tiger / leopard straying into a human dominated landscape, the district authorities need to ensure law and order by imposing section 144 of the Cr.Pc. This is essential to avoid agitation / excited local people surrounding the animal spot which hampers capture operation, leading to serious injuries on people and staff. It is also necessary that police and local administration be involved at an early stage. Effective coordination with them is critical to control mobs which as has been seen in several instances, worsen the situation and lead to avoidable fatalities/ tragedies.

(k) Take help of the district level officials to alert the villages in the vicinity of the area having the spatial presence of the tiger.

(l) If successive trapping efforts fail, chemical immobilization of the wild carnivore should be done by an expert team having a veterinarian, as per the protocol at **Annexure-I**.

(m) In case, the tranquilised tiger is found to be healthy in prime or young age without any incapacitation (loss of canine, injury, broken paw etc.), as confirmed / certified by the Committee as constituted at para (1), then it may be released after radio collaring in a suitable habitat with adequate prey base, away from the territory of a resident male tiger (if any) or human settlements, under intimation to the National Tiger Conservation Authority. (Under no circumstances an injured / incapacitated tiger should be released back, and the same needs to be sent to a recognized zoo).

(n) Under no circumstances, a tiger should be eliminated by invoking the Wildlife (Protection) Act, 1972, if it is not habituated for causing human death. The guidelines for dealing with 'man-eaters' are annexed for compliance / guidance in this regard **(Annexure-II)**.

(o) In case of a healthy tiger/encumbered tigress occupying a sugar cane field or similar habitat, attempt should be made first to attract it to nearby forest area, while avoiding disturbance. If such operations fail, the animal should be captured through immobilization for release in low density area of a nearby tiger reserve/protected area after radio collaring.

(p) An authorized spokesperson of the Forest Department, should periodically update the media (if required) to prevent dissemination of distorted information relating to the operation / incidents. Sensalization or distorted information can lead to further damage.

(q) In case monitoring using camera traps (Phase-IV) is ongoing in the area, the minimum tiger numbers based on individual tiger captures, should not be given undue publicity without due cross checking with the National Tiger Conservation Authority.

(r) The Chief Wildlife Warden has to take the final decision on whether a tiger has to be released back in the wild or transferred to a zoo.

(s) It is important to have properly designed suitable cages and transport mechanism which cause least stress to the captured carnivore.

9. **Preventive / Proactive Measures** to be followed in tiger straying incidents / areas prone are at **Annexure-III.**

10. Guidelines for prioritizing areas for tiger monitoring are at **Annexure-IV.**

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Annexure 1

PROTOCOL ON IMMOBILIZATION AND RESTRAINT OF TIGERS

PROTOCOL ON IMMOBILIZATION AND RESTRAINT OF TIGERS

General Consideration

Behavior: Tigers in conflict or those strayed into human habitation differ considerably in behavior as compared to those in native/ natural habitats. The animals may be stressed, shy, elusive, secretive and even unpredictable thereby posing challenge in capture. These animals may even pose safety threats for human involved in capture as well as to general public. ***Utmost care needs to be taken to ensure safety of humans when attempts for capture are made.***

Capture options: Tigers can be captured employing physical and chemical restraint methods or combination of both. The physiological and emotional status of the animal; length of the procedure; the environmental conditions; terrain/ escape cover; equipment availability; drug appropriateness and availability and most importantly the safety of the operator/team needs to be considered prior to making a choice of procedure. Both the procedures have their benefits and limitations however the present guidelines would focus primarily on the chemical restraint procedures.

Chemical Restraint

Chemical immobilization has become an important tool in wildlife management over the last few decades. Advancement and development in this field has resulted in use of newer and safer drugs for immobilization. and efficient and reliable systems of drug delivery. Chemical Immobilization involves use of drugs to restrict animal's movement by inducing a state of insensibility and preventing deliberate and coherent mobility. The technique is well suited for tigers in conflict as it allows capture of select individual, enables selection of time of capture and causes minimal stress to the animal. Chemical restraint drugs alter certain CNS functions without compromising the vital functions and produce a state of anaesthesia which immobilizes the animal to the extent that provides considerable safety both for human and animal.

Immobilization Equipment

Due to difficulty of directly approaching and handling wild animals, it is necessary to have safe and effective methods by which drugs can be administered. Projected darts have proved to be effective and safe option

for delivering drugs to wild animals. The dart is projected through an equipment and discharges the medicaments intramuscularly upon impact. The darts are available in different sizes, however are specific to the type of equipment used to propel them. Different power projection systems have been used for projecting the darts however for tigers; the system that employs compressed gas/CO_2 to propel the dart should be selected. Light weight plastic darts of 3-5 ml. capacity should be used for remote injection using air powered/CO2 tele-injection projector. Needle length is critical factor while darting tigers. The outside diameter of the needle should be 1.5- 2.0 mm and length of 38- 40 mm.

Immobilization Drugs

Though there are varieties of drugs that have been used for capturing tigers, a combination of alpha-2 adrenergic agonists (sedatives) and dissociatives have proved to be effective for immobilizing tigers.

Alpha-2 adrenergic agonists/ Sedatives: These drugs are CNS depressants with good sedative, muscle relaxant, and analgesic properties. These drugs need to be used with caution in animals as they produce initial hypertension followed by severe hypotension, bradycardia, hyperglycemia and glucosuria, disrupts thermoregulation and may lead to regurgitation/ vomiting in carnivores. These drugs however have the advantage of being non-controlled, inexpensive and reversible. The drugs have been extensively used in felids in combination with dissociatives. A mixture of *Xylazine* and *Ketamine* in a proportion of 1.25 :1 known as Hellabrunn mixture has been effectively used in tigers and other carnivores.

Another new Alpha-2 agonists Medetomidine in combination with ketamine has proved to be effective and specific sedative in large carnivores as it induces rapid drug induction and has specific antidote for reversal.

These Alpha-2 adrenergic agonists can be negated by antidote.

Examples: Xylazine, Detomidine, Medetomidine.
Antidotes include Yohimbine hydrochloride, Atipamezole hydrochloride, Tolazoline hydrochloride.

Dissociatives

These include the psychotomimetic drugs that are cyclohexamine derivatives. The drugs act by separating the conscious mind from sensory and motor or control mechanism in the brain (dissociative) producing, rapid analgesia and a trance-like state (psychosis) which may be as a

result of over stimulation of the CNS. The animal appears unaware of human presence. They have the advantage of being rapidly absorbed following IM, IV administration, have good safety margin and cause little depression of the respiratory and circulatory system. Pronounced muscle rigidity, hyperthermia, hyper salivation, convulsion and rough recovery are common side effects. These effects can be considerably reduced by combining these drugs with a tranquilizer or sedatives. Their effect cannot be reversed and the animal has to be monitored for long till complete recovery takes place. These drugs lack specific antidote.

Examples: Phencyclidine, Ketamine hydrochloride, Tiletamine Hydrochloride

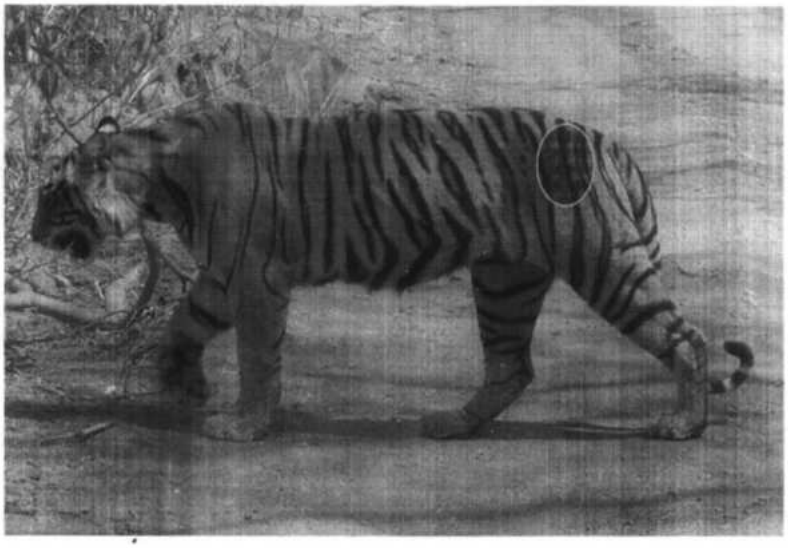
The choice of drug for immobilization may include the Hellabrunn mixture (HBM) (Xylazine –Ketamine mixture in ratio of 1.25:1) in appropriate doses. The dosage can be decided on the spot, taking into consideration the animal's health and condition, level of excitement, physiological status, sex, time of the day, and ambient temperature besides other habitat parameters. Medetomidine in combination with ketamine has proved to be effective for capturing tigers in conflict as it provides short and rapid induction thereby ensuring minimal movement of animal following darting.

Recommended drug/ dosages for immobilization of adult tiger

Sr. No.	Drug(s) for immobilization	Male	Female	Rreversal drugs (antidote)
1.	**Hellabrunn mixture (HBM)** [Xylazine (XYL) and Ketamine (KET)] mixture in a ratio of 1.25:1	**3.0 ml** (375 mg XYL & 300mg KET) **to3.5 ml** (437.5 mg XYL & 350 mg KET)	**2.5 ml** (312.5 mg XYL & 250 mg KET) **to 3.0 ml** (375 mg XYL & 300mg KET)	Yohimbine hydrochloride (0.125 $mgkg^{-1}$ body weight)
2	**Medetomidine (MED) and Ketamine (KET)**	50-60 µg kg^{-1} body weight MED and 1-2 $mgkg^{-1}$ body weight KET		25-35 mg of Atipamezole hydrochloride

Approach to the Target Animal

A four wheel field vehicle or trained captive elephants may be used to approach the animal taking due care of human safety and an overriding degree of patience. In a terrain where the vehicle cannot be used possibility of darting the animal from a *machan* (raised platforms) may also be considered. Tigers in conflict provide limited opportunities for darting and therefore require adequate experience by personnel in effective darting as well as knowledge of anatomical peculiarities. Hindquarters should be preferred for tele injection however depending on the opportunities; other suitable areas can also be explored.



Preferred darting site in a large carnivore

Induction Phase

The time interval between injection (darting) and the point when the animal is rendered immobile is induction period. The total time for the completion of induction may vary from 10-15 minutes. A close observation should be kept by the team for any movement of the animal however the team should ensure minimal disturbance during induction.

Handling and Care of the Immobilized Animal

The animal should be approached quietly and following steps should be followed:

- Removal of dart
- Blindfolding to protect the cornea from direct sunlight, dust and injury.
- Ensuring proper animal positioning (sternal or lateral recumbancy) to maintain patent airways and ensure normal breathing and circulation.
- Assessing the status of animal, the degree of muscle relaxation and the rate and depth of respiration. Assessment of anesthesia should be done using following methods:

- Monitor tissue perfusion: Anesthetic drugs frequently depress the contractile force of the heart and vasodilatation results in decreased tissue perfusion. Evaluation of tissue perfusion should be done by observation, auscultation, palpation and capillary refill time.
- Monitor gas exchange: Respiratory rates are highly variable during anesthesia.
- Quality of respiration should be evaluated by observing animal's chest movement.
- Monitor level of CNS depression by assessing the muscle tone-jaw tone and eye reflexes.
- Monitor vital signs such as respiration, heart rate and body temperature.
- Examine animal for any wound or injuries (including status of canines and claws).
- Estimate animal body weight and if possible take bodily measurements.

Shifting of the Animal to Stretcher

The animal should be shifted to a stretcher and placed in lateral or sternal recumbancy. Animal should then be shifted to a transport container.

Reversal of Anesthesia

Specific Alfa-2 antagonists (Yohimbine HCl , Atipamezole HCl) should be used to reverse the anesthesia.

Supplemental Information

a. **Preparedness:** All equipment for crating the animal, radio collars and accessories, emergency medicaments, biological sampling accessories, transport containers and any other essentials should be in place before the animal is darted.

b. **Data recording:** A complete immobilization record, particularly including each drug given, amount given, time of administration and physiological parameters should be maintained during the procedure. These details should be recorded in the datasheet in the format provided. It would be appropriate to ensure human safety considerations to meet any eventuality at all the time.

c. **Assessing depth of anaesthesia:** It should take about 15 minutes for the drug induction to happen. Prior to approaching the animal, the depth of anaesthesia should be assessed by either tapping on the tail or ears with the help of long pole and if the animal does not react, it should be approached. The depth of anaesthesia should be optimum if the jaws can be opened and the

tongue exteriorized with little or no resistance. Other indicators would include responses to stimulation of body, feet, cornea, ears and tongue. The physiological parameters should be assessed and should include assessment of temperature, respiration, pulse and color of mucous membrane including condition of pharynx, gingiva and teeth. In case of emergency (depressed respiration or cardiac arrhythmias or depression) the animal should be revived. Emergency drug including cardiac and respiratory stimulants should be kept handy at all times. The physiological parameters should be assessed and should include assessment of temperature, respiration, pulse and color of mucous membrane including condition of pharynx, gingiva and teeth.

d. **Managing emergencies:** Emergency drugs and equipment would be available during the entire operation. Adequate supplies of emergency drugs should be ensured at all times.

e. **Composition of team:** Capturing large felids poses a challenge and therefore requires a skilled team comprising wildlife managers, biologists, trained veterinarians and most preferably an individual specializing in animal anaesthesia.

Annexure 1a

Data Sheet for Recording and Monitoring Immobilized Animal

Area Details

Date .....

Location ..... GPS Lat..... Long.....

Collar Frequency .....

Purpose of capture .....

Ambient temperature ..... Day (cloudy, bright) .....

Animal Details

Species ..... Physical condition .....

Emotional state before drugging ..... Sex .....

Approximate age ..... Weight (kg).....

Breeding status .....

Body Measurements

Nose tip to Tip of tail ..... Nose tip to base of tail .....

Nose tip to base of skull (Occipital) ..... Tail length.....

Height (Shoulder blade to heel) ..... Hind limb length .....

Left fore limb or Hind limb paw dimension Length ..... Width .....

Neck girth ..... Length of Canines .....

Immobilization Details

Name of Immobilizing Drug(s)	Time of Injection	Drug dose given	Route	Site
1.				
2.				
3.				
4.				

Behaviour at the time of darting
(running, walking, standing, excited) .....

Induction time when animal goes down/ approached.....

Animal Monitoring

Time	Signs shown following immobilization	Respiration Shallow/ deep/ irregular & rate	Temperature (^{0}F)	Pulse (rate)

Drug reversal

Name of reversal Drug(s)	Time of Injection	Drug dose & volume given	Route	Site
1.				
2.				

Time when animal shows first sign of recovery - .....

Details about recovery event till animal regains consciousness /shows signs of recovery

.....

Any other comments .....

Supplemental drugs

Name of other supportive Drug(s)/antibiotic(s) etc. given	Trade name	Volume used	Route	Site
1				
2.				
3.				
4.				

15

Biological sampling

Name of sample	Preservative used	Examination required	Handed over to	Remarks

Annexure-II

GUIDELINES FOR DECLARATION OF BIG CATS AS 'MAN-EATERS'

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- Both tiger as well as leopard are known to cause habituated loss of human life (man-eaters). Such confirmed 'man-eaters' should be eliminated as per the statutory provisions provided in section 11 of the Wildlife (Protection) Act, 1972.

- Tiger as well as leopard are categorized under Schedule I of the Wildlife (Protection) Act, 1972, with highest statutory protection against hunting under section 9 (1) of the said Act. Hence, such species can be killed if they become dangerous to human life or are so disabled / diseased beyond recovery.

- Under section 11 (1) (a) of the Wildlife (Protection) Act, 1972, the Chief Wildlife Warden of a State alone has the authority to permit hunting of such animals becoming dangerous to human life or disabled or diseased beyond recovery. However, as per the statutory requirement, the Chief Wildlife Warden of the State has to state in writing the reasons for permitting elimination before hunting.

- There are several reasons for a big wild cat like tiger or a leopard to get habituated as a 'man-eater', viz. disability due to old age, incapacitation due to serious injury or loss / breakage of its canines etc. However, there may be several exceptions, and hence specific reasons have to be ascertained on a case to case basis.

- The tiger bearing forests and areas nearby prone to livestock depredation, besides having human settlements alongwith their rights and concessions in such areas, are generally prone to 'man-eaters'. Besides, loss of habitat connectivity in close proximity to a tiger source area owing to various land uses also foster straying of tiger near human settlements, eventually ending up as a 'man-eater'.

Suggested steps on loss of human life due to tiger / leopard

- Constitute a team for technical guidance and monitoring on day to day basis, as below:

  - A nominee of the Chief Wildlife Warden
  - A nominee of the National Tiger Conservation Authority
  - A veterinarian
  - Local NGO representative
  - A representative of the local Panchayat
  - Field Director/Protected Area Manager/DFO I/C - Chairman

- Set up camera traps near kill sites, besides creating pug impression pads to monitor the day to day spatial movement of the wild carnivore.
- Inform the district officials (Collector / DM / SP) for duly alerting the local people to refrain temporally from the area where human death(s) has / have been reported, besides ensuring tranquility in the area from mobs / crowds of local people.
- Obtain / establish the ID of the aberrant animal causing loss of human life, through the committee constituted for the purpose, through camera trappings or direct sightings or pug impressions if camera trappings could not be done, besides collecting pieces of hair / scats of the carnivore (if available) for DNA profiling.
- A differentiation should be made between 'human kill' due to chance encounters and 'habituated man-eaters'. As most of our forests outside protected areas are right burdened, the probability of chance encounters is very high. Further, tigers often use agriculture / sugar cane field and similar cover along river courses while feeding on livestock or blue bull, which may also cause lethal encounters with human beings. Such animals should not be declared as 'man-eaters'. However, confirmed habituated tiger / leopard which 'stalk' human beings and feed on the dead body are likely to be 'man-eaters'.
- The declaration of an aberrant tiger / leopard as a man-eater requires considerable examination based on field evidences. At

times, the human beings killed due to chance of encounters may also be eaten by the animal (especially an encumbered tigress in low prey base area). However, such happenings are not sufficient for classifying a tiger / leopard as a 'man-eater', which can best be established only after confirming the habituation of the aberrant animal for deliberate stalking of human beings, while avoiding its natural prey.

- Under no circumstances, mere an animal resorting to cattle depredation should be declared as a 'man-eater', despite the fact it may venture close to human settlements. To avoid untoward incidents in such situations, the efforts to trap the animal (chemical immobilization / use of traps) should alone be resorted to.
- Set up trap cages (automatic closure) in areas most frequented by the carnivore (with appropriate luring) for trapping.
- In case successive trapping operation fails set up an expert team for chemical immobilization of the aberrant animal as per the annexed protocol.
- The option of capturing the aberrant animal either through traps or chemical immobilization should be invariably resorted to as the first option. The wild carnivore thus captured, should be sent to a nearest recognized zoo and NOT released in the wild.
- Elimination of a tiger / leopard as a 'man-eater' should be the last option, after exhausting the option of capturing the animal live as detailed in the SOP.
- The Chief Wildlife Warden of the State after the above due diligence should record in writing the reasons for declaring the tiger / leopard as a 'man-eater'.
- After 'declaring' the man-eater, its elimination should be done by a Departmental personnel having the desired proficiency, while providing the fire arm with the appropriate bore size (not below .375 magnum). In case, such expertise is not available within the Department, an expert may be co-opted from the other State Governments or outside with due authorization.
- No award / reward should be announced for destruction of 'man-eaters'.

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Annexure-III

DETAILED INSTRUCTIONS FOR THE PROCEDURE TO BE FOLLOWED IN TIGER STRAYING INCIDENTS / AREAS PRONE FOR SUCH INCIDENTS : PREVENTIVE / PROACTIVE MEASURES

(a) Identify the crisis spots / districts in the State.
(b) Conduct science based research and analysis to arrive at reasons for frequent straying of tigers in such areas.
(c) Prepare a google map indicating forest patches, territory of the tigers, nearby habitation and corridors.
(d) Form monitoring teams consisting of locals with wireless communication on 24X7 basis besides rapid response team.
(e) Establish an early warning system.
(f) Issue alert to all nearby villages to take utmost caution.
(g) Monitor the cattle kill and immediately pay ex-gratia / compensation in the case of eventuality.
(h) Use electronic surveillance to monitor the movement of the tigers during the night.
(i) Water holes, cattle kill, transmission lines should be regularly monitored.
(j) Put in place Rapid Response Team (RRT) for capturing the animal to avoid lethal encounter. The RRT to be equipped with the following:-

(i) A field van/mini-truck with built in rails for accommodating a trap cage, with space for equipments, attendants and staff.
(ii) A tranquilization kit with drugs for chemical immobilization.
(iii) Taser gun for instant immobilization of the animal.
(iv) 2 mobile phones for continued communication with the authorities.
(v) 4 wireless handsets.
(vi) 2 GPS sets.
(vii) 1 long ranging night vision for seeing objects in the dark.

(viii) A digital camera.
(ix) 4 trap cages (2 for tiger and 2 for leopard).
(x) 1 mini-tractor for transporting the cage in rugged terrain.
(xi) 2 search lights.
(xii) 2 radio collars with receiver and antenna.
(xiii) 2 portable tents.
(xiv) Portable hides – which can be set up fast, to be used for persons with tranquilizers
(xv) 2 folding chairs with table.
(xvi) Hand held audio system.
(xvii) Rope and net.
(xviii) First aid kits

(k) The rapid rescue team is required to ensure unobtrusive close monitoring of the animal with least disturbance, for tracking its movement.
(l) In addition, at places which are not waterlogged, camera traps should be set up (fixed to a post or a tree) for establishing the identity of the animal.
(m) The rapid rescue team also requires due capacity building and 'hands on' field training involving the Wildlife Institute of India and other relevant outside experts, if needed.

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Annexure-IV

PRIORITISING AREAS FOR TIGER MONITORING

The tiger source areas and its surrounding forests have the maximum tigers, besides some protected areas and forest patches. The districts/forest divisions having spatial occupancy of tiger as indicated in the maps need ongoing monitoring on a daily basis. In this context, the following actions are indicated:

(a) Monitoring the tiger source areas using camera traps to generate photo ID for creating a photo database (Phase-IV monitoring)
(b) Implementing Phase-IV monitoring in areas having tiger occupancy as indicated in the map
(c) Periodic comparison / review of camera trap tiger photos to fix ID of tigers reported in several areas near a source site
(d) Complementing the camera trap monitoring with simple foot patrolling in the peripheral areas, while maintaining day-to-day record as per Phase-IV monitoring protocol
(e) Monitoring livestock depredation by tiger and ready payment of compensation
(f) Keeping track of sudden change in land use in areas having tiger presence
(g) Avoiding blockage of traditional tiger / wildlife corridors in areas outside the tiger reserves falling in various forest divisions
(h) Monitoring sudden change in cover values in tiger areas (change in cropping pattern etc.)
(i) Monitoring tiger movement along river courses
(j) Keeping track of insecticides sale outlets and their use in tiger bearing areas (to avoid poisoning of water)
(k) Networking through local workforce for gathering information relating to wandering gangs traditionally involved in poaching of wild animals
(l) Keeping track of local market days

(m) Fostering creation / maintenance of wildlife monitoring register at the Gram Sabha level in areas outside tiger reserves, with incentives for informing tiger presence
(n) Creation / maintenance of 'wildlife / tiger offence register' at the Gram Sabha level with reward system for assisting in crime detection
(o) Deploying special monitoring teams around highways. open wells, railway tracks, electrical transmission lines. village ponds, natural water holes, irrigation canals
(p) Insulating high tension electrical transmission poles in tiger bearing areas, besides covering open wells and irrigation canals
(q) Keeping track of encumbered tigresses in tiger bearing areas for monitoring the dispersing young ones
(r) Periodic checking of samples from water points/perennial water sources for lethal contamination
(s) Alerting local people in right burdened, tiger bearing areas to prevent lethal encounters
(t) Periodic disease monitoring of village cattle in the tiger bearing areas to avoid disease transmission to natural prey base for tiger
(u) Monitoring natural salt licks to prevent poisoning / poaching in tiger bearing areas
(v) Keeping track of local ironsmiths engaged in preparation of 'gin traps', snares etc.
(w) Creation of wildlife crime dossier and exchange of such information with field units in tiger bearing areas under intimation to the NTCA
(x) Fortnightly monitoring of tiger mortality and progress of tiger offence cases ongoing in the courts of law by the Chief Wildlife Warden
(y) Monthly monitoring of tiger mortality and progress of tiger offence cases ongoing in the courts of law by the PCCF/HOFF
(z) Use sniffer dogs for detection of body parts, escape routes and other leads

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STANDARD OPERATING PROCEDURE FOR DEALING WITH TIGER DEATH

MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

NATIONAL TIGER CONSERVATION AUTHORITY

STANDARD OPERATING PROCEDURE FOR DEALING WITH TIGER DEATH

1. **Title :** Standard Operating Procedure for dealing with tiger death

2. **Subject:** Tiger death/seizure of body parts

3. **Reference:** Advisories of NTCA/Project Tiger on the subject

4. **Purpose:** To ensure that the causative factors for tiger death are ascertained and taken to logical conclusion in the interest of tiger conservation.

5. **Short summary:** This Standard Operating Procedure (SOP) provides the basic, minimum steps which are required to be taken at the field level (tiger reserve or elsewhere) for dealing with incidents of tiger mortality where the carcass is available or the body parts have been seized.

6. **Scope :** The SOP applies to all forest field formations including tiger reserves besides other areas where the incident has occurred.

7. **Responsibilities :** The Field Director would be responsible in the case of a tiger reserve. For a protected area (National Park / Wildlife Sanctuary), the concerned protected area manager would be responsible. In the case of other areas (revenue land/conservation reserve/community reserve/village/township) the Wildlife Warden, as per the Wildlife (Protection) Act, 1972, or Divisional Forest Officer/ Deputy Conservator of Forests (under whose jurisdiction the area falls), would be responsible. The overall responsibility at the State level would rest with the Chief Wildlife Warden of the concerned State.

8. **Detailed instructions for the procedure to be followed in tiger death / seizure of body part / incident reported but no body part / carcass available but for corroborative field evidences**

(i) At Scene of crime (SoC) / incident (responsibility : Range Officer, Assistant Director / Assistant Conservator of Forests, Deputy Director / Divisional Forest Officer)

- Reach the spot at the earliest, while informing the Field Director/Conservator/Chief Conservator of Forests having jurisdiction
- Call for Investigation Team to the spot immediately. It should be mandatory for the Investigation Team to visit the SoC with Investigation Kit.
- Cordon off the area with the help of rope/tape so that evidences are not disturbed
- Take photographs of undisturbed site/video record from different angles for comparison with camera trap recordings (if done in the area). Photographs and video should have both close ups and from distance shots. Tapes may be placed to show distances of various physical objects found at SoC. Circumstantial observation at SoC should be minutely recorded.
- Do not manipulate evidences
- Divide the whole area into grids/circles for investigation and collection of evidences
- Note down all finer details, date, time, GPS location, weather etc. Each step and action in the investigation process should be properly documented. It is highly recommended that

Investigating Officers (IOs) should adopt the practice of writing daily case diaries as prescribed under Section 172 CrPC and submit it to next supervisory officer on daily basis.

- Requisite seizure/arrest memo should be prepared on the spot.
- Wherever possible, two independent witnesses should be associated in search, seizures and arrests.
- Survey the entire area. In case of suspected infighting of animals, look for trails of other injured animals also.
- At least an area of about 500 meters encircling the Scene of Crime (SoC) may be searched thoroughly for evidence. In many cases it is seen that the animal moves some distance after it is hit by the bullet or it consumed poison. It is also common that the poachers remove the carcass to a nearby place for the sake of convenience in de - skinning the animal.
- Rivers, lakes or other water bodies near by the SoC may also be inspected for collection of evidence as the poachers wash their body or the tools/weapons used in de-skinning the animal in the nearby rivers or water bodies. In some cases it is also noticed that the poachers enter the Tiger Reserve walking along the river banks.
- Record foot prints of animals/human/tyre marks of vehicles if any by using plaster of Paris.
- Search & collect all possible evidences carefully in original conditions, while preserving (if needed)
- Search for evidences at ground level, eye level and above eye level (eg. hideout/machan/bullet marks on trees/freshly cut branches/traces of kindled fire on the floor/burnt matchsticks etc.). Samples to be collected from the spot may include: blood, body-fluids, tissues, hair/fur/teeth/bone pieces etc., gun powder, cloth fibre, paint chips, soil, cartridge case, bullets, foot prints, tyre marks, gutka wrapper, match sticks, food items, water sample from waterhole etc.
- Tools recovered from the spot should be appropriately secured for finger prints, stains etc.
- At times clothes worn by the accused are to be seized for analysis of blood stains, fluids etc. Nail cuttings may be taken if skinning is suspected.
- Use transparent polythene bags for collecting these samples. The different articles should not be put in one bag. Each article needs to be put in one bag, separately.
- Specimen seal to be sent to the expert, Court and the third copy to be put in official file for records.
- Properly label and seal the samples collected. Assign each sample with exhibit number and brief description. Search the leads/trails/routes of escape/exit. Use sniffer dogs for leads (if available).
- Record external evidence from carcass: wounds, bullet injury/marks, symptoms of poisoning etc., apart from body measurement (if possible). Injuries on the carcass should be properly measured and described / explained.
- Go for Post Mortem (PM) if team available or otherwise keep the carcass in deep fridge. The PM has to be conducted during the day light.
- While doing PM – collect sample of visceral content and tissue. Send visceral sample for forensic analysis to a reputed laboratory; send the tissue sample to the Wildlife Institute of India (WII) or a recognized institute within the country having domain expertise for DNA profiling and histo-pathological tests.
- Finalize the PM report, and send the same to the Chief Wildlife Warden (CWLW) under intimation to the National Tiger Conservation Authority (NTCA). In case the PM report is under process, send a preliminary report to the Authority indicated immediately
- Dispose of the body as per rules in the presence of the competent authority In case of seizures of body parts, the same may be required as evidence for prosecution in the courts of law and

hence in such situations do not dispose the same till the orders of the concerned court for disposal of the same are received.

- Issue a departmental preliminary offence report (POR)/FIR etc.
- Prepare a seizure memo and arrest memo with signature of accused (if present), witnesses etc. alongwith a site map, and a species identification certificate issued by a forest officer, not below the rank of an Assistant Conservator of Forests who would certify that he has identified the species on the basis of his training and experience in identifying the species in the field

(ii) If suspect(s) is arrested:

- Collect name, address, biometric details, photographs, height, weight etc. of suspect(s). During the search/ arrest/ interrogation, special care should be taken to seize/ get details of telephone nos. especially mobile phones, diaries including numbers scribbled on a piece of paper etc. These are crucial in tracing linkages. Persons arrested must be informed of the full particulars of the offence committed and the grounds for arrest. (Sec.50 Cr. P.C. & Art 22 (1) - Constitution of India)
- Prepare an arrest memo with ground/basis for arrest, citing reasons/basis for arrest
- Record statements of suspects(s) and/or witness(s) alongwith signatures under Section 50(8) of WPA. Ideally the statement should be recorded by ACF and above authorized by the State Govt. in this behalf (which is the requirement of WPA)
- The nominated person by the accused needs to be informed about the arrest and place where the accused has been lodged as per Section 50A of Cr. P.C and Supreme Court's order in *Joginder Singh's* case intimate
- Get conducted medical examination of arrested suspect(s) and produce before the Magistrate having jurisdiction within 24 hrs. or where forward and backward linkages are to be discovered move an application for remand. Always contact your Public Prosecutor in the local Court before hand in case you are trying to move such application so that the staff succeeds in getting the remand.
- In the case of a female offender, the medical examination has to be conducted only by a female registered medical practitioner.
- Take proper care of health and safety of accused during which he is in your remand. If the accused falls ill in depts. custody, he must be given medical aid or treatment admitted for in a hospital
- Based on interrogations and leads, thoroughly investigate the matter, establish backward and forward links, arrest other links involved based on statement given by the accused and information given by accused.
- The arrested person has a right to consult and be defended by a legal practitioner of his choice (Article 22 (1) of the Constitution of India).
- If the arrested person is poor, he can get free Legal Assistance from the Legal Services Authority (Art 39 A Constitution of India).
- Arrest should not be made on mere suspicion (145 Cr. P.C).
- The arrested person is entitled for compensation for groundless arrest / illegal detention.
- Though the statement given by the accused under Psycho - analysis test has little evidentiary value but in case of hardened criminals who don't cooperate in investigation, such tests may be recommended.
- Prepare a final report, Complaint as per Section 55 of WPA and file in the court of law

- Submit a final report with conclusion regarding cause of death to the Chief Wildlife Warden under intimation to the National Tiger Conservation Authority through the Field Director/Wildlife Warden/Conservator/Chief Conservator of Forests having jurisdiction
- A format of 'Arrest cum Personal Search Memo' is at **Annexure - 1.**

(iii) Actions required at the Office of Field Director/Wildlife Warden/Conservator/Chief Conservator of Forests having jurisdiction/Control Room

- Send a preliminary intimation to NTCA, Chief Wildlife Warden and Regional Deputy Director (RDD) of WCCB about the incident (SMS/ e-mail/telephonic call/fax etc.) immediately
- Constitute a Post Mortem team as per the NTCA protocol
- Send an investigation team/issue office order appointing the Investigating Officer (IO)
- Analyze the past and present intelligence reports for possible leads, cell phone records of history sheeters/suspects, check with neighbouring districts/divisions/States
- Deploy vehicular checking on barriers, inform local Police and issue red alert for checking vehicles at all exit points
- Check the photographs of carcass and compare with the National Repository of Camera Trap Photographs of Tigers (NRCTPT) in NTCA or the Phase-IV camera trap monitoring database or other research database to establish the identity/source area
- Issue an official version of the incident through the Chief Wildlife Warden
- Send the biometric details of suspect(s) to the NTCA for alerting other Field Directors/States/Wildlife Crime Control Bureau, and for establishing possible linkage with other crimes elsewhere
- Closely monitor/supervise the investigation, liaise with Police Department, Tiger Cell of the State (if available), Wildlife Crime Control Bureau and other investigation agencies
- Prepare a ***'Final Report'*** and submit to the Chief Wildlife Warden under intimation to the NTCA. Since all tiger deaths are treated as 'Poaching Cases' by the NTCA unless proven otherwise, justification for categorizing a tiger death as 'Natural' should be provided alongwith evidences
- All cases of poaching / seizure should be dealt in the courts of law having jurisdiction
- Monitor the case ongoing in the court of law till its final disposal by the Court
- After the Court's order, analyze the case for corrective actions (if needed) for further appeal
- If the decision of the Court is satisfactory, close the case and report to the Chief Wildlife Warden under intimation to the NTCA

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ANNEXURE-A

IMPORTANT POINTS FOR PREPARING A COMPLAINT

- Check the complaint/ whether relevant sections of the Wildlife (Protection) Act, 1972 and other Acts have been invoked viz. Section 2, 9, 50 etc. of Wildlife (Protection) Act
- Statements under Section 50 (8) of the Wildlife (Protection) Act, 1972 of witnesses and confession statements of suspect(s), (besides relevant sections of other laws)
- Site plan of the crime scene. The map of the compartment can also be useful in this regard.
- Status of site of the said offence – protected area/tiger reserve/forest division/other area, alongwith a copy of Government notification (in case of tiger reserve/protected area/reserved forest/protected forest)
- Post Mortem report
- Expert identification report, from institutions like Wildlife Institute of India, Dehradun or Zoological Survey of India or reputed institution having domain expertise, regarding only portions/pieces/tissues, if seized
- Copy of the specimen seal affixed on the materials sealed
- CD of photographs/video recording done during investigation
- Copy of ownership papers of house/seized vehicle, identity proofs/cards etc.
- Copy of relevant section of the Wildlife (Protection) Act, 1972, and/or any other Act
- Annexure containing list of documents and witnesses
- Forensic report of visceral contents, ballistic report (if applicable)
- A format of Complaint is at **Annexure - 2**.
- A list of documents to be attached with the Complaint and guidelines for filing complaint u/s 55 of the Wildlife (Protection) Act 1972 are at **Annexure - 3**.

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ANNEXURE-B

NOTE ON ACTIONS NEEDED FOR ANTIPOACHING/TIGER PROTECTION

1) In-depth thorough investigation on **EACH CASE** with a final report (should not be left un-resolved/ open ended)
2) Investigation must examine forward/ backward linkages, trans border ramifications, cracking poacher-carrier-trader-consumer nexus/network
3) Close monitoring with the help of information technology/informer network on suspects/history sheeters
4) Examine Post Mortem (PM) and viscera reports
5) Intensive patrolling besides other antipoaching operations should be done in sensitive areas
6) Ensure multi-disciplinary approach and cooperation in case of investigation and intelligence sharing. Wildlife authorities should enter into MoU with IB/LIU for intelligence sharing, MoU with Paramilitary forces like BSF, CRPF, Assam Rifles, SSB etc. for joint patrolling in sensitive border areas, through the State Government and NTCA
7) Review of each case of mortality regularly at the highest appropriate level
8) Ensure review and coordination meeting with Judicial, Police and Revenue Officials on monthly basis
9) Each Tiger Reserve must have a highly trained team of officers/ Rangers for investigations of tiger related crime with all modern & scientific tools of forensic science. The State Forest Department, through the National Tiger Conservation Authority should organize training of such selected elite 'Investigating Teams', if required
10) After complete investigation, proper prosecution of cases in the appropriate courts of law should be ensured through regular monitoring of pending cases at the highest authority at the appropriate level
11) Prepare State/Reserve level of database/history sheet/dossier of each convicted criminals and suspects, while apprising the NTCA periodically. Personal Profiles (PPs) of all accused should be prepared. In case of habitual offenders History Sheets (HSs) may be prepared for surveillance. Copies of PPs and HSs may be sent to NTCA/WCCB as well for circulation and surveillance. A format of Personal Profile is at **Annexure - 4**
12) A separate note on the modus - operandi adopted by the criminals in each tiger poaching case may be recorded and circulated to NTCA/WCCB etc., which could be used in crime prevention strategy and also in the sensitization/ training courses for enforcement agencies.
13) Ensure that each Tiger Reserve has a Security Plan in place as per the guidelines issued by the NTCA
14) Ensure appropriate resources to deal with poaching threats and investigation
15) Since tiger is a highly endangered species falling in Schedule-I of the Wildlife (Protection) Act, 1972, weekly monitoring of tiger offence cases ongoing in courts of law should be done for expediting the same by the Field Director/Wildlife Warden/Conservator/Chief Conservator of Forests having jurisdiction
16) The Chief Wildlife Warden of the State should also review the progress of each tiger case ongoing in various courts of law every fortnight. The Principal Chief Conservator of Forests (HOFF) of the State should also review the same on a monthly basis, while apprising the NTCA

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ANNEXURE - 1

ARREST CUM PERSONAL SEARCH MEMO

(U/S 50 (3) of the Wild Life Protection Act, 1972)

1	Name of Office	
2	Case number, date and Sections of law	
3	Name, parentage and age of the accused arrested	
4	Present and permanent address of the arrested accused	
5	Identification marks of the arrested accused	
6	Reasons for arrest and whether without warrant or with warrant	
7	Place, date and time of arrest	
8	Documents/articles which found on the person of the accused	
9	Name and address of the independent witness who was present at the time of arrest	
10	Name and designation of the officer who effected the arrest	
11	Name of the relative/friend as declared by the arrestee who has been informed of his arrest	
12	Name of the local Police Station where the arrested person is to be kept in custody or other venue of custody of the accused	
13	Any other particulars including injuries on the person of the arrestee if any	
14	Signature of the arrested accused	
15	Signatures of independent witnesses.	

7

16	Name, designation and signature of the officer who effected the arrest	

ANNEURE - 2

COMPLAINT IN A WILDLIFE OFFENCE

(U/s 55 of Wildlife (Protection) Act 1972 r/w Sec 200 Cr.P.C)

1	Name of the Office	
2	Offence Report number and date	
3	Place, date and time of offence	
4	Sections of law	
5	Details of property seized	
6	Whose custody the seized properties are lying, if submitted in the court - Property Index number	
7	Live specimens if any seized and subsequently rehabilitated in its natural habitat as per the court order	
8	Details of perishable or hazardous materials seized and subsequently destroyed as per the court order	
9	Details of fire arms, if any, seized and handed over to the Police for investigation and the Police FIR number	
10	Whether samples were sent for examination to Wildlife Institute of India, Zoological Survey of India, Botanical Survey of India or any other scientific experts for opinion? If so, details of the opinion received	
11	Name, designation and office address of the officer who filed	

	the Offence Report	
12	Name, designation and office address of the officer filing the complaint	
13	Name and address of the accused against whom the complaint is filed	
(i)	Accused in custody	
(ii)	Accused on bail	
(iii)	Accused not arrested/ absconding	
(iv)	Accused who are habitual/ repeated offenders, details of previous cases	
13 .	Name and address of the witnesses and facts to be proved by the evidence of each witness	
14	List of documents, if any, submitted along with the complaint	
15	Nature of offences and facts of the case/allegation made against each accused	

Name & designation of the complainant
with office seal

To
The Chief Judicial Magistrate/JMFC
(Address)

ANNEURE - 3

DOCUMENTS TO BE ATTACHED WITH THE COMPLAINT

1. Forwarding/Covering letter addressed to the concerned magistrate praying for taking complaints u/s 55 of WL(P)Act,1972, r/w Section 200 of Indian Criminal Code 1973.
2. Sequential order of incidence preferably in chronological order along with the violation of relevant sections and section 51 under which sentence of the accused is prayed upon.
3. POR/FIR if any along with the information sent to the court
4. List of accused.
5. List of witness.
6. Site memo
7. Arrest memo
8. Medical report
9. Intimation to relatives
10. Seizure Memo
11. Statement of accused
12. Statement of Witness (u/s 50(8) of WLPA
13. Gazette Notification of R.F/NP/Sanctuary
14. PM Report/Expert Opinion
15. Wildlife Census Report (if any)
16. Appointment letter of I.O.
17. Posting order of staff.
18. Log book of vehicle (if used)

19. Any other relevant document having bearing on the incidence.

Guidelines for filing complaint u/s 55 of Wildlife (Protection) Act 1972:

The officer filing the complaint should ensure that he is authorized to file the complaint as envisaged under section 55 of Wildlife (Protection) Act 1972.

If the accused is in judicial custody, the complaint is to be filed within 60 days from the date of arrest of the accused. In case of more than one accused, the 60 days period starts from the date of arrest of the first accused.

The complaint should preferably be typed, or neatly written without any over writings, alterations etc.

Full details of all the accused and the role played by them individually, offences committed by each of them with relevant sections of the Act are to be narrated in the complaint. Present status of the accused like on bail, in judicial custody, absconding etc is also to be mentioned in the complaint. In the case of accused in judicial custody, name of the jail in which they are lodged is to be mentioned. In case of absconding accused, efforts taken by the Investigating Officer to apprehend them including action under Section 82 & 83 CrPC, are also to be narrated in the complaint.

The complaint should be specific and without any ambiguity. Facts not supported by evidence should not be mentioned in the complaint. Similarly, accused against which sufficient evidence is not there should not be named in the complaint. Facts and circumstances connected to the case should be narrated in simple language, sequentially. List of witnesses, documents and material objects should be submitted along with the complaint. The authorized officer who files the complaint should sign all the pages of the complaint and annexures if any.

Statements of all the witnesses, including the official witnesses, recorded u/s 50(8) of Wildlife (Protection) Act as per the list of witnesses, confessional statements of the accused and statements recorded by the Magistrate u/s 164 Cr.PC if any should be filed along with the complaint.

All documents in original or certified copy, as per the list of documents enclosed, should be submitted along with the complaint. A comprehensive list of documents which are to be compulsorily submitted along with the complaint is given below.

Annexure - 4

PERSONAL PROFILE

1. Name, aliases and Father's name:

PHOTO
with date

2. Address:

3. Personal Description:

Date of Birth / age:	Hair:
Place of Birth:	Eyes:
Height:	Sex:
Weight:	Complexion:
Build :	Language:

Citizenship:

Scars/ Identification Marks: ---

Remarks: ---

4. Important personal information:

   a. Telephone/ mobile No(s). :

   b. E – Mail Address:

   c. Passport No. :

   d. Bank Account No(s). :

   e. Aadhar Card No. :

   f. Voter Id Card No.:

   g. Ration Card No.:

   h. Finger print records:

5. Current/ previous occupation(s) and list of properties owned:

6. Associates / relatives/ family members and their occupation:

7. Crime history and brief facts of the wildlife case(s) against him:

8. Crime Modus Operandi:

9. Areas of his current activities/ places of usual movements:

10. Previous Acquittals / Convictions:

11. If declared absconder, details:

12. Any other remarks:

(SOP prepared with inputs from WCCB, Mr Saurabh Sharma, Legal Expert, Field Officers of Tiger Reserves)

STANDARD OPERATING PROCEDURE FOR DISPOSING TIGER/ LEOPARD CARCASS/BODY PARTS

MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

NATIONAL TIGER CONSERVATION AUTHORITY

STANDARD OPERATING PROCEDURE FOR DISPOSING THE TIGER/ LEOPARD CARCASS/BODY PARTS

1. **Title :** Standard Operating Procedure for disposing the tiger/ leopard carcass/ body parts.

2. **Subject:** Tiger death/seizure of body parts

3. **Reference:** Advisories of the Ministry of Environment & Forests/ Project Tiger/ NTCA on the subject (Advisory No: 1-60/89-WL I dated 04-11-1994 from the Addl. IGF (wildlife) Ministry of Environment and Forests)

4. **Purpose:** To ensure that the carcass/ body parts of tiger/ leopard are disposed of in a transparent manner to prevent any pilferage for illegal market.

5. **Short summary:** This Standard Operating Procedure (SOP) provides the basic, minimum steps which are required to be taken at the field level (tiger reserve or elsewhere) for disposing of tiger/leopard carcass/ body parts where carcass is available or the body parts have been seized.

6. **Scope :** The SOP applies to all forest field formations including tiger reserves besides other areas where the incident has occurred.

7. **Responsibilities:** The Field Director would be responsible in the case of a tiger reserve. For a protected area (National Park / Wildlife Sanctuary), the concerned protected area manager would be responsible. In the case of other areas (revenue land/conservation reserve/community reserve/village/township) the Wildlife Warden, as per the Wildlife (Protection) Act, 1972, or Divisional Forest Officer/ Deputy Conservator of Forests (under whose jurisdiction the area falls), would be responsible. The overall responsibility at the State level would rest with the Chief Wildlife Warden of the concerned State.

8. **Detailed instructions for the procedure to be followed for disposing of the tiger/ leopard carcass/ body part(s) where body part(s) / carcass is available**

(i) At Scene of crime (SoC) / incident: when carcass or parts available:

- Follow the SOP issued by the NTCA on dealing with the tiger mortality/ seizure of body parts.
- Dispose of the carcass by incineration in the presence of the Field Director or an officer not below the rank of the Conservator of Forests besides the Post Mortem (PM) Team having representation from the civil society institution
- While incinerating the carcass, the sequence must be photographed and video recorded.
- Before leaving the site, ensure that the whole carcass including bones are fully burnt.
- After ensuring the complete incineration of the carcass, prepare a 'Panchnama (Memo) on disposal of the carcass, duly signed by the PM Team and officer incharge, and send a final report (Annexure-I) to the CWLW under intimation to the NTCA with supporting photographs/ documents.

(ii) In case of seizure of body parts (Skin – dry or fresh/ bones/meat or other body parts):

- Follow the SOP issued by the NTCA on dealing with the tiger mortality/ seizure of body parts.
- In case of seizures of body parts, the same may be required as evidence for prosecution in the courts of law and hence in such situations do not dispose the same till the orders of the concerned court for such disposal are obtained.
- Once orders have been obtained by the competent authority, dispose of the body part (s) by incineration in the presence of the Field Director or an officer not below the rank of the Conservator of Forests besides the Team (same as prescribed for the Post Mortem) having representation from a civil society institution
- While incinerating the body parts, the sequence must be photographed and video recorded.
- Before leaving the site, ensure that the whole/ all body parts are fully burnt.
- After ensuring the complete incineration of the body part (s), prepare a 'Panchnama' (Memo) on disposal of the body part (s), duly signed by the said Team and officer incharge, and send a final report (Annexure-I) to the CWLW under intimation to the NTCA with supporting photographs/ documents.

(iii) In cases of seized stock of wildlife trophies obtained during seizure/ confiscation:

- All seized stock of wildlife trophies, where no case is pending in a Court of law, should be destroyed through incineration in the presence of the Field Director or an officer not below the rank of the Conservator of Forests besides a team (same as prescribed for the post mortem) having representation from a civil society institution.
- While incinerating the body parts, the sequence must be photographed and video recorded.
- Before leaving the site, ensure that the whole/ all body parts are fully burnt.
- After ensuring the complete incineration of the body part (s), prepare a 'Panchnama' (Memo) on disposal of the body part (s), duly signed by the said Team and officer incharge, and send a final report (Annexure-I) to the CWLW under intimation to the NTCA with supporting photographs/ documents.
- The provisions of the Wildlife (Protection) Act, 1972 must be followed before destroying such stock.

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ANNEXURE - 1

FINAL REPORT

To be submitted for disposal of each case of tiger/ leopard carcass/ body part (s)/ trophy

1	Name of Office	
2	Locational details of the mortality: description, GPS, Compartment /Block/Range /Sub-Division/ Forest Division/ Tiger Reserve or place/ time	
3	Date of Mortality/ carcass report	
4	In case of seizure of body parts details indicating the status of carcass or seized material	
5	Details of the person (staff/ Others) who reported the incident first: name/address/ contact details/ telephone numbers/e-mail	
6	For carcass: Date, time and Place of Post Mortem (PM)	
7	Details of PM Team (names/designation/ address/ contact)	
8	Details of the missing body parts, if any	
9	Cause of death as ascertained after the PM	
11	Colour photographs of the carcass/ body part (s)- (close ups, indicating injury, if any); details of comparison with camera trap photo data base	
12	Cause of death: Natural/ Poaching	
13	In case of poaching/ seizure of body parts: i. further action taken/ proposed: ii. attach colour photographs of the seized body part/s iii. attach certification regarding species identity (for bone pieces/ meat/ other body parts which are not physically	

	identifiable) iv. action taken with respect to offenders/ suspects (if arrested) v. status of Case/ complaint: number, date of filing the complaint, Sections of law, name of Court where filed	
14	Panchnama/memo of disposal of carcass/ body part (s)	Enclosed/ not-enclosed
15	Remarks if any	
16	Signature of the Officer In-charge with name, designation, date and stamp	

(SOP prepared with inputs from Field Officers of Tiger Reserves)

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ANNEXURE XI

COMMITTEES

A. **Tiger Conservation Authority**

The Minister of State in charge of the Ministry of Environment and Forests – Chairperson

The Minister of State in the Ministry of Environment and Forests- Vice-Chairperson

Three Members of Parliament of whom two shall be elected by the House of the People and one by the Council of States

Eight experts or professionals having prescribed qualifications and experience in conservation of wildlife and welfare of people living in tiger reserve out of which at least two shall be from the field of tribal development

Secretary, Ministry of Environment and Forests

Director General of Forests and Special Secretary, Ministry of Environment and Forests.

Director, Wildlife Preservation, Ministry of Environment & Forests

Six Chief Wildlife Wardens from the tiger reserve States in rotation for three years

An Officer not below the rank of Joint Secretary and Legislative Consel from the Ministry of Law and justice

Secretary, Ministry of Tribal Affairs

Secretary, Ministry of social justice and Empowerment.

Chairperson, National Commission of the Scheduled Tribes

Chairperson, National Commission for the Scheduled Castes

Secretary, Ministry of Panchayati Raj

Inspector-General of Forests or an officer of the equivalent rank having at least ten years experience in a tiger reserve or wildlife management, who shall be the Member-Secretary, to be notified by the Central Government, in the Official Gazzette.

B. State Level Steering Committee

Copy of Govt notification given overleaf.

GOVERNMENT OF ORISSA
FOREST & ENVIRONMENT DEPARTMENT.

NOTIFICATION

Dated, Bhubaneswar the 8-1-10

No 8F(T)-3/2007(Pt)-565/F&E. Under the provisions of section 38-U of the Wildlife (Protection) Amendment Act, 2006 a State Level Steering Committee for conservation of tiger is constituted as follows for Co-ordination and monitoring of all activities related to protection of Tigers, co-predators and their prey animals

Chief Minister, Orissa	-	Chairperson
Minister in charge, Forest & Environemnt	-	Vice-Chairperson.
Sri Subarna Naik, M.L.A., Keonjhar	-	Member
Sri Jhina Hikaka, MLA, Laxmipur	-	Member
Secretary to Govt.,Forest & Env. Deptt.	-	Member
Secretary to Govt., ST & SC Dev. Deptt.	-	Member
Secretary to Govt., Panchayati Raj Dept.	-	Member
Field Director, Similipal Tiger Reserve,Baripada	-	Member
Field Director, Satkosia Tiger Reserve, Angul	-	Member
DFO (Wildlife) in –charge, Sunabeda (Proposed) Tiger Reserve.	-	Member
Director, SC &ST Research & Training Institute	-	Member
Dr. S. N. Patra, Member. Expert Committee for Satkosia Tiger Reserve		Member
Sri S.K. Mishra, Member Expert Committee for Similipal Tiger Reserve	-	Member
Sri Guruva Soren, Organizer, Society for Research & Dev. Of Tribal Culture At. Raikadjharan, Via. Tiktabur, Baripada	-	Member
Chief Wildlife Warden, Orissa	-	Member Secretary.

By Order of Governor

B.P. Singh,
Special Secy.to Government.

OFFICE OF THE DEP. FIELD DIRECTOR SIMILIPAL TIGER RESERVE
21 JAN 2010 235

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Memo No. 566 /F&E, dt. 8.1.10

Copy forwarded to the Director, Printing, Stationery & Publication, Orissa, Cuttack for information and necessary action.

He is requested to publish the above notification in the next issue of Orissa Gazette and supply fifty (50) copies of the notification to this Department.

Joint Secretary to Government.

Memo No. 567 /F&E, dt. 8.1.10

Copy forwarded to Dr. Rajesh Gopal, IGF & Member Secretary (NTCA), MoEF, Govt. of India, Bikaner House, Annex-V, Shahjahan Road, New Delhi -110 011 for information.

Joint Secretary to Government.

Memo No. 568 /F&E, dt. 8.1.10

Copy forwarded to all the Members of the Committee for information.

Joint Secretary to Government

Memo No. 569 /F&E, dt. 8.1.10

Copy forwarded to the Private Secretary to the Hon'ble Chief Minister, Orissa / Private Secy. to the Chief Secretary, Orissa for information..

Joint Secretary to Government

Memo No. 570 /F&E, dt. 8.1.10

Copy forwarded to the P.S. to Principal Secretary to Government, F& E Department / P.S. to Spl. Secretary to Govt., F& E Department for information.

Joint Secretary to Government

Memo No. 571 /F&E, dt. 8.1.10

Copy forwarded to the Head State Portal Group, I.T. Centre with a request to launch the copy of the notification in the State Website / 20 (Twenty) spare copies for Guard File.

Joint Secretary to Government

C. **Similipal Tiger Conservation Foundation**

Governing Body of the Foundation:-

i.	Minister in-charge of Wildlife in the Govt. of Orissa.	President
ii.	Principal Secretary, Forest & Environment, Orissa	Vice-President
iii.	Principal Chief Conservator of Forests, Orissa	Member
iv.	Field Director, Similipal Tiger Reserve, Baripada	Member
v.	Deputy Director, Similipal Tiger Resreve, Baripada	Member
vi.	Two prominent Scientists or qualified Experts in the field to be nominated by Government.	Members
vii.	M.L.A., Jashipur.	Member
viii.	Chairman, Zilla Parishada, Mayurbhanj	Member
ix.	Two members of the executive committee of the Foundation (other than the Field Director/ Deputy Director).	Members
x.	Principal Chief Conservator of Forests(WL) and Chief Wildlife Warden, Orissa	Member-Secretary

The Executive Committee:-

1.	Field Director, Similipal Tiger Reserve	Chairperson
2.	Two representatives of Eco-development Committees working in the Similipal Tiger Reserve to be nominated in the Governing Body.	Members
3.	two members of front line staff of the Similipal Tiger Reserve	Members
4.	Deputy Director, Similipal Tiger Reserve	Member- Secretary

Rehabilitation and Periphery Development Advisory Committee (RPDAC) of Similipal Tiger Reserve for relocation of villages

1. Hon'ble Member of Parliament, Loksabha, Mayurbhanj
2. Hon'ble Member of Parliament, Rajyasabha, Mayurbhanj
3. All Hon'ble MLAs of Mayurbhanj District (Karajia/ Jashipur/Bahalda/ Rairangpur/Bangriposi/Kuliana/ Baripada/Baisinga/Khunta/Udala
4. President, Zilla Parishad, Mayurbhanj
5. Conservator of Forests & Field Director, STR, Baripada
6. Chairperson, Panchayat Samiti, Jashipur
7. Secretary, Lamp(NGO), At/Po- Bangriposi, Mayurbhanj
8. Chairman, Nawana Eco-Dev(NGO) Committee, At/Po- Nawana, Po- Astakunar, Via- Jashipur, Mayurbhanj
9. President, Ashra SHG, At- Sharapat, Po- Gurguria, Via- Jashipur, Mayurbhanj
10. Ganpati Woment SHG, At- Jamda Rangamatia, Po- Begunia, Mayurbhanj
11. Ganga Ho, At- Jenabil, Po- Gurguria, Via-Jashipur, Mayurbhanj
12. Rajendra Murmu, S/O Motilal Murmu, At-Kabatghai, PO- Gurguria, Via- Jashipur, Mayurbhanj
13. Project Director, DRDA, Mayurbhanj
14. Sub-Collector, Panchpir, Karanjia
15. Land Acquisition Officer, Mayurbhanj.

ANNEXURE XII

BYE- LAWS OF SIMILIPAL TIGER CONSERVATION FOUNDATION

The Rules and Regulations of Foundation has been approved as follows.

RULES AND REGULATIONS

(Bye- Laws)

1. Introduction:

i. The Name of the Foundation: Similipal Tiger Conservation Foundation

ii. The Registered Office of the Foundation : Office of the Field Director Similipal Tiger Reserve, Baripada, Dist- Mayurbhanj.

2. Area of Operation / Jurisdiction :

The area of operation shall be Similipal Tiger Reserve and its adjoining landscape with possible corridor value for dispersal of wild animals from Tiger Reserve.

3. Definitions –

In these Rules unless the context otherwise requires:

i. "Act" means the Wildlife (Protection) Act, 1972 (53 of 1972);

ii. "Executive Committee" means Executive Committee of the Foundation;

iii. "Foundation" means the Similipal Tiger Conservation Foundation (STCF) established under section 38X of the Act;

iv. "Governing Body" means Governing Body of the Foundation;

v. "Government" or "State Government" means Government of Orissa;

vi. "Implementing agency" means a tiger reserve notified under section 38V of the Act or a tiger reserve already notified by the Government of Orissa under Project Tiger Scheme;

vii. "Operations Manual" means the administrative code of the Foundation approved by the Government of Orissa;

viii."Rules of the Foundation" means the approved trust of deed and Operations Manual of the Foundation;

ix. "Staff" means any employee of the Foundation appointed by appropriate authority and shall include consultants, professionals engaged on contract, staff on deputation, daily wages worker, etc.;

x. "Tiger Conservation Authority" means the National Tiger Conservation Authority constituted under section 38L of the Act;

xi. "TigerReserveState" means a state having tiger reserve;

xii. All other words which have not been specifically defined in this Rule shall have the same meanings as have been assigned to them in the Act.

4. Constitution of the Foundation:

Similipal Tiger Conservation Foundation shall be an autonomous body to facilitate and support the

management, for conservation of tiger and bio-diversity for the tiger reserve at Similipal and to take initiative in eco-development by involvement of people in such development process.

i. Members of the Governing Body mentioned in clauses (vii) and (viii) shall, upon ceasing to be a Member of Legislative Assembly or, the Chairman, Zilla Parishad, as the case may be, cases to be a member of the Governing Body.

ii. The tenure of nominated member shall be for a period of three years from the date of nomination.

5.Governing Body of the Foundation-

i. The Governing Body of the Similipal Foundation shall consist of the following members, namely:-

i)	Minister in-charge of Wildlife in the Govt. of Orissa.	President
ii)	Principal Secretary, Forest & Environment, Orissa	Vice-President
iii)	Principal Chief Conservator of Forests, Orissa	Member
iv)	Field Director, Similipal Tiger Reserve, Baripada	Member
v)	Deputy Director, Similipal Tiger Reserve, Baripada	Member
vi)	Two prominent Scientists or qualified Experts in the field to be nominated by Government.	Members
vii)	M.L.A., Jashipur.	Member
viii)	Chairman, Zilla Parishad, Mayurbhanj	Member
ix)	Two members of the executive committee of the Foundation (other than the Field Director/ Deputy Director).	Members
x)	Principal Chief Conservator of Forests (WL) and Chief Wildlife Warden, Orissa	Member-Secretary

ii. Members of the Governing Body mentioned in clauses (vii) and (viii) shall, upon ceasing to be a Member of Legislative Assembly or, the Chairman, Zilla Parishad, as the case may be, cases to be a member of the Governing Body.

iii. The tenure of nominated member shall be for a period of three years from the date of nomination.

6. Power and functions of the General Body-

i. The Governing Body shall exercise the following powers and perform the following functions, namely:-

i. make overall policy of the Foundation in consonance with the provisions of the Act;

ii. consider and approve the balance sheet and audited accounts of the Foundation;

iii. consider and approve the Annual Report of the Foundation;

iv. approve the work plan, fund flow, Annual Budget of the Foundation;

v. make amendment in the deed of trust, which may be necessary, subject to the approval of the Government;

vi. approve the “Operations Manual” of the Foundation.

vii. co-ordinate between different departments and other institutions and with non-Governmental organisations to achieve the objectives of the Foundation;

viii.frame rules and regulations under the provisions of the deed of trust for managing the affairs of the Foundation;

ix. take all policy decisions regarding fund raising, investment and budget of the Foundation;

x. suspend, terminate or effect any other procedures on any Project or activity undertaken by the Foundation;

xi. supervise the works of the Executive Committee; and

xii. perform such other functions as may be necessary to achieve the objectives of the Foundation.

ii. Annual General Body Meeting:

The Foundation shall hold a General Body meeting of all the members of the Governing Body as per details furnished below;

a) it shall be held at least once in a year preferably in the month of April;

b) each year in the General Body Meeting the audited accounts of the previous year and the budget for the current year shall be presented, discussed and approved.

c) every meeting shall be called in writing by and under the signature of the Member-Secretary of the Governing Body through a prior notice of 15 days, containing a summary' of the business to be transacted in such meeting.

d) any inadvertent omission to give notice to, or the non-receipt of notice of any meeting by, any member shall not invalidate the proceedings of the meeting;

e) if the President is not present in the meetings of the Governing Body, the Vice-President shall preside over the meeting;

f) one third of the members of the Governing Body present shall form a quorum of the Governing Body provided that no quorum shall be necessary in respect of any adjourned meeting;

g) all disputes in a meeting of the Governing Body shall be determined by the division of vote;

h) the member who is unable to attend the Governing Body meeting may send his views on the agenda in writing and such expression of opinion shall be taken to be his vote on the matter concerned; and

i) the minutes of the proceedings of the meeting shall be recorded and such minutes after having been approved and signed by the Member-Secretary, shall be the conclusive proof of the business transacted in the meeting.

7. The Executive Committee :-

i. The Foundation shall have an Executive Committee to look after its day-to-day management.

ii. The affairs of the Foundation shall be administrated subject to the rules of the Foundation by the Executive Committee

iii. The Executive Committee shall consist of -

a) Field Director, Similipal Tiger Reserve-**Chairperson**

b) Two representatives of Eco-development Committees working in the Similipal Tiger Reserve to be nominated in the Governing Body-**Members**

c) Two members of front line staff of the Similipal Tiger Reserve-**Members**

d) The Collector & District Magistrate, Mayurbhanj or his representative-**Member**

e)The Superintendent of Police, Mayurbhanj or his representative-**Member**

f) Representative of two NGOs selected by Governing Body-**Members**

g)Deputy Director, Similipal Tiger Reserve-**Member- Secretary**

(the Deputy Director or, as the case may be,the Assistant Director of the tiger reserve shall function as the Secretary of the Executive Committee).

iv. The tenure of the nominated member shall be for a period of two years from the date of nomination.

v. A member of the Executive Committee, other than nominated members, shall cease to be a member as such, if he ceases to hold that office or post by virtue of which, he became the member of the committee.

ii. Powers and functions of the Executive Committee:

The Executive Committee shall have the following powers and perform the following functions, namely;

(a) manage the affairs and funds of the Foundation in accordance with the rules and regulations of the Foundation;

(b) make endeavor to achieve the objectives of the Foundation and discharge all its functions;

(c) exercise administrative and financial powers including power to engage any person of one description and make appointment thereon in accordance with the rules and regulations of the Foundation;

(d) enter into arrangement with other public or private organizations or individuals for furtherance of its objectives and in accordance with the rules and regulations of the Foundation;

(e) accept endowments, grant-in-aid, donations or gifts to the Foundation not inconsistent with the rules and regulations of the Foundation and interest of the Government;

(f) take over or acquire in the Foundation by purchase, gift or otherwise from Government or other public bodies or private individuals or organizations, any movable and immovable property in the state or elsewhere in conformity with the rules and regulations of the Foundation; and

(g) perform such others functions as are assigned to it by the Governing Body.

iii. Proceedings of Executive Committee Meeting:-

a) Every meeting of the Executive Committee shall be presided over by the Chairperson. Provided that in the absence of the Chairperson, the executive committee shall elect a Chairman to preside over the meeting.

b) One half of the total members of the Executive Committee present in the meeting shall constitute the quorum, provided that no quorum shall be necessary in respect of any adjourned meeting.

c) Not less than seven days notice of every meeting of the Executive Committee shall be given to each member of the said Committee, provided that the Chairperson may call an emergency meeting if the situation so warrants.

d) Any inadvertent omission to give notice to or the non-receipt of notice of any meeting by any member shall not invalidate the proceedings of the meetings. e) The Executive Committee shall meet as and when necessary but at least once in every month.

f) All disputed issues in the Executive Committee meetings shall be determined by vote among members.

g) Any member who is unable to attend the Executive Committee meeting may send his views on the agenda in writing and such expressio of opinion shall be taken to be his vote on the matter concerned.

h) The Executive Committee may refer any issue for the advice or recommendation to a Sub-Committee

constituted by it for the purpose and the Executive Committee shall have the right to override the recommendation or advice given by the Sub-Committee, and in doing so, it shall record reasons thereof.

i) The Minutes of the proceedings of the executive committee meetings shall be recorded and such minutes after due approval shall be issued by the Secretary.

8. Office and Authorities of the Executive Committee:-

a) The Field Director, Similipal Tiger Reserve shall be the Executive Director of the Foundation and he or she shall carry out all administrative and day-to- day function of the Foundation on behalf of the Executive Committee and he shall be the custodian of all records, assets and belongings of the Foundation.

b) The Executive Director shall have the following powers in conformity with the rules of the Foundation; namely:-

a) to accept contributions on behalf of the Foundation either in cash or in kind from a person or institutions.

b) to purchase, acquire, take on lease any movable and immovable property for the purpose of the achieving the objectives of the Foundation.

c) to have control and authority on the general administration of the Foundation.

d) to open and operate accounts with banks.

e) to prosecute, sue and defend all actions as per law for and on behalf of the Foundation.

c) The Executive Director shall have powers to convene seminars, workshops etc., and to oversee publications of research materials and books of the Foundation.

d) The Executive Director shall initiate appropriate actions for the preparation and submission of project proposals on different programmes to be undertaken by the Foundation, to various agencies for support.

e) The Executive Director shall have powers to interact with National and International Agencies for furthering the objectives of the Foundation.

9. Property, Assets and Liabilities.

a) The income and property of the Foundation, howsoever derived, shall be applied solely towards the promotions of the objectives thereof as set-forth above.

b) No portion of the income and property of the Foundation shall be paid or transferred directly or indirectly, by way of dividend, bonus or otherwise, howsoever, by way of profit, to the persons who at any point of time have been members of the Foundation or to any of them or to any person claiming through them. Provided that nothing herein contained shall prevent the payment of remuneration to any member or any persons in return of any service rendered to the Foundation or for any administrative expenses as stipulated in the Operations Manual.

10. Powers of the Government:-

The State Government may time to time review the functioning of the Foundation and issue such directions, as it may consider necessary in respect of the affairs of the Foundations. All such directions shall be binding upon the Foundation.

11. Funds of the Foundation –

i. Source of Fund :

The following shall be the various sources of funds for running the affairs of the Foundation in conformity with the rules of the Foundation, namely:-

a) the income generated from levying tourist entry fees and other charges for the services generated out of the Tiger Reserve;

b) contribution from other sources in terms of specific projects from national as well as international agencies as permitted by law; and contributions received for internal Agencies may be accounted for under a separate Head in Accounts, mentioning the purpose for which they are received.

c) grant-in-aids, donation or assistance of any kind from any individual or organisations including foreign Governments and other external agencies as permitted by law;

d) Income received from any other activities as permitted by law and in conformity with the rules of the Foundation; and

e) Interest, dividend earned on the funds of the Foundation.

ii. Management of Funds :

The fund of the Foundation shall be managed as per the provisions of the 'Operation Manual-Part-I' annexed with this Rules duly approved by the Governing Body.

iii. Delegation of Financial and Administrative Powers :

For day to day management of the affairs of the Foundation, 'Operation Manual-II' annexed with this Rules duly approved by the Governing Body shall provide the guidance of delegation of financial and administrative powers.

12. Accounts & Audit :

i. The foundation shall maintain proper accounts and prepare annual accounts comprising the receipts and payment. Statement of liabilities etc.

ii. Opening of bank account shall be in accordance with Rule 5 of the O.G.F.R. Vol-I and withdrawal shall be made by cheques signed by Field Director, Similipal Tiger Reserve, who is the Chairperson of the Executive Committee of the Foundation.

iii. The interest generated so, shall be utilized for development and protection of Similipal after approval of the Executive Committee.

iv. All the transactions i.e. petty as well as major transactions shall be made by Field Director or the person authorised by him and must be brought to account without delay.

v. The Foundation shall maintain the Balance Sheet including all assets and liabilities of permanent and intermittent nature, and all movable and immovable properties including consumable. Purchase of stores, tools and plants shall be guided by high standards of financial propriety and should be regulated in strict conformity with the store Rules given in Appendix-6 of OGFR volume-II.

vi. The Foundation is non-commercial in nature.

a) The accounts of the Foundation shall be audited annually by the qualified Chartered Accountant, empanelled by the Comptroller & Auditor- General of India, and approved by the Governing Body.

b) The audited accounts shall be discussed and approved by the Governing Body in its annual meeting held for the purpose; and

c) The accounts of the Foundation shall be subjected to the general provisions and directive of the Comptroller and Auditor-general of India.

d) The accounts shall be opened to Audit by internal Auditors of Forest and Environment department and A.G., Orissa. The accounts of the Foundation shall also be subject to Audit annually by the Principal Accountant

General (Civil Audit), Orissa and the accounts as certified by him shall be forwarded to the Govt. of India and State Govt. which shall cause a copy of the same to be laid before the State Legislature after the same has been perused by the Governing Body.

vii. The budget provision of the Foundation shall be made through Annual Plan of Operation and expenditure shall be made as per approved Plan.

viii. More than one subsidiary Cash Books shall be provided for daily transaction and these will be incorporated in main Cash Book / Central Cash Book of Executive Director, who is the Chairperson of the Executive Committee. The Cash balance of Executive Director is primarily the detailed record of transaction written up day by day. The Cash balance shall be closed and balanced monthly.

ix. A stock register of receipt books with machine numbering shall be maintained with clear indication of receipt books already exhausted and receipt books in use. Receipts shall be issued in support of receipt of money invariably and the transactions shall be exhibited in the Cash Book on the same day.

x. The monthly progress report, quarterly progress report and annual progress report regarding the physical and financial targets and achievements of the Foundation shall be submitted to the Principal Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden, Orissa / Forest & Environment Department as well as to National Tiger Conservation Authority.

xi. No remuneration shall be paid to any office bearers of the Foundation. However, incentive/honorarium can be given if so decided by Executive Committee.

xii. No travel expenses shall be payable to the staff for journey inside and outside the state when it is not related to Foundation work. The staff of the Foundation shall be governed by the T.A. Rules of State Government.

xiii. Purchase should be made in most economical manner in accordance with the definite requirement and strict adherence to the provisions of the OGFR for such purchases till the Foundation frames its own Rules for such transactions.

xiv. The Field Director, who is the Chairperson of the Executive Committee shall be responsible for watching the progress of expenditure and for keeping the expenditure within the grant.

xv. The Field Director, who is the Chairperson of the Executive Committee, shall take every precaution to get maximum work for the amount spent and to see that the Foundation money is not being wasted.

xvi. Monthly expenditure statement in respect of expenditure incurred out of Grants-in-aid received from Government of India / Government of Orissa may be submitted to A.G. (A & E), Orissa.

xvii. All the financial aspects / provisions shall be in conformity with the rules / provisions envisaged in Orissa Treasury Code, OGFR and Delegation of Financial Power Rules.

13. Dissolution of the Foundation:

The Foundation is irrevocable, however, in the event of any circumstance in which it is decided to terminate or dissolve the Foundation after the satisfaction of all its debts and liabilities, any assets and property, whatsoever be the same, shall not be paid to or distributed among members of the Foundation but shall be dealt with in such manner as the State Government may determine in that behalf.

14. Miscellaneous:-

a) As and when there is any change in the nomenclature of Ministries, Departments, or institution and designation mentioned, such changes shall automatically stand incorporated in the Rules of the Foundation.

b) Every staff of the Foundation may be sued or prosecuted by the Foundation for any loss or damage caused to the Foundation or its property for anything done by him/her, detrimental to the interests of the Foundation.

ANNEXURE XIII

RE-ORGANISATION OF SIMILIPAL TIGER RESERVE 2019

GOVERNMENT OF ODISHA
FOREST & ENVIRONMENT DEPARTMENT
*****

NOTIFICATION

Bhubaneswar, Dated the 21/02/19

No.1F-(A)-71/2018-3913 /F&E, In supersession to this Department Notification No.25673/F&E, dt.29.11.18 & pursuant to the proposal of the Principal Chief Conservator of Forests & HoFF, Odisha vide Letter No.2304, dated 07.02.19, Government have been pleased to reorganize the Similipal sanctuary covering 2306.61 Sq. Km of Similipal Tiger Reserve (2750 Sq. Km) into two Wildlife Divisions namely Similipal South Wildlife Division covering 1247.58 Sq. Km with headquarters at Baripada and Similipal North Wildlife Division covering 1059.03 Sq. Km with headquarters at Jashipur in the larger interest of Wildlife Management. In addition, as per codal provision it does not involve increase or decrease in the sanctioned strength of staff or any recurring or non-recurring expenditure.

The Forest Administration of Mayurbhanj District as per this Department Notification No.25673/F&E, dt.29.11.18 spread over five Divisions i.e. Similipal (South) Division, Similipal (North) Division, Baripada Forest Division, Rairangpur Forest Division & Jashipur Wildlife Division with area as follows:

Forest DIVISION	AREA (SQ. KM)	RANGES
1	2	3
BARIPADA	4186.8	7
RAIRANGPUR	3481.2	6
SIMILIPAL NORTH	845	6
SIMILIPAL SOUTH	1408	9
JASHIPUR (WL)	497	4
TOTAL	10418	32

After reorganization, the Similipal South Wildlife Division (headquarters at Baripada), Similipal North Wildlife Division (headquarters at Jashipur), Rairangpur Forest Division, Baripada Forest Division & Karanjia Forest Division shall have the following administrative setup as shown below:-

SIMILIPAL SOUTH WILDLIFE DIVISION			
SL. NO.	RANGE	SECTION	BEATS
1	PITHABATA NORTH (WL)	05	11
2	PITHABATA SOUTH (WL)	06	15
3	NAWANA SOUTH (WL)	04	09
4	DUKURA (WL)	04	10
5	JENABIL (WL)	05	15
6	NATIONAL PARK (WL)	04	09
7	UBK (WL)	07	17
8	BHANJABASA (WL)	04	12
9	PODADIHA (WL)	02	05
TOTAL	09	41	103

SIMILIPAL NORTH WILDLIFE DIVISION			
SL. NO.	RANGE	SECTION	BEATS
1	TALABANDHA (WL)	03	08
2	CHAHALA (WL)	05	12
3	NAWANA NORTH (WL)	04	11
4	BAREHIPANI (WL)	06	13
5	GURGURIA (WL)	04	08
6	KENDUMUNDI (WL)	06	12
7	THAKURMUNDA (WL)	03	06
8	JASHIPUR (ECO-TOURISM) (WL)	03 (Units)	04 (Sub-Units)
TOTAL	08	34	74

Continue... (P/02)

RAIRANGPUR FOREST DIVISION			
SL. NO.	RANGE	SECTION	BEATS
1	RAIRANGPUR	04	13
2	BAHALDA	03	06
3	BADAMPAHAR	03	07
4	MANADA	02	05
5	BISOI (WL)	05	12
TOTAL	05	17	43

BARIPADA FOREST DIVISION			
SL. NO.	RANGE	SECTION	BEATS
1	BARIPADA	06	16
2	UDALA	04	12
3	KAPTIPADA	05	14
4	BANGRIPOSI	03	09
5	BETNOTI	04	13
6	DEULI	04	11
7	RASGOBINDPUR	03	09
TOTAL	07	29	84

KARANJIA DIVISION			
SL. NO.	RANGE	SECTION	BEATS
1	SATKOSIA (WL)	04	11
2	KARANJIA	05	13
3	DUDHIANI	07	17
4	THAKURMUNDA	06	14
TOTAL	04	22	55

After reorganization the sanctioned strength of staffs, Division wise are as follows:-

DIVISIONS	AREA SQ. KM	FOREST AREA	ACF	RANGES	RO	DY. R.O.	SECTION	FORESTER	BEAT	F.G.
SIMILIPAL SOUTH (WL) DIVISION	1247.58	1211	3* + 1@	9	10	5	41	48	103	109
SIMILIPAL NORTH (WL) DIVISION	1059.03	1002	3#	8	9	4	34	40	74	81
RAIRANGPUR FOREST DIVISION	2002.48	503	2	5	6	4	17	21	43	49
BARIPADA FOREST DIVISION	4263.13	871	3	7	9	7	29	36	84	92
KARANJIA DIVISION	1845.78	493	2	4	4	5	22	26	55	60
TOTAL	10418	4080	14	33	38	25	143	171	359	391

*1 ACF to be stationed in Udala, @1 ACF to be stationed in FD, STR, #1 ACF to be stationed in Thakurmunda.

Continue... (P/03)

The cadre strength and posts of Office Staff to be transferred to Jashipur (WL) Division are detailed below:

SL. NO.	NAME OF POST	CADRE STRENGTH	POST TRANSFERRED FROM
1	JUNIOR ACCOUNTANT	3	RAIRANGPUR DIVISION – 2 WPO BALASORE – 1
2	JUNIOR CLERK	5	RAIRANGPUR DIVISION – 3 KARANJIA DIVISION – 1 WPO BALASORE – 1
3	GUIDE	1	STR BARIPADA – 1
4	DRIVER (LV)	1	RAIRANGPUR DIVISION – 1
5	CHOUKIDAR	1	BARIPADA DIVISION – 1
6	WATCHER	1	KARANJIA DIVISION – 1
7	MUGGER WATCHER	1	STR BARIPADA – 1

Order: Ordered that this notification be published in an extra ordinary issue of the Odisha Gazette and the copy forwarded to all Departments of the Govt./ All Heads of Department/ All Collectors / Advocate General, Odisha, Cuttack/ Registrar Odisha High Court, Odisha, Cuttack.

By order of the Governor

21/2/2019.

Addl. Chief Secretary to Government

Memo No. 3914 /F&E, Date. 21/02/19

Copy forwarded to the Director, Printing, Stationary & Publication, Odisha, Cuttack with a request to publish the said notification in the next issue of Odisha Gazette.

21/2/19

Additional Secretary to Government

Memo No. 3915 /F&E, Date. 21/02/19

Copy forwarded to the P.S. to Hon'ble Chief Minister, Odisha for favour of kind information of Hon'ble Chief Minister / P.S. to the Hon'ble Minister, Forest & Environment, for favour of kind information of Hon'ble Minister, F&E.

21/2/19

Additional Secretary to Government

Memo No. 3916 /F&E, Date. 21/02/19

Copy forwarded to P.S. to Chief Secretary, Odisha for kind information of Chief Secretary (O) /P.S. to Addl. Chief Secretary to Govt., F&E for kind information of Addl. Chief Secretary / Special Secretaries to Govt., F&E Deptt. / Director, Environment-cum-Special Secretary to Govt., F&E/ Addl. Secretaries to Govt., Forest & Environment Deptt. for information and necessary action.

21/2/19

Additional Secretary to Government

Continue.... (P/04)

Memo No. 3917 /F&E, Date. 21/02/19

Copy forwarded to the PCCF, Odisha/ PCCF (KL), Odisha / PCCF (WL) & CWLW, Odisha/ Addl. PCCF-cum-Field Director, STR, Baripada/ PD, OFSDP, BBSR/ MD, OFDC, BBSR/ All RCCFs/ All DFOs for information and necessary action.

21/2/19

Additional Secretary to Government

Memo No. 3918 /F&E, Date. 21/02/19

Copy forwarded to OIC, State Portal, NIC, IT Department, Odisha Secretariat/ Guard File (2 Copies) for information and necessary action.

The OIC, State Portal, NIC, IT Department, Odisha Secretariat is requested for publication of this Notification in the Website of Forest & Environment Department.

21/2/19

Additional Secretary to Government

ANNEXURE XIV

LIST OF MAMMALS

1.	Badger, Honey or Ratel (Oriya: Gada Bhalu) (*Mellivora capensis*)
2.	Bear, Sloth (Oriya: Bhalu) (*Melursus ursinus*)
3.	Bison, Indian or Gaur (Oriya: Gayala) (*Bos gaurus*)
4.	Boar, Wild (Oriya: Barha) (*Sus scorfa cristatus*)
5.	Cat, Fishing (Oriya: Machharankana Biradi) (*Prionailurus viverrinus*)
6.	Cat, Jungle (Oriya: Bana Bhua, Katas) (*Felis chaus*)
7.	Cat, Leopard (Oriya: Chitta Biradi) (*Felis bengalensis*)
8.	Cat, Rusty-spotted (Oriya: Chhota Biradi) (*Prionailurus rubiginosus*) (1st Recorded in 2014)
9.	Civet, Small Indian (Oriya: Salia Patani) (*Vivarricula indica*)
10.	Civet, Large Indian (Oriya: Salia Patani) (*Vivera Zibetha*)
11.	Civet, Common palm Civet (Oriya: Salia patani)(*paradoxurus hermaphodiths*)
12.	Civet, white banded palm civet(*Hemigalus derbyanus*)
13.	Deer, Barking or Muntjac (Oriya: Kutura) (*Muntiacus muntjak*)
14.	Deer, Mouse or Indian Chevrotan (Oriya: Gurandi) (*Traqulus = Moschiola meminna*)
15.	Deer, Sambar (Oriya: Sambar) (*Rusa unicolor*)
16.	Deer, Spotted or Chital (Oriya: Harina, Mruga) (*Axis axis*)
17.	Elephant, Indian (Oriya: Hati) (*Elephas maximus*)
18.	Fox, Indian (Oriya: Koki Siali) (*Vulpes bengalensis*)
19.	Fox, Indian Flying (Oriya: Badudi) (*Pteropus giganteus*)
20.	Fulvous fruit bat (Rousettus lesnaultii)
21.	Greater short-nosed fruit bat (*Cynopterus sphinx)*
22.	Lesser short-nosed fruit bat (*Cynopterus brachyotis*
23.	Fulvous horse shoe bat (*Rhinolophus rouxii*)
24.	Blyth's horse shoe bat (*Rhinolophus lepidus*)
25.	Indian leaf-nosed bat (*Hipposideros lankadiva*)
26.	Indian Pygmy Pipistrelle (*Pipistrellus mimus*)
27.	Coromandel Pipistrelle (*Pipistrellus coromandra*)
28.	Greater Asiatic Yellow house bat (*Scotoecus pallidus*)
29.	Lesser Asiatic Yellow house bat (*Scotophilus kuhlii*)
30.	White bellied tube-nosed bat (*Murina huttoni*) (1st Recorded in 2013)
31.	Hare, Rufous tailed (Oriya: Thekua) (*Lepus nigricollis ruficaudatus*)
32.	Hyaena, Stripped (Oriya: Hundala, Heta Bagha) (*Hyaena hyaena*)
33.	Jackal (Oriya: Bilua, Siala) (*Canis aureus*)
34.	Langur, Common (Oriya: Hanu Mankada) (*Semnopithecus*)
35.	Leopard (Oriya: Kalara-patria Bagha, Pendra) (*Panthera pardus*)

36.	Mole-Rat, Indian (Oriya: no specific name) (*Bandicuta bengalensis*)
37.	Mongoose, Common (Oriya: Bada Neula) (*Herpestes edwardsi*)
38.	Mongoose, Ruddy (Oriya: Kala Langudia Neula) (*Herpestes smithi*)
39.	Mongoose, Small Indian (Oriya: Sana Neula, Nali-muhan Neula) *(Herpestes auropunctatus)*
40.	Mongoose, Stripe necked mongoose (Oriya: Neula) (*Herpestes vittcollis*) (1st Recorded in 2012)
41.	Mouse, Indian Field (Oriya: Musa) (*Mus booduga*)
42.	Otter, Smooth-coated (Oriya: Machhakhia Pani Odha) (*Lutra perspicillata*)
43.	Otter, Asian Small-clawed (Oriya: Kankadakhia Pani Odha (*Aonyx cinereus*) (1st Recorded in 2012)
44.	Pangolin, Indian (Oriya: Bajrokapta) (*Manis crassicaudata*)
45.	Pipistrelle, Indian (Oriya: Chemini) (*Pitistrellus coromandra*)
46.	Procupine, Indian (Oriya: Jhinka) (*Hystrix Indica*)
47.	Rhesus Macaque (or Pati Mankada) (*Macaque mullata*)
48.	Shrew, Tree (Oriya: Bana chuchundra) (*Anathana ellioti*)
49.	Shrew, Pigmy (Oriya: Baman Chuchundra) (*Sorex minutus*) (1st Recorded in 2013)
50.	Squirrel, Common Giant Flying (Oriya: Olei Budi) (*Pteaurista petaurista*)
51.	Squirrel, Giant Indian (Oriya: Belera Musa) (*Ratufa indica*)
52.	Squirrel, Three stripped palm (Oriya: Gunduchi musa) (*Funambulus palmarum*)
53.	Tiger or Royal Bengal Tiger (Oriya: Mahabala Bagha) (*Panthera tigris*)
54.	Wolf (Oriya: Gadhia) (*Canis lupus*)
55.	Antelope, Four-horned or Chowsingha (Oriya: Chausingha) (*Tetracerus quadricornis*) (Not sighted for the last several years)
56.	Dog, Wild or Dhole (Oriya: Balia Kukura) (*Cuon alpinus*) (Not sighted for the last several years)

ANNEXURE XV

LIST OF BIRDS

Sl. no	Common Name	Scientific Name
PODICIPEDIDAE		
1	Great Crested Grebe	*Podiceps cristatus*
2	Little Grebe	*Tachybaptus ruficollis*
3	Red necked Grebe	*Podiceps grisegena*
PHALACROCORACIDAE		
4	Little Cormorant	*Phalacrocorax niger*
5	Indian Cormorant	*Phalacrocorax fuscicollis*
6	Great Cormorant	*Phalacrocorax carbo*
PHASIANIDAE		
7	Grey Francolin	*Francolinus pondicerianus*
8	Black Francolin	*Francolinus francolinus*
9	Common Peafowl	*Pavo cristatus*
10	Painted Spurfowl	*Galloperdix lunulata*
11	Red Spurfowl	*Galloperdix spadicea*
12	Red Junglefowl	*Gallus gallus*
13	Jungle Bush Quail	*Perdicula asiatica*
14	Rain Quail	*Coturnix coromandelica*
15	Blue-breasted Quail	*Coturnix chinensis*
16	Painted Bush Quail	*Crythro rsinyricha*
DENDROCYGNIDAE		
17	Lesser Whistling Duck	*Dendrocygna javanica*
ANATIDAE		
18	Cotton Pygmy-goose	*Nettapus coromandelianus*
19	Common Teal	*Anas crecca*
20	Garganey	*Anas querquedula*
21	Spot-billed Duck	*Anas poecilorhyncha*
22	Gadwall	*Anas strepera*
23	Eurasian Wigeon	*Anas penelope*
24	Northern Pintail	*Anas acuta*
25	Common Pochard	*Aythya ferina*
26	Ferruginous Pochard	*Aythya nyroca*
27	Tufted Duck	*Aythya fuligula*
28	Red crested Pochard	*Netta rufina*
29	Comb Duck	*Sarkidiornis melanotos*
30	Rudy Shelduck	*Tadorna ferruginea*

31	Baer's Pochard	*Aythya baeri*
TURNICIDAE		
32	Barred Buttonquail	*Turnix suscitator*
33	Small buttonquail	*Turnix sylvaticus*
34	Yellow legged buttonquail	*Turnix tanki*
PICIDAE		
35	Eurasian Wryneck	*Jynx torquilla*
36	Speckled Piculet	*Picumnus innominatus*
37	Brown-capped Pygmy Woodpecker	*Dencdrocopos nanus*
38	Fulvous-breasted Woodpecker	*Dendrocopus macei*
39	Yellow-crowned Woodpecker	*Dendrocopos mahrattensis*
40	Rufous Woodpecker	*Celeus brachyurus*
41	Lesser Yellownape	*Picus chlorolophus*
42	Greater Yellownape	*Picus flavinucha*
43	Streak-throated Woodpecker	*Picus xanthopygaeus*
44	Grey-headed Woodpecker	*Picus canus*
45	Black-rumped Flameback	*Dinopium benghalense*
46	Greater Flameback	*Chrysocolaptes lucidus*
47	Heart Spotted Woodpecker	*Hemicircus canente*
MEGALAIMIDAE		
48	Coppersmith Barbet	*Megalaima haemacephala*
49	Brown-headed Barbet	*Megalaima zeylanica*
50	Lineated Barbet	*Megalaima lineata*
51	Blue-throated Barbet	*Megalaima asiatica*
BUCEROTIDAE		
52	Indian Grey Hornbill	*Ocyceros birostris*
53	Oriental Pied Hornbill	*Anthracoceros albirostris*
54	Malabar Pied Hornbill	*Anthracoceros coronatus*
UPUPIDAE		
55	Common Hoopoe	*Upupa epops*
TROGONIDAE		
56	Malabar Trogon	*Harpactes fasciatus*
CORACIIDAE		
57	Indian Roller	*Coracias benghalensis*
ALCEDINIDAE		
58	Common Kingfisher	*Alcedo atthis*
59	White-throated Kingfisher	*Halcyon smyrnensis*
60	Stork-billed Kingfisher	*Halcyon capensis*

61	Pied Kingfisher	*Ceryle rudis*
MEROPIDAE		
62	Green Beeeater	*Merops orientalis*
63	Blue-tailed Bee-eater	*Merops philippinus*
64	Blue-bearded Bee-eater	*Nyctyornis athertoni*
65	Chestnut-headed Bee-eater	*Merops leschenaulti*
CUCULIDAE		
66	Asian Koel	*Eudynamys scolopacea*
67	Pied Cuckoo	*Clamator jacobinus*
68	Chestnut-winged Cuckoo	*Clamator coromandus*
69	Common Hawk Cuckoo	*Hierococcyx varius*
70	Large Hawk Cuckoo	*Hierococcyx sparverioides*
71	Indian Cuckoo	*Cuculus micropterus*
72	Oriental Cuckoo	*Cuculus saturatus*
73	Lesser Cuckoo	*Cuculus poliocephalus*
74	Grey-bellied Cuckoo	*Cacomantis passerinus*
75	Banded Bay Cuckoo	*Cacomantis sonneratii*
76	Drongo Cuckoo	*Surniculus lugubris*
77	Sirkeer Malkoha	*Phaenicophaeus leshcenaultii*
78	Blue-faced Malkoha	*Phaenicophaeus viridirostris*
79	Green billed Malkoha	*Phaenicophaeus tristis*
CENTROPIDAE		
80	Greater Coucal	*Centropus sinensis*
81	Lesser Coucal	*Centropus bengalnesis*
PSITTACIDAE		
82	Rose-ringed Parakeet	*Psittacula krameri*
83	Alexandrine Parakeet	*Psittacula eupatria*
84	Plum-headed Parakeet	*Psittacula cyanocephala*
85	Vernal Hanging Parrot	*Loriculus vernalis*
APODIDAE		
86	Asian Palm Swift	*Cypsiurus balasiensis*
87	Alpine Swift	*Apus melba*
88	White-rumped Needletail	*Zoonavena sylvatica*
89	House little Swift	*Apus affinis*
HEMIPROCNIDAE		
90	Crested Tree Swift	*Hemiprocne coronata*
TYTONIDAE		
91	Barn Owl	*Tyto alba*

92	Grass Owl	*Tyto capensis*
STRIGIDAE		
93	Collared Scops Owl	*Otus bakkamoena*
94	Oriental Scops Owl	*Otus sunia*
95	Spotted Owlet	*Athene brama*
96	Jungle Owlet	*Glaucidium radiatum*
97	Brown Hawk Owl	*Ninox scutulata*
98	Short-eared Owl	*Asio flammeus*
99	Indian Eagle Owl	*Bubo bubo*
100	Spot-bellied Eagle Owl	*Bubo nipalensis*
101	Brown Fish Owl	*Ketupa zeylonenis*
102	Brown Wood Owl	*Strix leptogrammica*
103	Mottled Wood Owl	*Strix ocellata*
CAPRIMULGIDAE		
104	Grey Nightjar	*Caprimulgus indicus*
105	Indian Nightjar	*Caprimulgus asiaticus*
106	Savanna Nightjar	*Caprimulgus affinis*
107	Large-tailed Nightjar	*Caprimulgus macrurus*
COLUMBIDAE		
108	Rock Pigeon	*Columba livia*
109	Pale-capped Pigeon	*Columba punicea*
110	Green Imperial Pigeon	*Ducula aenea*
111	Mountain Imperial Pigeon	*Ducula badia*
112	Oriental Turtle Dove	*Streptopelia orientalis*
113	Laughing Dove	*Streptopelia senegalensis*
114	Spotted Dove	*Streptopelia chinensis*
115	Red Collared Dove	*Streptopelia tranquebarica*
116	Eurasian Collared Dove	*Streptopelia decaocto*
117	Emerald Dove	*Chalcophaps indica*
118	Yellow-footed Green pigeon	*Treron phoenicoptera*
119	Orange-breasted Green Pigeon	*Treron bicincta*
120	Pompadour Green Pigeon	*Treron pompadora*
121	PTEROCLIDIDAE	
122	Chestnut-bellied Sandgrouse	*Pterocles exustus*
123	RALLIDAE	
124	Purple Swamphen	*Porphyrio porphyrio*
125	Water Cock	*Gallicrex cinerea*
126	Common Moorhen	*Gallinula chloropus*

127	White-breasted Waterhen	*Amaurornis phoenicurus*
128	Brown Crake	*Amaurornis akool*
129	Ruddy-breasted Crake	*Porzana fusca*
130	Slaty-breasted Rail	*Gallirallus striatus*
131	Common Coot	*Fulica atra*
ROSTRATULIDAE		
132	Greater Painted-Snipe	*Rostratula bengalensis*
SCOLOPACIDAE		
133	Common Snipe	*Gallinago gallinago*
134	Common Redshank	*Tringa totanus*
135	Common Greenshank	*Tringa nebularia*
136	Green Sandpiper	*Tringa ochropus*
137	Common Sandpiper	*Tringa hypoleucos*
138	Wood Sandpiper	*Tringa glareola*
139	Little Stint	*Calidris minuta*
140	Temminck's Stint	*Calidris temminckii*
BURHINIDAE		
141	Eurasian Thick-knee	*Burhinus oedicnemus*
RECURVIROSTRIDAE		
142	Black-winged Stilt	*Himantopus himantopus*
JACANIDAE		
143	Bronze-winged Jacana	*Metopidius indicus*
144	Pheasant-tailed Jacana	*Hydrophasianus chirurgus*
GLAREOLIDAE		
145	Small Pratincole	*Glareola lactea*
CHARADRIIDAE		
146	Little Ringed Plover	*Charadrius dubius*
147	Red-wattled Lapwing	*Vanellus indicus*
148	Yellow-wattled Lapwing	*Vanellus malabaricus*
149	Kentish plover	*Charadrius alexandrinus*
150	Gray-headed Lapwing	*Vanellus cinerens*
LARIDAE		
151	Brown-headed Gull	*Larus brunnicephalus*
152	Gull-billed Tern	*Gelochelidon nilotica*
153	River Tern	*Sterna aurantica*
154	Black bellied Tern	*Sterna acuticauda*
155	Whiskered Tern	*Chlidonias hybrida*
ACCIPITRIDAE		

156	Jerdon's Baza	*Aviceda jerdoni*
157	Black Baza	*Aviceda leuphotes*
158	Osprey	*Pandion haliaetus*
159	Black-shouldered Kite	*Elanus caeruleus*
160	Black Kite	*Milvus migrans*
161	Brahminy Kite	*Haliastur indus*
162	Cinereous Vulture	*Aegypius monachus*
163	Red headed Vulture	*Sarcogyps calvus*
164	Egyptian vulture	*Neophron percnopterus*
165	Short-toed Snake Eagle	*Circaetus gallicus*
166	Crested Serpent Eagle	*Spilornis cheela*
167	Black Eagle	*Ictinaetus malayensis*
168	Eurasian Marsh Harrier	*Circus aeruginosus*
169	Pallid Harrier	*Circus macrourus*
170	Pied Harrier	*Circus melanoleucos*
171	Shikra	*Accipiter badius*
172	Besra	*Accipiter virgatus*
173	Eurasian Sparrowhawk	*Accipiter nisus*
174	Crested Goshawk	*Accipiter trivirgatus*
175	Oriental Honey Buzzard	*Pernis ptilorhyncus*
176	White-eyed Buzzard	*Butastur teesa*
177	Common Buzzard	*Buteo buteo*
178	Greater Spotted Eagle	*Aquila clanga*
179	Steppe Eagle	*Aquila nipalensis*
180	Bonelli's Eagle	*Hieraaetus fasciatus*
181	Booted Eagle	*Hieraaetus pennatus*
182	Rufous-bellied Eagle	*Hieraaetus kienerii*
183	Changeable Hawk Eagle	*Spizaetus cirrhatus*
184	Pallas fish eagle	*Haliaeetus leucoryphus*
185	Lesser spotted eagle	*Aquila pomarina*
186	Grey headed fish eagle	*Ichthyophaga ichthyaetus*
FALCONIDAE		
187	Collared Falconet	*Microhierax caerulescens*
188	Common Kestrel	*Falco tinnunculus*
189	Lesser Kestrel	*Falco naumanni*
190	Peregrine Falcon	*Falco peregrinus*
191	Laggar Falcon	*Falco jugger*
192	Eurasian Hobby	*Falco subbuteo*

ANHINGIDAE		
193	Darter	*Anhinga melanogaster*
ARDEIDAE		
194	Little Heron	*Butorides striatus*
195	Pond Heron	*Ardeola grayii*
196	Purple Heron	*Ardea purpurea*
197	Grey Heron	*Ardea cinerea*
198	Cattle Egret	*Bubulcus ibis*
199	Little Egret	*Egretta garzetta*
200	Intermediate Egret	*Mesophoyx intermedia*
201	Great Egret	*Casmerodius albus*
202	Black crowned Night Heron	*Nycticorax nycticorax*
203	Black Bittern	*Dupetor flavicollis*
204	Yellow Bittern	*Ixobrychus sinensis*
205	Cinnamon Bittern	*Ixobrychus cinnamomeus*
CICONIDAE		
206	Asian Openbill	*Anastomus oscitans*
207	Woolly-necked Stork	*Ciconia episcopus*
208	Painted stork	*Mycteria leucocephala*
THRESKIORNITHIDAE		
209	Black Ibis	*Pseudibis papillosa*
210	Black-headed White Ibis	*Threskiornis melanocephalus*
CAMPEPHAGIDAE		
211	Rosy Minivet	*Pericrocotus roseus*
212	Scarlet Minivet	*Pericrocotus roseus*
213	Long-tailed Minivet	*Pericrocotus ethologus*
214	Small Minivet	*Pericrocotus cinnamomeus*
215	Large Cuckoo-shrike	*Coracina novaehollandiae*
216	Large Woodshrike	*Tephrodornis gularis*
217	Common Woodshrike	*Tephrodornis pondicerianus*
218	Black headed Cuckoo-shrike	*Coracina melanoptera*
219	Black-winged Cuckooshrike	*Coracina melaschistos*
220	Bar Winged Flycatcher Shrike	*Hemipus picatus*
LANIDAE		
221	Long-tailed Shrike	*Lanius schach*
222	Grey-backed Shrike	*Lanius tephronotus*
223	Bay-backed Shrike	*Lanius vittatus*
224	Brown Shrike	*Lanius cristatus*

CORVIDAE		
225	Rufous Tree Pie	*Dendrocitta vagabunda*
226	House Crow	*Corvus splendens*
227	Large-billed Crow	*Corvus macrorhyncos*
228	Grey tree pie	*Dendrocitta formosae*
DICRURIDAE		
229	Black Drongo	*Dicrurus macrocercus*
230	White-bellied Drongo	*Dicrurus caerulescens*
231	Bronzed Drongo	*Dicrurus aeneus*
232	Ashy Drongo	*Dicrurus leucophaeus*
233	Spangled Drongo	*Dicrurus hottentottus*
234	Greater Racket Tailed Drongo	*Dicrurus paradiseus*
ORIOLIDAE		
235	Indian Golden Oriole	*Oriolus oriolus*
236	Black-hooded Oriole	*Oriolus xanthornus*
237	Black-naped Oriole	*Oriolus chinensis*
ARTAMIDAE		
238	Ashy Wood Swallow	*Artamus fuscus*
IRENIDAE		
239	Common Iora	*Aegithina tiphia*
240	Blue-winged Leafbird	*Chloropsis cochinchinensis*
241	Golden-fronted Leafbird	*Chloropsis aurifrons*
242	Asian Fairy Bluebird	*Irene puella*
PITTIDAE		
243	Indian Pitta	*Pitta brachyura*
MUSCICAPIDAE		
244	Asian Paradise-flycatcher	*Terpsiphone paradisi*
245	Black-naped Monarch	*Hypothymis azurea*
246	White-browed Fantail	*Rhipidura aureola*
247	White-throated Fantail	*Rhipidura albicollis*
248	Oriental Magpie Robin	*Copsychus saularis*
249	White-rumped Shama	*Copsychus malabaricus*
250	Indian Robin	*Saxicoloides fulicata*
251	Bluethroat	*Luscinia svecica*
252	Black Redstart	*Phoenicurus ochruros*
253	Common Stonechat	*Saxicola torquata*
254	White-tailed Stonechat	*Saxicola leucura*
255	Pied Bushchat	*Saxicola caprata*

256	Blue Rock Thrush	*Monticola solitaries*
257	Blue-capped Rock Thrush	*Monticola cinclorhynchus*
258	Malabar Whistling Thrush	*Myophonus horsfieldii*
259	Pied Thrush	*Zoothera wardii*
260	Tickell's Thrush	*Turdus unicolor*
261	Orange headed thrush	*Zoothera citrina*
262	Scaly Thrush	*Zoothera dauma*
263	Black-breasted Thrush	*Turdus dissimilis*
264	Dark-throated Thrush	*Turdus ruficollis*
265	Eurasian Blackbird	*Turdud merula*
266	Red-throated flycatcher	*Ficedula parva*
267	Tickell's Blue Flycatcher	*Cyornis tickelliae*
268	Asian Brown Flycatcher	*Muscicapa dauurica*
269	Brown-breasted Flycatcher	*Muscicapa muttui*
270	Ultramarine Flycatcher	*Ficedula superciliaris*
271	Little Pied Flycatcher	*Ficedula westermanni*
272	Verditer Flycatcher	*Eumyias thalassina*
273	Pale-chinned Flycatcher	*Cyornis poliogenys*
274	Blue-throated flycatcher	*Cyornis rubeculoides*
275	Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*
PARIDAE		
276	Great Tit	*Parus major*
277	Black-lored Tit	*Parus xanthogenys*
SITTIDAE		
278	Velvet-fronted Nuthatch	*Sitta frontalis*
279	Chestnut-bellied Nuthatch	*Sitta castanea*
STURNIDAE		
280	Hill Myna	*Gracula relegiosa*
281	Asian Pied Starling	*Sturnus contra*
282	Common Myna	*Acridotheres tristis*
283	Jungle Myna	*Acridotheres fuscus*
284	Brahminy Starling	*Sturnus pagodarum*
285	Chestnut-tailed Starling	*Sturnus malabaricus*
286	Rosy Starling	*Sturnus roseus*
287	Bank Myna	*Acridotheres ginginianus*
PYCNONOTIDAE		
288	Black-crested Bulbul	*Pycnonotus melanicterus*
289	Red-whiskered Bulbul	*Pycnonotus jocosus*

290	Red-vented Bulbul	*Pycnonotus cafer*
291	White-browed Bulbul	*Pycnonotus luteolus*
CISTICOLIDAE		
292	Zitting Cisticola	*Cisticola juncidis*
293	Grey-breasted Prinia	*Prinia hodgsonii*
294	Ashy Prinia	*Prinia socialis*
295	Plain Prinia	*Prinia inornata*
296	Jungle Prinia	*Prinia sylvatica*
ZOSTEROPIDAE		
297	Oriental Whiteeye	*Zosterops palpebrosa*
SYLVIDAE		
298	Pale-footed Bush Warbler	*Cettia pallidipes*
299	Spotted Bush Warbler	*Bradypterus thoracicus*
300	Clamorous Reed Warbler	*Acrocephalus stentoreus*
301	Thick-billed Warbler	*Acrocephalus aedon*
302	Blyth's Reed Warbler	*Acrocephalus dumetorum*
303	Paddyfield Warbler	*Acrocephalus Agricola*
304	Bristled Grassbird	*Chaetornis striatus*
305	Common Tailor Bird	*Orthotomus sutorius*
306	Orphean Warbler	*Sylvia hortensis*
307	Lesser Whitethroat	*Sylvia curruca*
308	Common Chiffchaff	*Phylloscopus collybita*
309	Greenish Leaf Warbler	*Phylloscopus trochiloides*
310	Hume's Warbler	*Phylloscopus humei*
311	Tickell's Leaf Warbler	*Phylloscopus affinis*
312	Eastern Crowned Warbler	*Phylloscopus coronatus*
313	Golden-spectacled Warbler	*Phylloscopus burkii*
314	Puff-throated Babbler	*Pellorneum ruficeps*
315	Brown-cheeked Fulvetta	*Alcippe poioicephala*
316	Jungle Babbler	*Turdoides striatus*
317	Rufous-capped Babbler	*Stachyris ruficeps*
318	Striped Tit Babbler	*Macronous gularis*
319	Common Babbler	*Turdoides caudatus*
320	Indian Scimitar Babbler	*Pomatorhinus horsfieldii*
321	Tawny-bellied Babbler	*Dumetia hyperythra*
322	Yellow-eyed Babbler	*Chrysomma sinense*
ALAUDIDAE		
323	Rufous-winged Bushlark	*Mirafra assamica*

324	Oriental Skylark	*Alauda gulgula*
325	Ashy-crowned Sparrow Lark	*Eremopterix grisea*
326	Rufous-tailed Lark	*Ammomanes phoenicurus*
327	Indian Bushlark	*Mirafra erythroptera*
328	Jerdon's Bushlark	*Mirafra affinis*
NECTARINIIDAE		
329	Purple-rumped Sunbird	*Nectarinia zeylonica*
330	Purple Sunbird	*Nectarinia asiatica*
331	Crimson Sunbird	*Aethopyga siparaja*
332	Little Spiderhunter	*Arachnothera longirostra*
DICAEIDAE		
333	Thick-billed Flowerpecker	*Dicaeum agile*
334	Pale-billed Flowerpecker	*Dicaeum erythrorhynchos*
MOTACILLIDAE		
335	White Wagtail	*Motacilla alba*
336	Yellow Wagtail	*Motacilla flava*
337	Citrine Wagtail	*Motacilla citreola*
338	Grey Wagtail	*Motacilla cinerea*
339	White-browed Wagtail	*Motacilla maderaspatensis*
340	Forest Wagtail	*Dendronanthus indicus*
341	Paddyfield Pipit	*Anthus rufulus*
342	Olive-backed Pipit	*Anthus hodgsonii*
343	Tree Pipit	*Anthus trivialis*
344	Blyth's Pipit	*Anthus godlewskii*
PASSERIDAE		
335	House Sparrow	*Passer domesticus*
336	Chestnut-shouldered Petronia	*Petronia xanthocollis*
337	Baya Weaver	*Ploceus philippinus*
338	Black-breasted Weaver	*Ploceus benghalensis*
339	Streaked Weaver	*Ploceus manyar*
HIRUNDINIDAE		
340	Dusky Crag Martin	*Hirundo concolor*
341	Northern House Martin	*Delichon urbica*
342	Barn Swallow	*Hirundo rustica*
343	Wire-tailed Swallow	*Hirundo smithii*
344	Red-rumped Swallow	*Hirundo daurica*
345	Streak-throated Swallow	*Hirundo fluvicola*
ESTRILDIDAE		

346	Black-headed Munia	*Lonchura malacca*
347	Scaly-breasted Munia	*Lonchura punctulata*
348	White-rumped Munia	*Lonchura striata*
349	Black-throated Munia	*Lonchura kelartii*
350	Red Avadavat	*Amandava amandava*
351	Indian Silverbill or White throated Munia	*Lonchura malabarica*
FRINGILLIDAE		
352	Common Rosefinch	*Carpodacus erythrinus*
EMBERIZIDAE		
353	Crested Bunting	*Melophus lathami*

ANNEXURE XVI

LIST OF AMPHIBIANS

CLASS: AMPHIBIA

1	Marbled Toad (Oriya-Katha Benga) (*Duttaphrynus stomaticus*)
2	Common Asian Toad (Oriya-Luni benga, Sinduria benga) (*Duttaphrynus melanostictus*)
3	Indian SkipperFrog (Oriya-Pani benga) (*Euphlyctiscyanophlyctis*)
4	Dutta's Cricket Frog (Oriya-Pani benga) (*Fejervarya orissaensis)*
5	Syhadra Cricket Frog (Oriya-Pani benga) *(Fejervarya syhadrensis*)
6	Jerdon's Bull Frog (Oriya-Cheli benga) (*Hoplobatrachus Crassus*)
7	Indian Bull Frog (Oriya-Brahmani benga) (*Hoplobatrachus tigerinus*)
8	Short-Headed Burrowing Frog (Oriya-Mati Pota Benga) (*Sphaerotheca breviceps*)
9	Dobson's Burrowing Frog (Oriya-Matipota matia benga) (*Sphaerotheca dobsonii*)
10	Indian Burrowing Frog (Oriya-Chota matipota benga) (*Sphaerotheca rolandae*)
11	Painted Ballon Frog (Oriya-Sinduria phutka benga) (*Kaloula taprobanica*)
12	Ornate Narrow-Mouthed Frog (Oriya-Chuin benga) *(Microhyla Ornata*)
13	Variegated Ramanella (Oriya-Suneli benga) (Ramanella variegate)
14	Grey Ballon Frog (Oriya-Kolathia benga) (*Uperodon globulosus*)
15	Marbled Ballon Frog (Oriya-Chitra benga) (*Uperodon systoma*)
16	Fungoid Frog (Oriya-Nali benga) (*Hylarana malabarica*)
17	Pigmy Tree Frog (Oriya-Chuin buda benga) (*Chiromantis sp*)
18	Similipal Bush Frog (Oriya-Similipal buda benga) (*Philautus similipalensis*)
19	Common Indian Tree Frog (Oriya-katha benga, Akhi dian benga) (*Polypedates maculates*)
20	Dubois's Tree Frog (Oriya-Akhi dian benga) (*Polypedates teraiensis)*
21	Ferguson's Toad (Oriya- Luni Benga) (*Duttaphrynus scaber*)

ANNEXURE XVII

LIST OF REPTILES

1.	John's Sand Boa (Oriya-Domundia Sapa) (*Eryx johnii*)
2.	Common Sand Boa (Oriya-Boda sapa) (*Gongylophis conicus*)
3.	India Rock Python (Oriya-Ajagara sapa) (*Python molurus*)
4.	Common Vine Snake (Oriya-Laudankia sapa) (*Ahaetulla nasutus)*
5.	Buff striped keelback (Oriya-Mati birala, Mati biradi) (*Amphiesma stolata*)
6.	Banded Racer (*Argyrogena fasciolata*)
7.	Olive keelback water snake (Oriya-Sabuja dhanda) (*Atretium schistosum*)
8.	Forsten's Cat Snake (Oriya-Katakatia naga) (*Boiga forsteni*)
9.	Common Indian Cat Snake (Oriya-Pahadia chitti sapa) (*Boiga trigonata*)
10.	Ornate Flying Snake (Oriya-Udanta sapa) (*Chrysopelea ornate*)
11.	Common Indian Trinket Snake (Oriya-Donger chiti/pahadia chiti) (*Coelognathus helena helena*)
12.	Common-Headed Trinket Snake (Oriya-pahadia chiti) (*Coelognathus radiata*)
13.	Common Indian Bronze-Back (Oriya-Kanala, Kauchia) (*Dendrelaphis tristis*)
14.	Smooth water Snake (Oriya-Jal ganthia) (*Enhydris enhydris*)
15.	Common Wolf Snake (Oriya-Kaudia chiti sapa) (*Lycodon aulicus*)
16.	Twin-spotted wolf Snake (*Lycodon jara*)
17.	Barred wolf Snake (Oriya-Kaudia chiti) (*Lycodon striatus*)
18.	Indian Green keelback (Oriya-Sabuja dhanda) (*Macropisthodon plumbicolor*)
19.	Common kukuri Snake (Oriya-Matia hara sapa) (*Oligodon arnensis*)
20.	Mock Viper (*Psammodynastes pulverulentus*)
21.	Common Indian Rat Snake (Oriya-Dhamana sapa) (*Ptyas mucosus*)
22.	Cantor's Black-headed Snake (Oriya-Dhulia naga) (*Sibynophis Sagittarius*)
23.	Checkered keelback water snake (Pani Dhanda, Dhanda sapa) (*Xenochrophis piscator*)
24.	Comon Indian krait (Oriya-Chiti sapa) (*Bungarus caeruleus*)
25.	Banded Krait (Oriya-Rana sapa) (*Bungarus fasciatus*)
26.	Monocellate Cobra (Oriya-Tampa sapa) (*Naja kaouthia*)
27.	Binocellate Cobra (Oriya-Naga sapa, Gokhara sapa) (*Naja naja*)
28.	King Cobra (Oriya-Ahiraja) (*Ophiophagus hannah*)
29.	Common Blind Snake (Oriya-Do mundia sapa) (*Ramphotyphlops braminus*)
30.	Beaked worm snake (Oriya-Teli Sapa) (*Grypotyphlops acutus*)
31.	Russell's viper (Oriya-Chandan Boda) (*Daboia russellii*)
32.	Saw-scaled viper (Oriya-Dhulia boda sapa) (*Echis carinatus*)
33.	Bamboo pit Viper (Oriya-Fatka sapa, Gendamundia Boila) (*Trimeresurus gramineus*)
34.	Indian Garden Lizard (Oriya-Endua, Teneko, Kerkanta) (*Calotes versicolor*)
35.	Fan-Throated Lizard (Oriya-Mati endua) (*Sitana ponticeriana*)

36.	Indian Chamaeleon (Oriya-Bahurupa, Bahurupi, Pohola endua) (*Chamaeleo zeylanicus*)
37.	East Indian Leopard (Oriya-Kalakuta, Kalakuta sapa) (*Eublepharis hardwickii*)
38.	Clouded Ground Gecko (Oriya-Kalakuta) (*Geckoella nebulosa*)
39.	Spotted Indian House Gecko (Oriya-Jhitipiti) (*Hemidactylus brookii*)
40.	Indian House Gecko (Oriya-Jhitipiti)(*Hemidactylus flaviviridis*)
41.	Smooth house gecko (Oriya-Jhitipiti) (*Hemidactylus frenatus*)
42.	Bark Gecko (Oriya-Jhitipiti) (*Hemidactylus leschenaultia*)
43.	East Indian Forest Gecko (*Hemidactylus sp*)
44.	Snake-eyed Lacerta (*Ophisops jerdonii*)
45.	White-Spotted Supple Skink (Oriya-Champei sapa) (*Riopa albopunctata*)
46.	Common Snake Skink (Oriya-Nali lanzia champei sapa) (*Lygosoma punctatus*)
47.	Beddome's Grass Skink (Champeineula) (*Eutropis beddomii*)
48.	Common Indian Skink (Champeinula) (*Eutropis carinata*)
49.	Eastern Bronze Skink (Champeinula) (*Eutropis macularia*)
50.	Limbless Skink (*Sepsophis punctatus*)
51.	Common Indian Monitor (Oriya-matia godhi) (*Varanus bengalensis*)
52.	Yellow Monitor Lizard (Oriya-Sorisia godhi) (*Varanus flavescens*)
53.	Mugger Crocodile (Oriya-Kumbhira, Magara) (*Crocodylus palustris*)
54.	Indian Roofed Turtle (Oriya-Nali beka Katha Kaincha) (*Batagur tecta*)
55.	Peninsular Tent Turtle (Oriya-Katha Kainca) (*Batagur tentoria*)
56.	Tricarinate Hill Turtle (Oriya-Tinigaria pahadi Kaincha) (*Melanochelys tricarinata*)
57.	Eastern Black Turtle (Oriya-kala kaincha/Pahadi kaincha) (*Melanochelys trijuga indopeninsularis*)
58.	Elongated Tortoise (Oriya-Haladia katha Kaincha) (*Indotestudo elongate*)
59.	Indian Flapshell Turtle (Oriya-Pani Kainchha/Pankua kainchha) (*Lissemys punctata punctata*)
60.	Indian Rock Lizard(Oriya-Endua,Tenko)(Psammophilus blanfordanus)

ANNEXURE XVIII

LIST OF FISHES

CLASS: PISCES

Sl.No.	Local name in Oriya	Scientific name	Family
1.	Flai	*Notopteus notopterus*	Notopteridae
2.	Chitala	*Chitala Chitala*	Notopteridae
3.	Pathari	*Amblypharyngodon mola*	Cyprinidae
4.	Jhalli	*Barilius vagra*	Cyprinidae
5.	Jaradi	*Danio rerio*	Cyprinidae
6.	Bhakur	*Catla Catla*	Cyprinidae
7.	Dumala	*Cirrhinus fulungee*	Cyprinidae
8.	Mira	*Cirrhinus mrigala*	Cyprinidae
9.	Kalabatuli	*Crossocheilus latius*	Cyprinidae
10.	Mirkha	*Cyprinus carpio*	Cyprinidae
11.	Kulia	*Devario aequipinnatus*	Cyprinidae
12.	Jahi	*Esomus danricus*	Cyprinidae
13.	Patharachatta	*Garra gotyla*	Cyprinidae
14.	Gentu	*Garra mullya*	Cyprinidae
15.	Pohala	*Labeo bata*	Cyprinidae
16.	Kalabanisi	*Labeo calbasu*	Cyprinidae
17.	Rohi	*Labeo rohita*	Cyprinidae
18.	Jodda	*Laubuca sp*	Cyprinidae
19.	Chilanti	*Osteobrama vigorsii*	Cyprinidae
20.	Kerandi	*Puntius amphibius*	Cyprinidae
21.	Pita Kerandi	*Puntius conchonius*	Cyprinidae
22.	Sema	*Puntius Sarana*	Cyprinidae
23.	Patia Kerandi	*Puntius sophore*	Cyprinidae
24.	Kujikerandi	*Puntius ticto*	Cyprinidae
25.	Kerandi	*Puntius* Sp 1	Cyprinidae
26.	Kerandi	*Puntius* Sp.2	Cyprinidae
27.	Jilo	*Rasbora daniconius*	Cyprinidae
28.	Mino	*Rasbora sp*	Cyprinidae
29.	Baunsapatri	*Salmophasia bacaila*	Cyprinidae
30.	Mahaseer	*Tor putitora*	Cyprinidae
31.	Mahaseer	*Tor Tor*	Cyprinidae
32.	Patharachatta	*Acanthocobitis botia*	Nemacheilidae
33.	Patharachatta	*Schistura Sp.1*	Nemacheilidae

34.	Patharachatta	*Schistura* sp-2	Nemacheilidae
35.	Jimani	*Lepidocephalichthys guntea*	Cobitidae
36.	Balijimani	*Lepidocephalichthys thermalis*	Cobitidae
37.	Jimani	*Lepidocephalichthys sp*	Cobitidae
38.	Hara Sp	*Erethistidae*	
39.	Singla	*Sperata Aor*	Bagridae
40.	Singhi	*Sperata seenghala*	Bagridae
41.	Kujikantia	*Mystus bleekeri*	Bagridae
42.	Baikantia	*Mystus cavasius*	Bagridae
43.	Kantia	*Mystus gulio*	Bagridae
44.	Kantia	*Mystus vittatus*	Bagridae
45.	Baisilia	*Ompok bimaculatus*	Siluridae
46.	Balia	*Wallago attu*	Siluridae
47.	Puttuli	*Alia coila*	Schilbeidae
48.	Batbacha	*Eutropiichthys vacha*	Schilbeidae
49.	Jhilikantia	*Amblyceps mangois*	Ambiycipitidae
50.	Magur	*Clarias sp*	Claridae
51.	Singi	*Heteropneustes fossilis*	Heteropneustidae
52.	Gania	*Strongylura strongylura*	Belonidae
53.	Gangeitodi	*Xenentodon cancila*	Belonidae
54.	Cuchia	*Monopterus cuchia*	Synbranchidae
55.	Todi	*Macrognathus aculeatus*	Mastacembelidae
56.	Gomitodi	*Mastacembelus pancalus*	Mastacemblidae
57.	Kalileep	*Badis badis*	Badidae
58.	Tilapia	*Oreochromis mossambicus*	Cichlidae
59.	Kau	*Anabas cobojius*	Anabantidae
60.	Rajakau	*Anabas testudineus*	Anabantidae
61.	Raja kau	*Trichogaster fasciata*	Belontiidae
62.	Raja kau	*Trichogaster lalius*	Belontiidae
63.	Sahala	*Channa marulius*	Channidae
64.	Gadisa	*Channa punctata*	Channidae
65.	Seola	*Channa striata*	Channidae
66.	Channa sp	*Channidae*	

ANNEXURE XIX

LIST OF INVERTEBRATES

Invertebrate groups	No. of taxa reported	Remarks
Phylum Mollusca Class. Gastropoda Fam. Achatinidae, Ariophantidae, Pilidae, Viviparidae, Lymnaeidae	9	No specific group studies by ZSI/ others on malacofauna in SBR. First time ever report of 9 spp.
Phylum Arthropoda. Class. Diplopoda (Millipedes) Class. Chilopoda (Centipedes) Class. Crustacea Ord. Decapoda (Crabs) Class. Arachnida Ord. Scorpionida (Scorpions) Fam. Ischnuridae Ord. Araneae (Spiders) Fam. Araneidae and Clubionidae. Class. Insecta Ord. Orthoptera (Grasshopper/Crickets) Fam. Terigidae, Gryllidae, Acrididae, Pyrogomophidae Ord. Odonata (Dragon flies) Fam. Libellulidae, Calopterygidae, Aeshnidae Ord. Lepidoptera (Butterflies) Fam. Papilionidae, Nymphalidae, Pieridae, Lycaenidae and Hespriidae. Ord. Diptera (True flies) Fam. Tabanidae, Syrphidae, Sepsidae. Ord. Coleoptera (Beetles). Fam. Scrabaeidae, Coenagionidae, Agridae, Chrysomelidae, Cerambycidae Ord. Isoptera (Termites/ants) Ord.Hemiptera (Bugs) Ord.Hymnoptera (Bees) Ord.Homoptera (Aphids/leaf hoppers) **Total**	 1 2 1 2 13 42 10 42 6 24 6 4 4 3 **169**	 Single spp. of Juliformia millipedes and Sclopendromorpha centipedes occupies the great range of habitat in the reserve. Only 1 spp. of Potamonidae crabs reported from SBR first time forever. Two spp. of ischnuridae scorpion reported first time. 13 spp. of spiders are recorded from the protected area, under 3 families. 42 spp. of Grasshopper/Crickets belong to 4 families and 18 genera are reported from the reserve. 10 spp. of Dragon flies under 3 families are recorded from Similipal. 42 spp. of butterflies under 5 families 26 genera, are recorded from the reserve, of which 12 spp. are new record to Similipal. 6 spp. of diptera fauna under 5 families and 6 genera are reported from the reserve. Previous ZSI study records 22 spp. beetles, from the reserve under 5 families and 12 genera, 2 spp. are now added to the faunal list. 6 spp. of Isoptera belongs to single family and 3 genera are reported from the protected area. Further detailed surveys of different habitats, in the reserve may reveal large number of unexplored invertebrate fauna.

ANNEXURE XX

LIST OF PLANTS

Sl. No.	Local Name	Scientific Name	Family
PTERIDOPHYTA			
1.		*Huperzia hamiltonii*	Huperziaceae
2.		*Palhinhaea cernua*	Lycopodiaceae
3.	Mrityusanjivani	*Selaginella bryopteris*	Selaginellaceae
4.		*Selaginella Cillaris*	Selaginellaceae
5.		*Selaginella repanda*	Selaginellaceae
6.		*Equisetum ramosissimum*	Equisetaceae
7.		*Botrychium daucifolium*	Botrychiaceae
8.		*Angiopteris evecta*	Angiopteridaceae
9.		*Dicranopteris linearis*	Dicranopterida-ceae
10.		*Colysis pedunculata*	Polypodiaceae
11.		*Lepisorus nudus*	Polypodiaceae
12.		*Microsorium punctatum*	Polypodiaceae
13.		*Paraleptochilus decurrens*	Polypodiaceae
14.		*Pyrrosia adnascens*	Polypodiaceae
15.		*Pyrrosia stigmosa*	Polypodiaceae
16.		*Drynaria quercifolia*	Drynariaceae
17.	Mahajal	*Lygodium flexuosum*	Lygodiaceae
18.		*Lygodium scandens*	Lygodiaceae
19.		*Cheilanthes anceps*	Cheilanthaceae
20.		*Cheilanthes tenuifolia*	Cheilanthes
21.		*Pteris biaurita*	Pteridaceae
22.		*Pteris cretica*	Pteripdaceae
23.		*Pteris pellucida*	Pteripdaceae
24.		*Pteris quadriaurita*	Pteripdaceae
25.		*Pteris vittata*	Pteripdaceae
26.		*Adiantum incisum*	Adiantaceae
27.		*Adiantum philippense*	Adiantaceae
28.		*Coniogramme fraxinea*	Hemionitidaceae
29.		*Hemionitis arifolia*	Hemionitidaceae
30.		*Antrophyum reticulatum*	Antrophyaceae
31.		*Ceratopteris thalictroedes*	Parkeriaceae
32.		*Marsilea minuta*	Marsileaceae

33.		*Mecodium exsertum*	Hymenophylla-ceae
34.		*Cyathea gigantean*	Cyatheaceae
35.		*Microlepia speluncae*	Dennstaedtiaceae
36.		*Pteridium aquilinum*	Pteridiaceae
37.		*Sphenomeris chinensis*	Lindsaeaceae
38.		*Ampelopteris prolifera*	Thelypteridaceae
39.		*Amphineuron opulentum*	Thelypteridaceae
40.		*Amphineuron terminans*	Thelypteridaceae
41.		*Christella dentate*	Thelypteridaceae
42.		*Christella parasitica*	Thelypteridaceae
43.		*Pronephrium nudatum*	Thelypteridaceae
44.		*Pseudocyclosorus falciloba*	Thelypteridaceae
45.		*Sphaerostephanos unitus*	Thelypteridaceae
46.		*Trigonospora ciliata*	Thelypteridaceae
47.		*Asplenium indicum*	Aspleniaceae
48.		*Asplenium laciniatum*	Aspleniaceae
49.		*Asplenium parakense*	Aspleniaceae
50.		*Anisocampium cumingianum*	Athyriaceae
51.		*Diplazium asperum*	Athyriaceae
52.		*Diplazium dilatatum*	Athyriaceae
53.		*Diplazium esculentum*	Athyriaceae
54.		*Diplazium polypodiodes*	Anthyriaceae
55.		*Archinodes aristata*	Dryopteridaceae
56.		*Dryopteris cochleata*	Dryupteridaceae
57.		*Dryopteris sparsa*	Dryopteridaceae
58.		*Blechnum orientale*	Blechnaceae
59.		*Salvinia cucullata*	Salviniaceae
GYMNOSPERMS			
60.		*Gnetum ula*	Gnetaceae
61.	Orguna/Odasamari	*Cycas circinalis*	Cycadaceae
62.		*Cryptomeria japonica*	Coniferae
63.		*Pinus insularis*	Coniferae
ANGIOSPERMS			
64.		*Clematis gouriana*	Ranunculaceae
65.		*Clematis roylei*	Ranunculaceae
66.		*Clematis smilacifolia*	Ranunculaceae
67.		*Clematis wightiana*	Ranunculaceae

68.		*Naravelia zeylanica*	Ranunculaceae
69.		*Ranunculus pensylvannicus*	Ranunculaceae
70.		*Thalictrum foliolosum*	Ranunculaceae
71.	Rai	*Dillenia aurea*	Dilleniaceae
72.	Oou	*Dillenia indica*	Dilleniaceae
73.	Rai	*Dillenia pentagyna*	Dilleniaceae
74.	Champa	*Michelia champaca*	Magnoliaceae
75.		*Alphonsea lutea*	Annonaceae
76.		*Alphonsea ventricosa*	Annonaceae
77.	Badhiala	*Annona reticulata*	Annonaceae
78.	Ata	*Annona squamosa*	Annonaceae
79.		*Artabotrys hexapetalus*	Annonaceae
80.		*Desmos chinensis*	Annonaceae
81.		*Miliusa tomentosa*	Annonaceae
82.	Gandha palasa	*Miliusa velutina*	Annonaceae
83.	Champati	*Polyalthia cerasoides*	Annonaceae
84.		*Polyalthia simiarum*	Annonaceae
85.		*Polyalthia suberosa*	Annonaceae
86.		*Uvaria hamiltonii*	Annonaceae
87.	Okanbindi	*Cissampelos pareira*	Menispermaceae
88.		*Cocculus hirsutus*	Menispermaceae
89.		*Stephania japonica*	Menispermaceae
90.		*Tinospora cordifolia*	Menispermaceae
91.		*Tinospora sinensis*	Menispermaceae
92.	Padma	*Nymphaea pubescens*	Nymphaeaceae
93.	Laphar phula	*Argemore mexicana*	Papaveraceae
94.	Sorisa	*Brassica juncea*	Brassicaceae
95.	Mula	*Raphanus sativus*	Brassicaceae
96.	Asadua	*Capparis zeylanica*	Capparaceae
97.	Anasorisa	*Cleome viscose*	Capparaceae
98.		*Hybanthus enneaspermus*	Violaceae
99.		*Viola betonicifolia*	Violaceae
100.		*Bixa orellana*	Bixaceae
101.	Khakada	*Casearia elliptica*	Flacourtiaceae
102.	Kokra	*Casearia graveolens*	Flacourtiaceae
103.		*Casearia rubescens*	Flacourtiaceae
104.	Baincha	*Flacourtia indica*	Flacourtiaceae
105.	Baincha	*Flacourtia jangomas*	Flacourtiaceae

106.	Kakhara/Kakhada	*Homalium nepaulense*	Flacourtiaceae
107.		*Homalium tomentosum*	Flacourtiaceae
108.	Kapasia/Pithaalu	*Cochlospermum religiosum*	Cochlosperma-ceae
109.		*Pittosporum wightii*	Pittosporaceae
110.		*Polygala arvensis*	Polygalaceae
111.		*Polygala crotalarioides*	Polygalaceae
112.		*Polygala elongata*	Polygalaceae
113.		*Polygala erioptera*	Polygalaceae
114.		*Polygala furcata*	Polygalaceae
115.		*Polygala longifolia*	Polygalaceae
116.		*Salomonia cantoniensis*	Plygalaceae
117.		*Salmonia ciliate*	Polygalaceae
118.		*Drymaria cordata*	Caryophyllaceae
119.		*Polycarpaea corymbosa*	Caryophyllaceae
120.		*Polycarpon prostratum*	Caryophyllaceae
121.		*Portulaca oleracea*	Portulacaceae
122.		*Hypericum gaitii*	Hypericaceae
123.		*Hypericum japonicum*	Hypericaceae
124.	Sankada	*Garcinia cowa*	Clusiaceae
125.	Satyambo, Chinyar	*Garcinia xanthochymus*	Clusiaceae
126.	Nageswar	*Mesua ferrea*	Clusiaceae
127.	Chaa	*Camellia sinensis*	Theaceae
128.	Sal	*Shorea robusta*	Dipterocarpaceae
129.	Simli	*Bombax ceiba*	Malvaceae
130.		*Abelmoschus crinitus*	Malvaceae
131.		*Abelmoschus manihot*	Malvaceae
132.		*Abelmoschus moschatus*	Malvaceae
133.		*Abutilon indicum subsp. indicum*	Malvaceae
134.		*Abutilon persicum*	Malvaceae
135.		*Gossypium barbadense*	Malvaceae
136.	Piri-Prirka	*Hibiscus aculeatus*	Malvaceae
137.		*Hibiscus lobatus*	Malvaceae
138.		*Hibiscus platanifolius*	Malvaceae
139.	Kapasia	*Kydia calycina*	Malvaceae
140.	Bajarmuli	*Sida acuta*	Malvaceae
141.		*Sida cordata*	Malvaceae
142.		*Sida mysorensis*	Malvaceae

143.		*Sida rhombifolia*	Malvaceae
144.	Bankapsi	*Thespesia lampas*	Malvaceae
145.		*Urena lobata L. ssp lobata*	Malvaceae
146.		*Urena lobata L. ssp sinuta*	Malvaceae
147.	Samarkhoi	*Byttneria herbacea*	Sterculiaceae
148.	Kodalo	*Firmiana colorata*	Sterculiaceae
149.		*Guazuma ulmifolia*	Sterculiaceae
150.	Mudimudika	*Helicteres isora*	Sterculiaceae
151.	Telpuri	*Melochia corchorifolia*	Sterculiaceae
152.	Kanaka champa	*Pterospermum acerifolium*	Sterculiaceae
153.	Muchukunda	*Pterospermum xylocarpum*	Sterculiaceae
154.		*Sterculia urens*	Sterculiaceae
155.		*Sterculia villosa*	Sterculiaceae
156.		*Waltheria indica*	Sterculiaceae
157.		*Sloanea sterculiacea*	Elaeocarpaceae
158.	Bananalita	*Corchorus aestuans*	Tiliaceae
159.	Panasia	*Elaeocarpus tectorius*	Tiliaceae
160.		*Elaeocarpus wallichii*	Tiliaceae
161.		*Grewia abutifolia*	Tiliaceae
162.		*Grewia disperma*	Tiliaceae
163.	Mirgi chara	*Grewia elastic*	Tiliaceae
164.	Sonaranga	*Grewia hirsute*	Tiliaceae
165.	Burso	*Grewis sapida*	Tiliaceae
166.	Dhaman	*Grewia tiliifolia*	Tiliaceae
167.		*Triumfetta annua*	Tiliaceae
168.		*Triumfetta pentandra*	Tiliaceae
169.		*Triumfetta pilosa*	Tiliaceae
170.		*Triumffetta rhomboidea*	Tiliaceae
171.	Tisi	*Linum usitatissimum*	Linaceae
172.		*Reinwardtia indica*	Linaceae
173.		*Aspidopterys tomentosa*	Malpighiaceae
174.	Banomali	*Hiptage benghalensis*	Malpighiaceae
175.		*Biophytum reinwardtii*	Oxalidaceae
176.		*Oxalis corniculata*	Oxalidaceae
177.		*Oxalis dehradunensis*	Oxalidaceae
178.		*Acronychia pedunculata*	Rutaceae
179.	Bela	*Aegle marmelos*	Rutaceae
180.		*Atalantia monophylla*	Rutaceae

181.	Bheru	*Chloroxylon swietiana*	Rutaceae
182.	Kamala	*Citrus aurantium*	Rutaceae
183.	Janglilembu	*Citrus medica*	Rutaceae
184.	Agnijala	*Clausena excavata*	Rutaceae
185.	Chauli	*Glycosmis pentaphylla*	Rutaceae
186.		*Micromelum minutum*	Rutaceae
187.	Bursingo	*Murraya koenigii*	Rutaceae
188.	Ban mallika	*Murraya paniculata*	Rutaceae
189.	Baintha	*Naringi crenulata*	Rutaceae
190.		*Toddalia asiatica*	Rutaceae
191.	Morei	*Zanthoxylum rhetsa*	Rutaceae
192.	Pata champa	*Ochna obtusata DCvar. obtusata*	Ochnaceae
193.	Bhuin champa	*Ochna obtusata DC var.pumila*	Ochnaceae
194.	Salia	*Boswellia serrata*	Burseraceae
195.	Moi	*Garuga pinnata*	Burseraceae
196.	Rimuli	*Protium serratum*	Burseraceae
197.	Nimba	*Azadirachta indica*	Meliaceae
198.	Pittamari	*Cipadessa baccifera*	Meliaceae
199.	Mahanimbo	*Melia dubia*	Meliaceae
200.	Rohini	*Soymida febrifuga*	Meliaceae
201.	Tun	*Toona ciliate var. cilliata*	Meliaceae
202.	Raiphala	*Trichilia connaroides*	Meliaceae
203.	Mundica	*Walsura trifoliate*	Meliaceae
204.		*Natsiatum herpeticum*	Icacinaceae
205.	Bhadai	*Olax scandens*	Olacaceae
206.	Bodelia	*Opilia amentacea*	Opliaceae
207.	Mokha	*Cassine glauca*	Celastraceae
208.	Pengu	*Celastrus paniculatus*	Celastraceae
209.		*Euonymus glaber*	Celastraceae
210.		*Maytenus baliadiana*	Celastraceae
211.		*Siphonodon celaastrineus*	Siphonodonta-ceae
212.		*Gouania leptostachya*	Rhamnaceae
213.		*Helinus lanceolatus*	Rhamnaceae
214.		*Rhamnus napalensis*	Rhamnaceae
215.	Rainjhai	*Ventilago denticulate*	Rhamnaceae
216.	Pitchule	*Ventilago maderaspatana*	Rhamnaceae
217.	Chunkoli	*Ziziphus funiculosa*	Rhamnaceae

218.		*Ziziphus glabrata*	Rhamnaceae
219.	Borokoli	*Ziziphus mauritiana*	Rhamnaceae
220.	Kanakoli	*Ziziphus oenoplia*	Rhamnaceae
221.	Chunkoli/Tinkoli	*Ziziphus rugosa*	Rhamnaceae
222.	Gonti/ Goto	*Ziziphus xylopyrus*	Rhamnaceae
223.		*Ampelocissus divaricata*	Vitaceae
224.	Paninoha	*Ampelocissus latifolia*	Vitaceae
225.		*Ampelocissus tomentosa*	Vitaceae
226.		*Cayratia auriculata*	Vitaceae
227.		*Cayratia pedata*	Vitaceae
228.		*Cissus adnata*	Vitaceae
229.		*Cissus assamica*	Vitaceae
230.		*Cissus quadrangular*	Vitaceae
231.	Tekual, Panibel	*Cissus repanda*	Vitaceae
232.	Diboria	*Cissus repens*	Vitaceae
233.		*Leea aequata*	Vitaceae
234.		*Leea asiatica*	Vitaceae
235.		*Leea guineensis*	Vitaceae
236.	Kalad chana	*Leea indica*	Vitaceae
237.	Jibni	*Leea macrophylla*	Vitaceae
238.		*Tetrastigma lanceolarium*	Vitaceae
239.	Lahunga	*Lepisanthes rubiginosa*	Sapindaceae
240.	Lichu	*Litchi chinensis*	Sapindaceae
241.	Kusuma	*Schleichera oleosa*	Sapindaceae
242.		*Turpinia nepalensis*	Staphyleaceae
243.		*Meliosma pinnata*	Sabiaceae
244.		*Meliosma simplicifolia*	Sabiaceae
245.	Kaju	*Anacardium occidentale*	Anacardiaceae
246.	Chara	*Buchanania lanzan*	Anacardiaceae
247.	Moi	*Lannea coromandelica*	Anacardiaceae
248.	Amba	*Mangifera indica*	Anacardiaceae
249.		*Nothopegia heyneana*	Anacardiaceae
250.		*Rhus chinensis*	Anacardiaceae
251.	Bhalia	*Semecarpus anacardium*	Anacardiaceae
252.	Ambada	*Spondias pinnata*	Anacardiaceae
253.	Sajana	*Moringa oleifera*	Moringaceae
254.		*Bauhinia acuminata*	Caesalpiniaceae
255.		*Bauhinia malabarica*	Caesalpiniaceae

256.	Barada	*Bauhinia purpurea*	Caesalpiniaceae
257.	Amta	*Bauhinia semla*	Caesalpiniaceae
258.	Siali	*Bauhinia vahlii*	Caesalpiniaceae
259.	Kanchan	*Bauhinia variegata*	Caesalpiniaceae
260.		*Caesalpinia cucullata*	Caesalpiniaceae
261.		*Caeselpinia pulcherrima*	Caesalpiniaceae
262.	Sunari	*Cassia fistula*	Caesalpiniaceae
263.		*Cassia hirsute*	Caesalpiniaceae
264.		*Cassia lechenaultiana*	Caesalpiniaceae
265.	Kala chakunda	*Cassia occidentalis*	Caesalpiniaceae
266.		*Cassia pumila*	
267.		*Cassia sophera*	Caesalpiniaceae
268.	Chakunda	*Cassia tora*	Caesalpiniaceae
269.	Krushnachuda	*Delonix regia*	Caesalpiniaceae
270.	Ashok	*Saraca asoca*	Caesalpiniaceae
271.	Tentuli	*Tamarindus indica*	Caesalpiniaceae
272.		*Acacia auriculoformis*	Mimosaceae
273.		*Acacia farnesiana*	Mimosaceae
274.	Ghar-khair	*Acacia lenticularis*	Mimosaceae
275.	Kantasiris	*Acacia leucophloea*	Mimosaceae
276.	Babul	*Acacia nilotica*	Mimosaceae
277.	Dantari	*Acacia pennata*	Mimosaceae
278.	Dantari	*Acacia torta*	Mimosaceae
279.	Kala sirisa	*Albizia chinensis*	Mimosaceae
280.	Sirisa	*Albizia lebbeck*	Mimosaceae
281.		*Albizia odoratissima*	Mimosaceae
282.	Satpuri	*Albizia procera*	Mimosaceae
283.	Gilo /Giredi	*Entada rheedii*	Mimosaceae
284.	Kirkichi	*Mimosa himalayana*	Mimosaceae
285.	Lajkuli	*Mimosa pudica*	Mimosaceae
286.	Kongda, Bankhira	*Xylia xylocarpa*	Mimosaceae
287.	Kaicho, Runjo	*Abrus precatorious*	Fabaceae
288.	Lajuari	*Aeschynomene indica*	Fabaceae
289.		*Alysicarpus vaginalis*	Fabaceae
290.	Kuldiha	*Atylosia scaraboides*	Fabaceae
291.		*Atylosia volubilis*	Fabaceae
292.	Palasa	*Butea monosperma*	Fabaceae
293.		*Butea parviflora*	Fabaceae

294.	Noipalasa	*Butea superba*	Fabaceae
295.		*Canavalia gladiata*	Fabaceae
296.	Aparajita	*Clitoria ternatea*	Fabaceae
297.		*Crotalaria acicularis*	Fabaceae
298.		*Crotalaria albida*	Fabaceae
299.		*Crotalaria bilata*	Fabaceae
300.		*Crotalaria calycina*	Fabaceae
301.		*Crotalaria Montana*	Fabaceae
302.		*Crotalaria mysorensis*	Fabaceae
303.	Junjunka	*Crotalaria pallida*	Fabaceae
304.		*Crotalaria prostrata*	Fabaceae
305.		*Crotalaria retusa*	Fabaceae
306.	Jhunka	*Crotalaria spectabilis*	Fabaceae
307.		*Dalbergia lanceolaria*	Fabaceae
308.	Pahadisisu	*Dalbergia latifolia*	Fabaceae
309.	Sujuni	*Dalbergia paniculata*	Fabaceae
310.		*Dalbergia pinnata*	Fabaceae
311.		*Dalbergia volubilis*	Fabaceae
312.		*Desmodium benthamii*	Fabaceae
313.		*Desmodium dichotomum*	Fabaceae
314.		*Desodium gangeticum*	Fabaceae
315.		*Desmodium heterocarpon*	Fabaceae
316.		*Desmodium laxiflorum*	Fabaceae
317.		*Desmodium microphyllum*	Fabaceae
318.		*Desmodium motorium*	Fabaceae
319.	Bandhano	*Desmodium oojeinense*	Fabaceae
320.	Birkapi	*Desmodium pulchellum*	Fabaceae
321.		*Desmodium triangulare*	Fabaceae
322.		*Desmodium triflorum*	Fabaceae
323.	Salparni	*Desmodium triquetrum*	Fabaceae
324.		*Desmodium triquetrum L. ssp. Pseudotri-quetrum*	Fabaceae
325.		*Desmodium velutinum*	Fabaceae
326.		*Dumasia villosa*	Fabaceae
327.		*Dunbaria rotundifolia*	Fabaceae
328.	Paldhua	*Erythrina suberosa*	Fabaceae
329.		*Flemingia bracteata*	Fabaceae
330.	Rani kathi	*Flemingia chappar*	Fabaceae

331.		*Flemingia macrophylla*	Fabaceae
332.		*Flemingia nana*	Fabaceae
333.		*Flemingia paniculata*	Fabaceae
334.		*Flemingia prostrata*	Fabaceae
335.		*Flemingia stricta*	Fabaceae
336.		*Flemingia strobilifera*	Fabaceae
337.		*Galactia longifolia*	Fabaceae
338.		*Indigofera atropurpurea*	Fabaceae
339.	Giliri	*Indigofera cassioides*	Fabaceae
340.		*Indigofera glabra*	Fabaceae
341.		*Indigofera linifolia*	Fabaceae
342.		*Indigofera prostrata*	Fabaceae
343.		*Indigofera spicata*	Fabaceae
344.	Simba	*Lablab purpureus*	Fabaceae
345.	Guadhuni/Guadhubni	*Millettia exensa*	Fabaceae
346.		*Millettia racemosa*	Fabaceae
347.	Bado baidonko	*Mucuna nigricans*	Fabaceae
348.	Baidanka	*Mucuna pruriens*	Fabaceae
349.	Karanja	*Pongamia pinnata*	Fabaceae
350.		*Pseudarthria viscida*	Fabaceae
351.	Piasal/ Bija	*Pterocarpus marsupium*	Fabaceae
352.	Bhuinkakharu	*Pueraria tuberose*	Fabaceae
353.		*Sesbania bispinosa*	Fabaceae
354.	Jhilliphula	*Shuteria involucrate*	Fabaceae
355.		*Smithia conferta*	Fabaceae
356.		*Smithia sensitive*	Fabaceae
357.		*Sophora bakeri*	Fabaceae
358.	Gileri	*Tephrosia purpurea*	Fabaceae
359.		*Termanus labialis*	Fabaceae
360.		*Termanus mollis*	Fabaceae
361.	Krushna parni	*Uraria alopecuroides*	Fabaceae
362.		*Uraria lagopodioides*	Fabaceae
363.	Salparni	*Uraria rufescens*	Fabaceae
364.		*Vigna adenantha*	Fabaceae
365.	Biri	*Vigna mungo*	Fabaceae
366.		*Vigna pilosa*	Fabaceae
367.	Banamongo	*Vigna radiate*	Fabaceae
368.		*Vigna umbellate*	Fabaceae

369.	Jhudanga	*Vigna unguiculata*	Fabaceae
370.		*Zornia gibbosa*	Fabaceae
371.		*Duchesnea indica*	Rosaceae
372.		*Prunus ceylanica*	Rosaceae
373.		*Rubus ellipticus*	Rosaceae
374.	Hemsagar	*Kalanchoe pinnata*	Crassulaceae
375.		*Drosera burmannii*	Droseraceae
376.		*Drosera indica*	Droseraceae
377.		*Carallia brachiata*	Rhizophoraceae
378.	Dhaura	*Anogeissus latifolia*	Combretaceae
379.	Kokundia	*Calycopteris floribunda*	Combretaceae
380.		*Combretum nanum*	Combretaceae
381.	Atundi	*Combretum roxburghii*	Combretaceae
382.	Asan	*Terminalia tomentosa*	Combretaceae
383.	Arjuna	*Terminalia arjuna*	Combretaceae
384.	Bahada	*Terminalia bellirica*	Combretaceae
385.	Harida	*Terminalia chebula*	Combretaceae
386.		*Eucaluptus citriodora*	Myrtaceae
387.		*Eucaluptus tereticornis*	Myrtaceae
388.	Pijuli	*Psidium guajava*	Myrtaceae
389.	Poijamu	*Syzygium cerasoides*	Myrtaceae
390.	Jamu	*Syzygium cumini*	Myrtaceae
391.	Bhalu jamu	*Syzygium fruticosum*	Myrtaceae
392.		*Syzygium heyneanum*	Myrtaceae
393.	Golab jamu	*Syzygium jambos*	Myrtaceae
394.		*Syzygium roxburghianum*	Myrtaceae
395.	Hinjal	*Barringtonia acutangula*	Barringtoniaceae
396.	Kumbhi	*Careya arborea*	Barringtoniaceae
397.	Koroli	*Melastoma malabathricum*	Melastomataceae
398.	Niresho	*Memecylon umbellatum*	Melastomataceae
399.		*Osbeckia chinensis*	Melastomataceae
400.		*Osbeckia muralis*	Melastomataceae
401.		*Obsackia stellata var. rostrata*	Melastomataceae
402.		*Sonerila tenera*	Melastomataceae
403.		*Ammannia baccifera*	Lythraceae
404.		*Ammannia multiflora*	Lythraceae
405.	Sidha	*Lagerstoemia parviflora*	Lythraceae
406.	Patoli	*Lagerstroemia reginae*	Lythraceae

407.	Manjuati	*Lawsonia inermis*	Lythraceae
408.		*Rotala densiflora*	Lythraceae
409.		*Rotala indica*	Lythraceae
410.		*Rotola rotundifolia*	Lythraceae
411.	Dhatuki	*Woodfodia fruiticosa*	Lythraceae
412.	Dalimba	*Punnica granatum*	Punicaceae
413.		*Ludwigia hyssopifolia*	Onagraceae
414.		*Ludwigia octovalvis*	Onagraceae
415.		*Ludwigia perennis*	Onagraceae
416.		*Ludwigia prostrate*	Onagraceae
417.	Panisingada	*Trapa natans*	Trapaceae
418.		*Turnera ulmifolia*	Turneraceae
419.	Papaya	*Carica papaya*	Caricaceae
420.	Banakundri	*Coccinia grandis*	Cucurbitaceae
421.		*Cucumis melo*	Cucurbitaceae
422.		*Cucumis sativus*	Cucurbitaceae
423.	Kakharu	*Cucurbita maxima*	Cucurbitaceae
424.	Shivalingi	*Diplocyclos palmatus*	Cucurbitaceae
425.		*Gymnopetalum cochinchinensis*	Cucurbitaceae
426.		*Gynostemma pedata*	Cucurbitaceae
427.	Lau	*Lagenaria siceraria*	Cucurbitaceae
428.	Janhi	*Luffa acutangula*	Cucurbitaceae
429.	Janhi	*Luffa aegyptiaca*	Cucurbitaceae
430.	Janhi	*Luffa cylindrica var. Minor*	Cucurbitaceae
431.	Kalara	*Momordica charantia*	Cucurbitaceae
432.	Kankud	*Mimordica dioica*	Cucurbitaceae
433.	Paharikakharu	*Mukia maderaspatana*	Cucurbitaceae
434.	Lata baigana	*Sechium edule*	Cucurbitaceae
435.	Bankunduri	*Solena amplexicaulis*	Cucurbitaceae
436.	Mahakala	*Trichosanthes tricuspidata*	Cucurbitaceae
437.		*Begonia picta*	Begoniaceae
438.	Nagapheni	*Opuntia vulgaris*	Cactaceae
439.	Pita saga	*Glinus oppositifolius*	Molluginaceae
440.		*Mollugo pentaphylla*	Molluginaceae
441.	Puruni saga	*Trianthema portulacastrum*	Aizoaceae
442.		*Bupleurum ramosissimum*	Apiaceae
443.	Thalkudi	*Centella asiatica*	Apiaceae
444.	Dhania	*Coriandrum sativum*	Apiaceae

445.	Janglidhania	*Erynginum foetidum*	Apiaceae
446.		*Hydrocotyle sibthorpioides*	Apiaceae
447.		*Oenanthe javanica*	Apiaceae
448.	Banshi Gopal	*Peucedanum nagpurense*	Apiaceae
449.		*Pimpinella bracteata*	Apiaceae
450.		*Pimpinella heyneana*	Apiaceae
451.		*Aralia Montana*	Aralaceae
452.	Jari	*Schlefflera venulosa*	Araliaceae
453.		*Trevesia palmate*	Araliaceae
454.	Ankula	*Alangium salviifolium*	Alangiaceae
455.	Kadamba	*Anthocephalus chinensis*	Rubiaceae
456.		*Argostemma verticillatum*	Rubiaceae
457.	Phiriki	*Benkara malabarica*	Rubiaceae
458.	Kumarchikni/ Jordaru	*Canthium dicoccum (Gaertn.) var.umbellatum*	Rubiaceae
459.		*Canthium glabrum*	Rubiaceae
460.		*Canthium parviflorum*	Rubiaceae
461.	Kalei kanta	*Catunaregam spinosa*	Rubiaceae
462.		*Chassalia curviflora*	Rubiaceae
463.		*Coffea benghalensis*	Rubiaceae
464.		*Dentella repens*	Rubiaceae
465.		*Fagerlindia fasciculate*	Rubiaceae
466.	Bhurudu	*Gardenia gummifera*	Rubiaceae
467.	Dambaru	*Gardenia latifolia*	Rubiaceae
468.		*Gardenia resinifera*	Rubiaceae
469.	Kuruma, Kaima	*Haldinia cordifolia*	Rubiaceae
470.		*Hedyotis affinis*	Rubiaceae
471.		*Hedyotis auricularia*	Rubiaceae
472.	Gharpodia	*Hedyotis corymbosa*	Rubiaceae
473.		*Hedyotis diffusa*	Rubiaceae
474.		*Hedyotis gracilis*	Rubiaceae
475.		*Hedyotis ovatifolia*	Rubiaceae
476.		*Hedyotis pinifolia*	Rubiaceae
477.		*Hedyotis verticillata*	Rubiaceae
478.		*Hedyotis vestita*	Rubiaceae
479.	Bhurkunda	*Hymenodictyon orixense*	Rubiaceae
480.	Banodadri	*Hyptianthera stricta*	Rubiaceae
481.	Lohajharia	*Ixora pavetta*	Rubiaceae
482.		*Ixora undulate*	Rubiaceae

483.		*Knoxia sumatrensis*	Rubiaceae
484.		*Meyna spinosa*	Rubiaceae
485.		*Mitracarpus villosus*	Rubiaceae
486.	Gudikoima	*Mitragyna parvifolia*	Rubiaceae
487.	Pindra	*Morinda citrifolia*	Rubiaceae
488.	Achu	*Morinda pubescens*	Rubiaceae
489.		*Morinda umbellate*	Rubiaceae
490.		*Mussaenda incana*	Rubiaceae
491.		*Neanotis montholoni*	Rubiaceae
492.		*Neanotis tubulosa*	Rubiaceae
493.		*Neanotis wightiana*	Rubiaceae
494.		*Ophiorrhiza fasciculata*	Rubiaceae
495.		*Ophiorrhiza rugosa*	Rubiaceae
496.	Prasaruni	*Paederiafoetida*	Rubiaceae
497.	Kukuchalia	*Pavetta crassicaulis*	Rubiaceae
498.		*Pavetta tomentosa*	Rubiaceae
499.		*Psychotria adenophylla*	Rubiaceae
500.		*Psychotria denticulate*	Rubiaceae
501.		*Psychotria monticola*	Rubiaceae
502.		*Richardia scabra*	Rubiaceae
503.	Rangachireita	*Rubia cordifolia*	Rubiaceae
504.		*Spermacoce articularis*	Rubiaceae
505.		*Spermacoce hispida*	Rubiaceae
506.		*Spermacoce pusilla*	Rubiaceae
507.		*Spermacoce ramanii*	Rubiaceae
508.		*Spermadictyon suaveolens*	Rubiaceae
509.	Telkur	*Tamilnadia uliginosa*	Rubiaceae
510.	Jajanka	*Tarenna asiatica*	Rubiaceae
511.		*Uncaria sessilifructus*	Rubiaceae
512.	Tilai	*Wendlandia tinctoria*	Rubiaceae
513.	Gokhura	*Acanthospermum hispidum*	Asteraceae
514.		*Adenostomma lavenia*	Asteraceae
515.		*Ageratum conyzoides*	Asteraceae
516.		*Anaphilis adnata*	Asteraceae
517.		*Artemisia japonica*	Asteraceae
518.	Magha latenga	*Bidens biternata*	Asteraceae
519.		*Bidens pilosa*	Asteraceae
520.		*Blainvillea acmella*	Asteraceae

521.		*Blumea aromatic*	Asteraceae
522.		*Blumea clarkei*	Asteraceae
523.		*Blumea fistulosa*	Asteraceae
524.		*Blumea hieraciifolia*	Asteraceae
525.		*Blumea lacera*	Asteraceae
526.		*Blumea laciniata*	Asteraceae
527.		*Blumea lanceolaria*	Asteraceae
528.		*Blumea membranacea var. jacquemontii*	
529.		*Blumea mollis*	Asteraceae
530.		*Blumea oxyodonta*	Asteraceae
531.	Moharenti	*Blumeopsis flava*	Asteraceae
532.	Jamjuria	*Caesulia axillaris*	Asteraceae
533.	Nakchika	*Centipeda minima*	Asteraceae
534.	Phulgandhuri	*Chromolaena odorata*	Asteraceae
535.		*Chrysanthellum americanum*	Asteraceae
536.		*Conyza Canadensis*	Asteraceae
537.		*Conyza japonica*	Asteraceae
538.		*Conyza stricta*	Asteraceae
539.		*Cyathocline purpurea*	Asteraceae
540.		*Dicrocephalla integrifolia*	Asteraceae
541.	Kasarda	*Eclipta prostrate*	Asteraceae
542.	Tatmuli,Mayurchulia	*Elephantopus scaber*	Asteraceae
543.	Sarkara	*Emilia sonchifolia*	Asteraceae
544.		*Emilia zeylanica*	Asteraceae
545.	Hidimichi	*Enydra fluctuans*	Asteraceae
546.		*Gnaphalium luteo-album*	Asteraceae
547.		*Gnaphalium pensylvanicum*	Asteraceae
548.		*Gnaphalium polycaulon*	Asteraceae
549.	Painjari	*Grangea maderaspatana*	Asteraceae
550.		*Gynura aurantiaca*	Asteraceae
551.	Gota khadaka	*Laggera alata*	Asteraceae
552.		*Laggera crispata*	Asteraceae
553.		*Launaea acaulis*	Asteraceae
554.		*Mikania micrantha*	Asteraceae
555.		*Sigesbeckia orientalis*	Asteraceae
556.		*Solidago Canadensis*	Asteraceae
557.		*Sonchus asper*	Asteraceae
558.		*Sonchus wightianusvar. glaber*	Asteraceae

559.	Bhuikadam,Halamundi	*Sphaeranthus indicus*	Asteraceae
560.		*Synedrella nodiflora*	Asteraceae
561.	Vaishalyakarni	*Tridex procumbens*	Asteraceae
562.		*Vernonia anthelmintica*	
563.		*Vernonia aspera*	Asteraceae
564.		*Vernonia cineria*	Asteraceae
565.		*Vernonia divergens*	Asteraceae
566.		*Vernonia squarrosa*	Asteraceae
567.		*Vicoa cernua*	Asteraceae
568.	Bana sebati	*Vicoa indica*	Asteraceae
569.		*Wedelia urticifolia*	Asteraceae
570.	Parbatjeera	*Wedelia wallichii*	Asteraceae
571.	Gokhru	*Xanthium indicum*	Asteraceae
572.		*Youngia japonica*	Asteraceae
573.		*Campanula benthamii*	Campanulaceae
574.		*Lobelia alsinoides*	Lobeliaceae
575.		*Lobelia heyneana*	Lobeliaceae
576.		*Anagallis arvensis*	Primulaceae
577.		*Anagallis pumila*	Primulaceae
578.		*Primula umbellata*	Primulaceae
579.		*Ardisia depressa*	Myrsinaceae
580.	Tinkoli	*Ardisia solanacea*	Myrsinaceae
581.		*Embelia ribens*	Myrsinaceae
582.	Baibirango	*Embelia tsjeriam-cottam*	Myrsinaceae
583.	Mahulo	*Madhuca indica*	Sapotaceae
584.	Jayasthamadhuro, Ghurmur	*Xantolis tomentosa*	Sapotaceae
585.		*Diospyros ferrea*	Ebenaceae
586.	Makarkendu	*Diospyros malabarica*	Ebenaceae
587.	Kendu	*Diospyros melanoxylon*	Ebenaceae
588.	Halda/ Jallai	*Diospyros Montana*	Ebenaceae
589.	Kalicha	*Diospyrous sylvatica*	Ebenaceae
590.		*Styrax serullatum*	Styraceae
591.	Bhaunri	*Symplocos cochichinensis*	Symplococaceae
592.	Lodha	*Symplocos recemosa*	Symplococaceae
593.	Masur danta	*Chionanthus intermedius*	Oleaceae
594.	Pochandia	*Chionathus mala-elengi*	Oleaceae
595.	Bana malli	*Jasminum arborescens*	Oleaceae
596.		*Jasminum flexile*	Oleaceae

597.		*Jasminum sambac*	Oleaceae
598.	Ban malli	*Jasminum scandens*	Oleaceae
599.		*Ligustrum gamblei*	Oleaceae
600.	Gangasiuli	*Nyctanthes arbor-tristis*	Oleaceae
601.	Eksira	*Schrebera swietenioides*	Oleaceae
602.	Gandhomalati	*Aganosma caryophyllata*	Apocynaceae
603.	Chhatiana	*Alstonia scholaris*	Apocynaceae
604.		*Alstonia venenata*	Apocynaceae
605.		*Catharanthus pusillus*	Apocynaceae
606.	Sadabihari	*Catharanthus roseus*	Apocynaceae
607.	Korua/ Khurchi/ Indrajalo	*Holarrhena pubescens*	Apocynaceae
608.	Dudhilata/ Swanlata	*Ichnocarpus frutescens*	Apocynaceae
609.	Kaner	*Nerium oleander*	Apocynaceae
610.	Kathachampa	*Plumeria rubra*	Apocynaceae
611.	Patal garud	*Rauvolfia serpentina*	Apocynaceae
612.	Tagar	*Tabernaemontana divaricata*	Apocynaceae
613.	Kaniar	*Thevetia peruviana*	Apocynaceae
614.	Banakaneari	*Vallaris solanacea*	Apocynaceae
615.	Pahadia kuduchi	*Wrightia arborea*	Apocynaceae
616.		*Wrightia tinctoria*	Apocynaceae
617.	Dudhi	*Cryptolepis buchananii*	Peripiocaceae
618.	Dudhi/Antamula/ Sugandhi	*Hemidesmus indicus*	Peripiocaceae
619.	Arakha	*Calotropis gigantea*	Asclepiadaceae
620.		*Caralluma umbellata*	Asclepiadaceae
621.		*Ceropegia hirsuta*	Asclepiadaceae
622.		*Cynanchum callialatum*	Asclepiadaceae
623.		*Dischidia nummularia*	Asclepiadaceae
624.		*Gymnema sylvestre*	Asclepiadaceae
625.		*Heterostemma tanjorense*	Asclepiadaceae
626.		*Holostemma annulare*	Asclepiadaceae
627.		*Hoya alexicaca*	Asclepiadaceae
628.		*Hoya parasitica*	Asclepiadaceae
629.		*Pentatropis capensis*	Asclepiadaceae
630.	Utrali/ Uturudi	*Pergularia daemia*	Asclepiadaceae
631.		*Toxocarpus kleinii*	Asclepiadaceae
632.		*Wattakaaka volubilis*	Asclepiadaceae
633.	Kochila	*Strychnos nux-vomica*	Strychnaceae

634.	Kakato/Koyar	*Strychonos potatorum*	Strychnaceae
635.		*Buddleja asiatica*	Buddlejaceae
636.		*Mitreola petiolata*	Spigeliaceae
637.		*Mitrasacme indica*	Spigeliaceae
638.		*Mitrasacme pygmaea*	Spigeliaceae
639.		*Canscora decurrens*	Gentianaceae
640.		*Cansocora decussata*	Gentianaceae
641.		*Canscora diffusa*	Gentianaceae
642.		*Centaurium centaurioides*	Gentianaceae
643.		*Exacum bicolor*	Gentianaceae
644.		*Exacum tenue*	Gentianaceae
645.		*Hoppea dichotoma*	Gentianaceae
646.		*Swertia angustifolia*	Gentianaceae
647.		*Nymphoides hydrophylla*	Menyanthaceae
648.	Languliya	*Hydrolea zeylanica*	Hydrophyllaceae
649.	Ghanti	*Cordia macleodii*	Ehretiaceae
650.		*Cordia wallichii*	Ehretiaceae
651.		*Ehretia acuminata*	Ehretiaceae
652.	Mosania	*Ehretia laevis*	Ehretiaceae
653.		*Coldenia procumbens*	Boraginaceae
654.		*Cynoglossum zeylanicum*	Boraginaceae
655.		*Heliotropium indicum*	Boraginaceae
656.		*Heliotropium strigosum*	Boraginaceae
657.		*Trichodesma zeylanicum*	Boraginaceae
658.		*Argyreia bella*	Convolvulaceae
659.		*Argyreia daltonii*	Convolvulaceae
660.	Jada	*Erycibe paniculata*	Convolvulaceae
661.	Bichhamalia	*Evolvulus alsinoides*	Convolvulaceae
662.		*Evolvulus nummularius*	Convolvulaceae
663.		*Hewittia sublobata*	Convolvulaceae
664.	Kalam	*Ipomea aquatic*	Convolvulaceae
665.		*Ipomea barlerioides*	Convolvulaceae
666.		*Ipomea cairica*	Convolvulaceae
667.		*Ipomea carnea*	Convolvulaceae
668.		*Ipomea eriocarpa*	Convolvulaceae
669.		*Ipomea nil*	Convolvulaceae
670.		*Ipomea pes-tigridis*	Convolvulaceae
671.		*Ipomea quamoclit*	Convolvulaceae

672.		*Ipomea sinensis*	Convolvulaceae
673.		*Ipomea turbinata*	Convolvulaceae
674.		*Merremia emarginata*	Convolvulaceae
675.		*Merremia hirta*	Convolvulaceae
676.		*Merremia umbellata*	Convolvulaceae
677.		*Merremia vitifolia*	Convolvulaceae
678.	Nirmuli	*Cuscuta reflexa*	Cuscutaceae
679.	Lanka	*Capsicum annum*	Solanaceae
680.	Dutura	*Datura metel*	Solanaceae
681.	Bilati	*Lycopersicon esculentum*	Solanaceae
682.	Tipai	*Physalis minima*	Solanaceae
683.		*Solanum erianthum*	Solanaceae
684.		*Solanum giganteum*	Solanaceae
685.	Baigana	*Solanum melongena var. melongena*	Solanaceae
686.	Bhejibaigan	*Solanum melongenavar. insanum*	Solanaceae
687.	Nununu nia	*Solanum nigram*	Solanaceae
688.	Kantua	*Solanum torvum*	Solanaceae
689.	Bhejibaigan	*Solanum vairum*	Solanaceae
690.		*Solanum violaceum*	Solanaceae
691.		*Solanum virginianum*	Solanaceae
692.		*Adenosma microcephalum*	Scrophulariaceae
693.		*Baccopa monnieri*	Scrophulariaceae
694.		*Buchnera hispida*	Scrophulariaceae
695.		*Centranthera indica*	Scrophulariaceae
696.		*Centranthera tranquebarica*	Scrophulariaceae
697.		*Limnophila aquatica*	Scrophulariaceae
698.		*Limnophila aromatica*	Scrophulariaceae
699.		*Limnophila connata*	Scrophulariaceae
700.		*Limnophila heterophylla*	Scrophulariaceae
701.		*Limnophila indica*	Scrophulariaceae
702.		*Limnophila rugosa*	Scrophulariaceae
703.		*Lindenbergia muraria*	Scrophulariaceae
704.		*Lindernia anagallis*	Scrophulariaceae
705.		*Lindernia antipoda*	Scrophulariaceae
706.		*Lindernia caespitosa*	Scrophulariaceae
707.		*Lindernia ciliata*	Scrophulariaceae
708.		*Lindernia crustacea*	Scrophulariaceae
709.		*Lindernia hookeri*	Scrophulariaceae

710.		*Lindernia nummularifolia*	Scrophulariaceae
711.		*Lindernia viscosa*	Scrophulariaceae
712.		*Mecardonia procumbens*	Scrophulariaceae
713.	Khelopapada	*Scoparia dulcis*	Scrophulariaceae
714.		*Striga angustifolia*	Scrophulariaceae
715.		*Striga asiatica*	Scrophulariaceae
716.		*Torenia cordifolia*	Scrophulariaceae
717.		*Torenia violacea*	Scrophulariaceae
718.		*Aeginetia indica*	Orobanchaceae
719.		*Utricularia aurea*	Lentibulariaceae
720.		*Utricularia bifida*	Lentibulariaceae
721.		*Utricularia caerulea*	Lentibulariaceae
722.		*Utricularia scandens*	Lentibulariaceae
723.		*Aeschynanthus parasiticus*	Gesneriaceae
724.		*Chirita hamosa*	Gesneriaceae
725.		*Rhinchoglossum obliquum*	Gesneriaceae
726.	Phimpinia/ Phanphana	*Oroxylum indicum*	Bignoniaceae
727.		*Radermachera xylocarpa*	Bignoniaceae
728.		*Spathodea campanulata*	Bignoniaceae
729.	Parudi/Patuli	*Stereospermum chelonoides*	Bignoniaceae
730.	Rasi	*Sesamum orientale*	Pedaliaceae
731.	Baghanakhi	*Martynia annua*	Martyniaceae
732.		*Andrographis elongate*	Acanthaceae
733.		*Andrographis ovate*	Acanthaceae
734.		*Andrographis paniculata*	Acanthaceae
735.		*Barleria cristata*	Acanthaceae
736.		*Barleria strigosa*	Acanthaceae
737.		*Barleria gibsonii*	Acanthaceae
738.	Daskeranta	*Barleria prionitis*	Acanthaceae
739.		*Barleria lupulina*	Acanthaceae
740.		*Blepharis maderaspatensis*	Acanthaceae
741.		*Dicliptera bupleuroides*	Acanthaceae
742.		*Dicliptera verticillata*	Acanthaceae
743.		*Dipteracanthus beddomei*	Acanthaceae
744.		*Dipteracanthus suffruticosus*	Acanthaceae
745.		*Ecbolium viride*	Acanthaceae
746.		*Eranthemum capsense*	Acanthaceae
747.		*Eranthemum nervosum*	Acanthaceae

748.		*Eranthemum purpurascens*	Acanthaceae
749.		*Hemiadelphis polysperma*	Acanthaceae
750.		*Hemigraphis latebrosa*	Acanthaceae
751.	Koilekha	*Hygrophila auriculata*	Acanthaceae
752.		*Hygrophila salicifolia*	Acanthaceae
753.		*Indoneesiella echioides*	Acanthaceae
754.		*Justicia adhatoda*	Acanthaceae
755.		*Justicia betonica*	Acanthaceae
756.		*Justicia diffusa*	Acanthaceae
757.		*Justicia gendarussa*	Acanthaceae
758.		*Justicia japonica*	Acanthaceae
759.		*Justicia nilgherrensis*	Acanthaceae
760.		*Justicia quiqueangularis*	Acanthaceae
761.		*Lepidagathis fasciculata*	Acanthaceae
762.		*Lepidagathis incurva*	Acanthaceae
763.		*Lepidagathis purpuricaulis*	Acanthaceae
764.		*Nelsonia canescens*	Acanthaceae
765.		*Peristrophe speciosa*	Acanthaceae
766.		*Petalidium barlerioides*	Acanthaceae
767.		*Phaulopsis imbricata*	Acanthaceae
768.		*Rhinacanthus nasutus*	Acanthaceae
769.		*Ruellia tuberosa*	Acanthaceae
770.		*Rungia pectinata*	Acanthaceae
771.		*Rungia repens*	Acanthaceae
772.		*Staurogyne glutinosa*	Acanthaceae
773.	Pianya	*Strobilanthes auriculatus*	Acanthaceae
774.		*Strobilanthes heyneanus*	Acanthaceae
775.		*Strobilanthes lupulinus*	Acanthaceae
776.		*Strobilanthes scaber*	Acanthaceae
777.	Chakrakedar	*Thunbergia frangrans*	Acanthaceae
778.		*Callicarpa longifolia*	Verbenaceae
779.		*Callicarpa macrophylla*	Verbenaceae
780.		*Callicarpa tomentosa*	Verbenaceae
781.		*Clerodendrum indicum*	Verbenaceae
782.	Samarkand/ Tirkatia	*Clerodendrum serratum*	Verbenaceae
783.	Kunti	*Clerodendrum viscosum*	Verbenaceae
784.	Gambhari	*Gmelina arborea*	Verbenaceae
785.	Putus	*Lantana camaravar. aculeate*	Verbenaceae

786.	Naguari	*Lippia javanica*	Verbenaceae
787.	Gosingi	*Phyla nodiflora*	Verbenaceae
788.		*Premna calycina*	Verbenaceae
789.		*Premna coriacea*	Verbenaceae
790.	Gandhanu	*Premna latifolia*	Verbenaceae
791.	Gitia	*Pygmaeopremna herbacea*	Verbenaceae
792.		*Stachytarpheta jamaicensis*	Verbenaceae
793.	Poiyan	*Symphorema polyandrum*	Verbenaceae
794.	Sagwan	*Tectona grandis*	Verbenaceae
795.	Muria	*Vitex glabrata*	Verbenaceae
796.		*Vitex leucoxylon*	Verbenaceae
797.	Begunia, Nirgundi	*Vitex negundo*	Verbenaceae
798.	Chadaigudi/ simkata	*Vitex peduncularis*	Verbenaceae
799.		*Acrocephalus hispidus*	Lamiaceae
800.		*Ajuga macrosperma*	Lamiaceae
801.		*Anisochilus carnosus*	Lamiaceae
802.		*Anisomeles indica*	Lamiaceae
803.		*Colebrookea oppositifolia*	Lamiaceae
804.		*Eusteralis stellata*	Lamiaceae
805.		*Gomphostemma parviflorum*	Lamiaceae
806.	Banatulsi	*Hyptis suaveolens*	Lamiaceae
807.		*Leonotis nepetifolia*	Lamiaceae
808.		*Leucas aspera*	Lamiaceae
809.	Gaisa	*Leucas indica*	Lamiaceae
810.		*Leucas lanata*	Lamiaceae
811.		*Leucas mollissimaVar. scaberula*	Lamiaceae
812.		*Micromeria capitellata*	Lamiaceae
813.		*Micromeria biflora*	Lamiaceae
814.		*Mosla dianthera*	Lamiaceae
815.	Bantulsi	*Ocimum americanum*	Lamiaceae
816.		*Ocimum basilicum*	Lamiaceae
817.	Tulsi	*Ocimum tennuiflorum*	Lamiaceae
818.		*Orthosiphon aristatus*	Lamiaceae
819.		*Orthosiphon pallidus*	Lamiaceae
820.	Chandua	*Orthosiphon rubicundus*	Lamiaceae
821.		*Orthosiphon thymiflorus*	Lamiaceae
822.		*Platystoma africanus*	Lamiaceae
823.		*Plectanthus japonicus*	Lamiaceae

824.		*Plectanthus mollis*	Lamiaceae
825.		*Plectanthus ternifolius*	Lamiaceae
826.		*Plectanthus wightii*	Lamiaceae
827.		*Pogostemon auricularius*	Lamiaceae
828.		*Pogostemon benghalensis*	Lamiaceae
829.		*Teucrium viscidum*	Lamiaceae
830.	Kharkharia/ Parni	*Boerhavia diffusa*	Nyctaginaceae
831.		*Bougainvillea glabra*	Nyctaginaceae
832.		*Bougainvillea spectabilis*	Nyctaginaceae
833.	Apamaranga	*Achyranthes aspera*	Amaranthaceae
834.		*Acaranthes bidentata*	Amaranthaceae
835.		*Aerva lantana*	Amaranthaceae
836.		*Aerva sanguinolenta*	Amaranthaceae
837.		*Allmania nodiflora*	Amaranthaceae
838.		*Alternanthera sessilis*	Amaranthaceae
839.	Khada saga	*Amaranthus caudatus*	Amaranthaceae
840.	Kanta khada	*Amaranthus spinosus*	Amaranthaceae
841.	Nautia	*Amaranthus tricolor*	Amaranthaceae
842.		*Amaranthus viridis*	Amaranthaceae
843.		*Celosia argentea*	Amaranthaceae
844.		*Cyathula prostrata*	Amaranthaceae
845.		*Gomphhrena celosioides*	Amaranthaceae
846.		*Pupalia lappacea*	Amaranthaceae
847.		*Chenopodium album*	Chenopodiaceae
848.		*Polygonum barbatum*	Polygonaceae
849.		*Polygonum barbatum L.* *Var. stagninum*	Polygonaceae
850.		*Polygonum chinense*	Polygonaceae
851.		*Polygonum glabrum*	Polygonaceae
852.		*Polygonum hydropiper L.* *Ssp. Microcarpum var. triquetrum*	Polygonaceae
853.		*Polygonum pendunculare*	Polygonaceae
854.		*Polygonum plebeium*	Polygonaceae
855.		*Polygonum strigosum*	Polygonaceae
856.		*Polypleurum wallichii*	Podostemaceae
857.	Iswar-mula	*Aristolochia indica*	Aristolochiaceae
858.		*Peperomia dindigulensis*	Piperaceae
859.		*Peperomia tetraphylla*	Piperaceae

860.	Chaikatha	*Piper triocum*	Piperaceae
861.		*Actinodaphne anguistifolia*	Lauraceae
862.		*Cassytha filliformis*	Lauraceae
863.	Ledha chhali	*Litsea glutinosa*	Lauraceae
864.	Paja	*Litsea monopetala*	Lauraceae
865.		*Neocinnamomum caudatum*	Lauraceae
866.		*Persea villosa*	Lauraceae
867.		*Phoebe lanceolata*	Lauraceae
868.		*Phoebe wightii*	Lauraceae
869.		*Grevillea robusta*	Proteaceae
870.		*Elaeagnus kologa*	Elaeagnaceae
871.		*Dendrophthoe falcata*	Loranthaceae
872.		*Macrosolen cochinchinensis*	Loranthaceae
873.	Malanga	*Scurrula parasitica*	Loranthaceae
874.	Malanga	*Viscum articulatum*	Loranthaceae
875.	Malanga	*Viscum monoicum*	Loranthaceae
876.	Malanga	*Viscum orientale*	Loranthaceae
877.		*Osyris wightiana*	Santalaceae
878.	Chandan	*Santalum album*	Santalaceae
879.		*Acalypha indica*	Euphorbiaceae
880.		*Alchornea mollis*	Euphorbiaceae
881.	Nunnunia	*Antidesma acidum*	Euphorbiaceae
882.		*Antidesma acuminatum*	Euphorbiaceae
883.		*Antidesma bunius*	Euphorbiaceae
884.	Amtua/Nuniari	*Antidesma ghaesembilla*	Euphorbiaceae
885.	Tabo	*Aporosa octandra*	Euphorbiaceae
886.	Rajkoli	*Baccaurea ramiflora*	Euphorbiaceae
887.		*Baliospremum montanum*	Euphorbiaceae
888.		*Biscofia javanica*	Euphorbiaceae
889.	Jajana	*Breynia vitis-idaea*	Euphorbiaceae
890.		*Bridelia pubescens*	Euphorbiaceae
891.	Kasi	*Bridelia retusa*	Euphorbiaceae
892.	Nota kasi	*Bridelia stipularis*	Euphorbiaceae
893.	Karada	*Cleistanthus collinus*	Euphorbiaceae
894.		*Cleistanthus patulus*	Euphorbiaceae
895.		*Croton bonplandianus*	Euphorbiaceae
896.	Furudi	*Croton caudatus*	Euphorbiaceae
897.	Masud/Putudi	*Croton roxburghii*	Euphorbiaceae

898.		*Cnesmosa javanica*	Euphorbiaceae
899.		*Dimorphocalyx glabellus*	Euphorbiaceae
900.	Anla	*Embica officinalis*	Euphorbiaceae
901.	Dudhi	*Euphorbia hirta*	Euphorbiaceae
902.	Seju	*Euphorbia nivulia*	Euphorbiaceae
903.		*Euphorbia prostrata*	Euphorbiaceae
904.		*Euphorbia thymifolia*	Euphorbiaceae
905.		*Glochidion lanceolarium*	Euphorbiaceae
906.		*Glochidion velutinum*	Euphorbiaceae
907.		*Glochidion zeylanicum*	Euphorbiaceae
908.	Pani jhorabi/Jamla	*Homonoia riparia*	Euphorbiaceae
909.	Banpri jada	*Jatropha curcas*	Euphorbiaceae
910.		*Jatropha gossypifolia*	Euphorbiaceae
911.	Jandaki	*Kirganelia reticulata*	Euphorbiaceae
912.	Kukuda-hadi	*Lasiococca comberi*	Euphorbiaceae
913.		*Macaranga denticulate*	Euphorbiaceae
914.		*Macaranga peltata*	Euphorbiaceae
915.	Sinduri	*Mallotus philippensis*	Euphorbiaceae
916.		*Pachystylidium hirsutum*	Euphorbiaceae
917.		*Phyllanthus amarus*	Euphorbiaceae
918.		*Phyllanthus debilis*	Euphorbiaceae
919.	Bhui-amla/Bari-amla	*Phyllanthus fraternus*	Euphorbiaceae
920.	Jhar	*Phyllanthus lawii*	Euphorbiaceae
921.		*Phyllanthus urinaria*	Euphorbiaceae
922.		*Phyllanthus virgatus*	Euphorbiaceae
923.	Jada	*Ricinus communis*	Euphorbiaceae
924.		*Sapium insigne*	Euphorbiaceae
925.		*Sauropus quadrangularis*	Euphorbiaceae
926.		*Sebastiania chamaelea*	Euphorbiaceae
927.		*Securinega virosa*	Euphorbiaceae
928.		*Suregada multiflora*	Euphorbiaceae
929.		*Tragia involucrata*	Euphorbiaceae
930.	Panigambhari	*Trewia nudiflora*	Euphorbiaceae
931.		*Triadica cochinchinensis*	Euphorbiaceae
932.		*Celtis tetrandra*	Ulmaceae
933.	Charla/Turuda	*Holoptelea intergrifolia*	Ulmaceae
934.	Kharkas	*Trema orientalis*	Ulmaceae
935.	Jautha/Jeota	*Artocarpus lacucha*	Moraceae

936.	Panasa	*Artocarpus heterophullus*	Moraceae
937.		*Cudrania cochinchinensis*	Moraceae
938.	Bara	*Ficus benghalensis*	Moraceae
939.		*Ficus benjamina var. comosa*	Moraceae
940.		*Ficus fruticosa*	Moraceae
941.		*Ficus heterophylla*	Moraceae
942.		*Ficus hispida*	Moraceae
943.		*Ficus lanceolata*	Moraceae
944.		*Ficus microcarpa*	Moraceae
945.		*Ficus nervosa*	Moraceae
946.	Dimiri	*Ficus racemosa*	Moraceae
947.	Pipalo/Aswastha	*Ficus religiosa*	Moraceae
948.		*Ficus scandens*	Moraceae
949.	Potkuli	*Ficus semicordata*	Moraceae
950.	Kharsara	*Ficus tinctoria subsp. gibbosa*	Moraceae
951.		*Ficus virens*	Moraceae
952.	Tutkoli	*Morus australis*	Moraceae
953.		*Morus macroura*	Moraceae
954.	Sara	*Streblus asper*	Moraceae
955.	Phutkuli	*Streblus taxoides*	Moraceae
956.		*Boerhmeria macrophylla*	Urticaceae
957.		*Elatostemma cuneatum*	Urticaceae
958.		*Laportea interrupta*	Urticaceae
959.		*Maoutia puya*	Urticaceae
960.		*Oreocnide frutescens*	Urticaceae
961.		*Pilea microphylla*	Urticaceae
962.		*Pilea scripta*	Urticaceae
963.		*Pouzolzia auriculata*	Urticaceae
964.		*Pouzolzia pentandra*	Urticaceae
965.		*Populus cilata*	Salicaceae
966.	Panibegunia	*Salix tetrasperma*	Salicaceae
967.		*Ceratophyllum demersum*	Ceratophyliaceae
968.		*Blyxa auberti*	Hydrocharitaceae
969.		*Ottelia alismoides*	Hydrocharitaceae
970.		*Vallisneria natans*	Hydrocharitaceae
971.		*Burmannia coelestis*	Burmanniaceae
972.		*Acampe carinata*	Orchidaceae
973.	Rasna	*Acampe ochracea*	Orchidaceae

974.		*Acampe praemorsa*	Orchidaceae
975.		*Acampe rigida*	Orchidaceae
976.		*Acanthephippium sylhetens*	Orchidaceae
977.		*Aerides maculosum*	Orchidaceae
978.		*Aerides multiflorum*	Orchidaceae
979.		*Aerides odoratum*	Orchidaceae
980.		*Bulbophyllum cariniflorum*	Orchidaceae
981.		*Bulbophyllum crassipes*	Orchidaceae
982.		*Bulbophyllum macraei*	Orchidaceae
983.		*Bulbophyllum panigrahianum*	Orchidaceae
984.		*Bulbophyllum polyrhizum*	Orchidaceae
985.		*Bulbophyllum triste*	Orchidaceae
986.		*Bulbophyllum umbellatum*	Orchidaceae
987.		*Chiloschista parishii*	Orchidaceae
988.		*Cleisostoma appendiculatum*	Orchidaceae
989.		*Cymbidium aloifolium*	Orchidaceae
990.		*Dendrobium aphyllum*	Orchidaceae
991.		*Dendrobium bicameratum*	Orchidaceae
992.		*Dendrobium cathcartii*	Orchidaceae
993.		*Dendrobium crepidatum*	Orchidaceae
994.		*Dendrobium fimbriatum*	Orchidaceae
995.		*Dendrobium formosum*	Orchidaceae
996.		*Dendrobium herbaceum*	Orchidaceae
997.		*Dendrobium moschatum*	Orchidaceae
998.		*Dendrobium nobile*	Orchidaceae
999.		*Dendrobium peguanum*	Orchidaceae
1000.		*Dendrobium regium*	Orchidaceae
1001.		*Dendrobium transparens*	Orchidaceae
1002.		*Diploprora championi*	Orchidaceae
1003.		*Eria bambusifolia*	Orchidaceae
1004.		*Eria meghasaniensis*	Orchidaceae
1005.		*Eulophia explanata*	Orchidaceae
1006.		*Eulophia nuda*	Orchidaceae
1007.		*Flickingeria nodosa*	Orchidaceae
1008.		*Gastrochilus inconspicuous*	Orchidaceae
1009.		*Geodorum densiflorum*	Orchidaceae
1010.		*Goodyera fumata*	Orchidaceae
1011.		*Goodyera hispida*	Orchidaceae

1012.		*Goodyrea procera*	Orchidaceae
1013.		*Goodyera thailandica*	Orchidaceae
1014.	Dev Sunda	*Habenaria commelinifolia*	Orchidaceae
1015.		*Habenaria crassifolia*	Orchidaceae
1016.		*Habenaria foliosa*	Orchidaceae
1017.		*Habenaria furcifera*	Orchidaceae
1018.		*Habenaria plantaginea*	Orchidaceae
1019.		*Habenaria reniformis*	Orchidaceae
1020.		*Habenaria stenopetala*	Orchidaceae
1021.		*Kingidium decumbens*	Orchidaceae
1022.		*Liparis bituberculata*	Orchidaceae
1023.		*Liparis elliptica*	Orchidaceae
1024.		*Liparis nervosa*	Orchidaceae
1025.		*Liparis resupinata*	Orchidaceae
1026.		*Liparis viridiflora*	Orchidaceae
1027.		*Lusia brachystychis*	Orchidaceae
1028.		*Luisia trichorhiza*	Orchidaceae
1029.		*Luisia zeylanica*	Orchidaceae
1030.		*Malaxis latifolia*	Orchidaceae
1031.		*Malaxis purpurea*	Orchidaceae
1032.		*Malaxis rheedii*	Orchidaceae
1033.		*Micropera pallida*	Orchidaceae
1034.		*Nervilia aragoana*	Orchidaceae
1035.		*Nervilia discolor*	Orchidaceae
1036.		*Nervilia infundibulifolia*	Orchidaceae
1037.		*Nervilia prainiana*	Orchidaceae
1038.		*Oberonia denticulata*	Orchidaceae
1039.		*Oberonia ensiformis*	Orchidaceae
1040.		*Oberonia iridifolia*	Orchidaceae
1041.		*Oberonia falconeri*	Orchidaceae
1042.		*Oberonia gammiei*	Orchidaceae
1043.		*Oberonia proudlockii*	Orchidaceae
1044.		*Pecteilis gigantea*	Orchidaceae
1045.		*Pelatantheria insectifera*	Orchidaceae
1046.		*Peristylus constrictus*	Orchidaceae
1047.		*Peristylus goodyeroides*	Orchidaceae
1048.		*Peristylus lawii*	Orchidaceae
1049.		*Peristylus parishii*	Orchidaceae

1050.		*Pholidota pallida*	Orchidaceae
1051.		*Rhynchostylis retusa*	Orchidaceae
1052.		*Smitinandia micrantha*	Orchidaceae
1053.		*Spiranthes sinensis*	Orchidaceae
1054.		*Staurochilus ramosus*	Orchidaceae
1055.		*Tainia hookeriana*	Orchidaceae
1056.		*Thunia bracteata*	Orchidaceae
1057.		*Tropidia angulosa*	Orchidaceae
1058.		*Tropidia curculigoides*	Orchidaceae
1059.	Malanga/ Amdahaka/ Ransa	*Vanda tessellata*	Orchidaceae
1060.	Rasna/Malang	*Vanda testacea*	Orchidaceae
1061.		*Zeuxine gracilis*	Orchidaceae
1062.	Ban Kadali	*Musa paradisiaca*	Musaceae
1063.		*Amomum maximum*	Zingiberaceae
1064.		*Catimbium malaccense*	Zingiberaceae
1065.		*Costus speciosus*	Zingiberaceae
1066.	Ban haldi/Amada	*Curcuma amada*	Zingiberaceae
1067.	Palua	*Curcuma angustifolia*	Zingiberaceae
1068.	Ban haldi/Palua	*Curcuma aromatica*	Zingiberaceae
1069.		*Curcuma zedoaria*	Zingiberaceae
1070.		*Curcumorpha longiflora*	Zingiberaceae
1071.		*Globba marantina L. G. bulbifera Roxb.*	Zingiberaceae
1072.		*Globba racemosa*	Zingiberaceae
1073.		*Hedychium coccineum*	Zingiberaceae
1074.		*Hedychium coronarium*	Zingiberaceae
1075.		*Kaempferia rotunda*	Zingiberaceae
1076.		*Zingiber capitanum*	Zingiberaceae
1077.		*Zingiber purpureum*	Zingiberaceae
1078.		*Zingiber rubens*	Zingiberaceae
1079.		*Canna coccinea*	Cannaceae
1080.		*Ananas comosus*	Bromeliaceae
1081.		*Crinum amoenum*	Amaryllidaceae
1082.	Kondai	*Crinum defixum*	Amaryllidaceae
1083.		*Pancratium triflorum*	Amaryllidaceae
1084.	Sisal	*Agave sisalana*	Agavaceae
1085.	Talmuli/ Kua kanda	*Curculigo orchioides*	Hypoxidaceae
1086.		*Curculigo trichocarpa*	Hypoxidaceae

1087.		*Tacca leontopetaloides*	Taccaceae
1088.		*Dioscorea alata*	Dioscoreaceae
1089.		*Dioscorea belophylla*	Dioscoreaceae
1090.		*Dioscorea bulbifera*	Dioscoreaceae
1091.	Kanta alu	*Dioscorea glabra*	Dioscoreaceae
1092.	Suta alu	*Dioscorea hamiltonii*	Dioscoreaceae
1093.	Bainya	*Dioscorea hispida*	Dioscoreaceae
1094.	Pani alu	*Dioscorea oppositifolia*	Dioscoreaceae
1095.	Karabha alu	*Dioscorea pentaphylla*	Dioscoreaceae
1096.	Kosa alu/ Saiga alu	*Dioscorea puber*	Dioscoreaceae
1097.		*Dioscorea tomentosa*	Dioscoreaceae
1098.	Tunga alu	*Dioscorea wallichii*	Dioscoreaceae
1099.	Satawari/ Gaisiro/ Gaic-hero	*Asparagus racemosus*	Liliaceae
1100.	Jhinka	*Chlorophytum arundinaceum*	Liliaceae
1101.		*Chlorophytum tuberosum*	Liliaceae
1102.		*Disporum cantoniensis*	Liliaceae
1103.		*Dracaena ternifolia*	Liliaceae
1104.		*Drimia indica*	Liliaceae
1105.		*Gloriosa superba*	Liliaceae
1106.		*Iphigenia indica*	Liliaceae
1107.	Ramdantani/Mutri Mothuri	*Smilax perfoliata*	Smilaceae
1108.	Ramdantani/Mutri Mothuri	*Smilax zeylanica*	Smilaceae
1109.		*Monochoria vaginalis*	Pontederiaceae
1110.		*Aneilema ovalifolium*	Commelinaceae
1111.		*Commelina appendiculata*	Commelinaceae
1112.		*Commelina benghalensis*	Commelinaceae
1113.		*Commelina diffusa*	Commelinaceae
1114.		*Commelina erecta*	Commelinaceae
1115.		*Commelina paludosa*	Commelinaceae
1116.		*Commelina suffruticosa*	Commelinaceae
1117.		*Cyanotis arachnoides*	Commelinaceae
1118.		*Cyanotis cristata*	Commelinaceae
1119.		*Cyanotis fasciculata*	Commelinaceae
1120.		*Cyanotis tuberosa*	Commelinaceae
1121.		*Floscopa scandens*	Commelinaceae
1122.		*Mudrannia edulis*	Commelinaceae
1123.		*Mudrannia japonica*	Commelinaceae

1124.		*Mudrannia nudiflora*	Commelinaceae
1125.		*Mudrannia spirata*	Commelinaceae
1126.		*Mudrannia vaginata*	Commelinaceae
1127.		*Tonningia axillaries*	Commelinaceae
1128.		*Juncos prismatocarpus*	Juncaceae
1129.	Gauri-bet	*Calamus latifolius*	Arecaceae
1130.		*Calamus viminalis var fasciculatus*	Arecaceae
1131.		*Caryota urens*	Arecaceae
1132.	Khejuri	*Phoenix acaulis*	Arecaceae
1133.		*Alocasia fornicata*	Araceae
1134.		*Alocasia macrorrhizos*	Araceae
1135.		*Amorphophalus paeoniifolius var campanulatus*	Araceae
1136.		*Arisaema tortuosum*	Araceae
1137.		*Colocasia esculenta*	Araceae
1138.		*Lasia spinosa*	Araceae
1139.		*Plesmonium margaritiferum*	Araceae
1140.		*Pothos scandens*	Araceae
1141.		*Raphidophora glauca*	Araceae
1142.		*Remusatia vivipara*	Araceae
1143.		*Rhapidophora decursiva*	Araceae
1144.		*Scindapsus officinalis*	Araceae
1145.		*Theriophonum minutum*	Araceae
1146.		*Tenagocharis latifolia*	Butomaceae
1147.		*Aponogeton natans*	Aponogetonaceae
1148.		*Eriocaulon melaleucum*	Erioleucaceae
1149.		*Eriocaulon quinquangulare*	Erioleucaceae
1150.		*Eriocaulon ritchieanum*	Erioleucaceae
1151.		*Eriocaulon sollyanum*	Erioleucaceae
1152.		*Eriocaulon truncatum*	Erioleucaceae
1153.		*Eriocaulon xeranthum*	Erioleucaceae
1154.		*Carex baccans*	Cyperaceae
1155.		*Carex filicina*	Cyperaceae
1156.		*Carex phacota*	Cyperaceae
1157.		*Carex stramentitia*	Cyperaceae
1158.		*Cyperus brevifolius*	Cyperaceae
1159.		*Cyperus compactus*	Cyperaceae
1160.		*Cyperus cuspidatus*	Cyperaceae

1161.		*Cyperus cyperoides*	Cyperaceae
1162.		*Cyperus distans*	Cyperaceae
1163.		*Cyperus flavidus*	Cyperaceae
1164.		*Cyperus haspan*	Cyperaceae
1165.		*Cyperus iria*	Cyperaceae
1166.		*Cyperus malccensia*	Cyperaceae
1167.		*Cyperus niveus*	Cyperaceae
1168.		*Cyperus nutans*	Cyperaceae
1169.		*Cyperus pilosus*	Cyperaceae
1170.		*Cyperus procerus*	Cyperaceae
1171.		*Cyperus pubisquama*	Cyperaceae
1172.		*Cyperus pumilus*	Cyperaceae
1173.		*Cyperus rotundus*	Cyperaceae
1174.		*Cyperus sanguinolentus*	Cyperaceae
1175.		*Cyperus sesquiflorus*	Cyperaceae
1176.		*Cyperus tenuispica*	Cyperaceae
1177.		*Eleocharis congesta*	Cyperaceae
1178.		*Eleocharis retroflexa*	Cyperaceae
1179.		*Fimbristylis aestivalis*	Cyperaceae
1180.		*Fimbristylis bisumbellata*	Cyperaceae
1181.		*Fimbristylis dichotoma*	Cyperaceae
1182.		*Fimbristylis littoralis Gaud. Var. littoralis*	Cyperaceae
1183.		*Fimbristylis miliacea*	Cyperaceae
1184.		*Fimbristylis swchoenoides*	Cyperaceae
1185.		*Fuirena ciliaris*	Cyperaceae
1186.		*Indocourtoisia cyperoides*	Cyperaceae
1187.		*Lipocarpha chinensis*	Cyperaceae
1188.		*Lipocarpha sphacelata*	Cyperaceae
1189.		*Scirpus articulatus*	Cyperaceae
1190.		*Scirpus grossus*	Cyperaceae
1191.		*Scirpus juncoides*	Cyperaceae
1192.		*Scirpus mucronatus*	Cyperaceae
1193.		*Scirpus squarrosus*	Cyperaceae
1194.		*Scleria lithosperma*	Cyperaceae
1195.		*Scleria terrestris*	Cyperaceae
1196.		*Scleria tessellata*	Cyperaceae
1197.		*Alloteropsis semialata*	Poaceae
1198.		*Andropogon ascinodes*	Poaceae

1199.		*Apluda mutica*	Poaceae
1200.		*Apocopis courtallumensis*	Poaceae
1201.		*Apocopis paleacea*	Poaceae
1202.		*Arthraxon lanceolatus*	Poaceae
1203.		*Arthraxon lancifolius*	Poaceae
1204.		*Arthraxon quartinianus*	Poaceae
1205.		*Arundinella setosa*	Poaceae
1206.		*Arundo donax*	Poaceae
1207.		*Bambusa nutans*	Poaceae
1208.		*Bambusa tulda*	Poaceae
1209.		*Bothriochloa bladhii*	Poaceae
1210.		*Bothriochloa parviflora*	Poaceae
1211.		*Bothriochloa pertusa*	Poaceae
1212.		*Brachiaria distachya*	Poaceae
1213.		*Brachiaria ramose*	Poaceae
1214.		*Capillipedium assimile*	Poaceae
1215.		*Centosteca latifolia*	Poaceae
1216.		*Chionachne koenigii*	Poaceae
1217.		*Chrysopogon aciculatus*	Poaceae
1218.		*Chrysopogon verticillatus*	Poaceae
1219.		*Coelachne simpliciuscula*	Poaceae
1220.		*Coix aqquatica*	Poaceae
1221.		*Coix gigantia*	Poaceae
1222.		*Coix lacryma*	Poaceae
1223.		*Cymbopogon caecius*	Poaceae
1224.	Dhanantri	*Cymbopogon fexuosus*	Poaceae
1225.	Dhanantri	*Cymbopogon martinii*	Poaceae
1226.	Duba	*Cynodon dactylon*	Poaceae
1227.		*Crytococcum oxyphyllum*	Poaceae
1228.		*Crytococcum patens*	Poaceae
1229.		*Dacyloctenium aegyptium*	Poaceae
1230.	Saliabanso	*Dendrocalamus strictus*	Poaceae
1231.		*Desmostachya bipinnata*	Poaceae
1232.		*Dicanthium caricosum*	Poaceae
1233.		*Digitaria abludens*	Poaceae
1234.		*Digitaria bicornis*	Poaceae
1235.		*Digitaria ciliaris*	Poaceae
1236.		*Digitaria longifloga*	Poaceae

1237.		*Digitaria stricta*	Poaceae
1238.		*Echinochloa colona*	Poaceae
1239.		*Eleusine indica*	Poaceae
1240.		*Eragrostiella nardoides*	Poaceae
1241.		*Eragrostis atrovirens*	Poaceae
1242.		*Eragrostis coarctata*	Poaceae
1243.		*Eragrostis gangetica*	Poaceae
1244.		*Eragrostis tenella*	Poaceae
1245.		*Eragrostis unioloides*	Poaceae
1246.	Banga-serum	*Eulalia trispicata*	Poaceae
1247.	Baguli/Bubai/Sabai	*Eulaliopsis binata*	Poaceae
1248.		*Garnotia tenella*	Poaceae
1249.		*Hackelochloa granularis*	Poaceae
1250.	Sukla	*Heteropogon contortus*	Poaceae
1251.		*Hygroryza aristata*	Poaceae
1252.		*Ichnanthus vicinus*	Poaceae
1253.	Chhana ghas	*Imperata cylindrica*	Poaceae
1254.		*Isachne albens*	Poaceae
1255.		*Isachne globosa*	Poaceae
1256.		*Isachne miliacea*	Poaceae
1257.		*Ischaemum hirtum*	Poaceae
1258.		*Ischaemum idicum*	Poaceae
1259.		*Ischaemum rugosum*	Poaceae
1260.		*Iseilema laxum*	Poaceae
1261.		*Leersia hexandra*	Poaceae
1262.		*Leptochloa chinensis*	Poaceae
1263.		*Microstegium ciliatum*	Poaceae
1264.		*Mnesithea laevis*	Poaceae
1265.		*Oplismenus burmannii*	Poaceae
1266.		*Oplismenus compositus*	Poaceae
1267.		*Oryza meyeriana*	Poaceae
1268.		*Oryza rufipogon*	Poaceae
1269.	Dhana	*Oryza sativa*	Poaceae
1270.		*Oryza officinalis*	Poaceae
1271.		*Panicum brevifolium*	Poaceae
1272.		*Panicum notatum*	Poaceae
1273.	Gundlu/Gundla	*Panicum sumatrense*	Poaceae
1274.		*Panicum trypheron*	Poaceae

1275.		*Paspalidium flavidum*	Poaceae
1276.	Kodo	*Paspalum scrobiculatum*	Poaceae
1277.		*Pennisetum pedicelatum*	Poaceae
1278.		*Pennisetum polystachyon*	Poaceae
1279.		*Pennisetum purpureum*	Poaceae
1280.		*Perotis indica*	Poaceae
1281.		*Phragmitis karka*	Poaceae
1282.		*Pogonatherum paniceum*	Poaceae
1283.		*Pogonatherum rufo-barbatum*	Poaceae
1284.		*Pseudopogonatherum contortum*	Poaceae
1285.		*Pseudosorghum fasciculare*	Poaceae
1286.		*Rottboellia cochinchinensis*	Poaceae
1287.		*Saccharum fallax*	Poaceae
1288.		*Saccharum narenga*	Poaceae
1289.		*Saccharum spontaneum*	Poaceae
1290.		*Sacciolepis indica*	Poaceae
1291.		*Sacciolepis interrupta*	Poaceae
1292.		*Schizachyrium brevifolium*	Poaceae
1293.		*Sehima nervosa*	Poaceae
1294.		*Setaria intermedia*	Poaceae
1295.		*Setaria palmifolia*	Poaceae
1296.		*Setaria pumila*	Poaceae
1297.		*Sorghum bicolor*	Poaceae
1298.		*Sorghum nitidum*	Poaceae
1299.		*Sporobolus indicus (L.) R. Br. Var. diander*	Poaceae
1300.		*Sporobolus indicus (L.) R.Br. var. purpureosuffusus*	Poaceae
1301.		*Sporobolus wallichii*	Poaceae
1302.		*Themeda arundinacea*	Poaceae
1303.		*Themeda caudata*	Poaceae
1304.		*Themeda laxa*	Poaceae
1305.		*Themeda quadrivalvis*	Poaceae
1306.		*Themeda triandra*	Poaceae
1307.		*Themeda villosa*	Poaceae
1308.		*Thysanolaena maxima*	Poaceae
1309.	Maka	*Zea mays*	Poaceae

ANNEXURE XXI

LIST OF ORCHIDS

Acampe carinata (Griff.)Panigr., Taxon 34:688-689, 1985.

papillosa (Lindl.) Lindl., Fol. Orch. Acampe 2, 1853. nom. Illeg; Mishra 1985:168.

Occurrence : Jamuani, Jenabil, Kabatghai, Mahubhandar, Manbhanga ghat; Pithabata, Talabandha, Upper Barakamuda; very common in the semi-evergreen forest, in shade; flowering during Dec.-Feb.

Acampe ochracea (lindl.)Hochr., Bull. N. Y. Bot. Gard. 6:270, 1910.

Occurrence: Bada makabadi, Banjikusum ghat, Chahala, Gurguria, Jenabil, Kabatghai, Meghasini, Upper Barakamuda; very common in the semi-evergreen forest, in shade; flowering during Dec.:Feb.

Acampe praemorsa (Roxb.)Blatt.& McCann, J. Bombay nat. Hist. Soc. 35:495, 1932.

Occurrence : Baniabasa, Deokund, Kabatghai, Lulung, Manbhanga ghat, Sitakunda; occasional, in open forests, in the periphery; flowers during May-June.

Acampe rigida (Buch.-Ham.Ex J.E. Sm.) Hunt, *Kew Bull.* 24:98, 1970.

Occurrence : Baniapada, Champaghat, Dhanagoji, Jenabil; scarce, in semi-ever-green to evergreen forests, in shade; flowers during Sept.

***Acanthephippium bicolor**Lindl., Bot. Reg.:t.1730, 1835.

Occurrence: Badamakabadi; scarce, in semi-evergreen forest, on stream bank, under shade, in association with *A.sylhetense;* flowers in May.

Acanthephippium sylhetense Lindl. Gen. & SP. Orch.: 177, 1830.

Occurrence: Balidahar, Baniapada, Bhanjabasa, Dhudruchampa, Garandia nala, Hatisala, Jenabila, Mandadahar, Meghasini block, Tangaria, tarinibila; scarce, in semi-ever green to evergreen forests, on stream banks under heavily shaded situations; flowers in May-June.

Aerides multiflora Roxb., Corom. P1.271, 1820.

Occurrence: Baniabasa, Banjikusum ghat, Debakund, Dhudruchampa, Garh Similipal, Gurguria, Jamuani, Jenabil, Kabatghai, Kendumundi, Lulung, Mahubhandar, Meghasini, Talabandh, Upper Barakamuda; common, in moist deciduous to semi-evergreen forests; flowers in June.

Aerides odorata Lour., F1.Cochinch. 2:525,1790.

Occurrence: Badamakabadi, Baniabasa, Banjikusum ghat, Chahala, Deokund, Garh Similipal, Gurguria, Jamuani, Jenabil, Joranda fall, Kabatghai, Lulung, Manabhanga ghat, Uski; common, in the moist deciduous forests; flowers in June.

Bulbophyllum cariniflorum Rchb.f, in Walp.Ann.6:253,1861.

Occurrence: Jenabil, Matughar, Meghsani, Meghasini-Bhanjabasa, Nekdanacha-Balidahar, Upper Barakamuda; occasional, in semi-evergreen and evergreen forests, under shade; flowers during Aug.-Sep.

Bulbophyllum crassipes Hook.f.F1. Brit. Ind.5:760,1890.

Occurrence: Bhanjabasa, Deokund, Joranda fall, Kendumundi, Munidhar-Lulung, Sanjo valley, Sitakund; occasional, in the moist deciduous forests by stream side, epiphytic or lithophytic; flowers in Oct.

Bulbophyllum macraei (Lindl.)Rchb.f., in Walp.Ann. 6:263,1861.

Occurrence: Bhudaka, Hatisala, Matughar, Pataghara, Upper Barakamuda scarce, in ever-green forests, by stream side, under shade; flowering during July-Aug.

Bulbophyllum panigrahinum S. Misra in Nord. J.Bot. 6(1): 25-29, 1986.

Occurrence : Bhuduka, near Baniapada, very rare in evergreen forest, in moist valley, lithophytic by stream side; flowers in June; flowers waxy-white, maroon-speckled; fruiting Jan.

Bulbophyllum polyrhizum Lindl., Gen & Sp.Orch.:53,1830.

Occurrence : Meghasini hill, nearing the peak; scarce, in semi-evergreen forest, in partly open condition; flowers in Mar.

Bulbophyllum triste Rchb.f.**,** in Walp. Ann.6:1861.

Occurrence : Meghasini hill, Nekadanecha-Balidahar; scarce, in semi-evergreen forests, in partly open situations; flowers in Feb.-Mar.

Bulbophyllum umbellatum Lindl., Wall,Cat, 1984,1829 non.nud., Gen. & Sp. Orch.:56,1830.

Occurrence : Upper Barakamuda, Baladi nala; occasional, in evergreen forest, by stream side, under shade; flowers in Apr.

***Calanthe triplicata** (Willem) Ames, Philipp. J. Sc. Bot. 2:326, 1907.

Occurrence: Bandiriabasa on Deo river; on edge of the stream, rare, in semi-evergreen forest, under shade.

Cirrhopetalum panigrahianum(S.Mishra) S.Mishra. J.Orchid Soc.India11 (1-2):1997

Occurrence : Bhuduka, Jenabil extension of endemic range in evergreen forest, flowering in June.

Chiloschista parishii Seidenf.in Opera Bot.95:176-178, 1988. Chiloschista lunifera auct. non (Rchb.f.) J. J. Sm.; Misra 1985:170.

Occurrence : Bakua, Baniabasa, Bhanjabasa, Debasthali, Dhangoji, Garandia, Jenabil, Kabatghai, Meghasini, Tarinibila, Upper Barakamuda; occasional, in semi-evergreen to evergreen forests, epiphytic usually on slender branches, at low heights, under shade; flowers during Apr.- June.

Cleisostoma appendiculatum (Lindl.)Benth.& Hook. f. Scidenef., Dansk. Bot.Ark. 29(2-4): 58,1975.

Occurrence : Andharajodi, Gurguria, Kabatghai, Manabhanga ghat, Tangaria, Tarukdora; occasional, in semi-evergreen to moist deciduous forests, usually by stream side, epiphytic or lithophytic at low heights, under shade; flowers in Sept.

Cymbidium aloifolium (L.) Sw., Kg1.Sv.Vet.Akad.nya Handl.6:73,1799.

Occurrence : Badamakabadi, Baniabasa, Bhanjabasa, Champaghat, debakunda, Ghagra, Gudgudiam, Jenabil, Joranda, fall, Kendumundi, Lulung, Manabhanga ghat, Upper Barakamuda, Meghasini, Uski; frequent, in moist deciduous to semi-evergreen forests, in open situations; flowers during April.-June.

Cymbidium bicolor Lindl., Gen. & Sp. Orch.:164,1833.

Occurrence : Badamakabadi, Baniapada, Jenabil, Joranda fall (bed), Kairakacha, Meghasini, Pathuria, Upper Barakamuda; occasional, in semi-evergreen forests, under shade, preferring moist conditions; flowers in Mar.

Dendrobium aphyllum (Roxb.)Fisch., in Gamble,F1.Madr.Pres.8:141,1928.

Occurrence : Badamakabadi, Baniabasa, Banjikusum ghat, Bhanjabasa, Chahala, Deokund, Gurguria, Jenabil, Joranda fall (top and bottom), Kabatghai, Lulung, Upper Barakamuda, Uski; common, in moist deciduous to semi-evergreen forests, in partly open situations; flowers during Mar.-Apr.

Dendrobium bicameratum Lindl. Bot. Reg. 25:85, misc.52,1839.

Occurrence : Badamakabadi, Bhanjabasa, Jenabil-Dhudruchampa, Matughar, Meghasini, Upper Barakamuda; occasional, in semi-evergreen forests; flowers during July-Aug.

Dendrobium cathcartii Hook.f., F1. Br. Ind. 5:727,1890.

Occurrence : Badamakabadi, Baniapada, Bhanjabasa, Dhanagoji, Meghasini, Nekadanecha, Sarua, tarinibila, Upper Barakamuda; occasional in semi-evergreen to evergreen forests, in well shaded situations; flowers during Apr.-June.

Dendrobium cathcartii J. Hook., Fl. Br. India 5:727, 1890.

Occurrence : Badamakabadi, Baniapada, Bhanjabasa, Dhanagoji, Meghasini, Nekadanacha, Sarua, Tarinibilla, Upper Barakamuda; occasional, in semi-evergreen to evergreen forests, in well shaded situations; flowers during April – June.

Dendrobium crepidatum Lindl.&Paxt., Paxton F1.Gard. 1:63, Fig.45, 1850.

Occurrence : Badamakabadi, Baniapada, Bhanjabasa, Dhanagoji, Dhudruchampa, Garh Similipal, Jenabil, Kabataghai, Khejuri, Meghasini, Sarua, Tarinibila, Upper Barakamuda; occasional, in moist deciduous to semi-evergreen forests, in partly shaded situation; flowers in Apr.

Dendobium formosum Roxb.exLindl., in Wallich, Pl. As.rar. 1:24, T.29, 1830.

Occurrence: Badamakabadi, Barehipani, Dha ghat, Dhanagoji, Ghagara, Gurguria, Jenabil, Kabatghai, Patbil, Talabandh-Chahala, Tangaria, Tinadiha, Upper Barakamuda; frequent, in moist deciduous or semi-evergreen forests, in open situation; flowers during May-June.

Dendobium herbaceum Lindl., Bot. Reg. Misc.69,1840.

Occurrence : Bhanjabasa, Chahala, Dhanagoji, Jenabil, Kabatghai, Meghasini, Tangaria, Upper Barakamuda; frequent, in moist deciduous to semi-evergreen forests; flowers during Feb.-Apr.

Dendrobium macrostachyum Lindl.Gen.& Sp. Orch, 78, 1830.

Occurrence : Bakua, Barehipani, Kendumundi, Uski; scarce, in moist deciduous forests, in open situations; flowers in Apr.

Dendrobium moschatum (Buch.-Ham.)Sw. Schrader Neue Joourn. 1:94, 1806

Occurrence : Badamakabadi, Baniapada, Bhanjabasa, Chahala, Champaghat, Deokund, Ghagra, Jenabil, Joranda fall (bed), Kabatghai, Manbhangaghat, Meghasini, Sanjo valley, Sitakund, Tinadiha, Upper Barakamuda, frequent in semi-evergreen forests, in shade, flowers May-June.

Dendrobium nobile Lindl. Gen & Sp. Orch.: 34, 1830.

Occurrence: Badamakabadi, Bhanjabasa, Chahala, Jenabil, Kabatghai, Meghasini, Tinadiha, Upper Barakamuda, frequent in semi-evergreen forests, in shade, flowers May-June.

Dendrobium peguanum Lindl., J. Linn. Soc. 3:19, 1859.

Occurrence : Jamuani; scarce in moist deciduous forest, in open situation. Flowers in Dec-Jan.

Dendrobium transparens Lindl. Gen. & Sp. Orch.: 79,1830.

Occurrence : Bhanjabasa, Chahala, Gurguria, Hatisala, Jamuna, Jenabil, Kabatghai, Meghasini, Patbil, Sanjo valley, U. Barhakamunda, Uski; frequent, in moist deciduous to semi-evergreen forests, in partly open situations; flowers during Apr.-June.

Dendrobium regium Prain. J. Asiat Soc. Bengal. Pt.2 . Nat Hist.71:1902

Occurrence : Badamakabadi, Bhanjabasa, Chahla,Kabatghai,Meghashini,Tarinibila, UBK, Occasional in Semi-evergreen forests, flowering in April-June

Diploprora championi (Lindl.) Hook.f., F1.Brit.India,6:26,1890.

Occurrence : Baniapada, Bhanjabasa, Garandia nala, Meghasini nala, Sanabaladi nala (near Pataghar), Tangaria and Tarinibila; scarce; in evergreen forests, by stream side in completely shaded situations, hanging from a slender branches at low heights; flowers June, fruit; in Oct.-Apr.

Disperis neilegherrensis Wight. Icon. Pl. Ind. Orient.5 :1851

Occurrence : Meghashini Hill, very rare in Semi-evergreen forest in moist and shady localities,flowering in August.

Eria bambusifolia Lindl., J. Linn. Soc. 3:61,1859.

Occurrence : Baniapada, Bhanjabasa, Jenabil, Matughar, Meghasini, Pathuria, Tarinibila, Upper Barakamuda; frequent, in semi-evergreen to evergreen forest, in shade, under moist conditions; flowers during Dec.-Jan.

Eria meghasaniensis (Sarat Misra) Sarat Misra, *J. Orchid Soc. India* 3(1,2) :69, 1990.

Occurrence : Meghasini hill, Khairiburu hill; rare, in tropical evergreen forests, epiphytes, at low heights, in moist and partly open situations, flowers in Sept.

Eulophia explanata Lindl., Gen. & Sp. Orch.: 180, 1833.

Occurrence : Bamanghaty, Balidar (near); occasional, in moist deciduous forests, on foot hills or forest floors with loamy soil, flowers during May.

Eulophia graminea Lindl., (Wall. Num. List no. 7372 nom. Nud.)Gen. Sp. Orch. Pl.:182, 1833.

Occurrence : Gurguria; scarce, on bank of Khairi nala, in moist deciduous forest, in open situation.

Eulophia mackinnoni Duthie. J. Asiat Soc. Bengal. Pt.2 . Nat Hist.71:1902

Occurrence : Matughar,Tarinibila, rare in meadow in open patches in evergreen forests, flowering in June-July

Eulophia nuda Lindl. Gen. Sp. Orch. P1:180, 1833

Occurrence : Bamanghaty, Barehipani, Chahala, Debasthali, Gurguria, Jenabil, Meghasini, Sanjo valley, Upper Barakamuda; common in forest floors or hills, even with stoney soil; flowers during May-June.

Epipogium roseum (D.Don) Lindl. J. Proc. Linn. Soc, Bot:1857

Occurrence : UBK, rare in semi-evergreen forest in damp shade, flowering in June

Flickingeria macraei (Lindl) Seid.*Dansk Bot. Ark*.34 (1): 39, 1980.

Occurrence : Baniapada, Bhanjabasa, Hatisala, Jenabil, Meghasini, Tarinibila, Upper Barhakamuda; frequent, in semi-evergreen to evergreen forest, in shade, under moist conditions; flowers during Dec.-Jan.

Gastrochilus inconspicuum (Hook.f.)Kuntze, Rev. Gen. 2:661, 1891.

Occurrence : Barehipani, Bhanjabasa-Meghasini, Gurguria, Hatisala, Jamuani, Jenabil, Kabatghai,Talbandha, Upper Barakamuda; common, in moist deciduous to semi-evergreen forest, in partly open situation; flowers during June-Oct.

Geodorum densiflorum (Lamk.) Schltr. *Fed. Rep.Beih*. 4:259, 1919.

Occurrence : Bakua, Bamanghaty, Bhanjabasa-Meghasini, Chahala, Gurguria, Kabatghai, Lulung, Meghasini, Patbil, Sanjo valley, Upper Barakamuda-Meghasini; very common throughout, under forest floor; flowers during June-July.

Geodorum recurvum (Roxb.) Alston in Trimen. Handb. Fl. Ceylon:1976

Occurrence : Bakua, Barehipani, Bhnajabasa,Meghashini, Chahala, Gudgudia, Kabatghai, Patbil, UBK in moist deciduous forest open fotest as undergrowth, flowers in May-June

Goodyera fumata Thw., Enum. Pl. Zeyl. 314,1864.

Occurrence : Pataghara, by the side of Baladinala; rare, in dense evergreen forest, inshade; flowers in Feb.

Goodyera hispida Lindl., J. Linn. Soc.1:183,1857.

Occurrence : Tarinibila nala, Upper Barakamuda, by the side of Baladinala; scarce, in dense evergreen forest, under shade; flowers in Aug.

Goodyera procera (Ker-Gawl.)Hook., Exot.FL.1.3:T.39,1823.

Occurrence : Badamakabadi, Gurguria, Jenabil, Upper Barakamuda; occasional, in semi-evergreen to evergreen forests, by stream side, under shade, flowers during March.

Goodyera thailandica Seid., Bot. Tidskr. 65:109,1969; Misra 1988a:21-23.

Occurrence : Baniapada, Bhanjabasa, Hatisala (Sendakida nala), Tarinibila and Upper Barakamuda (Pataghar and Mandadahar); scarce, in dense evergreen forest, near streams, under heavy shade; flowers during Feb.-Mar.

Habenaria commelinifolia (Roxb.) wall. Ex Lindl., Gen. & Sp. Orch.:325, 1835.

Occurrence : Barehipani, Debasthali, Gurguria, Joranda, Lulung, Nawana, Patbil; common on forest floors, in open, in moist deciduous forests; flowers during Aug.-Oct.

Habenaria crassifolia A. Rich.in Ann. Sci.nat.Ser.2.15:72t3c.1841.

Occurrence : Gurguria, Lulung, Sargada; occasional, inmoist deciduous forest floor, fruiting Sept.

Habenaria diphlla Dalzell. Hooker's J.Bot.Kew Gard. Misc.2:1850

Occurrence : Gudgudia,rare in moist deciduous sal forest under medium shade, flowers in September.

Habenaria furcifera Lindl., Gen. & Sp. Orch.: 319, 1835.

Occurrence: Dhangoji, Gurguria (on way to Bakua); occasional, in moist deciduous forests, under cover, flowers inAug.

Habenaria gibsoni var. foetida Blatt.&McCann, J. Bombay nat.Hist. Soc. 36:16, 1932.

Occurrence : Chahala, Gurguria-Bakua, Kusumi; occasional, in moist deciduous forests, under cover, fruiting Oct.

Habenaria plantaginea Lindl., Gen & Sp. Orch.:323, 1835.

Occurrence : Baniabasa, Barehipani, Chahala, Champagada, Gurguria, Kusumi, Lulung; common around Chahala, occasional elsewhere, in moist deciduous forests, under cover, flowers during Sept.-Oct.

Habenaria reniformis (D. Don.)Hook.f., FL.Brit.Ind.6:152,1890.

Occurrence: Gurguria, Joranda, Patabila, Tinadiha; common, in open grassy land; flowers in Aug.

Habenaria stenopetala Lindl., Gen. & Sp. Orch.:319,1835.

Occurrence: Baniapada, Jenabil-Tarinibilla; rare, in evergreen forest, under dense shade, in moist condition, with light soil; flowers Sep.-Oct.

Kingidium deliciosum (Rchb.f.) Sweet, Am.Orch.Soc.Bull.39:1095,1970.

Occurrence : Ghagra, Joranda fall (bed), Nekdanach, Tarinibila; scarce, in semi-evergreen forests, in shade; flowers during May-Sept.

Liparis elliptica Wight, Ic.Pl.Ind.Or.5(1): 17,Pl.1735,1851.

Occurrence : Upper Barakamuda, Mandadahara, Meghasini nala, Tarinibila; rare, in evergreen forests, under heavy shade, in moist condition; flowers in Nov.-Dec.

Liparis nervosa (Thunb.)Lindl. Gen. & Sp. Orch.:26,1830.

Occurrence: Balidar, Baniapada, Bhanjabasa, Dhudruchampa, Garandia, Hatisala, Jenabila, Kabataghai, Tarinibila and Upper Barhakamuda; scarce; in semi-evergreen to evergreen forests, under cover, on edge of perinnial streams, with humus rich soil; flowers in June.

Liparis paradoxa (Lindl.) H.G.Rchb in Walp.Ann.6:218,1861.

Occurrence : Jenabil, Maghasani, Tinadiha-U.Barhakamuda; in semi-evergreen forests, under cover; flowers June-July.

Liparis viridiflora (B1.)Lindl., Gen. & Sp. Orch.:31,p.p.1830.

Occurrence: Meghasini, Nekdanacha, Pathuria; occasional, in semi-evergreen to evergreen forests, under moist conditions; flowers during Nov.-Dec.

Luisia brchystachys (Lindl.)B1., Rumphia 4:50, 1848.

Occurrence : Badampahar, on the periphery; scarce, in moist deciduous open forest; flowers in Apr.

Luisia trichorhiza (W. Hook.)B1., Mus. Bot. Lugd.Bat.1:63,1849.

Occurrence : Bada makabadi, Barehipani fall, Chahala, Debasthali, Gurguria, Jamuani, Joranda fall, Kabatghai, Kairakacha, Kendumundi, Sanjo valley, Upper Barakamuda; very common, in open, moist deciduous forests, flowers during Feb.-Apr.

Luisia zeylanica Lindl., Fol. Orch. Luisia 3, 1853.

Occurrence: Barehipani-Uski, Barehipani-Nawana, Khadakai-Nigirdha; occasional, in open moist deciduous forests; flowers in Apr.-May.

Malaxis ophrydis (Koen) Ormerod in Seidenf., Descrip. Epidend.: 18, 1995.

Occurrence : Meghasini-Bhanjabasa, Tarinibilla, Udiabasa; scarce, in semi-evergreen forest, under shade, flowers in June.

Malaxis purpurea (Lindl.)Kze., Rev. Gen. 2:673, 1891.

Occurrence : Bhanjabasa, on way to Ghagra, rare, in partly shaded situations of semi-evergreen forest, near water courses, with loamy soil; flowers in June-July.

Malaxis rheedii Sw., Kgl., Vet.Akad.nya Handl.21:235,1800.

Occurrence : Bhanjabasa-Meghasini, Bhudaka, Hatisala, Meghasini, Upper Barakamuda; occasional, terrestrial, epiphytic or lithophytic, in semi-evergreen to evergreen forests, under moist conditions; flowers in July.

Micropera pallida (Roxb.)Lindl., Bot.Reg.18:sub T.1522,1832.

Occurrence : Andharajodi, Baniabasa, Joranda fall (bed), Manbhanga ghat, Tangaria; occasional, in semi-evergreen forests, by stream side, in shade; flowers in June.

Nervilia aragoana Gaud. In Freycss., Voy. Bot.422,T.35,1829.

Occurrence: Barigam Deokund, Kusumi, Lulung; occasional, in moist deciduous forests, under cover;flowers in May.

Nervilia infundibulifolia Blatt.& McCann, *J. Bombay nat. Hist. Soc.* 35:725, T.3,1932.

Occurrence : Andharajodi, Bakua, Gurguria; scarce, in moist deciduous forests, under cover, flowers in June.

Nervilia plicata (Andr.)Schltr., Engl. Bot.Jahrb.45:403,1911.

Occurrence : Lulung; fairly abundant, in moist deciduous forests, under cover.

Nervilia crociformis (Zoll.&Mor.) Seid.,*Dansk Bot. Ark.*32(2):151, fig.92, 1978.

Occurrence : Bakua, Barehipani, Barigam, Chahala, Champagada, Garandia, Gurguria, Jenabil, Kusumi, Meghasini, Patbil, Upper Barakamuda; frequent, in semi-evergreen forests, under cover, in moist conditions.

Oberonia denticulata Wight var. iridigolia (Roxb.) Sarat Misra, *J. Orchid Soc.Ind.*3(1,2), 1990.

Occurrence : Akhapalana; scarce, in open moist deciduous forests; flowers in Nov.

Oberonia ensiformis (J.E.Sm) Lindl., Fol. Orch. Ober. No.21, 1859.

Occurrence : Badamakabadi, Baniapada, Bhanjabasa, Chahala, Champagada-Khadakai, Dhudruchampa, Garh Similipal, gudgudia, Jenabil, Kabatghai, Meghasini, Sanjo valley, Upper Barakamuda, Uski; frequent, in moist decicuous to semi-evergreen forests; flowers during Oct.-Nov.

Oberonia falconeri Hook.f., Fl.Br. Ind.5: 678, 1890.

Occurrence : Barehipani, Deokund, Garh Similipal, Gurguria, Joranda fall (bed), Kabatghai, Lulung, Kachudahan, Saragada, Upper Barakamuda, Uski; frequent, preferring moist deciduous open forets; fowers during Sept.-Oct.

Oberonia gammiei King & Pantl. J. Soc. Beng. 66, 2:578, 1897.

Occurrence: Badamakabadi, Baniapada, Bhanjabasa, Chakunda nala, Garandia, Jenabil, Khairiburu, Matughar, Meghasini, Pakaladiha nala, Tarinibilla, Upper Barakamuda, Udiabasa; frequent, in semi-evergreen to evergreen forests, in moist conditions, under shade; flowers in Aug.

Oberonia proudlockii king & Pantl. J.As. Soc. Beng. 66, 2 :580, 1897.

Occurrence : Jenabil (on way to Dhudruchampa), Meghasini ; occassional ; in semi-evergreen forest on the hills in open situations; flowers Feb.

Oberonia pyrulifera (lindl.), Fol. Orch. Oberonia No.15, 1859.

Occurrence : Bandhanala, Naranga, Udiabasa, UpperBarakamuda; scarce in semi-evergreen to evergreen forests, in shaded situations; flowers during Oct-Nov.

Odisha cleistantha ssp.cleistanta S.Misra. Nelumbo 60(2):2018

Occurrence : Barehipani, Gudgudia, Kabatghai,Scarce in moist deciduous forestas undergrowths, flowers in October.

Pecteilis gigantea (J.E.Sm.) Rafin.Fl.Tell.2:38, 1837.

Occurrence : Patbil, Tinadiha; open grass land; flowers Aug.

Pelatantheria insectifera (H.G. Rchb.)Ridl., J. Linn.Soc.32:373, 1896.

Occurrence : Andharjodi, Joranda fall (stream bed, lithophytic), Lulung, Mahubhandar, Sanjo valley; common, in moist deciduous forests, in partly open conditions; flowers during Sept.-Oct.

Peristylus constrictus (Lindl.), Gen & Sp. Orch.:300, 1835.

Occurrence : Bakua-Jenabil, Lulung, Meghasini, Patbil; occasional, in open patches of semi-evergreen forests; flowers in Aug.

Peristylus goodyeroides (D.Don.)Lindl., Gen & Sp. Orch.:299, 1835.

Occurrence : Kachudahan (fide Panigrahi), Khadkhai, Lulung, occasional, in moist deciduous forest, in shrubs; flowers in Sept.

Peristylus lawii Wight, Icones 5:12, t.1695, 1851.

Occurrence : Lulung, occasional, in moist deciduous forest, as under growth, with clayeeloamy soil; fruits in late July.

Peristylus parishii Rchb.f., Trans. Linn. Soc. 30:139, 1874.

Occurrence : Balidahar, occasional, in semi-evergreen forest, in partly open situations, with loamy soil; flowers in June.

Peristylus plantagineus (Lindl.)Lindl., Gen Sp. Orch. P1.:300, 1835.

Occurrence : Lulung; occasional, in mixed deciduous forest; flowers during early Sept.

Pholidota imbricata W.J.Hook., Exot.Fl.2: T. 138,1825.

Occurrence : Badamakabadi, Baniapada, Bhanjabasa, Chahala, champaghat, Deokund, Jenabil, Kabatghai, Meghasini, Sitakunda, Tarinibila, Upper Barakamuda; common, in semi-evergreen gorest, in shade; flowers dueing Aug.-Sept.

Rhynchostylis retusa (L.)B1., Bijdr.: 286, Fig 49, 1825.

Occurrence : Bhanjabasa, Chahala, Deokund, Gurguria, Lulung, Manabhanga ghat, Meghasini, Sanjo valley, Upper Barakamuda, Uski; very common, throughout, in open situations; flowering May-June.

Seidenfia versicolor (Lindl.) Mag. & Szlach. Pol. Bot. Journ.46(1):2001

Occurrence : Bhanjabasa-Meghashini, Hatisala, Tarinibila, UBK, occasional in evergreen to semi-evergreen forest in moist localities under shade, Flowers in July-August

Smitinandia micrantha (Lindl.)Holtt., Gard, Bull. Sing.25:106, 1969.

Occurrence : Baniabasa, Banjikusum, Bhanjabasa, Deokund, dhudruchampa, Gurguria, Hatisala-Jenabil, Joranda fall (bed), Kairakacha, Kendumundi, Mahubhandar, Meghasini, Tinadiha, U. Brhakamuda; common throughout, in shade, flowers during Apr.-May.

Sprinthes sinensis (Pers.) Armes, Orch.2:53. 1908.

Occurrence : Jenabil, scarce, on edge of stream, lithophytic on moss covered rock, flowers in Feb. Also in Gurguria (fide Panigrahi).

Staurochilus ramosus (Indl.)Seid. Op. Bot. 95:95, Fig.53, 1988.

Occurrence : Deokund, Kairakacha, Lulung, Sanjo valley; in semi-evergreen forest, by stream side, under shade; flowers in May.

Tainia hookeriana King & Pantl., J. As. Soc. Beng.64, 2:336, 1895.

Occurrence : Jenabil; rare, in semi-evergreen forest, on stream bank; flowers during Jan.- Mar.

Thunia bracteata (Roxb.), Fed.Rep.*Eeih*.4:205,1919. (excl.syn. *Thunia alba*).

Occurrence : Bakua, Bhanjabasa, Chahala, Dhangoji, Jenabil, Meghasini, Tarinibila; occasional, in semi-evergreen forests; flowers in Aug.

Tropidia angulosa (Lindl.).Bl., Coll. Orch. Arch. Ind. 122, 1858.

Occurrence : Badamakabadi, Balidar, Baniapada, Garandia, Meghasini, Tangaria, Tarinibila, Upper Barakamuda; occasional, in evergreen forests,under shade.

Tropidia pedunculata Bl., Coll. Orch. Archip.India: 122, t. 40, 1859.

Occurrence : Andharjodi, Badamakabadi, Bhanjabasa, Chahala, Gurguria, Jenabil, Hatisal, Kabatghai, Matughar, Nekedanacha, Balidar, Tangiria, Upper Barakamuda, occasional in semi-evergreen forest, under shade.

Vanda tessellata (Roxb.) Hook.exG.Don.in Lond., Hort. Brit. 372, 1830.

Occurrence: Bhaniabasa, Deokund, Joranda fall, Kendumundi, Lulung, Manabhanga ghat; very common in the dry to moist deciduous forests, in open, in the periphery only; flowers during Mar.-May and Sept.-Nov.

Vanda testacea (Lindl.) Rchb.f.Gard. Chron.166, 1877.

Occurrence : Badamakabadi, Chahala, Garh Similipal, Gurguria, Jenabil-Dhudruchampa, Joranda fall, Kendumundi, Lulung, Manbhanga ghat, Uski; common in mixed forests, in open; flowers during Apr.

Zeuxine affinis (Lindl.)Benth.ex Hook.f.Fl. Brit. India 8:108, 1890.

Occurrence : Bhanjabasa, Garandia, Hatisala, Matughar, scarce, in evergreen forests, on stream banks, with light soil, under heavy shade; flowers in Feb.

Zeuxine nervosa (Wall. ex. Lindl.)Benth.ex Clerke, J. Linn. Soc.25:73, 1889.

Occurrence : Badamakabadi; scarce in semi-evergreen forest, on edge of a stream, with light soil, under shade; flowered in cultivation at Baripada in Feb.-Mar.

Zeuxine pseudogracilis Ormer. Harvards Pap. Bot. 23(2):2018

Occurrence : Pithabata Range, on the banks of Papala, rare in moist deciduous forest under shade, Flowers in January

ANNEXURE XXII

LIST OF ETHNOBOTANICAL SPECIES

Sl. No.	Local name	Botanical name	Parts used	Purpose
1.	Kundan jaman	*Acacia torta*	Pods	Wounds/ sore of goat
2.	Rasna	*Acampe ochracea*	Leaf	Headache
3.	Apamaranga	*Achyranthes aspera*	Twigs	Tooth brush, wounds of animals
4.	Ainso	*Alangium salvifolium*	Root	Stomachache
5.	Chhatiana	*Alstonia scholaris*	Latex	Spermatorrhoea
6.	Bhuineem	*Andrographis paniculata*	Twings	Malaria and stomach trouble
7.	Dhaura	*Anogeissus latifolia*	Bark	Diarrhoea
8.	Gaisira	*Asparagus racemosus*	Root	Night pollution/ Gonorrhoea
9.	Rajkoli	*Baccaurea ramiflora*	Fruits	Food
10.	Kundadi	*Bauhinia purpurea*	Seeds, leafs, flowers	Food and fatigue
11.	Chara	*Buchanania lanzan*	Bark	Mouth sores
			Leaf & flower	Laxative
12.	Jordaru	*Canthium dicoccum*	Bark	Stomach-ache and worm
13.	Jhinka	*Chlorophytum arundinaceum*	Root	Food in fever
14.	Sonna rasi	*Chrysanthellum americanus*	Entire plant	Gastric trouble
15.	Hadasara	*Cissus quadrangularis*	Stem	Prevents conception
16.	Samarkand	*Cherodendrum serratum*	Root	Diarrhoea
17.	Kapasia/Pithalu	*Cochlospermum religiosum*	Root	Urination
			Bark	Food
18.	Furudi	*Croton caudatus*	Leaf	Fever
19.	Masund	*Croton roxburghii*	Root & bark	Boils
20.	Duba	*Cynodon dactylon*	Leaf	Nose bleeding
21.	Malang	*Dendropthoe falcata*	Leaf	Wound
22.	Bandhan	*Desmodium oojeinense*	Bark	Rheumatism
23.	Tutamuli	*Elephantopus scaber*	Root	Headache
24.	Katako	*Entada rheedii*	Bark	Boats
25.	Jodakoli	*Erycibe paniculata*	Bark	Fever
26.	Lowa	*Ficus racemosa*	Latex	Mumps
27.	Bhaincho	*Flacourtia ramontchi*	Fruit	Urination
28.	Pitari	*Glochidion lanceolarium*	Seeds	Nausea
29.	Jagli Badam	*Gnetum ula*	Seeds	Food

30.	Koim	*Haldinia cordifolia*	Leaf	Cuts and boils
31.	Antomulo	*Helicteres isora*	Fruit	Defective limbs
32.	Dahanimari	*Homalium nepalense*	Bark	Stomach-ache
33.		*Hoya pendula*	Leaf	Skin diseases
34.	Gileri	*Indigofera cassioides*	Flowers	Food
			Root	Pneumonia
35.	Bina	*Ipomoea turbinate*	Seed	Detergent
36.	Banprijada	*Jatropha curcas*	Seed	Oil
37.	Mahola	*Madhuca logifolia*	Corolla	Piles and fistula
38.	Niresho	*Memecylon umbellatum*	Fruits	Indigestion
39.	Gaudhuni	*Millettia extensa*	Root	Skin diseases Tick
40.	Boidonko	*Mucuna nigricans*	Seeds	Ulcers of genital organs
41.	Pahari kakharu	*Mukia maderaspatana*	Leaf	Vegetable
42.	Gangasiuli	*Nyctanthes arbortristis*	Leaf	Fever
43.	Banatulasi	*Ocimum americanum*	Shoot-tips	Malaria
			Plants	Ticks of chicken
44.	Phimphinia	*Oroxylum indicum*	Seed	Mumps/ Stomach-ache
45.	Suti	*Oxalis corniculata*	Root	Cold
46.	Utrali	*Pergularia daemia*	Flowers	Whooping cough
47.	Pehardang	*Peucedanum nagpurense*	Root	Gonorrhoea
48.	Chanyeekantho	*Piper trioicum*	Stem	Eye, Asthma, Cold, Tonsillitis & Throat infection
49.	Rimuli	*Protium serratum*	Fruit	Food
			Bark & root	Cracking of lips and mouth ulcers
50.	Bija	*Pterocarpus marsupium*	Bark	Mouth ulcers
51.	Mucchkando	*Pterospermum xylocarpum*	Bark	Veneral diseses & general debility
52.	Ranga chireta	*Rubia cordifolia*	Root	Intoxication
53.	Kusum	*Schleichera oleosa*	Seed	Cuts and white patches
54.	Jhilliphulo	*Shuteria involucrata*	Leaf & flowers	Vegetable
55.	Kantua	*Solanum torvum*	Fruit	Cough
56.	Amra	*Spondias pinnata*	Fruit	Blood dysentery
57.	Jhato	*Stachytarpheta jamicensis*	Root	Wounds
58.	Parudi	*Stereospermum chelonoides*	Bark	Scorpion bite
59.	Painya	*Strobilanthes auriculatus*	Flowers	Apiculture
60.	Jamun	*Syzygium cumini*	Fruit	Food & cleaning of bowels and expelling of hairs

61.	Kankata	*Vanda tessellata*	Leaf	Ear-ache & lactogogue
62.	Malang	*Vanda testacea*	Leaf	Cuts
63.	Katkom	*Viscum orientale*	Fruit	Giddiness & stiff neck
64.	Chadheigudi	*Vitex peduncularis*	Bark	Tea
65.	Icha	*Woodfordia fruiticosa*	Flowers	Excess bleeding during menstruation
66.	Tinkoli	*Ziziphus rugosa*	Root	Dislocation of joints
67.	Gonti	*Ziziphus xylopyrus*	Leaf	Snake bite

ANNEXURE XXIII

LIST OF ENDEMIC, ENDANGERED, VULNERABLE AND RARE PLANT SPECIES

Endemic

Bulbophyllum panigrahianum S. Mishra **(Orchidaceae)**

Habit and occurrence: An epiphyte ; Bhuduca, in moist valley .

Distribution: Orissa.

Probable cause: Restricted distribution

Eria meghasaniensis S. Mishra **(Orchidaceae)**

Habit and occurrence: An epiphyte; Bhuduca, in moist valley.

Distribution: Orissa.

Probable cause: Restricted distribution

Endangered

Gnetum ula Brongn.**(Gnetaceae)**

Habit and occurrence: Climber; Devigarh, along stream course

Distribution: Eastern Himalaya, Malay islands.

Probable cause: Habitat destruction

Goodyera fumata Thw. **(Orchidaceae)**

Habit and occurrence: Ground orchid; Pataghara,in shady habitat.

Distribution: Sikkim, Arunachal pradesh,Srilanka.

Probable cause: Forest fire

Goodyera hispida Lindl.**(Orchidaceae)**

Habit and occurrence: Ground orchid; Tarinibila, stream side

Distribution: Sikkim, Himalaya, Thailand

Probable cause: Forest fire

Goodyera thailandica Seidenf.**(Orchidaceae)**

Habit and occurrence: Ground orchid; Bhanjabasa,Hatisala, along stream edge.

Distribution: Orissa (Koira, Sundargarh), Thailand

Probable cause: Forest fire.

Liparis elliptica Wight. **(Orchidaceae)**

Habit and occurrence: An epiphyte; Meghasani, in semi evergreen forests.

Distribution: Tamilnadu, Sri Lanka, Thailand

Probable cause: Habitat loss.

Rauvolfia serpentina (Linn) Benth.ex Kurz **(Apocynaceae)**

Habit and occurrence: Undershrub; Kalipahar, foothill.

Distribution: Deccan peninsula, sub-Himalayan ranges.

Probable cause: Over-exploitation for drugs.

Rhaphidophora glauca Schott. **(Araceae)**

Habit and occurrence: Climber, Chitrabania, hill slopes.

Distribution: Tropical and sub-tropical Himalayan range,

Western peninisula.

Probable cause: Habitat loss.

Tanacetum cineraarifolium (Trev.) Sch. –Bip. **(Asteraceae)**

Habit and occurrence: Perennial herb; Tangi pahar, rock crevices.

Distribution: Western Himalaya, Tibet.

Probable cause: Jhum cultivation.

Vulnerable

Garcinia cowa Roxb. **(Clusiaceae)**

Habit and occurrence: Tree, Meghasani hill, along stream course.

Distribution: Assam, Eastern peninsula, East Bengal.

Probable cause: Over exploitation.

Gloriosa superba Linn. **(Liliaceae)**

Habit and occurrence: Scrambling shrub; Chitrabania, foothill.

Distribution: Tropical India and tropical Asia.

Probable cause: Over exploitation for drugs.

Mesua nagassarium (Burm. f.) Kostermans **(Clusiaceae)**

Habit and occurrence: Trees, Debkund, along stream course.

Distribution: Western peninsula.

Probable cause: Over exploitation for drugs.

Pectilis gigantean (Sm.) Rafin. **(Orchidaceae)**

Habit and occurrence: Ground orchid; Debasthali, in open grass land.

Distribution: Maharashtra

Probable cause: Over exploitation.

Pterospermum acerifolium (Linn.)Willd. **(Sterculiaceae)**

Habit and occurrence: Tree,Meghasani, ravines near foot hill.

Distribution: Northwest Himalayas, Western peninsula.

Probable cause: Over exploitation for drugs.

Radermachera xylocarpa (Roxb.) K. Schum **(Bignoniaceae)**

Habit and occurrence: Tree; Namopahar, hill slope.

Distribution: Deccan peninsula.

Probable cause: Over exploitation for drugs.

Rubia cordifolia Linn. **(Rubiaceae)**

Habit and occurrence: Scrambling herb; Barehipani, in gorges.

Distribution: Hilly districts of India, North westHimalaya.

Probable cause: Over exploitation for drugs.

Trevesia palmata Vis. **(Araliaceae)**

Habit and occurrence: Prickly tree; Shirsha fall, in moist gorges.

Distribution: Nepal to Sikkim.

Probable cause: Habitat destruction and over exploitation.

Rare

Acanthephippium bicolor Lindl. **(Orchidaceae)**

Habit and occurrence: Ground orchid, Bada Makabadi, stream edges.

Distribution: Tamilnadu, Kerala, Sri Lanka.

Probable cause: Jhum cultivation.

Ajuga macrosperma Wall. **(Lamiaceae)**

Habit and occurrence: Herbs; Lulung, shady moist forest floor.

Distribution: Tropical and temperate Himalaya, Chitagong, Khasia.

Probable cause: Habitat destruction.

Alphonsea ventricosa Hook.F. & Thoms. **(Annonaceae)**

Habit and occurrence: Tree, Barehipani, Meghasani, damp ravines.

Distribution: Assam, Chitagong, Andamans

Probable cause: Habitat destruction.

Anaphalis adnata DC **(Asteraceae)**

Habit and occurrence: cottony herbs; Meghasani hill, rock-crevices.

Distribution: Temperate Himalaya, Khasia hill, Simla.

Probable cause: Jhum cultivation.

Bambusa nutans Wall. **(Poaceae)**

Habit and occurrence: Trees; Bhanjabasa, on trap rocks.

Distribution: Lower Himalaya, Sikkim, East Bengal.

Probable cause: Habitat destruction.

Bulbophyllum macraei (Lindl.) Rchb. F. **(Orchidaceae)**

Habit and occurrence: Epiphyte; Tarinibila, stream bank.

Distribution: Lower Himalaya, Sikkim, East Bengal.

Probable cause: Habitat destruction.

Cynoglossum glochidiatum Wall. Ex. Benth. **(Boraginaceae)**

Habit and occurrence: Herbs, Meghasani, hill top.

Distribution: Khasia hills, Assam.

Probable cause: High –altitude plant.

Diploprora chompionii (Lindl.) J. Hook.

Habit and occurrence: Epiphyte; Baniapada, stream edge.

Distribution: Arunachal pradesh, Sikkim, Meghalaya, Karnataka, Sri Lanka.

Probable cause: Habitat loss.

Hypericum gaitii Haines **(Hypericaceae)**

Habit and occurrence: Shrub, Meghasani, along stream course.

Distribution: Bihar and Orissa.

Probable cause: Forest fire.

Justicia nilgherrensis Wall. Ex. T. And. **(Acanthaceae)**

Habit and occurrence: Procumbent herb; Meghasani, among grasses.

Distribution: Westernghats, Karnataka, Nilgiris.

Probable cause: High-altitude plant.

Malaxis purpurea (Lindl.) Kze **(Orchidaceae)**

Habit and occurrence: Ground orchid, Bhanjabasa, moist loamy forest floor.

Distribution: Uttar Pradesh, Orissa, Thailand.

Probable cause: Forest fire.

Meliosma simplicifolia Walp. **(Sabiaceae)**

Habit and occurrence: Tree; Ramjori, along narrow gorges and deep ravines.

Distribution: Tropical Himalaya, Khasia mountains, Western peninsula.

Probable cause: Habitat destruction.

Neocinnamomum caudatum (Nees) Mer. **(Lauraceae)**

Habit and occurrence: Shrub; Ramjori pahar, hill slopes.

Distribution: Central & Eastern Himalaya, Sikkim, Nepal,Burma.

Probable cause: Over-exploitation.

Oberonia pyrulifera Lindl. **(Orchidaceae)**

Habit and occurrence: Epiphyte; Naranga, shaded habitats.

Distribution: Eastern Himalaya, Thailand.

Probable cause: Habitat loss.

Peperomia heyneana Miq. **(Piperaceae)**

Habit and occurrence: Succulent herb; Meghasani, hill top.

Distribution: Subtropical Himalaya, Khasia hills, Assam.

Probable cause: Jhum cultivation and forest fire.

Peristylus parishii Rchb. F. **(Orchidaceae)**

Habit and occurrence: Ground orchids; Jenabil, moist forest floor.

Distribution: Eastern Himalayas, Thailand.

Probable cause: Forest fire.

Phoebe wightii Meissn. **(Lauraceae)**

Habit and occurrence: Shrub; Deb kund, streamside.

Distribution: Central Himalaya, Nilgiri.

Probable cause: Habitat destruction.

Pittosporum nepaulense (DC.) Rehd.& Wilson **(Pittosporaceae)**

Habit and occurrence: Small tree; Bakua, hill slope.

Distribution: Sub-tropical Himalaya, Khasi hills, Western peninsula.

Probable cause: Habitat destruction.

Podostemon wallichii R. Br. **(Podostemaceae)**

Habit and occurrence: Herb; Meghasani, hill top.

Distribution: Khasia hills, Ava.

Probable cause: Jhum cultivation and forest fire.

Psychotria adenophylla Wall. **(Rubiaceae)**

Habit and occurrence: Shrub; Similipal, shady moist locality.

Distribution: Assam, Sikkim, Chitagong, Burma.

Probable cause: Habitat destruction.

Rhus semialata Murray. **(Anacardiaceae)**

Habit and occurrence: Tree; Kusumbani and Duduruchampa, high hill slope.

Distribution: Temperate Himalaya, Khasia hills

Probable cause: Habitat destruction.

Rubus niveus Sm. **(Rosaceae)**

Habit and occurrence: Straggling shrub; Meghasani, hill top.

Distribution: Temperate Himalaya.

Probable cause: High-altitude plant.

Salomonia cantoniensis Lour **(Polygalaceae)**

Habit and occurrence: Herbs; Kiajhari, damp places.

Distribution: Assam, Khasia hills, Eastern peninsula.

Probable cause: Forest-fire and jhum cultivation.

Sonerilla tenera Royle **(Melastomaceae)**

Habit and occurrence: Herb; Rajmori, depressions on hill top.

Distribution: Western Himalaya.

Probable cause: High-altitude plant.

Tainia hookeriana King & Prantl **(Orchidaceae)**

Habit and occurrence: Ground orchid; Jenabil, stream bank,

Distribution: Sikkim, West Bengal, Thailand.

Probable cause: Forest fire.

Toxocarpus kleinii Wt. & Arn **(Asclepiadaceae)**

Habit and occurrence: Twining shrub; Bhanjabasa, hill slope.

Distribution: Deccan peninsula, Sri Lanka.

Probable cause: Forest fire.

Trichosporum grandiflorum D. Don **(Gesneriaceae)**

Habit and occurrence: Undershrub; Similipal, high hill slope.

Distribution: Assam, Khasia hills.

Probable cause: Forest fire.

Uvaria hamiltonii Hook.f.& Thoms. **(Annonaceae)**

Habit and occurrence: Liane; Meghasani, moist valley near stream.

Distribution: Eastern Himalaya, Bihar.

Probable cause: Habitat destruction.

Walsura trifolia A. Juss. **(Meliaceae)**

Habit and occurrence: Trees; Debigarh, rocky ravines.

Distribution: Eastern Himalaya.

Probable cause: Habitat destruction.

Insufficiently Known

Aspidopteris hutchinsonii Haines **(Malpighiaceae)**

Habit and occurrence: Climber, Similipal, high hill slopes.

Distribution: Orissa.

Probable cause: Forest fire.

Cynachnum tunicatum (Retz.) Alston **(Asclepiadaceae)**

Habit and occurrence: Twining herbs; Tangi pahad, along gorges.

Distribution: Deccan peninsula.

Probable cause: Jhum cultivation.

Dichrocephala integrifolia (Linn. f.) Kuntze **(Asteraceae)**

Habit and occurrence: Herbs; Debkund, along depressions on hill top.

Distribution: Eastern and western Himalaya.

Probable cause: Habitat destruction.

Machilus villosa Hook. f. **(Lauraceae)**

Habit and occurrence: Tree; Kali pahad, foot hill near stream.

Distribution: SikkimHimalaya, Chitagong.

Probable cause: Habitat destruction.

Polyalthia simiarum Benth.& Hook. f. **(Annonaceae)**

Habit and occurrence: Tree; Similipal, moist valley.

Distribution: Assam, Silhet, Burma

Probable cause: Habitat destruction

ANNEXURE XXIV

LIST OF RESEARCH PAPERS ON SIMILIPAL

1	Sethy, P. G. S., & Siddiqi, S. Z. (2007). Observations on Odonates in Similipal Biosphere Reserve, Mayurbhanj, North Orissa. Zoos' Print Journal, 22(11), 2893-2894.	This study records distribution of 16 species of odonates in the Similipal Biosphere Reserve, under 14 genera and six families.
2	Reddy, C. S., Pattanaik, C., Mohapatra, A., & Biswal, A. K. (2007). Phytosociological observations on tree diversity of tropical forest of Similipal Biosphere Reserve, Orissa, India. *Taiwania*, *52*(4), 352-359.	The present study deals with the quantitative floristic inventory of three tropical forest types in Similipal Biosphere Reserve in Eastern Ghats of Orissa, India. Three forest types were distinct in field and differed in dominance, composition, diversity and structure. The study resulted in documentation of a total 549 species of flowering plants. Altogether, 4819 stems of ≥30 cm gbh belonging to 185 tree species were enumerated and analysed. Tree stand density varied from 527 to 665 ha-1 with average basal area of 43.51 m2 ha-1. Shannon–Wiener index (H') ranges from 4.3 to 5.46. Similarity index revealed that only 25% of floristic composition of semi-evergreen forest was similar with moist deciduous forest. Analysis of population density of tree species across girth class interval showed that around 48.9% of individuals belong to 30-60 cm gbh. The present study can serve as baseline information for phytodiversity characterisation of tropical forests in the Similipal Biosphere Reserve in particular and Eastern Ghats of Orissa in general.
3	Das, S. K., Ahmed, R. A., Sajan, S. K., Dash, N., Sahoo, P., Mohanta, P., ... & Dutta, S. K. (2012). Diversity, distribution and species composition of Odonates in buffer areas of Similipal Tiger Reserve, Eastern Ghat, India. *Academic Journal of Entomology*, *5*(1), 54-61.	Odonates diversity in buffer area of Similipal Biosphere Reserve was observed, where we recorded 58 species. Libellulidae was the richest family with 31 species and Orthretum was the most common genera. The sub-order Zygoptera was represented by 23 species and 35 species represents sub-order Anisoptera. Perennial river system with different habitat types provides good opportunities to these wonderful insect groups to flourish and survive. Mostly odonates were aggregated due to habitat specific nature and random distribution indicates availability of resource utilization to survive. But, in the buffer area high anthropogenic disturbances were observed which creates high biotic pressure on forest. A detailed list of odonates recorded from buffer area is presented.
4	Mohanta, J., Dey, D. G., & Mohanty, N. (2014). Studies on lac insect (Kerria lacca) for conservation of biodiversity in Similipal Biosphere Reserve, Odisha, India. *Extraction*, *1*, 15.	The lac insect, Kerria lacca Kerr (Coccoidea: Homoptera) is well known for its valuable resin. It thrives on host plants like Palas, Kusum and Ber. An attempt has been made to study culture of lac in non-conventional method of cultivation in peripheral and buffer zones of

		Similipal Biosphere Reserve (SBR) where farmers are practicing in a conventional way. The initial density of settlement of larva ranged between 92.58-126.74 no. /cm2 and 93.12-109.62 no. /cm2 in Kusmi strain on Kusum and Ber trees, respectively. For Rangeeni strain it was 82.67-118.32 no. /cm2. The sex ratio (male: female) was found to be 1:3 for all the crops, strains and host plants. The range of resin output per cell was 17.00-21.40 mg for winter crop and 19.00-25.60 mg for summer crop of Kusmi strain on Kusum and Ber plants. For Rangeeni strain on Palas plant it was 05.30-11.20 mg for rainy crop and 18.72 -23.00 mg for summer crop. Moreover, the temperature influenced the life cycle, life span and resin output of this insect. Pruning of trees meet the firewood requirement as fuel and also for household uses, also prevents deforestation and conserve the forest ecosystem. Lac insect has some vertebrate predators like monkeys, squirrels, rats, lizards, woodpeckers, birds and insect predators are Lepidopterans (Eublemma amabilis, Pseudohypatopa pulverea) and Neuropterans (Chrysopa madestes, C. lacciperda). So directly or indirectly lac cultivation helps in conservation of biodiversity.
5	Palei, H. S., Pradhan, T., Sahu, H. K., & Nayak, A. K. (2016, December). Estimating mammalian abundance using camera traps in the tropical forest of Similipal Tiger Reserve, Odisha, India. In *Proceedings of the Zoological Society* (Vol. 69, No. 2, pp. 181-188). Springer India.	Knowledge on the occurrence and distribution of species is crucial for designing and evaluating conservation strategies within a geographical region. Similipal Tiger Reserve though confined to a small area needs information on the diversity and abundance of mammalian fauna to ensure conservation of tiger. Thus, we aimed to assess the diversity and abundance of medium to large sized mammals in Similipal Tiger Reserve by using remotely triggered camera traps. A total of 6413 camera trap days at 187 trap stations were deployed from November 2012 to July 2013 to estimate the status of mammal. We obtained 3763 independent photographs and detected 24 species of mammals. The relative abundance index of each mammalian species was calculated. Leopard (*Panthera pardus*) was the most abundant carnivore while barking deer (*Muntiacus muntjac*) was the most abundant prey. Anthropogenic activities like hunting, livestock grazing and free ranging domestic dogs were found to be the detrimental factors for the existing mammalian species. These activities should be addressed through conservation and development perception with an interdisciplinary approach, incorporating social and ecological components cautiously.

6	Rath, S. K., Mohapatra, N., Dubey, D., Panda, S. K., Thatoi, H. N., & Dutta, S. K. (2009). Antimicrobial activity of Diospyros melanoxylon bark from similipal biosphere reserve, Orissa, India. *African Journal of Biotechnology*, *8*(9).	The antimicrobial activity of five extracts of Diospyros melanoxylon Roxb. bark collected from Similipal Biosphere Reserve, Orissa was evaluated against human pathogenic bacteria and fungi. The extracts including both polar and non polar solvents; petroleum ether, chloroform, ethanol, methanol and aqueous were evaluated for their antimicrobial activity against three gram positive and five gram negative bacteria as well as three fungal strains. Although, all the five extracts exhibited promising antibacterial activities, yet maximum activity was observed in ethanol extract. In case of antifungal activity, except petroleum ether extract none of the extracts were found to be active against the fungal strains. MIC values for most of the extracts ranged from 1.5 to 6 mg/ml, while MBC values varied from 3 mg/ml to values greater than 12 mg/ml. Phytochemical analysis exhibited the presence of steroids, alkaloids, glycoside, proteins, tannins, phenolic compounds, carbohydrates, gums and mucilage in acetone, methanol and ethanol extracts with maximum phytochemicals in ethanol extract. Least phytochemicals was observed in case of petroleum ether. These results, so obtained, demonstrate the broad spectrum activity of D. melanoxylon bark extracts which may be useful in treatment of various microbial infections. However, the active components responsible for antimicrobial activity need to be evaluated.
7	Baliarsingh, B. K., Kosygin, L., Swain, S. K., & Nayak, A. K. (2013). Species diversity and habitat characteristics of freshwater fishes in the Similipal Biosphere Reserve, Odisha with Some New Records. In *Biological Forum–An International Journal* (Vol. 5, No. 2, pp. 64-70).	A systematic, updated checklist of freshwater fishes of the Similipal Biosphere Reserve is provided with notes on status, distribution and habitat characteristics. It includes 66 species of fishes belonging to 42 genera, 19 families and 6 orders. A total of 24 species are reported here for the time from the reserve. As per IUCN status the fish fauna of the Biosphere Reserve includes one endangered, one vulnerable, 6 near threatened, 42 least concern, and 3 data deficient. The Similipal Biosphere Reserve harbours rich diversity of fishes and water quality of the rivers and streams are suitable for fish and wild life propagation.
8	Mohanta, M. R., Sahoo, S., & Sahu, S. C. (2021). Variation in structural diversity and regeneration potential of tree species in different tropical forest types of Similipal Biosphere Reserve, Eastern India. *Acta Ecologica Sinica*, *41*(6), 597-610.	Understanding the regeneration potential of tree species in natural forest ecosystems is crucial to deliver suitable management practices for conservation of biodiversity. We studied the variation in structural diversity and regeneration potential of tree species in three different tropical forest types, namely: Dry Deciduous forest (DDF), Moist Deciduous forest (MDF) and Semi-evergreen forest (SEF) of Similipal Biosphere Reserve (SBR), Eastern India. Random sample plots were laid for studying the diversity and distribution pattern of tree, sapling, and seedling stages of the tree species.

		A total of 84 species belong to 73 genera and 35 families were recorded from the study area. The highest species richness was reported for tree (54 species) in DDF, sapling (24 species) in MDF and seedling (22 species each) in SEF and DDF. The overall density of trees with GBH (Girth at Breast Height) ≥ 10 cm was 881 individuals/ha. The regeneration potential of tree species was poor in DDF (39%) where as it was fair in SEF (43%) and MDF (49%). Most of the dominant tree species at each forest type performed good regeneration. The species such as *Ehretia laevis* Roxb., *Bridelia retusa* (L.)A.Juss., *Mitragyna parviflora* (Roxb.) Korth., *Terminalia tomentosa* Wight & Arn., *Terminalia chebula* Retz., *Terminalia bellirica* (Gaertn.) Roxb.etc. had either no regeneration or poor regeneration potential need immediate attention for conservation measures. The diversity of standing trees did not correlate with seedling or sapling diversity in all the cases but there was significant correlation among seedling and sapling diversity found in DDF (r = 0.67, $p \leq 0.05$) and SEF (r = 0.83, $p \leq 0.05$). Further, the diversity of tree species increased with their age (trees > saplings > seedlings) and the stem density decreased with their age (trees < saplings < seedlings) in all three forest types. The results of our study would be helpful in understanding the structural attributes, diversity and regeneration potential of different tropical forest types of India for their better conservation and management.
9	Sahoo, S., & Davidar, P. (2013). Effect of harvesting pressure on plant diversity and vegetation structure of Sal forests of Similipal Tiger Reserve, Odisha. *Tropical Ecology*, *54*(1), 97-107.	Anthropogenic impacts on forests are pervasive in the Indian subcontinent, and human dependence on fuel-wood and other products is one of the main reasons for forest loss and degradation. We evaluated the impact of local populations on vegetation structure and diversity of Sal (Shorea robusta Gaertn. f.) dominated forests of Similipal Tiger Reserve (STR), Odisha, using plot-based method. We selected eight villages, four in the buffer zone and four in the core zone of STR. We then laid two one-hectare plots in the forests adjacent to each village: one was the study plot where the local people extensively collected fuel-wood and fodder (called disturbed plot), while the other served as control and was located > 1 km away in a site with no current harvesting (called undisturbed plot). In the study plots we also evaluated the extraction pressure on vegetation over a 21-month period from 2006 to 2008. All woody species ≥ 3.18 cm dbh (diameter at breast height) were permanently marked and tagged. We monitored the rate of removal of plant parts like stem and branches at 3-month intervals to estimate extraction pressure. The species richness, diversity, basal area and stand density were lower in the disturbed compared with the undisturbed plots. Mean extraction pressure, in terms of percent trees lopped/harvested mo-1, ranged from 1.2 - 11 % and was positively correlated with the population size of villages. Fuel-wood was the major

		product harvested. Therefore, an alternate source of domestic energy for rural households is important for arresting forest loss.
10	Singh, K. P., & Kamal, K. (2012). A note on the lichens from Similipal Biosphere Reserve, Odisha, India. *Indian Journal of Forestry*, *35*(3), 383-390.	The paper records 141 species of lichens from Similipal Biosphere Reserve in Mayurbhanj district of Odisha state. 129 species marked by an asterisk (*) are new records for the state of Odisha while 3 species viz. *Conotrema lumbricoides* Siepman, *Megalotremis biocellata* Aptroot, and *Ocellularia lankaensis* Hale marked by double asterisk (**) are new records for India.
11	Alam, A., Behera, K. K., Vats, S., & Iqbal, M. (2013). *A preliminary study on bryodiversity of Similipal Biosphere Reserve (Odisha), India*. Univ.-Bibliothek.	Similipal Biosphere Reserve is a part of biotic province of Chhotanagpur Plateau. It has a representative ecosystem under Mahanadian biogeographic region. Its biodiversity is an assemblage representation of Western Ghats and North-East India. Regarding bryophytes this area was rather unexplored and the current investigation shows the occurrence of 33 taxa of bryophytes in this biosphere reserve and its neighboring areas. Each species has been enumerated with its ecological and distributional details.
12	Patra, J. K., Mishra, R. R., Rout, S. D., & Thatoi, H. N. (2011). An assessment of Nutrient Content of Different Grass Species of Similipal Tiger Reserve, Orissa. *World J. Agric. Sci*, *7*, 34-41.	This study was carried out to assess the nutrient contents of ten grass species collected in two phases from both southern and northern parts of Similipal Tiger Reserve. The grasses are Dentella repens, Cynodon dactylon, Eriochloa procera, Eleusine indica, Hybanthus enneapermus (weed), Apocopis paleacea., Oropetium thomacum, Melanocenchris jacqumontii, Tragus roxburghii and Paspalidium flavidum. The moisture content in the grass species varied between 34.87±0.48 and 61.24±0.22% dry weight. Total protein content ranged from 1.78±0.19 - 6.81±0.24% dry weight, total soluble sugar varied between 0.56±0.01 and 9.14±0.10% dry weight, total starch ranged from 1.02±0.01-26.32±0.24% dry weight and total lipid ranged from 0.09±0.01 – 6.55±0.03% dry weight. Out of the ten grass species, Hybanthus enneapermus, Melanocenchris jacqumontii and Tragus roxburghii showed high nutritive value.
13	Dash, P. K., Mohapatra, P. K., & Kar, M. (2011). Diversity of cyanobacteria from freshwater bodies of similipal biosphere reserve, Orissa, India. *E-planet*, *9*(1), 1-14.	The cyanobacterial diversity from 10 freshwater streams, 8 reservoirs and 4 waterfalls of Similipal Biosphere Reserve was estimated during the survey conducted from 2003 to 2008. In total 65 species under 3 orders, 7 families and 24 genera are reported for the first time from the Biosphere Reserve. Morphological descriptions, common habitats and distribution pattern in India for each species are presented systematically. Among the dominant genera, Oscillatoria accounts for the maximum number of species followed by Anabaena, Calothrix, Nostoc and Scytonema. Hapalosiphon and Chroococcus were the least dominant genera. After detailed literature review and specimen examination, 15 species were found to be new

		distributional record for fresh water bodies of India and 11 species are reported to be new record for fresh water bodies of Odisha
14	Mohanty, R. C., Mishra, R. K., Bal, S., & Upadhyay, V. P. (2005). Plant diversity assessment of Shorea robusta dominated forest stands of Similipal Biosphere Reserve. *Journal of Indian Botanical Society*, *84*, 21-29.	
15	Singh, L. A. K., & Swain, D. (2003). The four-horned antelope or chousingha (Tetracerus quadricornis) in Similipal. *Zoos' print journal*, *18*(9), 1197-1198.	Prater (1971) mentioned the distribution of Chousingha or Fourhorned Antelope (FHA), Tetraceros quadricornis as peninsular India south of the Himalaya where the country is wooded and hilly, but not too densely forested, and that it was not found on the Malabar Coast. Ranjitsinh (1987) reported that the range of Chousingha extends from the Terai forests and Jammu to Mudumalai Sanctuary in Tamil Nadu, though in the past it was reported even in the Palani Hills, and that it occurs in the Barda and Gir forests of Gujarat, extending eastwards to Bihar. It was never reported to occur in Orissa. Rice (1991) conducted a questionnaire survey on the status of FHA in 1986-1987 and cited the information gathered from Orissa through the questionnaire
16	Palei, H. S., Sahu, H. K., & Nayak, A. K. (2016). Ungulate densities and biomass in the tropical moist deciduous forest of Similipal Tiger Reserve, India. *National Academy Science Letters*, *39*(4), 255-258.	Density and biomass estimates for six ungulate species were obtained in the tropical forest of Similipal Tiger Reserve, eastern India using distance sampling methods. Line transects (n = 27) were walked seven to eight times for a total of 390 km to obtain the distance sampling data. The estimated densities of the ungulate species in the intensive study area were: sambar (6.65/km2), wild pig (4.81/km2) muntjac (3.82/km2) chital (2.82/km2) and mouse deer (1.88/km2). The estimated ungulate density and biomass of 19.98/km2 and 1264 kg/km2 respectively are relatively low compared with some other parts of the country. Anthropogenic pressures such as hunting and competition with livestock may be the cause of the low ungulate densities. Better protection and management are needed to enhance the ungulate population in the Similipal Tiger Reserve.
17	Janmejay, S., & Jyotirmay, J. (2009). Notes on butterflies of Gudgudia Range of Similipal Tiger Reserve, Orissa, India. *Indian Forester*, *135*(10), 1442-1445.	This study was conducted to prepare a database on the butterfly fauna of Gudgudia Range of Similipal Tiger Reserve, Orissa, India. During the study period, from December 2001 to April 2002, a total of 50 species representing 35 genera of five families, Nymphalidae was dominant in this area with 16 genera and 21 species. Among all the butterflies of this family, Common Indian Crow (*Euploea core*), Common Tiger (*Danaus genutia*), Danaid Eggfly (*Hypolimnas misippus*), Lemon Pansy (*Precis lemonias*), Yellow Pansy (*Junonia hierta*) and Blue Pansy

		(*Junonia orithya*) were frequently encountered. Mixed forest and riverine forests were more preferred by the butterflies. However, incidences of forest fire were found to be most devastating factor in this area. Hence, measures must be take to minimize the forest fire not only to conserve the butterfly fauna but also for preserving the ecology of this area.
18	Srivastava, S. S., & Singh, L. A. K. (2003). Status of Wild Dog (Cuon alpinus) in Similipal and possible impacts of village dogs. *Zoos' Print*, *18*(10), 18-21.	dholes, domestic dogs, impact on ecology, domestic dogs effects on wild herbivores and tigers, Panthera tigris, effects on biodiversity conservation, interspecific competition, stray animals, wildlife parks, Similipal Tiger Reserve, India.
19	Debidutta, R. O. U. T., & Mohanta, M. R. (2022). Floristic diversity of climbing plants in tropical forests of Similipal Biosphere Reserve, Odisha, India. *Notulae Scientia Biologicae*, *14*(1), 11003-11003.	Climbers influence the diversity and composition of forest ecosystem immensely. We have investigated the floristic composition of climbing plants in tropical forests of Similipal Biosphere Reserve (SBR), Odisha, India. A total of 120 climber plant species belonging to 74 genera and 33 families were documented in all forests. Among families, the most speciose families were Fabaceae (25 species) and Convolvulaceae (22 species) followed by Cucurbitaceae (11 species), Vitaceae (8 species), Dioscoreaceae (7 species) etc. Similarly, dominant genera were *Ipomoea* possessing the highest number of species i.e., 9 species followed by *Dioscorea* (7 species), *Vigna* (6 species) and *Cissus* (4 species) etc. There was a remarkable difference noted in the structure and climbing mechanism of different climbers. The climbing plants diversity of SBR not only contributing to the overall forest biodiversity significantly but also maintain the ecological balance of the whole ecosystem. Climbers are the major resource of economic value in and around the biosphere reserve and thus their use and sustainable management must be given principal attention.
20	Prusty, B. C., & Singh, L. A. K. (1996). Trend of population of Tiger and Leopard in Similipal Tiger Reserve: a conservation concern. *Indian Forester*, *122*, 865-868.	Media-based doubts have been expressed in recent years about the continued survival of Tiger in India. While causes forthis are attributed tointernational market on Tiger products, critics have, nonetheless, released debates concerning the 'procedure of pug-mark census'.
21	RATHORE, H. S., PATI, J., DAS, A., & PANDAV, B. (2021). Population status and distribution of mugger crocodile Crocodylus palustris in the Similipal Tiger Reserve, Odisha, India. *Herpetological Bulletin*, *156*, 28-30.	The mugger crocodile Crocodylus palustris (Lesson, 1831) is one of the 27 extant crocodilians (Grigg, 2015). It is distributed across six countries, Iran, Pakistan, India, Nepal, Sri Lanka and possibly also Bangladesh (Choudhury & de Silva, 2013) although formally it was also found in Bhutan and Myanmar. In India, the mugger has been reported at altitudes up to 420 m a.s.l. in Corbett Tiger Reserve (Whitaker & Whitaker, 1984; Whitaker, 1987) which is listed as its highest altitude by IUCN (Choudhury & de Silva, 2013) but is also present in the lower hill streams up to 700 m a.s.l. (Daniel, 1983; Rao, 1993). In Nepal, most records are from below 200 m a.s.l. (Schleich & Kästle, 2002), while in Sri Lanka it has been recorded at 450 m a.s.l. (Whitaker & Whitaker, 1979).

22	Mishra, S. R., Nayak, A. K., & Nandi, D. (2013). Population Status of Mugger Crocodile (Crocodylus palustris) in Similipal Tiger Reserve, Odisha, India. *Internafional Research Journal of Environmental Sciences*, *2*, 92-94.	Total 85 numbers of mugger crocodiles are recorded from six rivers named East Deo, West Deo, Palpala, Khadkei, Khairi and Budhabalanga running through seven Ranges of Similipal Tiger Reserve. Out of 85 individuals, highest 64 numbers of muggers are recorded from West Deo followed by 9 individuals from Khadkei, 6 from Khairi, 3 from East Deo, 2 from Palpala and 1 from Budhabalanga. Maximum size of about 2.45 metre of single individuals is recorded from West Deo River at Patbil darh region of Upper Barakamuda Range. The recorded size varies from individual to Individual according to different age groups and lies between 0.5 m to 2.5 metre. Among different age groups Juveniles are more (43.52%) followed by sub adults (21.17%), adults (16.47%) and yearlings (7.05%). Age group is unknown for 11.76% individuals. Among the study Ranges Upper Barakamuda Range hosts highest (52) number of mugger crocodiles followed by Karanjia Division (12), Nawana South Range and Jenabil Range (9), Nawana North Range (3) and no crocodile is observed from Chahala Range and National Park Range.
23	SIDDABATHULA, N., & Misra, S. (2021). Oberonia similipalense S. Misra, a new orchid from the Similipal forest of Odisha, India. *Nelumbo*, *63*(2).	A new species of *Oberonia* Lindl. (Orchidaceae) from the Similipal forest, Odisha is described here. A slender inflorescence, usually longer than the narrowly ensiform leaves; an ovate, acute, unlobed lip with laciniate margin, are important characters of this species to separate it from allied species of *Oberonia*.
24	Mishra, S. R., & Bisht, H. K. (2015). A study on population structure of Asiatic elephant (Elephas maximus) in Similipal Tiger Reserve, Odisha, India. *World journal of Zoology*, *10*(1), 13-16.	The study was carried out in 2010 (Month of April) and 2012 (Month of June) in all the seven Ranges of the core area. Most of the sightings were recorded near water bodies, Foot path, Saltlicks. In 2010 total of 331 elephants were estimated in the core area out of which 118 (35.64%) from UBK Range, 81 (24.47%) from Pithabata Range, 37 (11.17%) from Jenabil Range, 34 (10.27%) from Chahala Range, 30 (9.06%) from National Park Range, 24 (7.25%) from Nawana north Range and 7 (2.11%) from Nawana south Range were observed. It was found that in 2010 population of adult cow was high (32.32%) followed by sub adult cow (28.39%), calf (21.75%), adult bull (6.64%), sub adult bull (5.13%) and juvenile (4.2%). In 2012 total 334 elephants were sighted in the core area out of which 132 (39.52) from UBK Range, 62 (18.56%) from Chahala Range, 52 (15.56%) from Jenabil Range, 50 (14.97%) from Pithabata Range, 18 (5.38%) from National Park Range, 14 (4.19%) from Nawana North Range and 6 (1.79%) from Nawana South Range were sighted. In 2012 also the adult cow population is high (46.4%), followed by calf (15.86%), sub adult cow (7.48%), Juvenile (11%), sub adult bull (7.48%), adult bull (4.49%). However, the female proportion is much more than male in Similipal Tiger Reserve.

25	Palei, H. S., Sahu, H. K., & Nayak, A. K. (2016). Estimating the density of Red Junglefowl Gallus gallus (Galliformes: Phasianidae) in the tropical forest of Similipal Tiger Reserve, eastern India. *Journal of Threatened Taxa*, *8*(2), 8495-8598.	To determine population status of wild animal using reliable sampling techniques forms an important component of conservation effort and effective wildlife management. We estimated the density of Red Junglefowl Gallus gallus using distance sampling, a quantitatively robust technique, in Similipal Tiger Reserve, Odisha, eastern India during September 2012 to May 2013. We laid 27 transects and walked seven to eight times for a total of 390km to obtain the distance sampling data. We used DISTANCE software for analysis. We estimated per km2 Red Junglefowl group density as 4.99 and density as 7.64 birds in the intensive study area. Mean group size of Red Junglefowl was 1.48. Our results may prove helpful in planning better management needs and strategies for the survival and conservation of Red Junglefowl in different protected areas.
26	Mishra, S. R., & Mohan, M. (2019). SEASONAL VARIATION OF PREY DENSITY IN SIMILIPAL TIGER RESERVE, ODISHA, INDIA. *International Journal of Conservation Science*, *10*(3), 519-524.	A 3 day transect line survey was conducted in May 2016 and November 2016 in 75 transect lines covering core area over entire landscape of 1194.75 sqkm2 of similipal Tiger reserve (STR) for relative abundance of prey species. During survey period prey species were encountered along the transect lines like sambar, chital, Barking deer, wild pig, common langur, Rhesus macaque, Indian gaur, Giant squirrel, pea fowl, Hare and Elephant. In PreMonsoon over all 32.7±4.32SE/km2 prey population was estimated in Similipal Core division.Simillarly in Post-Monsoon over all 37.3±2.3SE/km2 was estimated in Similipal Core division. Continous prey population monitoring is going on in Similipal Tiger Reserve which may indicates the rising of prey populations in the tiger reserve.
27	Panda, B., Pati, S., & Dash, B. P. (2017). Occurrence of Malabar Whistling Thrush: Myophonus horsfieldii,(Vigors, 1831) in Similipal Biosphere Reserve of Odisha. Bird-o-soar# 05. *Zoo's Print*, *32*(11), 37.	Malabar whistling thrush (Myophonus horsfieldii) is resident to Western Ghats, associated peninsular India and some parts of Eastern Ghats including North West region of Odisha (Grimmett et al., 2011, Narayanan et al., 2007). This species is generally native to Eastern Ghats (Ananth, 1982). The M. horsfieldii is not migratory in nature but in winter they are wider spread (Praveen, 2006). The species is generally present near rocky hill stream, evergreen jungles, well wooded areas etc (Grimmett et al., 2011, Ali and Ripley, 1987)
28	Debata, S., & Palita, S. K. (2020). Diversity and Abundance of Bats within the Human-Dominated Transitional Zone of Similipal Biosphere Reserve, India: Implications for Conservation. *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences*, *90*(2), 353-363.	Species richness, diversity and abundance of bat fauna in Similipal Biosphere Reserve were studied during 2013–2015. Bats were surveyed by exploring the roosting sites and mist netting for 288 nights in primary forest, degraded forest, agricultural land and human habitation. A total of 21 species representing three species of frugivore bats and 18 species of insectivorous bats in seven families were recorded during the study, of which 152 individuals in 13 species were captured in mist nets. Species diversity and capture rate were recorded higher in primary forest. Vespertilionidae was reported as the most diverse family with five species, and *Rhinolophus lepidus* was reported to be

		the most abundant species with maximum capture rate during the study. As Similipal Biosphere Reserve is experiencing severe biotic pressure, it can be predicted that the structure and composition of bat fauna may be affected. The authors expect that their findings will be useful for future comparative studies to monitor the change over time and develop conservation plans.
29	Mishra, S. R., & Bisht, H. K. (2019). Distribution Pattern of Grey Wolf in Similipal Tiger Reserve by Camera Trapping In Similipal Tiger Reserve, Odisha. *Journal of Zoological Research, 3 (2)*, 12-14.	During the Camera trap exercise from November 2017 to February 2018 two nos of photos captured from the Satkosia Ranges of Similipal Tiger Reserve. The entire photo captured from Buffer area of the similipal tiger reserve. The major threats to grey wolf included loss of habitat, biotic pressure by human i.e. grazing, fuel wood collection and human-wolf conflict due to depredation on their livestock.
30	Reddy, R. N., Kar, M., & Rath, S. P. (2014). Floristic diversity of Similipal Wildlife Sanctuary in Odisha. *Advances in Plant Sciences*, *27*(2), 545-549.	An extensive survey of the angiosperm floristic diversity was carried out in Similipal Wildlife Sanctuary, Odisha. A total of 25 Sample quadrats each measuring 20 m × 20 m (1.0 ha) were laid randomly at different geographic locations of the sanctuary and trees below 10 cm girth were enumerated. The established plants and shrubs were enumerated in 5 m × 5 m plots drawn within the sample quadrat of 20 m × 20 m. Herbs and ground flora were enumerated in 1 m × 1 m plot drawn within the sample quadrat of 20 m × 20 m. The enumeration, carried out in the sample quadrats resulted in a total of 241 species, 141 genera belonging to 68 families. Of these enumerated plant species, 91 were tree forms, 44 shrubs, 78 herbs, 28 climbers and remaining were miscellaneous category. *Shorea robusta* Gaerten.f. form the denser species among the trees in the sanctuary with a total of 819 trees/25 sample quadrats (D=32.76/quadrat) while *Croton roxburghii* Balak. with 100 individuals, /25 sample quadrat (D=4/quadrat) and *Dioscorea glabra* Roxb., *Xanthium strumarium* L. with 19, 93 individuals, were dominant among climbers and herbs respectively. *Symphorema polyandrum* Wight, with 37 individuals is dominant among shrubs. The study also recorded a very good Shannon-Wiener and Simpson diversity index of 2.9973, 90.838 for trees, 2.8738, 27.9428 for climbers and 3.3061, 77.9419 for herbs, 3.1584, 43.9465 for shrubs. The vegetation is predominant with trees.
31	Kar, T., Nayak, A. K., Dash, B. R., & Mandal, K. K. (2014). Duchesnea indica (Rosaceae): An addition to the flora of Odisha, India. *Bioscience Discovery*, *5*(2), 202-203.	Duchesnea indica (Andrews) Focke is reported first time for Odisha from Similipal Biosphere Reserve. A detailed description with nomenclature, photograph, notes on occurrence and distribution of this taxon are provided for easy identification.
32	Mishra, R. K., Upadhyay, V. P., & Mohanty, R. C. (2008). Vegetation ecology of the Similipal biosphere reserve, Orissa, India. *Applied Ecology and Environmental Research*, *6*(2), 89-99.	Vegetation analysis of the forest ecosystem of Similipal Biosphere Reserve (SBR) was carried out at 10 sites to study changes in structure and composition in plant community distributed in the core (undisturbed) and buffer (disturbed) areas of the reserve. The study reveals a higher number of herbs and shrubs and a lower

		number of trees in the buffer area indicating greater anthropogenic disturbance. Total tree basal area varied from 48.7 to 78.61 m2 ha-1 in the buffer area and 81.4 to 104.9 m2 ha-1 in the core area. The density of saplings and seedlings was nearly equal both at the disturbed and undisturbed sites. However, the rate of conversion of saplings to trees was greater at undisturbed sites. The lower rate of conversion at disturbed sites is due to the removal of seedlings of most of the tree species. The high herb diversity (2.14 – 3.50) and low tree diversity (2.14 – 2.98) in buffer area is a result of Environmental openings providing greater opportunity for the recruitment of herbs and shrubs. The presence of only a few individuals of major tree species in larger diameter classes and more in young diameter classes in buffer areas indicate that the plant community was subjected to disturbance and are in the regenerating stage. Greater fluctuation in the species / genus ratio in the herbaceous species at sites of the buffer area in comparison to core area has led to variation in developmental status of plant communities among the core and buffer areas of the reserve. However, the presence of the seedlings of dominant tree species in the buffer area may help in the restoration of the plant communities in the long-run, provided protection means are strengthened and biotic stress reduced.
33	Mohanta, J., Dey, D. G., & Mohanty, N. (2014). Studies on lac insect (Kerria lacca) for conservation of biodiversity in Similipal Biosphere Reserve, Odisha, India. *Extraction*, *1*, 15.	The lac insect, Kerria lacca Kerr (Coccoidea: Homoptera) is well known for its valuable resin. It thrives on host plants like Palas, Kusum and Ber. An attempt has been made to study culture of lac in non-conventional method of cultivation in peripheral and buffer zones of Similipal Biosphere Reserve (SBR) where farmers are practicing in a conventional way. The initial density of settlement of larva ranged between 92.58-126.74 no. /cm2 and 93.12-109.62 no. /cm2 in Kusmi strain on Kusum and Ber trees, respectively. For Rangeeni strain it was 82.67-118.32 no. /cm2. The sex ratio (male: female) was found to be 1:3 for all the crops, strains and host plants. The range of resin output per cell was 17.00-21.40 mg for winter crop and 19.00-25.60 mg for summer crop of Kusmi strain on Kusum and Ber plants. For Rangeeni strain on Palas plant it was 05.30-11.20 mg for rainy crop and 18.72 -23.00 mg for summer crop. Moreover, the temperature influenced the life cycle, life span and resin output of this insect. Pruning of trees meet the firewood requirement as fuel and also for household uses, also prevents deforestation and conserve the forest ecosystem. Lac insect has some vertebrate predators like monkeys, squirrels, rats, lizards, woodpeckers, birds and insect predators are Lepidopterans (Eublemma amabilis, Pseudohypatopa pulverea) and Neuropterans (Chrysopa madestes, C. lacciperda). So directly or indirectly lac cultivation helps in conservation of biodiversity.

34	Payra, A., Das, G. N., Boruah, B., Dash, S. K., Das, U. P., & Sethy, J. (2016). Butterfly diversity in two selected fringe area of Similipal Biosphere Reserve, Odisha, India, with notes on some important sightings. *Journal of Wildlife Research*, *4*(2), 17-25.	Among the insects, butterflies are the most taxonomically studied group and play key role in ecosystem as pollinators and bio-indicator species. A total of 136 species of butterflies belonging to 87 genera representing 5 families were recorded from two selected study sites in the fringe area of Similipal Biosphere Reserve during January 2014 to November 2015. Family Nymphalidae was dominant with 44 species, followed by Lycaenidae (42 species), Hesperiidae (22 species), Papilionidae (14 species) and Pieridae (14 species). Out of these 136 species, 15 species are protected under the Indian Wildlife (Protection) Act (1972). The paper also shows some rare and important sightings of butterflies during the study period.
35	Nair, M. V. (2010). Thick-billed Green-Pigeon Treron curvirostra in Similipal Hills, Orissa: an addition to the avifauna of peninsular India. *Indian Birds*, *6*(1), 19-20.	Thick-billed Green-Pigeon Treron curvirostra is a resident bird in the Himalaya—from western Nepal eastward to Sikkim, north Bengal duars and Bhutan, to extreme eastern Arunachal Pradesh—as also in the hills of north-eastern India, south of the Brahmaputra River. It affects well-wooded areas and forests from plains to at least 1,500 m a.s.l. (Ali & Ripley 1987). Its occurrence in peninsular India has not been recorded (Ali & Ripley 1987; Grimmett et al. 1998; Kazmierczak 2000; Rasmussen & Anderton 2005). Here, I report its presence in Similipal hills, north-eastern Orissa
36	Nair, M. V. (2011). Three new butterfly records for peninsular India: Dusky Yellow-breasted Flat Gerosis phisara (Moore)(Hesperiidae), Common Gem Poritia hewitsoni Moore (Lycaenidae) and Great Nawab Polyura eudamippus (Doubleday) (Nymphalidae) from Similipal Hills, Odisha, India. *Journal of Threatened Taxa*, *3*(3), 1624-1628.	Three species of butterflies hitherto known only from the Himalayan region and northeastern India, viz. Dusky Yellow-breasted Flat Gerosis phisara (Moore), Common Gem Poritia hewitsoni Moore and Great Nawab Polyura eudamippus (Doubleday) were recorded from Similipal Hills, Odisha, thus constituting significant new locality records and range extensions for peninsular India. This also re-inforces the unique bio-geographic role of Similipal as a hill range harbouring representatives of north-eastern and autochthonous peninsular Indian species and supports its putative function as a possible pathway along the Eastern Ghats for species exchange between bio-geographical zones.
37	NAYAK, A. K., BEHERA, S., & YADAV, S. P. (2014). SEASONAL OCCURRENCE OF AVAILABLE PREY DENSITIES IN SIMILIPAL TIGER RESERVE, MAYURBHANJ, ODISHA, INDIA. *International Journal of Conservation Science*, *5*(3).	Prey densities were estimated in Similipal Tiger Reserve, Odisha, India from January 2012 to October 2012 by applying line transect distance methods. Season wise available prey density data was collected. The pre-monsoon and Post-monsoon seasons prey data was analyzed separately. In total, seven prey items were found on the transect lines from various parts of the reserve core and buffer area in an area of 2530.41 km:. The common langur (Semnopithecus entellus) and rhesus macaque (Macaque mulata) population densities in the study area were the highest, followed by chital (Axis axis), wild pig (Sus scrofa), sambar (Rusa unicolor), barking deer (Muntiacus muntjac) and mouse deer (Tragulus kanchil).

		Common langur population was highest 10.2±2 SE/km² in pre-monsoon and 16±2.7 SE/km² in post-monsoon whereas mouse deer population was found to be low 0.6±0.2 SE/km² in pre-monsoon. Our preliminary results may indicate that in Similipal the density of the overall ungulates and each species seems to be fewer compared with other landscapes. Continuous prey population monitoring is going on in Similipal Tiger Reserve which may indicates the rising of prey populations in reserve subsequently. However, only one year data is presented here to know the preliminary prey status of this tiger reserve. Further analysis is under consideration in due course ofprey population study. Therefore, the proper management plan is required for better conservation of the prey and their predator in Similipal Tiger Reserve.
38	Prusty, B. C., & Singh, L. A. K. (1995). Male-male aggression in Asian elephant observed in Similipal Tiger Reserve, Orissa. *Indian Forester*, *121*, 902-908.	During dt.27 February to dt.01 March 1994 two well grown tuskers were found killed with injuries sustained due to goring-in of tusks (of a victor). An inquiry was conducted into the incidents to obtain answers to two questions-- (1) if the victor was still alive, and (2) what may have led to such male-male aggression leading to the deaths.
39	Palei, H. S., & Mohapatra, P. P. (2015). Unusual death of two sambar stags (Rusa unicolor) in Similipal Tiger Reserve-Odisha, eastern India. *Indian Forester*, *141*(10).	This paper reports an unusual death of two sambar stags (*Rusa unicolor [Cervus unicolor]*) in Similipal Tiger Reserve, Odisha, eastern India. It was found that the relatively smaller stag died an early death and the head was turned, for which it was assumed that the animal probably died due to cervical dislocation. The larger stag died later after struggling for at least 36-48 h, which was evident from the carcass condition and the surrounding situation. From the surroundings, it was assumed that the individuals were fighting and somehow their antlers got interlocked and when the larger stag tried to unlock the antlers the head of the smaller stag turned backward and the animal died.
40	Mahapatra, S., Rout, J., Sahoo, G., & Sethy, J. (2017). DIETARY PREFERENCE OF EUPHLYCTIS CYANOPHLYCTIS TADPOLES IN DIFFERENT HABITATS IN AND AROUND SIMILIPAL BIOSPHERE RESERVE, ODISHA, INDIA. *International Journal of Conservation Science*, *8*(2).	Amphibian tadpoles are the key consumers and play an important role in the food chain of aquatic ecosystems. Understanding the natural diet of tadpoles can help in developing management strategies for them. We characterized the diet of 170 Euphlyctis cyanophlyctis tadpoles collected from 34 sites during rainy seasons (July to October) of 2014 and 2013 in different temporary habitats in and around Similipal Biosphere Reserve, India. After morphometric measurements (total length, body length and body width), the complete intestine of each tadpole was analyzed for food items and quantified based on the numeric frequency (NF%) and frequency of occurrence (FO%). The food spectrum of tadpoles included mostly detritus followed by phytoplanktons (represented by 6 classes and 35 genera). The food items ingested were similar in all the habitats, suggesting that they are non-selective predators and their diet is mostly dependent

		on the availability of food items. Knowledge of food habits and feeding behaviour of the tadpoles is essential, since the early part of the life history of amphibians is dependent on the availability of the food items in the natural habitat.
41	Mishra, S. R., & Mohan, M. (2018). First Photographic Documentation and Distribution of the Asian Small-Clawed Otter Aonyx cinereus in Similipal Tiger Reserve, Odisha, India. *IUCN Otter Spec. Group Bull*, *35*(4), 186-192.	There is a decline in the populations of the Asian Small-clawed otter throughout its distribution, and there is a perception that it is a key stone species for riverine ecosystems. The species inhabits major freshwater wetlands throughout south and southeast Asia and often comes into direct conflict with humans for food and habitat. Further, the species is also suffering from neglectful attitudes and mismanagement due to a lack of baseline information. This paper presents camera trap images and distribution evidence for Asian Small-clawed otters in the Similipal Tiger Reserve.
42	Swain, D., & Singh, L. A. K. (2003). Musth in female Asian Elephant. *ZOOS'PRINT JOURNAL*, *18*(9), 1202.	According to the census carried out in May 2002, Similipal forests (20º17'-22º34'N; 85º40'-87º10'E) of Orissa, harbour 512 elephants consisting of 96 males, 283 females, 133 juveniles and calves, and five whose sex could not be identified. Only one makhna, the tusk-less male, was in the record. In a compilation of information on elephants of Similipal (Srivastava & Singh, 2001) there has been no specific mention about musth condition in females of Similipal, although specific mention has been about musth in male elephants (Prusty & Singh, 1995). In the present note, an observation of musth-like secretion in a female elephant is reported from Similipal.
43	Park, N. B. (2021). Genetic basis of rare stripe pattern in tigers.	opulation in which the frequency of recessive genetic variants may increase in following a population bottleneck, a process known as genetic drift. Few studies are mesured genetic drift in Similipal, isolated and endengered populations, especially for genes associated with visible phenotypes.
44	Biswal, A. K., & Rout, N. C. (2013). Antrophyum henryi hieron [Antrophyaceae]: A rare fern recorded from peninsular India. *Annals of Plant Sciences*, *2*(11), 494-496.	: Antrophyum henryi Hieron is reported from the Similipal Biosphere Reserve, Odisha, India. Thus, the taxon extends its distribution from Eastern Himalaya to Peninsular India which adds to the biogeographical significance of Similipal hill ranges under Chhotnagpur plateu. Detail accounts of the taxon comprising description, photographs, distributional and ecological notes have been provided

45	AK, B., Mandal, K. K., Kar, T., & Reddy, C. S. Uncaria sessilifructus Roxb. (Rubiaceae): A new generic record for Odisha, India.	The genus Uncaria (Rubiaceae) has about 40 species with most species native to tropical Asia, three from Africa and the Mediterranean and two from the neotropics. Uncaria sessilifructus Roxb. finds its distribution in Indian subcontinent, China & Vietnam. Similipal Biosphere Reserve in the state of Odisha is a grand repository of Flora and Fauna. The occurrence of certain Himalayan taxa in this region is of great phytogeographical significance. Uncaria sessilifructus Roxb. is reported as new distributional record for Odisha from Similipal Biosphere Reserve. Occurrence of this taxon adds to phytogeographical uniqueness of the region and the state of Odisha in India. Correct botanical nomenclature, brief description, with photographs of the taxon have been provided for easy identification.
46	MANDAL, K., REDDY, T. K. C., & BISWAL, A. (2014). 11. ON THE IDENTITY AND OCCURRENCE OF DISCHIDIA NUMMULARIA (ASCLEPIADACEAE) IN PENINSULAR INDIA By 1K. K. MANDAL_ 1T. KAR_ 2C. S. REDDY AND 1A. K. BISWAL. *LIFE SCIENCES LEAFLETS*, *49*, 97-to.	Dischidia nummularia R.Br. is identified correctly and reported from the geographical boundary of Odisha, India. Its occurrence as new record for the Peninsular India adds to the biogeographical significance of Similipal hill ranges under Chhotnagpur plateu. Detail accounts of the taxa comprising description, photographs, distributional and ecological notes have been provided.
47	Kar, T., Nayak, A. K., & Mandal, K. K. Sloanea sterculiacea (Elaeocarpaceae): a New Generic Record for Odisha, India.	The family Elaeocarpaceae comprises 15 genera and about 500 species (Heyword, 2007). Sloanea L. is a genus that occurs in both the Old & New World and harbours 150 species (Mabberley, 2008). About 04 species are found in India, which are distributed in various type of vegetation. During botanical exploration in Similipal Biosphere Reserve, the authors collected few interesting specimens of Sloanea L. Based on critical examination & reference to relevant taxonomic literature (Hooker, 1874.; Haines, 1921-25; Kanjilal et al., 1934; Saxena & Brahmam, 1994 and Singh et al., 2001) it has been identified as Sloanea sterculiacea (Benth.) Rehder & Wilson. The identity of the specimen has been confirmed by comparing with the specimens deposited at Central National Herbarium (CAL). The specimen has been preserved at Similipal Tiger Reserve Herbarium, Baripada, Odisha. This taxon is hitherto unknown to the flora of Odisha. So it is reported here as new generic record for Odisha state. Detailed description, photographs, phenology, habitat and distributional note have been provided for easy identification.

48	Falcon, S. (2020). Observation of Shaheen Falcon in Odisha, India.	Shaheen Falcon Falco peregrinus peregrinator is a subspecies of Peregrine Falcon Falco peregrinus found mainly in the Indian subcontinent, Sri Lanka (Dottlinger 2002; Dottlinger & Nicholls 2005), central, southeastern China, and northern Myanmar (de Silva et al. 2007). The Shaheen Falcon has also been reported in Andaman & Nicobar Islands (Pande et al. 2009). It is said to be a resident bird of this region (Ali & Reply 1987) and described as a migratory subspecies by (Molard et al. 2007).
49	Sahu, S. C., Mohanta, M. R., & Biswal, A. K. (2018). Phytogeographical Affinities of Tree Species of Similipal Biosphere Reserve, Odisha, India. *Notulae Scientia Biologicae*, *10*(3), 354-362.	The phytogeography of Similipal Biosphere Reserve (SBR), Odisha, India, reveals very interesting information on distribution of tree species. Phytogeographical affinities of tree species of SBR has been analysed by obtaining the information about the species distribution at local and global scale. A total of 240 tree species were recorded and their phytogeographical affinities were compiled with different countries of the globe. An analysis of the affinities revealed that SBR has strong affinity with Sri-Lanka (46.66%) and Myanmar (45.83%) followed by China, Malaysia, Thailand, Australia and Africa. SBR has also affinity with Himalayan vegetation possessing several trees and orchids find distribution in both the areas. The phytogeographical affinity of SBR supports the migration, establishment and naturalization of flora from/to SBR. This hypothesis needs further study for biogeographical mapping of Indian sub-continent.
50	Rout, S. D., Panda, T., & Mishra, N. (2009). Ethnomedicinal studies on some pteridophytes of similipal biosphere reserve, Orissa, India. *International Journal of Medicine and Medical Sciences*, *1*(5), 192-197.	Investigations had been made on medicinal values of higher plants but pteridophytes are often ignored. In spite of the luxuriant growth of these plants in and around Similipal in Mayurbhanj district of Orissa, northern India, they had not been studied taxonomically or ethnobotanically. The dominant tribes involved in using pteridophyte as medicines in the district are Santhal, Kol, Bhumija, Bhuyan, Mahalis, Sounti and Saharas. The plant parts, viz. leaves, roots, rhizomes and fronds were used in raw or cooked forms for the treatment of malaria, gonorrhea, leprosy, rheumatism etc. Mostly used genera are Adiantum, Asplenium, Lygodium and Pteris .The present study had been designed to assess the medicinal uses of 33 pteridophyte species belonging to 21 families on the basis of field surveys and taxonomic identification of plants
51	Kumar, S., Das, G., Shin, H. S., & Patra, J. K. (2017). Dioscorea spp. (a wild edible tuber): a study on its ethnopharmacological potential and traditional use by the local people of Similipal Biosphere Reserve, India. *Frontiers in pharmacology*, *8*, 52.	A number of wild crops remain unexplored in this world and among them some have excellent medicinal and nutritional properties. India is a harbor of biodiversity in general and phytodiversity in particular. The plant diversity is distributed from the Western Ghats to Eastern Ghats, along with the North-Eastern region and from the Greater Himalayas to the plain of Ganga. Among these distributed floral regions of the country, the Eastern Ghats are important due to their rich floral diversity. The forests of Odisha form a major part of Eastern Ghats in general and the Similipal Biosphere Reserve (SBR) in particular.

		The SBR is inhabited by many local communities. The food and medicinal habits of these communities are not fully explored even today. They are dependent on the forests of SBR for their food and medicine. Among their collections from forests, root and tuberous plants play a significant role. The local communities of SBR use about 89 types of tuberous plants for various purposes. *Dioscorea* is one such tuber, having maximum use among the local of SBR. However, less documentation and no specific reports are available on the food and medicinal values of the species available in this part of the World. *Dioscorea* species, popularly known as Yam worldwide and as Ban Aalu in Odisha, India, is a prime staple medicinal-food substitute for the majority of rural and local people of the state of India. Of the 13 *Dioscorea* species available in SBR, 10 species are known to be bitter in taste and unpalatable when taken raw. Since less documentation is available on the *Dioscorea* species of SBR and their traditional uses, the present study was focused on the ethnobotany, nutritional and pharmacological values of these species along its nutraceutical importance
52	Panda, S. K. (2014). Ethno-medicinal uses and screening of plants for antibacterial activity from Similipal Biosphere Reserve, Odisha, India. *Journal of Ethnopharmacology*, *151*(1), 158-175.	The present study examined the variety and the extent of medicinal plants used in the health care system of tribal inhabitants of Similipal Biosphere Reserve. In addition to this, such plants were also screened for antibacterial properties against common pathogenic bacteria.
53	Panda, S. K., Thatoi, H. N., & Dutta, S. K. (2009). Antibacterial activity and phytochemical screening of leaf and bark extracts of Vitex negundo l. from similipal biosphere reserve, Orissa. *J Med Plant Res*, *3*(4), 294-300.	The antimicrobial activity and phytochemicals of the leaves and bark of Vitex negundo L. was evaluated against three Gram-positive bacteria viz. Staphylococcus epidermidis, Bacillus subtilis, Staphylococcus aureus and five Gram-negative bacteria viz. Escherchia coli, Salmonella typhimurium, Pseudomonas aeruginosa, Vibrio cholerae and Vibrio alginolyteus. Both polar and nonpolar extracts viz. petroleum ether, chloroform, ethanol, methanol and aqueous extracts were prepared and studied for antibacterial activity using disc diffusion, agar cup and broth dilution methods. Results showed promising antibacterial activity of all the extracts of both leaf and bark against E. coli, followed by S. aureus. Ethanol and methanol extracts of the leaf showed inhibition activity against both Gram-positive and Gram-negative bacteria where as petroleum ether and chloroform extracts of bark had better antibacterial activity against Gram-positive bacteria. MIC showed that 5% of the extracts were active in a concentration of 0.312 mg/ml; 27.5% in a concentration of 0.625 mg/ml and 88.75% in a concentration of 1.25 mg/ml; were active against different human pathogenic bacteria. At concentration about 2.5 mg/ml, 100% of inhibition was recorded against both Gram-positive and Gram-negative bacteria. The result obtained with ethanol and methanol

		extracts of leaves; petroleum ether and chloroform extract of bark exhibited significant antibacterial activity, a property that supports traditional use of the plant in the treatment of some diseases as broad spectrum antibacterial agents.
54	Mishra, N., Rout, S. D., & Panda, T. (2011). Ethno-zoological studies and medicinal values of Similipal Biosphere Reserve, Orissa, India. *African Journal of Pharmacy and Pharmacology*, *5*(1), 6-11.	This paper documents zootherapeutic practices in Similipal Biosphere Reserve of Mayurbhanj district, Orissa, India. It is primarily based on field surveys carried out in villages, where dwellers provided information on animal species used as medicine, body parts used to prepare the remedies, and the illnesses to which the remedies were prescribed. The dominant tribes involved in using animal parts as medicines in the district are Santhal, Kol, Bhumija, Bhuyan, Mahalis, Sounti and Saharas. The animal parts, namely, blood, excreta, feather and hair were used in raw or cooked forms for the treatment of piles, asthma, skin diseases, fever and rheumatism.The species used as medicinal drug and their respective families were: Bos gaurus gaurus(Mammalia), Buceros bicormis (Bucerotidae), Crocodylus palustris (Crocodilidae), Pavo cristatus(Phasianidae), Hystrix indica (Rodentia), Pterocarpus giganteus (Chiroptera) and Sus scorofacristatus (Mammalia).These zootherapeutical resources were used for the cure of 12 illnesses.
55	Panda, S. K., Padhi, L., Leyssen, P., Liu, M., Neyts, J., & Luyten, W. (2017). Antimicrobial, anthelmintic, and antiviral activity of plants traditionally used for treating infectious disease in the Similipal Biosphere Reserve, Odisha, India. *Frontiers in pharmacology*, *8*, 658.	In the present study, we tested *in vitro* different parts of 35 plants used by tribals of the Similipal Biosphere Reserve (SBR, Mayurbhanj district, India) for the management of infections. From each plant, three extracts were prepared with different solvents (water, ethanol, and acetone) and tested for antimicrobial (*E. coli, S. aureus, C. albicans*); anthelmintic (*C. elegans*); and antiviral (*enterovirus 71*) bioactivity. In total, 35 plant species belonging to 21 families were recorded from tribes of the SBR and periphery.
56	Panda, S. K., Patra, N., Sahoo, G., Bastia, A. K., & Dutta, S. K. (2012). Anti-diarrheal activities of medicinal plants of Similipal Biosphere Reserve, Odisha, India. *International Journal of Medicinal and Aromatic Plants*, *2*(1), 123-134.	This paper deals with ethnomedicinal uses and anti-diarrheal properties of medicinal plants used by the tribal people of District Mayurbhanj, Odisha, India. Aqueous and methanol extracts of 72 plants were tested for antibacterial activity using agar well diffusion (sample concentration of 100 mg/ml) against eight pathogenic bacteria responsible for diarrheal diseases. The results indicated that out of 77 plants species, 47 species exhibited antibacterial activity against one or more test organisms. Out of 168 extracts, 54 methanolic and 43 aqueous extracts expressed antibacterial properties. Nineteen plants are newly reported to have ethnomedicinal uses to treat diarrheal diseases. Among these, Bombax ceiba, Buchanania lanzan, Butea superba, Coccinia grandis, Curculigo orchioides, Eleutherine bulbosa, Ficus racemosa, Flemingia nana, Helicteres isora, Lannea coromandelica, Mesua ferrea, Semecarpus anacardium and Smilax zeylanica experimentally proved to inhibit the diarrhea

		causing bacteria. Salmonella typhi, Escherichia coli and Vibrio cholera were the most sensitive strain. Shigella dysentriae showed least activity compared to all other test strains.
57	Mohanta, R. K., Rout, S. D., & Sahu, H. K. (2006). Ethnomedicinal plant resources of Similipal biosphere reserve, Orissa, India. *Zoos Print J*, *21*(8), 2372-2374.	The study revels that the inhabitants of similipal area have vast knowledge about ethnomedicinal uses of plants growing in their vicinity. The tribal inhabitants like Kharia, Mankadia, Bhumija, Santals, Gonds, Kols, Mahalis dominate in similipal. These tribes live in deep forests with their own
58	Dash, M., & Behera, B. (2016). Determinants of household collection of non-timber forest products (NTFPs) and alternative livelihood activities in Similipal Tiger Reserve, India. *Forest Policy and Economics*, *73*, 215-228.	Using primary data collected randomly from 244 households across 11 villages located in and around the Similipal Tiger Reserve in the eastern Indian state of Odisha, this study examines the extent and pattern of household collection of non-timber forest products (NTFPs), and identifies and analyzes the factors that influence a household's participation in NTFP activities vis-à-vis alternative livelihood activities. Descriptive statistics and econometric techniques such as probit, tobit, and Heckman two-step selection models were used to analyze the data. The study finds that households derive a significant portion of their income from the collection of NTFPs; however, the extent and pattern of household dependence on NTFPs for income differ widely across different socioeconomic and demographic profiles.
59	Behera, Kambaska Kumar. "Ethnomedicinal plants used by the tribals of Similipal Bioreserve, Orissa, India: a pilot study." Ethnobotanical leaflets 2006.1 (2006): 17.	Herbal medicine has been widely practiced throughout the world since ancient times. These medicines are safe and environmentally friendly. According to WHO about 80% of the world's population relies on traditional medicine for their primary health care. India, being one of the world's 12 mega biodiversity countries, enjoys export of herbal raw material worth U.S. $100-114 million per year approximately. Currently the Government of India, realizing the value of the country's vast range of medicinal plants, has embarked on a mission of documenting the traditional knowledge about medicinal plants and herbs.
60	Mohanta, Y. K., Singdevsachan, S. K., Parida, U. K., Panda, S. K., Mohanta, T. K., & Bae, H. (2016). Green synthesis and antimicrobial activity of silver nanoparticles using wild medicinal mushroom Ganoderma applanatum (Pers.) Pat. from Similipal Biosphere Reserve, Odisha, India. *IET nanobiotechnology*, *10*(4), 184-189.	In the present study, green synthesis and cost effective approach of silver nanoparticles using wild medicinal mushroom *Ganoderma applanatum* (Pers.) Pat. from Similipal Biosphere Reserve, Odisha, India is reported. The biosynthesised AgNPs were characterised using UV-visible spectroscopy, particle analyser and scanning electron microscopy studies. It was found by dynamic light scattering analysis, that the average size and charges of the AgNPs were 133.0 ± 0.361 nm and −6.01 ± 5.30 mV, respectively. Moreover, the Fourier transform infrared study was also conducted to identify the biomolecules or functional groups responsible for the reduction of Ag and stabilisation of the AgNPs. The potential biomedical application with reference to antimicrobial activity of the

		synthesised AgNPs was investigated against some pathogenic microorganisms viz. *Escherichia coli*, *Bacillus subtilis*, *Staphylococcus epidermidis*, *Vibrio cholerae*, *Staphylococcus aureus* and *Shigella flexneri*.
61	Rout, S. D., & Thatoi, H. N. (2009). Ethnomedicinal practices of Kol tribes in Similipal biosphere reserve, Orissa, India. *Ethnobotanical Leaflets*, *2009*(3), 1.	Similipal Biosphere Reserve (SBR) in Mayurbhanj district of Orissa is the most luxuriant forest and rich in medicinal plant resources. The forest area is dominated by a number of tribes such as Kol, Santal, Bhumij, Mankidias and Khadias who depends on the forest for their food to medicine. The present paper reports on ethnomedicinal uses of 32 potential medicinal plants belong to 24 families of medicinal plants used for ailment of various diseases like leucorrhoea, spermatorrhea, piles, sore throat, rheumatism, elephantiasis etc. by Kol tribe living in some villages situated in and around Similipal Biosphere Reserve.The botanical name, family name, vernacular name, parts used, method of preparation, usage, administration of the drugs are given
62	Sachan, S. K. S., Patra, J. K., & Thatoi, H. N. (2013). Indigenous knowledge of ethnic tribes for utilization of wild mushrooms as food and medicine in similipal biosphere reserve, Odisha, India. *J Agric Technol*, *9*(2), 403-16.	Indigenous knowledge of tribal peoples for utilization of wild mushrooms is quite different in Similipal Biosphere Reserve, Odisha, India. Traditionally the tribes lived in and subsisted on the forests, but with increasing loss of forest areas, integration into mainstream society and urbanization, they are rapidly losing their traditional knowledge and culture. An effort has been made to record some of this precious indigenous knowledge through questionnaire survey, visits and interviews which were conducted with selected indigenous tribal communities in Similipal Biosphere Reserve (SBR) of Odisha, India. The knowledge about the wild edible mushroom flora of Similipal Biosphere Reserve and their uses by the indigenous tribes for food and medicine were documented. The study revealed that more than 10 enthnic groups (Santal, Kolha, Munda, Khadia, Bhumija, Bhuyan, Bathudi, Kudumi, Ho and Mankdias) of SBR were found to be mycophilic and have extensive traditional mycological knowledge. In total 14 species of fleshy mushrooms belongs to 8 genera and 6 families were collected through field visits and identified by phenotypic and microscopic characters. All these mushrooms are being used by the tribes as source of food as well as ethnomedicinal purposes including cure for malnutrition, weakness and other nutritional disorders etc. The study highlights the diversity and ethnomedicinal potential of some indigenous mushrooms from SBR. Further studies in these mushrooms may be undertaken to discover active compounds for their possible pharmaceutical applications.

63	Jena, S. K., & Tayung, K. (2013). Endophytic fungal communities associated with two ethno-medicinal plants of Similipal Biosphere Reserve, India and their antimicrobial prospective. *Journal of Applied Pharmaceutical Science*, *3*(4,), S7-S12.	To study endophytic fungi associated with two plant species used as ethno-medicines by aboriginal tribes of Similipal Biosphere Reserve and evaluation for their antimicrobial potentials against some clinically significant human pathogens. A total of 458 endophytic isolates were obtained from leaf, stem and fruit tissues of Solanum rubrum and Morinda pubescence. The dominant endophytic fungi belong to genera Aspergillus, Colletotrichum, Curvularia and Mycelia sterilia. Maximum endophytic isolates were obtained from leaves segments followed by stem and fruit tissues. In both the plants class hypomycetes were dominant over other fungal classes. ShannonWeiner and Simpson indexes showed rich diversity of endophytic fungi suggesting even and uniform occurrence of various species. The endophytic isolates showed varying degree of antimicrobial activity against 9 human pathogens. In S. rubrum 20% and 10% of the isolates inhibited all the Gram-positive and Gram-negative bacteria and 35% of the isolates displayed antifungal activity against all the test fungal pathogens. One of the isolate showed considerable antimicrobial activity against all the test pathogens. Endophytic isolates of M. pubescence showed 24% antibacterial activity against Gram-positive bacteria and 28% antifungal activity against all the test fungal pathogens. The study revealed that medicinal plants associated endophytes could be a rich source of antimicrobial agents.
64	Singdevsachan, S. K., Patra, J. K., & Thatoi, H. (2013). Nutritional and bioactive potential of two wild edible mushrooms (Lentinus sajor-caju and Lentinus torulosus) from Similipal Biosphere Reserve, India. *Food Science and Biotechnology*, *22*(1), 137-145.	The nutritional and medicinal potential (antioxidant and antibacterial activities) of 2 wild edible mushroom species (*Lentinus sajor-caju* and *Lentinus torulosus*) of Similipal Biosphere Reserve were determined. The macronutrient profile of these mushrooms in general revealed high source of protein (27.31–28.36 g/100 g), carbohydrate (64.95–68.24 g/100 g), and low amounts of fat (1.36–2.42 g/100 g) and possessed good quantities of micronutrients (vitamins and carotenoids) and minerals (P, K, Mn, Ni, and Fe). The solvent extracts (ethanol, methanol, and water) of the mushrooms exhibited strong antioxidant properties (ABTS, DPPH, H2O2, and metal chelating activities) with scavenging activity upto 70.54% along with phenol, flavonoid, and total antioxidant capacity. Both the mushrooms showed moderate antibacterial activity (11.0–18.33 mm inhibition zones) against *Streptococcus aureus* and *Vibrio cholerae*. Being a rich source of nutritional and medicinal potential, these 2 studied mushrooms can be used in human diet as nutraceuticals and functional foods.
65	Kumar, S., Mahanti, P., Singh, N. R., Rath, S. K., Jena, P. K., & Patra, J. K. (2018). Antioxidant activity, antibacterial potential and characterization of active fraction of Dioscorea pentaphylla	*Dioscorea pentaphylla* L., a wild tuber is used both as food and medicines among different ethnic groups of Similipal Biosphere Reserve, India. Tubers are used against skin infections. In order to establish and confirm tribal claims, methanol extract was subjected to fractionation. The active fraction (DP1) was subsequently used for further

	L. tuber extract collected from Similipal Biosphere Reserve, Odisha, India. *Brazilian Journal of Pharmaceutical Sciences*, *53*.	purification and NMR (Nuclear magnetic resonance) characterization. The phytochemical analysis revealed the presence of saponin groups. The antibacterial activity of DP1 was done against selected bacterial strains (*Salmonella typhi*, *Shigella flexneri*, *Streptococcus pyogenes*, *Streptococcus mutans* and *Vibrio cholerae*) using DD (disc diffusion), AWD (agar well diffusion) and broth dilution assay. The activity was compared with antibiotics Penicillin and Kanamycin. It was observed that DP1 showed significant inhibitory activity against the tested bacteria. The characterization of DP1 through NMR analysis and presence of proton in carbon position at C-3, C-19, C-18, C-21 and C-27 was same as the known compound "Diosgenin". Therefore, isolated compound was confirmed to be Diosgenin. The study for the first time showed that, diosgenin present in *D. pentaphylla* tuber was responsible for antibacterial and antioxidant potential. Present study highlights the importance of *Dioscorea* species as sources of diverse secondary metabolites for the isolation of active compound(s).
66	Rath, S. K., Mohapatra, N., Dubey, D., Panda, S. K., Thatoi, H. N., & Dutta, S. K. (2009). Antimicrobial activity of Diospyros melanoxylon bark from similipal biosphere reserve, Orissa, India. *African Journal of Biotechnology*, *8*(9).	The antimicrobial activity of five extracts of Diospyros melanoxylon Roxb. bark collected from Similipal Biosphere Reserve, Orissa was evaluated against human pathogenic bacteria and fungi. The extracts including both polar and non polar solvents; petroleum ether, chloroform, ethanol, methanol and aqueous were evaluated for their antimicrobial activity against three gram positive and five gram negative bacteria as well as three fungal strains. Although, all the five extracts exhibited promising antibacterial activities, yet maximum activity was observed in ethanol extract. In case of antifungal activity, except petroleum ether extract none of the extracts were found to be active against the fungal strains. MIC values for most of the extracts ranged from 1.5 to 6 mg/ml, while MBC values varied from 3 mg/ml to values greater than 12 mg/ml. Phytochemical analysis exhibited the presence of steroids, alkaloids, glycoside, proteins, tannins, phenolic compounds, carbohydrates, gums and mucilage in acetone, methanol and ethanol extracts with maximum phytochemicals in ethanol extract. Least phytochemicals was observed in case of petroleum ether. These results, so obtained, demonstrate the broad spectrum activity of D. melanoxylon bark extracts which may be useful in treatment of various microbial infections. However, the active components responsible for antimicrobial activity need to be evaluated.
67	Tripathy, P. K., Kumar, S., & Jena, P. K. (2014). Nutritional and medicinal values of selected wild Cucurbits available in Similipal Biosphere Reserve forest, Odisha. *International Journal of Pharmaceutical Sciences and Research*, *5*(12), 5430.	Cucurbitaceae commonly known as "Guard family" is distributed throughout India. Most of them, are perennial climbers with attractive flowers. The family includes plants having food as well as medicinal values. The species of the family are collectively known as cucurbits. They grow wild as well as cultivated throughout the state in Odisha in general and Similipal Biosphere Reserve (SBR) forest

		and its adjoining areas in particular. The major cucurbits available in SBR and its adjoining areas are Coccinia grandis L., Cucumis melo L., Lufa acutangula (L.) Roxb., Luffa cylindrica (L.) Roem., Solena amplexicaulis Lam., Mukia madraspatana (L.) Roem., Trichosanthus cucumerina L., Trichosanthus tricuspidata Lour. and Diplocyclos palmatus (L.) Jeffrey. The food values of some of these cucurbits have been assessed. Phytochemical analysis and antibacterial activity of the plant parts have shown potent medicinal values. Present paper highlights the diversity of wild cucurbits (WC) at SBR along with their nutritional and medicinal importance.
68	Singdevsachan, S. K., Patra, J. K., Tayung, K., & Thatoi, H. (2017). Chemical constituents, antioxidative and antibacterial properties of medicinal mushrooms collected from Similipal Biosphere Reserve, Odisha, India. *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences*, *87*(2), 559-570.	Medicinal mushrooms viz. *Ganoderma applanatum*, *Ganoderma lipsiense*, *Ganoderma chalceum* and *Ganoderma tsugae* are important forest products of Similipal Biosphere Reserve, India. The present study aimed to evaluate the chemical constituents, antioxidant and antibacterial potential of these mushrooms. The chemical constituents were determined in terms of macronutrients, micronutrients and phenolic contents. The macronutrient content of these mushrooms revealed high amounts of protein (17.10–20.50/100 g), carbohydrate (41.80–59.16/100 g) and low fats (1.2–3.0/100 g) and possessed good quantities micronutrients (vitamins, carotenoids). Mushrooms showed strong antioxidant properties due to the presence of high phenol (27.40–220.41 mg catechol/g extract) and flavonoid (3.42–171.44 mg quercetin/g extract) content. All these mushrooms possess moderate antibacterial properties with zone of inhibition ranging from 11.76 to 18.83 mm against five human pathogenic bacteria. Based on their rich bioactive compounds (vitamins and phenolics), antioxidant and antibacterial activity, they might be exploited by pharmaceutical and cosmetic industries.
69	Panda, S. K., Rout, S. D., Mishra, N., & Panda, T. (2011). Folk uses of some medicinal plants by Kol tribes of Similipal Biosphere Reserve, Orissa, India. *International Journal of Biological Technology*, *2*(1), 16-20.	Similpal Biosphere Reserve of Mayurbhanj, a hilly district of Odisha, India, is rich in ethno medicinal plants. This paper provides information on potential ethnomedicinal value of plant crude drugs for various diseases commonly used by the Kol tribes residing in and around Similipal Biosphere Reserve of the area surveyed. It is primarily based on field surveys carried out in villages, where dwellers provided information on plant species used as medicine, parts used to prepare the remedies, and the illnesses to which the remedies were prescribed. The plant parts, viz. leaf, bark, seed, root, tuber, fruit and whole plant were used in raw or cooked forms for the treatment of piles, skin disease, fever, dysentery etc. The species used as medicinal drug comprise 19 plant species belonging to 17 families.These phytotherapeutical resources were used for the cure of 18 illnesses. Due to poor condition of modern healthcare facilities and poverty,

		indigenous people of the district fully or partially depend on local medicinal plants.
70	Rout, P. G., & Panda, T. (2017). Ethnobotanical survey of medicinal plants used for the treatment of diarrhoea and dysentery by the tribals of Similipal forest, Mayurbhanj, Odisha, India. *Applied Science Reports*, *19*(1).	Traditional uses of medicinal plants in healthcare practices are providing clues to new areas of research; hence their importance is now well recognized. However, information on the uses of indigenous plants for medicine is not well documented from many rural pockets of Mayurbhanj district, Odisha, India including Similipal forest. The study focuses on presenting the therapeutic effects of selected plants that are used by the local people in relation to diarrhea and dysentery. Questionnaire surveys, participatory observations and field visits are made to elicit information on the uses of various plants. About 47 plant species belonging 45 genera and 33 families are used by the tribals of Similipal forest for diarrhoea and dysentery. The most cited species for the management of diarrhoea and dysentery are Acorus calamus L., Aegle marmelos (L.) Correa., Centella asiatica (L.) Urb., Curculigo orchioides Gaertn., Emblica officinalis Gaertn., Oroxylum indicum (L.)Vent., Syzygium cumini (L.) Skeels. and Terminalia bellerica (Gaertn.) Roxb. Research is needed to meet the challenges of identifying the active compounds in the plants, and there should be research-based evidence on whether whole herbs or extracted compounds are better. The potent antimicrobial activity on these medicinally important species is warranted.
71	Singdevsachan, S. K., Patra, J. K., & Thatoi, H. (2013). Nutritional and bioactive potential of two wild edible mushrooms (Lentinus sajor-caju and Lentinus torulosus) from Similipal Biosphere Reserve, India. *Food Science and Biotechnology*, *22*(1), 137-145.	The nutritional and medicinal potential (antioxidant and antibacterial activities) of 2 wild edible mushroom species (*Lentinus sajor-caju* and *Lentinus torulosus*) of Similipal Biosphere Reserve were determined. The macronutrient profile of these mushrooms in general revealed high source of protein (27.31–28.36 g/100 g), carbohydrate (64.95–68.24 g/100 g), and low amounts of fat (1.36–2.42 g/100 g) and possessed good quantities of micronutrients (vitamins and carotenoids) and minerals (P, K, Mn, Ni, and Fe). The solvent extracts (ethanol, methanol, and water) of the mushrooms exhibited strong antioxidant properties (ABTS, DPPH, H2O2, and metal chelating activities) with scavenging activity upto 70.54% along with phenol, flavonoid, and total antioxidant capacity. Both the mushrooms showed moderate antibacterial activity (11.0–18.33 mm inhibition zones) against *Streptococcus aureus* and *Vibrio cholerae*. Being a rich source of nutritional and medicinal potential, these 2 studied mushrooms can be used in human diet as nutraceuticals and functional foods.
72	Behera, D., Rath, C. C., Tayung, K., & Mohapatra, U. B. (2013). Ethnomedicinal uses and antibacterial activity of two orchid species collected from Similipal Biosphere Reserve Odisha, India. *Int J Agric Technol*, *9*(5), 1269-1283.	Ethnomedicinal uses of orchids among aboriginal tribes of Similipal Biosphere Reserve, India were surveyed. The result indicated that eight species were used as ethnomedicine for treatment of different ailments. Antibacterial activities of crude extracts of two orchid species (Acampe praemorsa and Vanda tessellata) obtained by four different solvents were studied against some clinically significant human pathogens.

		The result revealed that all crude extracts showed antibacterial activity in varying degree inhibiting at least one or more test pathogens. Among the solvents, di-ethyl ether extracts showed significant antibacterial activity against all the test pathogens followed by butanolic, chloroform and methanolic extracts. The MIC value of different extracts ranged from 3.5 to 25 mg/ml. The results indicated that the crude extracts were bactericidal in action. The antibiogram pattern of the pathogens revealed multiple antibiotic resistance indexes of 40%-60%. The activity of different extracts was compared with standard antibiotics, in terms of zones of sensitivity. The findings suggest that, ethno-medicinal orchids could be used as an alternative source of therapeutic agent in near future.
73	Devi, R. S., Chakroborty, S., Kumar, S., & Dhal, N. K. (2019). Garcinia xanthochymus Hook. f. ex T. Anderson: an ethnobotanically important tree species of the similipal biosphere reserve, India. In *Ethnopharmacology and biodiversity of medicinal plants* (pp. 385-396). Apple Academic Press.	Garcinia xanthochymus (Clusiaceae) is an evergreen tree species of tropical regions. The fruits are consumed by the rural and tribal communities of Similipal Biosphere Reserve, India. Fruits have sound nutritional and antibacterial activities. Less reports on leaf extracts are available in spite of sound anti-inflammatory activities and leaf paste is used against bacterial infections collected from the local communities. Keeping this in view, an attempt has been made to evaluate the antibacterial activities of aqueous extract of Garcinia xanthochymus leaves. The plant extract was prepared by maceration in water. The qualitative phytochemical analysis was done. The extract was used to evaluate the Minimum Inhibitory Concentration (MIC) using broth dilution method against selected five bacterial strains [Vibrio cholerae (MTCC 3909), Salmonella typhi (MTCC 1252), Shiegella flexneri 386(MTCC 1457), Streptococcus pyogenes (MTCC 1926), Streptococcus mutans (MTCC497)]. Field survey revealed that leaves are used against inflammation and antibacterial infections. The MIC values showed that aqueous extract of experimental leaves are low against MTCC 1926 than other studied bacterial strains. Based on the validation of tribal claims, it is concluded that ethnobotanical values are the base of ethnopharmacological and pharmaceutical industries and could help to fight against AMR (Antimicrobial resistance).
74	Rout, Y., Kumar, S., Das, G., & Patra, J. K. (2021). Wild Cucurbits: An Ethnomedicinally Important Plant Species for Aboriginals of the Similipal Biosphere Reserve, Odisha, India. In *Bioresource Utilization and Management* (pp. 75-94). Apple Academic Press.	Fecundity-oriented research and breeding among cultivated plants in agriculture have resulted in narrowing down the genetic base of indigenous food plants. Cucurbits are the most common plants that grow either in wild or under cultivated conditions. They have enormous genetic diversity, leading to vegetative and reproductive characters. They grow in almost all vegetative regions of the world. Many reports revealed that the Cucurbits possess certain bioactive compounds that are responsible for their therapeutic values against diseases and disorders. Therefore, in the present study, an enumeration survey was carried out to document the wild Cucurbits (WCs) as

		prime genetic resources available in and around the protected areas of Northern part (Similipal Biosphere Reserve), Odisha State, India, during 2012-2016. Atotal of 11 species belonging to 8 genera ofWCs were enumerated that were used as food and medicines. Out of 11, Cucumis melo, Trichosanthus cucumerina, and Coccinea grandis were very common in all 76parts of the study area. Solena amplexicaulis and Mukia madrespatna were rare in these localities. The medicinal values and active compounds present in the enumerated Cucurbits were gathered and have been documented. The present chapter highlights the importance of WCs in the advance research of pharmacology.
75	Murmu, P., Kumar, S., Patra, J. K., Singh, N. R., & Rath, S. K. (2016). Ethnobotanical, nutritional, phytochemical and antimicrobial studies of Garcinia xanthochymus fruit extracts. *British Biotechnology Journal*, *13*(2).	An attempt has been made to document the ethnobotanical values of the fruits of G. xanthochymus in and around the Similipal Biosphere Reserve (SBR) forest and evaluate the nutritional, phytochemical and antimicrobial potential of fruit extracts of G. xanthochymus. Study Design: Ethnomedicinal collection were made, followed by nutritional evaluation of the fruits. Phytochemical analysis was carried out by qualitative method and antimicrobial activity was evaluated.
76	Rath, S. K., Mohapatra, N., Dubey, D., Panda, S. K., Thatoi, H. N., & Dutta, S. K. (2009). Antimicrobial activity of Diospyros melanoxylon bark from similipal biosphere reserve, Orissa, India. *African Journal of Biotechnology*, *8*(9).	The antimicrobial activity of five extracts of Diospyros melanoxylon Roxb. bark collected from Similipal Biosphere Reserve, Orissa was evaluated against human pathogenic bacteria and fungi. The extracts including both polar and non polar solvents; petroleum ether, chloroform, ethanol, methanol and aqueous were evaluated for their antimicrobial activity against three gram positive and five gram negative bacteria as well as three fungal strains. Although, all the five extracts exhibited promising antibacterial activities, yet maximum activity was observed in ethanol extract. In case of antifungal activity, except petroleum ether extract none of the extracts were found to be active against the fungal strains. MIC values for most of the extracts ranged from 1.5 to 6 mg/ml, while MBC values varied from 3 mg/ml to values greater than 12 mg/ml. Phytochemical analysis exhibited the presence of steroids, alkaloids, glycoside, proteins, tannins, phenolic compounds, carbohydrates, gums and mucilage in acetone, methanol and ethanol extracts with maximum phytochemicals in ethanol extract. Least phytochemicals was observed in case of petroleum ether. These results, so obtained, demonstrate the broad spectrum activity of D. melanoxylon bark extracts which may be useful in treatment of various microbial infections. However, the active components responsible for antimicrobial activity need to be evaluated.

77	Padhi, S., Das, D., Panja, S., & Tayung, K. (2017). Molecular characterization and antimicrobial activity of an endolichenic fungus, Aspergillus sp. isolated from Parmelia caperata of Similipal Biosphere Reserve, India. *Interdisciplinary Sciences: Computational Life Sciences*, *9*(2), 237-246.	Similipal Biosphere Reserve an untapped reservoir of diverse algal resources, is located in the central part of the Mayurbhanj district of Odisha lies between 21° 28" and 22° 08" North latitude and 86° 04" and 86° 37" East longitudes. The present investigation aims to document diverse algal forms collected from tree bark surfaces of different collection sites of the Similipal Biosphere Reserve. A total of 19 species were recorded from 10 sampling sites of Biosphere during the study. Out of these, 18 were cyanobacteria and only one belonging to green algae. The major dominant cyanobacterial taxa were Nostoc (4) followed by Gloeocapsa (2), Chroococcidiopsis (2), Aphanocapsa (2), Phormidium (2), Scytonema (2), Myxosarcina (1), Stigonema (1), Tolypothrix (1), Fischerella (1) and a single species of green algae named Desmococcus olevaceoous were recorded during the study
78	Tripathy, P. K., Kumar, S., & Jena, P. K. (2013). Diversity and ethno-botanical assessment of some wild cucurbits of Similipal Biosphere Reserve forest, Odisha, India. In *Proceeding of the P Parija Memorial National Conference (PPMNC) on Recent Advances in Plant Biotechnology, December-22 to* (Vol. 23, pp. 77-83).	An ethnobotanical survey was carried out to collect information on the diversity of Wild Cucurbits (WC) and their medicinal uses by the aboriginals of Similipal Biosphere Reserve (SBR) forest. Total of 11 species belonging to 8 genera of WC were studied in the area. Fruits are the major plant parts collected by aboriginals, particularly Khardia, Mankardia and Ho. For use against diseases by these tribal communities, plant materials are prepared in the form of juice and pastes. Present work highlights the diversity and ethnobotanical values of some WC of SBR
79	Dikshit, N., Sivaraj, N., & Dikshit, S. Ethnobotany and traditional health care practices in Similipal Biosphere Reserve, Odisha.	Ethno-botanical uses and traditional health care practices followed among the tribal people of Similipal Biosphere Reserve of Odisha, India have been highlighted in this paper. Physiography, agro climatic condition of the area surveyed, botanical name, plant parts used, ethnomedicinal uses and distribution of plant families belonging to 45 genera and 49 species are discussed. Local indigenous knowledge using plant parts either in isolation or mixed with other ingredients to cure common ailments like common cold, stomach disorder, rheumatism, asthma, urinary problem, menstrual disorder, detoxification, diabetes, skin diseases, improving memory power, gonorrhoea, syphilis, cooling effect of stomach, wormicide, snake bite, aphrodisiac, abortion, mosquito repellent and treatment of cancer etc. are mentioned. Forest fire and indiscriminate felling of trees and poaching of wild animals particularly tigers, elephants, deer and other wild animals are causing serious threat to the biodiversity in the region. The local community play an important role in collection and utilisation of medicinal plant resources. They are rich in traditional knowledge but there is scope to upgrade the understanding on the sustainability and safe guarding the biodiversity in the region.

80	Padhi, L. P., Panda, S. K., Satapathy, S. N., & Dutta, S. K. (2011). In vitro evaluation of antibacterial potential of Annona squamosa L. and Annona reticulata L. from Similipal Biosphere Reserve, Orissa, India. *Journal of agricultural Technology*, *7*(1), 133-142.	Three different solvent extracts of leaf of Annona squamosa L. and Annona reticulata L. were studied for its antibacterial activity. Agar cup and broth dilution methods were selected to test antibacterial activity using three Gram-positive (Bacillus subtilis, Staphylococcus aureus and Staphylococcus epidermidis) and five Gram-negative (Escherichia coli and Pseudomonas aeruginosa, Salmonella typhi, Vibrio alginolyticus, Vibrio cholerae) bacteria. The screening results showed that highest inhibition was observed by the methanol extract followed by petroleum ether and aqueous extracts for both Annona squamosa and Annona reticulata leaf. Bacillus subtilis, Staphylococcus epidermidis, Staphylococcus aureus and Vibrio alginolyticus are the most sensitive bacterial strains among all test organisms. None of the plant extracts showed growth of inhibition against Salmonella typhi.
81	Jena, S. K., & Rath, C. C. (2013). Optimization of culture conditions of phosphate solubilizing activity of bacterial sp. isolated from similipal biosphere reserve in solid-state cultivation by response surface methodology. *International Journal of Current Microbiology and Applied Sciences*, *2*(5), 47-59.	In this investigation, an attempt was made to determine the load of phosphosphate solubilizing bacteria in soil samples collected from Similipal Biosphere Reserve and to carry out the condition optimization of phosphate solubilizing activity of desirable isolates by solid state culture against physical parameters. Total bacterial load in the samples ranged between 1.15×105-5.8×107 CFU/gm of soil. Whereas, the density of phosphate solubilizing bacteria ranged between 3.0×104-9.3×105 CFU/gm of soil amounting to 20-60% of total bacterial populations. Five isolates S1-7 (*Bacillus subtilis*), S5-1 (*Bacillus megaterium*), S7-1 (*Pseudomonas* sp.-1), S10-1 (*Pseudomonas* sp.2) and S16-1 (*Bacillus* sp.) showed highest phosphate solubilizing activity among the isolates were selected for condition optimization for incubation period, temperature, pH and carbon sources. Further, experimentation based on Central Composite Design (CCD) were conducted to study the co-effect of incubation period, temperature and pH on activity of phosphatase were optimized using response surface methodology (RSM). The optimum values of incubation period, temperature and pH were found to be 3 days, 36°C and pH-7 respectively for all the isolates. Maximum phosphatase activity (Solubilizing index) was recorded on the presence of dextrose 1% in the medium. The isolates S7-1 and S16-1 retained their phosphate solubilizing activities at 45°C with 10% NaCl in the medium.
82	Panda, S. K., Dubey, D., & Dutta, S. K. (2010). Anticandidal activity of Diospyros melanoxylon Roxb. Bark from Similipal Biosphere Reserve, Orissa, India. *International Journal of Green Pharmacy (IJGP)*, *4*(2).	The anticandidal activity and phytochemicals of bark of Diospyros melanoxylon Roxb. (Ebenaceae) was evaluated against four species of Candida viz. C. albicans, C. krusei, C. parapsilosis and C. tropicalis. Both polar and nonpolar extracts viz. petroleum ether, ethyl acetate, ethanol, methanol and aqueous were prepared and studied for anticandidal activity using agar cup and broth dilution methods. Although all five extracts showed promising anticandidal activity against all tested Candida species,

		yet maximum activity was observed in ethanol extract. Minimum inhibitory concentration values for most of the extracts ranged from 0.375 to 6.0 mg/ ml, while the least minimum fungicidal concentration value was observed at 3.0-6.0 mg/ml. Phytochemical analysis exhibited the presence of carbohydrates, protein and amino acids, tannin and phenolic compound, glycoside, steroid and sterols and flavonoids
83	Padhi, S., Das, D., Panja, S., & Tayung, K. (2017). Molecular characterization and antimicrobial activity of an endolichenic fungus, Aspergillus sp. isolated from Parmelia caperata of Similipal Biosphere Reserve, India. *Interdisciplinary Sciences: Computational Life Sciences*, *9*(2), 237-246.	Endolichenic fungi are microbes that inhabit healthy inner lichen tissues without any disease symptoms. They have been reported to produce new and interesting bioactive metabolites. In the present study, an endolichenic fungus frequently isolated from surface-sterilized lichen thallus of *Parmelia caperata* has been described. The fungus was identified as *Aspergillus tubingensis* based on morphological traits and ITS rDNA sequence. Crude metabolites extracted from the culture broth exhibited considerable antimicrobial activity against a panel of clinically significant human pathogens. The fungus showed optimum antimicrobial activity in PDB medium in day 7 of incubation period. PDB medium amended with 1 % NaCl and at alkaline pH was found to be optimal for antimicrobial metabolites production. Enhanced activity was observed when the fungus was exposed briefly to a heat shock of 60 °C during incubation. The metabolites showed optimum λ-max at 214 nm with an absorbance value of 1.589. Molecular characterization of the isolate was carried out by ITS phylogeny and ITS2 secondary structure analyses. The phylogenetic trees based on both ITS rDNA and ITS2 sequences showed the isolate within the clade *A. tubingensis*. Considering the ubiquity and ambiguity in identifying *Aspergillus* species of different lifestyles, a method to differentiate pathogenic and endophytic *Aspergillus* at species level was developed using ITS2 secondary structure analysis. The results showed common folding pattern in the secondary structures with a helix and a 5′ dangling end found to be highly conserved. Certain features in the secondary structure like multi-bulges and a symmetric interior loop were observed to be unique which distinguish our isolate from other *A. tubingensis*.
84	Pradhan, S., Upreti, D. K., Meher, R. K., & Satapathy, K. B. (2022). Antimicrobial, anticancer, and antioxidant potential of two dominant macro-lichen Dirinaria aegialita and Parmotrema praesorediosum collected from Similipal Biosphere Reserve of Odisha, India. *Journal of Applied Biology and Biotechnology*,	The present study was undertaken to evaluate the antimicrobial, antioxidant, and anticancer activity of *Dirinaria aegialita* (Afzel. ex Ach.) B.J. Moore and Parmotrema praesorediosum (Nyl.) Hale, the two dominant macrolichens taxa from the Similipal Biosphere Reserve of Odisha. Both the lichens were evaluated for their efficacy against three bacterial species such as *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Bacillus subtilis*, and three fungal species such as *Aspergillus niger*, *Trichoderma harzianum,* and Candida albicans. The *D. aegialita* and *P. praesorediosum* showed higher inhibitory effect against *Bacillus subtilis* and *Staphylococcus aureus*, respectively. D. aegialita also showed the higher

	(Notice: Undefined variable: last_ word in/home/jabonlin/public_ html/jab_php/abstract. php on line 226), Notice-Undefined.	inhibitory activity against MCF-7 and MDA MB-231 breast cancer cell line as compared to P. praesorediosum. Besides, D. aegialita was found to have better antioxidant activity than P. praesorediosum in scavenging assay. Thus, the results of the above study confirmed that *D. aegialita* species is having better potential in its antibacterial, antioxidant, and anticancer activity as compared to P. praesorediosum.
85	Paul, M., Meher, S. R., Giri, S., & Thatoi, H. (2021). Isolation, screening, and evaluation of cellulase-producing bacteria from the soil of Similipal Biosphere Reserve for biofuel production from lignocellulosic biomass. In *Advances in Bioprocess Engineering and Technology* (pp. 457-466). Springer, Singapore.	Lignocellulose is found in nature as an alternative source of energy and can be used for the production of bioethanol. Cellulose, one of the most abundant components of lignocellulose can be hydrolyzed using enzymes cellulase to produce glucose, which can be used for the production of ethanol. Cellulase production from cellulolytic bacteria is challenging. Hence, research has been focused on isolation and identification of efficient cellulolytic bacteria for their use in bioethanol production. In the present investigation, the most potent screened bacterial strain was subjected to optimization of its cellulase production by using response surface methodology taking four independent variables such as substrate concentration, pH, temperature, and incubation time. The optimization result showed that the bacteria had a maximum production of cellulase enzyme of 617.71 U/mL in an optimized condition at an incubation time of 42 h, pH 9, carboxy methyl cellulose (CMC) concentration of 15 gm/L, and temperature of 37.5 °C. The strain, SCB9, was identified as *Bacillus albus* based on the 16S rRNA sequencing and phylogeny analysis. Overall results from this study indicate that the cellulolytic bacteria SCB9 is a potent candidate for cellulase production, which can be exploited for bioethanol production from lignocellulosic biomass through adaptation of further appropriate biotechnological approaches.
86	Behera, M., Dandapat, J., & Rath, C. C. (2009). Isolation, characterization and screening of bacteria isolates from Similipal Biosphere Reserve forest soil for their metal tolerance capacity and extracellular enzymatic activities. *Biorem Biodiv Bioavail*, *3*, 72-78.	In total 50 bacteria were isolated from 15 soil samples collected from Similipal Biosphere Reserve through spread and pour plate technique. The CFU of bacteria per gram of soil ranged between 106 and 109 . The isolates were identified and assigned to the genera Bacillus (38, 76%), Pseudomonas (8, 16%), Micrococcus (2, 4%) and Geomicrococcus (2, 4%). Isolates were characterized for their growth in different media and pH. The isolates grew well at acidic pH, although growth was observed over a wide pH range. Surprisingly a high degree of multiple antibiotic resistance (0.142-0.428) was reported while studying the antibiogram pattern of the isolates. Isolates were screened for their metal tolerance capacity against heavy metals such as Hg, Cd, Cr, Ni, Cu, Zn, Co and Pb. When the isolates were screened for the production of industrially important enzymes by the plate assay method it was reported that 25 (51.02%), 24 (48.97%), 18 (36.73%), 18 (36.73%) and 28 (57.14%) of the isolates were positive for amylase, protease, lipase, phosphatase and DNase, respectively. Soil bacteria growing at acidic pH, having metal tolerance capacity and producing industrially important enzymes could be novel elements for different industrial processes.

87	Singdevsachan, S. K., Patra, J. K., Tayung, K., Sarangi, K., & Thatoi, H. (2014). Evaluation of nutritional and nutraceutical potentials of three wild edible mushrooms from Similipal Biosphere Reserve, Odisha, India. *Journal für Verbraucherschutz und Lebensmittelsicherheit*, *9*(2), 111-120.	A variety of edible mushrooms are growing in Similipal Biosphere Reserve (SBR), some of which are used as ethno-medicine by indigenous tribals. In the present study, three wild edible mushrooms viz., *Russula vesca*, *Russula delica* and *Termitomyces eurrhizus* of SBR were analyzed for their nutritional and mineral contents along with antioxidant and antibacterial potential. The results showed that these three mushrooms are rich sources of nutrients (protein, carbohydrate, starch, reducing sugars and low fats), micronutrients (vitamins and carotenoids) and minerals (P, K, Mn, Co, Ni, Cd, Fe) with promising bioactive properties (antioxidant and antibacterial potentials). In general, these mushrooms revealed high amounts of proteins (22.82–35.17 g/100 g) and carbohydrates (45.68–63.27 g/100 g) and low contents in fats (2.03–4.62 g/100 g), while micronutrients (vitamins and carotenoids) and minerals were present in significant amounts. The antioxidant potentials of three different solvent extracts (ethanol, methanol and aqueous) of studied wild mushrooms showed strong antioxidant properties (ABTS, DPPH, H2O2 and metal chelating activities) with scavenging potential up to 89 % at concentration 100 µg/ml. Total phenol content was found between 21.92–41.99 mg catechol/g extract and flavonoid 2.53–7.52 mg quercetin/g extract. The studied mushrooms possess moderate antibacterial properties with zones of inhibition ranging from 13 to 30 mm against six human pathogenic bacteria which are comparable with Amphoxyllin standard. Being a source of nutrients and molecules with medicinal potential, the studied mushrooms can be used in human diet as nutraceuticals/ functional foods for maintaining and promoting health, longevity and life quality.
88	Dash, M., & Behera, B. (2012). Management of similipal biosphere reserve forest: Issues and challenges. Advances in Forestry Letter (AFL), 1(1), 7-15.	“The conservation of biodiversity has been a contentious and complex issue over the years. Protected areas [PAs] that are created to preserve biodiversity are in critical condition due to excessive anthropogenic pressure. The Similipal biosphere reserve [SBR] in the Odisha state of India is the sixth largest biosphere reserve in the country and forms a major part of the World Network of Biosphere Reserves. SBR is the home for diverse flora and fauna and most of them are endemic in nature. Besides the rich floral and faunal biodiversity, SBR is also the abode of many tribes living in and around the biosphere reserve and critically depend on the reserve for livelihoods. Designing appropriate and effective local institutions that fosters biodiversity conservation and livelihoods is widely considered as a panacea for this problem. The paper describes the current issues and challenges faced by the SBR; analyzes how the local institutions are functioning and demonstrates how management interventions can be effectively and equitably prioritized towards the members

		of a community who are mostly dependent on forest resources in order to promote sustainable local livelihoods and biodiversity conservation. Lessons learned include the capacity building training activities to raise the skill and capabilities of the stakeholders through joint government-community collaboration; sharing of benefits in equitable way among the shareholders; empowerment of local people through better participatory programmes; and provision of well-defined livelihood enhancement opportunities through promotion of eco-tourism which is highly neglected in SBR."
89	Dash, M., & Behera, B. (2014). Biodiversity conservation and local livelihoods: A study on Similipal Biosphere Reserve in India. *Journal of Rural Development*, *32*(4), 409-426.	Over-exploitation of natural resources and changing climatic conditions due to global warming are responsible for rapid loss of biological diversity. Creation of protected areas (PAs) across the globe which forms a critical component in global biodiversity conservation efforts are primarily designed for preventing further loss of species by restricting human use of natural resources. The Similipal Biosphere Reserve (SBR) in the Indian State of Odisha is the sixth largest biosphere reserve in the country and forms a major part of the World Network of Biosphere Reserves. However, currently the reserve is under increasing pressure from growing human population that directly depends on the reserve for their livelihoods. The objectives of the present study are to develop a comprehensive understanding of the problems facing the SBR; and identify and analyse different factors that determine the extent of dependency of villages located in and around the reserve for extraction of non-timber forest products (NTFPs). The paper reviews the existing studies on the SBR by using the DPSIR framework for an in-depth understanding of interaction between local population and the biosphere reserve. Econometric techniques and descriptive statistics are applied to analyse the secondary data collected from 136 villages located in and around the reserve. The results show that economically poor villages and villages having more male members are likely to extract more NTFPs from the reserve. Villages located in transitional and buffer zones are likely to extract more NTFPs compared to villages that are in core zone. Designing appropriate and effective local institutions that would foster biodiversity conservation as well as livelihoods and structure the community behaviour are widely considered as the panacea for this problem.
90	Dash, M., & Behera, B. (2018). Biodiversity conservation, relocation and socio-economic consequences: A case study of Similipal Tiger Reserve, India. *Land Use Policy*, *78*, 327-337.	The paper examines (i) the factors affecting households' attitude towards conservation and relocation and (ii) the impact of relocation on the livelihood of displaced tribal communities of Similipal Tiger Reserve (STR) in India. The study uses primary data collected from 40 relocated households and compares them with 61 non-relocated

		households currently residing inside the core zone of STR. The study finds that the average share of income from agriculture, livestock and non-timber forest products are relatively higher in case of households residing inside the core area. Conversely, income derived from non-agricultural wage labour contributes maximum to the total income of the relocated households. Although access to educational facilities, transport and health care are reported to be some of the immediate benefits after relocation, food security of the displaced households is found to be adversely affected due to reduced crop diversity and output. The econometric results find that the working-age population and the literates in the region are more willing to relocate from the reserve. Particularly, the male members in the community are more desirous of participating in the relocation process and reaping the associated benefits as opposed to their female counterparts. The study gainsays the existing conservation paradigm via relocation and suggests that participatory capacity building of the affected community alongside consultation with all the stakeholders can go a long way in achieving the twin objectives of biodiversity conservation and local livelihood promotion.
91	Sahoo, S., Puyravaud, J. P., & Davidar, P. (2013). Local knowledge suggests significant wildlife decline and forest loss in insurgent affected Similipal Tiger Reserve, India. *Tropical Conservation Science*, *6*(2), 230-240.	Similipal Tiger Reserve is a large insurgent-affected protected area (PA) located in the northern Eastern Ghats, India, with a resident tribal population of about 12,500. In 2007-08, we carried out a survey of conservation attitudes among 217 men and women (<20 years old) and documented their perceptions of wildlife and forest decline over a 20-year period from 1997-2007. Using data from the Forest Survey of India, we ascertained the decrease in forest cover (<40%), and using available census information we assessed tiger status over this period. Most of the respondents were primarily agriculturists (79%), and all households collected fuel-wood from the forest; 13% hunted and 49% fished. The majority of the respondents (80%) agreed that trees had disappeared, and 90% agreed that the tiger and elephant had disappeared. Respondents' recollections of Bengal tiger and Asian elephant sightings over a 20-year period indicated a drastic decline in their numbers, and perceptions of forest loss were supported by assessments of changes in dense forest cover indicating an annual deforestation rate of 1.577% yr^{-1} over a 20-year period, or loss of 274 km^2 of dense forest. This suggests that forest dwelling communities have an acute awareness of disappearing forests and wildlife, and informant-based surveys can be indicative of the status of wildlife and forests in situations such as Similipal, where ecological studies are problematic due to civil conflict.
92	SEN, K. (2001). Similipal Tiger Project and Eco-Development of the Surrounds. *Environment and Development*, 297.	Biological diversity is a unique feature of this earth. But man through un wise and indiscriminate exploitation of natural resources has seriously affrcted this bio-diversity. Consequentl, many species of flora and fauna have either become extinct or area on the verge of extinction.

		The decline in Biodiversity is simoly staggering. it has been estimated that due de forestation and habitat destroctuion about 100 species of invertebrates are lost to the world every day. The gravity of the station may be further grasped from the fact that the number of endengered species in India has increased from 13 in 1952 to about 140 days
93	Soren, P., & Naik, I. C. (2020). ROLE OF TRIBAL LIVELIHOOD OF NON-TIMBER FOREST PRODUCT COLLECTED IN SIMILIPAL AREA OF MAYURBHANJ DISTRICT OF ODISHA. *PalArch's Journal of Archaeology of Egypt/ Egyptology*, *17*(7), 4086-4096.	Forest productions a vital role in the socio-economic life of tribal people in fact their life can't be imagined without forest. Collection and sell of different minor forest products for commercial purposes are considered as crucial means of their livelihood. The tribal people seasonally collect various NTFPs to satisfy the needs for their food, fodder and medicine. The dominant tribes involved in using minor forest product in the District of Mayurbhanj are santal, kolha, munda, bathudi, bhumij, gonds, saunti, hill kharia, mahali, mankirdia, lodha etc. The current study tried to explore the role of tribal livelihood of NTFPs collected in similipal area through a sample of 150 respondents selected from eight villages in Jashipur block, Mayurbhanj district of Odisha. In this context, the purpose of the paper is to examine the non-timber forest product the collects the different seasons and mostly use the forest for their livelihood. The research is focused on both quantitative and qualitative data using empirical field work. The respondents were given a structured interview schedule. The result shows that almost all tribal people in the study village collect minor forest products illegally and sell in local markets. Specific knowledge about NTFPs is required to ensure that communities create optimal use of their rural resources.
94	Sahu, J. R., & Barik, K. L. STUDY OF BELOW GROUND BIOMASS OF A GRASSLAND COMMUNITY OF SIMILIPAL BIOSPHERE RESERVE, ODISHA.	The below ground biomass of a grassland community in Podadiha Forest Block (86o 27' E ; 21o 33' N) of Similipal Biosphere Reserve was studied from July 2015 to July 2016. Short term harvest method of Odum[1] was employed for the determination of various compartmental biomass values. The below ground biomass of the community exhibited a gradual increase in biomass value from July to December and attends a peak during January. Then, the value followed a decreasing trend till July. Thereafter, again an increase in below ground biomass value was observed at the end of sampling period. A minimum of 40.92 g m-2 and a maximum of 102.98 g m-2 of below ground biomass were observed in the month of July and January respectively. Compared to other grassland communities, maximum below ground biomass of the community did not show similarity. This variation is below ground biomass might be due to the variation in climatic condition, topography, soil characteristics, microbial activities in the soil, rate of decomposition and the biotic interference of the locality.

95	Mishra, R. K., Mishra, P. K., Upadhyay, V. P., & Mohanty, R. C. (2011). Ecological problems of tree species in protected ecosystems of Orissa, India. *Journal of environmental biology*, *32*(1), 111-116.	The tree layer vegetation of two protected ecosystems i.e. Similipal Biosphere Reserve (SBR) and Bhitarkanika National Park (BNP) of eastern ghat was analysed for structure, composition and diversity. With respect to the tree species composition the two protected ecosystems were differed from each other at the family, genera and species level. About 117 tree species representing 85 genera and 42 families were recorded in SBR. The average number of species per hectare was 32.5. However, a total of 29 tree species representing 22 genera and 16 families were recorded in BNP with an average number of species per hectare of 24.17. Species dominancy of the two protected areas was also different due to their difference in habitat condition. In SBR Shorea robusta was the most dominant species while in BNP Excoecaria agallocha was the most dominant species. Shannon-Wiener species diversity was 3.15 for Similipal and 2.314 for Bhitarkanika indicating that Similipal was highly diverse than Bhitarkanika. In general both the protected ecosystems of Orissa are highly rich in biodiversity and are characteristics of good ecological wealth of eastern ghat. Thus conservation and management practices are essential for the sustainability of their biodiversity.
96	Mishra, R. K. (2002). Phytosociological study of forest ecosystems of similipal biosphere reserve Orissa.	Orthosiphon aristatus (Blume) Miq. (Lamiaceae) is reported for the first time from Odisha state from Similipal Biosphere Reserve. Brief botanical description, nomenclature, distribution and ecological notes of the taxon has been provided in the present paper
97	Upadhyay, S., Sahu, S. K., Panda, G. K., & Upadhyay3Ψ, V. P. (2012). Plant Science Research.	The present paper is an attempt to study the village-forest interface in the Similipal Biosphere Reserve. Many villages of Jashipur Block are located within Buffer Zone of Reserve. Study of the ecosystem linkage of Gudgudia village of this block indicates that the village have total area of about 1.6 Sq. km with majority of land coming under un-irrigated and culturable wastes categories. The village is dominated by Adivasi and SC and ST (73%) and Non Adivasi (27%) populations. Kharia and Kohl together constitute about 71.4% of houses and Mahakud, Teli, Mahali and Kamar etc. around 10%. Population of 180 cattle of the village are looked after by two Baramashias. The population depends on rain fed cultivation for livelihood as they grow only single crop per year. To improve the soil quality, some work to check soil erosion by making check dam and water harvesting structures has been done in the village. During Summer, villagers face problem of water shortage. Ground water level is around 300 feet. The people construct trenches to ward off the wild animals from the villages. Elephant herds usually enter in the village and destroy the paddy crop. The anthropogenic disturbances in wild habitats of core area force the wild animals to invade the human settlements.

		The Minor Forest Products (MFP) collection continues to be their main occupation as they collect wild vegetables, wild seeds, wild fruits, wild tubers and roots and wild flower in different months. The medicinal plants are also collected by the villagers as they consider the traditional medicines very effective over allopathic ones. It appears with this preliminary investigation that there is a close link between the inhabitants and the nature. Further study shall be of much help for revalidating the local knowledge for sustainable livelihood and for eco-sustainable management.
98	Swain, S. K., Parida, B. B., & Bagri, S. C. (2008). Community Participation and Visitor Satisfaction for Ecotourism Development in Similipal National Park, Orissa. *Atna Journal of Tourism Studies*, *3*(1), 1-24.	Community and *tourists* are two inseparable *stakeholders* that are complementary to each other *in many respects in the* development of ecotourism *destinations. The assessment* of perceptions of community *and tourists on ecotourism development in* the protected areas *is* a *baseline on which* ecotourism potential of the park *is* completely dependent. It *is* proved *in* many cases *that* there *is* a better *understanding between community and tourists in the conservation* of protected areas *through the* development of ecotourism. *This* paper explores how *the*
99	Mantri, J. K., Panigrahi, S. S., Tripathy, T. K., & Gahan, P. (2007). An Optimization Methodology (DEA Analysis): A Case Study in Similipal. *International Journal of Engineering*, *1*(2), 1.	In the growing face of deforestation, conservation is the only way to save forest and its precious wild animals, from the human encounter. "Project Tiger "(1973) at Similipal is a welcome step on the direction of tiger conservation, whose population is on the verge of extinction. For the proper protection, preservation and propagation of tiger and forest in the Similipal Tiger Reserve (STR) funds have been allocated from time to time by central govt., state govt. & various NGOs of national and international repute. The responsibility of managing the earmarked fund rests with the management of STR. This paper observes the interrelationship of funds with the trend of tiger population & other variables by using suitable econometric model. Some standard results have been explained. Also it examines the level of efficiency of fund utilization for eight financial years taking the help of Data Envelopment Analysis (DEA).
100	Prusty, B. C., & Singh, L. A. K. (1997). Tourism pattern in Similipal Tiger Reserve. *Similipal: A natural habitat of unique biodiversity. Orissa Environmental Society, Bhubaneswar*, 169-180.	The results of a three years' study have been analysed and presented to highlight various information on tourists visiting Similipal. The information includes the types and sources of tourists, and the profiles of the tourists and the mode of transportation used by them.

101	Dash, M., & Behera, B. (2014). Biodiversity conservation and local livelihoods: A study on Similipal Biosphere Reserve in India. *Journal of Rural Development*, *32*(4), 409-426.	The subterranean parts of many wild plants form an important constituent of traditional diet of the tribal inhabitants of Similipal Biosphere Reserve, Odisha especially in times of food scarcity during critical periods. However, no specific study has been made so far on this aspect. The present study was conducted during 2008–2012 as a search for sources of food and to assess the dietary diversity, consumption pattern, culinary uses and prioritized species of wild tuberous plants sustained by local tribes. The exploration and germplasm collection missions along with intensive botanical survey, focus group discussions, structured household interview and market survey were conducted in 30 villages interacting with 102 key informants of core and buffer zones. A total of 55 wild edible tuberous species representing 37 genera and 24 families were inventoried including 17 species used during food deficiency to meet seasonal shortages. The analyzed data contributed 5 use categories, 4 preparation methods, 7 kinds of food items, 10 species as children snacks, 35 species of pharma-foods and 20 prioritized species. Ten species were domesticated by tribes thus reducing threats on wild tubers and 20 species were traded in local markets to generate additional income exemplifying economic benefits from wild tubers. Seventeen species were identified as novel uses of food items from India. The findings suggested that the nutritional profile along with pharmaceutical attributes of preferred wild food plants be analyzed for recommending suitable species for better nutrition and development of nutraceuticals. Further, many genetic resources of these wild tuberous species of agri-horticultural importance constitute the wild genepool hence their economic and breeding potential along with desirable attributes need to be investigated for utilization in crop improvement programmes.
102	Rout, S. D. (2008). Anthropogenic threats and biodiversity conservation in Similipal Biosphere Reserve, Orissa, India. *Tigerpaper*, *35*(3), 22-26.	This paper describes the floral and faunal diversity, and the threats to biological diversity in the Similipal Biosphere Reserve, Orissa, India. The threats include human activities, domestic livestock grazing, illegal cutting of trees, poaching, mass hunting, collection of non-wood forest products and medicinal plants, and tourism.
103	Singh, L. A. (1973). Wildlife Research in Similipal.	The status of Similipal is unique for ecological and wildlife studies. While,the Project Tiger and the Crocodile Project have produced most research daJa, studies pursued by outsiders are largely not available. The present account is about the trend of researh in Similipal covering institutionsand individuals, research contributions through important surveys, management of endangered species. species-oriented research, socio-economic studies, development of techniques, habitat and indicator fauna management. tourism pattern' and conservation

		education. development of database. research in the periphery of Similipaland in the BiosphereReserve.and identification of research priorities.
104	Swain, S. K., Parida, B. B., & Bagri, S. C. (2008). Community Participation and Visitor Satisfaction for Ecotourism Development in Similipal National Park, Orissa. *Atna Journal of Tourism Studies*, *3*(1), 1-24.	The Similipal is a densely forested hill-range in the heart of Mayurbhanj district,Orissa, lying close to the eastern-most end of the Easternghats. Similipal Biosphere Reserve is located in the Mahanadian Biogeographical Region and within the Biotic Province, Chhotanagpur Plateau.There are 4 villages in the core and 61 villages in the buffer area of the biosphere reserve .Agriculture is not well developed and employment opportunities are very poor, most of the people derive their income from collection of NTFP and sale of firewood and timber. A collaborative work is carried out by Regional Remote Sensing Centre(East) and Anthropological survey of India,Kolkata to study the impact of those four villages in the core area of SBR on the conservation of natural resources over the decades. Change in vegetation density as measured by NDVI over the decades is analysed to study the impact of these villages on the core area of Similipal Biosphere Reserve.
105	Debabrata, S. (2014). State of forest in Similipal Tiger Reserve, Odisha, India: a case study. *Indian Forester*, *140*(11), 1049-1055.	Similipal Tiger Reserve, Odisha, was designated as a Tiger Reserve in 1973. As of December, 2006, core area of the Reserve constituted 906.26 km2 and buffer area was 1304.49 km2. The forest cover of Similipal for the year 1997, 2003 and 2006 was assessed using the satellite data of IRS-1D, sensor LISS-III, spatial resolution 23.5 m × 23.5 m and spectral resolution 4 bands. The results of such assessment have been presented in this paper. Dense forest constitutes 87.81% area of Similipal forests, whereas open and degraded (scrub) forest constitute 5.65% and 3.24% respectively. Grassland, crucial for wild ruminants is only 0.04% and it is available in the core area. Barren rocky/stony waste constitutes 2% of Similipal forests. Water bodies, mostly in the form of streams flowing inside Similipal form 0.23%. Tree-clad area is 0.12%. Agricultural land and built-up land is 0.9%. Similipal witnessed decrease of 252.71 km2 dense forests in six years from 1997 to 2003 and increase of 347.87 km2 in three years from 2003 to 2006. There is increase of open forests of 343.82 km2 from 1997 to 2003 and decrease of 330.56 km2 from 2003 to 2006. Degraded forests have decreased by 34.56 km2 between 1997 and 2003 and 27.47 km2 between 2003 and 2006. Forest biomass carbon stock of Similipal has been estimated to be 16-31 million tonnes of carbon. The dense forest cover of Similipal has the high potential to mitigate CO2 emission in the locality.

106	Swain, D. (2009, October). Role of India's tiger reserves in the protection of origin/catchment of water courses: A case study of the Similipal Tiger Reserve. In *XIII World Forestry Congress, Buenos Aires, Argentina* (Vol. 13).	There are twenty-nine tiger reserves in India spread over seventeen states covering 38,620 km2 prime forests, occupying over one percent of its geographical area. The reserves were established to protect the endangered tiger (Panthera tigris), and now they form origin/catchments of several important rivers, which serve as the backbone of the irrigation networks and provide drinking water to the cities and villages situated on both sides of the water courses. There is an increase of 33 km2 of very dense forest (canopy density >70%) and decrease of 251 km2 of moderately dense forest (canopy density 40 - 70%) in tiger reserve network in the country between 1997 and 2002. With the aim of evaluating the impact of management of a tiger reserve in securing the future of catchments/watersheds of rivers and streams across India, the Similipal tiger reserve, one of the nine initially established in 1973 was chosen as a case study. Similipal, which forms the watersheds of as many as eleven rivers/ streams in Eastern India, has witnessed a conversion of 1.41 km2 of dense forest to open forest (canopy density 10-40%) from 1983 to 1989, and a conversion of one km2 of moderately dense forest to open forest from 1997 to 2002. In contrast, dense forest as well as overall forest cover surrounding Similipal has continuously decreased during the same period which indicates that the establishment of tiger reserve helped in the protection of Similipal forests. But there are 63 villages inside the reserve and some 1200 villages located within 10 km of the reserve inhabiting 450,000 people basically tribals. Because of the establishment of the reserve these indigenous people feel neglected. Alienating the people depending on the tiger reserve, conservation of the tiger and its habitats is not only futile but also detrimental to the socio-cultural-economic fabric of the ecosystem of the people. The paper discusses the issues of conservation/management vis-à-vis dependence of people on Similipal forests for their livelihood. Participation of local communities as a success story in the protection of Similipal forests to maintain the water flow has also been discussed.
107	Mohanta, M. R., Mohanta, A., Mohapatra, U., Mohanty, R. C., & Sahu, S. C. (2020). Carbon stock assessment and its relation with tree biodiversity in Tropical Moist Deciduous Forest of Similipal Biosphere Reserve, Odisha, India. *Tropical Ecology*, *61*(4), 497-508.	patial understanding of biomass and carbon stock in tropical moist deciduous forests is crucial in assessment of global carbon budget. The present study was aimed to assess the above ground and below ground carbon stock and its relation with tree diversity parameters in two tropical moist deciduous forest sites, namely: *Xylia* dominated forest (XDF) and *Sal* dominated forest (SDF) of Similipal Biosphere Reserve (SBR), Odisha, India. A total of seventy-two tree species ≥5 cm diameter at breast height (dbh) were recorded, belonging to 62 genera and 27 families. Estimated average above-ground biomass carbon and soil organic carbon were 180.05 Mg C ha–1, 55.4 Mg C ha–1 and 209.3 Mg C ha–1, 61.8 Mg C ha–1 in XDF and SDF of SBR, respectively. *Shorea*

		robusta Gaertn. was the most carbon accumulating species of both the forests contributing about 21.5% of biomass carbon in XDF and 47.8% biomass carbon in SDF. Maximum carbon allocation was in above-ground biomass pool (69.04%) followed by soil organic carbon (20.9%) and below-ground biomass/root (10.1%). The correlation study revealed that above-ground biomass had strong positive correlation with basal area and Importance Value Index of tree species indicating importance of dominant species in carbon storage. Therefore, the dominant tree species such as *S. robusta* Gaertn., *Xylia xylocarpa* (Roxb.) Taub., *Terminalia tomentosa* Wight & Arn., *Schleichera oleosa* Lour.) Merr. etc. is suggested for proper conservation and management to maintain the carbon stock of SBR. The results emphasized the importance of tropical moist deciduous forests in potential carbon storage and conservation of biodiversity in forest ecosystem of India. Further, the information will supplement to the global deficit of carbon stock data of moist deciduous forest and has implications in carbon model projections and management both nationally and globally.
108	Mishra, R. K., Upadhyay, V. P., Bal, S., Mohapatra, P. K., & Mohanty, R. C. (2006). Phenology of species of moist deciduous forest sites of Similipal biosphere reserve. *Lyonia*, *11*(1), 5-17.	Vegetative and reproductive phenology of 57 overstorey and 33 understorey species was studied in a tropical moist deciduous forest of Similipal Biosphere Reserve (SBR) located in Orissa state in India. A prominent peak in leaf drop, leaf flush and flowering of overstorey species occurred in March, April and April to May, respectively. However the peak period of such phenological events in understorey species is slightly different than over storey species. The peak fruiting period of both overstorey and understorey species are same i.e. from May to June. The fruiting phenology follows closely the flowering phenology. Fruit fall culminates before or just at the beginning of the monsoon season and, thus, ensures availability of sufficient moisture to seeds for germination and seedling establishment. Leaf drop, leaf flush and flowering both in overstorey and under storey species have been triggered by changes in day length and temperature, which indirectly signifies that soil moisture availability may have shaped the phenological patterns of both overstorey and understorey species. The phenological information obtained both for overstorey and understorey species in the present study is mostly influenced by the seasons and would be useful for planning proper management strategies in Similipal biosphere reserve to sustain regeneration development .

109	Sahu, K. K. (2014). Myths and realities of tribal education: a primary study in Similipal area of Odisha. *International Journal of Humanities and Social Science Invention*, *3*(4), 01-06.	Poverty in Nigeria is so prevalent because more than half of Nigerian lives below poverty line of one dollar per day going by the United Nations standard. This has necessitated the introduction of several poverty alleviation programmes both by the government and non-government organizations to properly address the issue of poverty in the country. It is to this extent that the objective of this research work is to properly identify and analyze the causes of poverty. It is also the objective of the research to properly assess the impact of the various poverty alleviation programmes on workers in Maiduguri Metropolitan Council (MMC) and finally, to examine the problems hindering the proper implementation of the various poverty alleviation schemes in the MMC. The data for achieving these research objectives were sourced using both primary and secondary sources of data collection. The primary data was generated through questionnaire administration while the secondary data was obtained through reports, government publications, newspapers, journals and other library materials. The simple percentage was used to analyze the data in the questionnaire. In all, one hundred and fifty (150) questionnaires were distributed out of which one hundred and forty were completed and returned representing 94.7% of the sampled population. The responses of these 142 respondents were used for the analysis of the study. This research work revealed that though, there has been various poverty alleviation schemes in the Maiduguri Metropolitan Council, the MMC still does not have a well designed and articulated poverty alleviation scheme that recognizes and properly takes care of the diverse needs of the target population – physically disabled, elderly, children etc who are the most vulnerable group to poverty in the society. This has contributed to the increasing rate of poverty in the MMC. The research work also discovered that MMC is characterized by urban poverty which is caused by high level of rural-urban migration as well as migration from neighbouring countries of Chad, Niger and Cameroon. This has led to mass unemployment in the MMC which is the most fundamental cause of poverty in the MMC. It also reveals that the failure of most of the poverty alleviation schemes is due to poor funding, management and implementation. This research work further recommends that for poverty to be tackled, the most vulnerable group in the society should be targeted so that they can benefit from the scheme and that government should adopt decentralized poverty alleviation approach which emphasizes that the approach to tackling poverty should not be generalized. Rather, the approach to poverty alleviation of each society should be such that it will be able to take care of the peculiar needs of that society. It also recommended that rural-urban

		migration should be property checked by providing infrastructural facilities and creating employment opportunities at the rural areas and also ensuring proper checking of migration from neighbouring countries through the involvement of appropriate agencies.
110	Behera, S. K., Das, D., Balasubramani, K., Chellappan, S., Rajaram, K., Mohanta, H. K., & Nina, P. B. (2020). Seroprevalence and risk factors of brucellosis in livestock in the wildlife and livestock interface area of Similipal Biosphere Reserve, India. *Veterinary World*, *13*(3), 465.	Brucellosis is an important zoonotic disease that affects fertility in farm animals. The risk factors of brucellosis have not been well studied. This study aimed to understand the seroprevalence and risk factors of brucellosis among livestock in Bangriposi block of Mayurbhanj district in Odisha, a region that borders Similipal wildlife reserve.
111	Mohanta, J., Dey, D. G., & Mohanty, N. (2012). Performance of lac insect Kerria lacca Kerr in conventional and nonconventional cultivation around Similipal Biosphere Reserve, Odisha, India. *The Bioscan*, *7*(2), 237-240.	Lac is the only resin of animal origin that is the secretion of a tiny scale insect, Kerria lacca Kerr. It thrives on the tender shoots of its host plants, like Palas (Butea monosperma) and Kusum (Schleichera oleosa). These primary host plants are plently available in different zones (buffer and peripheral) of the Similipal Biosphere Reserve (SBR) where people (mostly tribals) are cultivating lac in a conventional way. A comparison between nonconventional (scientific) and conventional (tradional) methods of lac cultivation at SBR shows 25-35% more resin production in former method. The resin production is also more in its two strains (Kusmi on Kusum and Rangeeni on Palas) in buffer zone than that of the peripheral zone. Further, the result shows that resin production is greater in Kusmi strain compared to Rangeeni strain.
112	Mohanta, M. R., Rout, Y., Pradhan, B., Bhoi, D., Chand, P. K., & Sahu, S. C. (2022). Anthropogenic interventions regulate forest structure and carbon stock in transitional dry forests of Similipal Biosphere Reserve, India. Écoscience, 1-16.	Tropical dry forests play an important role in the storing of significant amounts of biomass and carbon. However, carbon storage in these forests is linked to biotic, edaphic and climatic factors as well as human interventions. The forest structure and carbon storage in relation to human interventions and soil properties were studied in tropical dry forest patches located in a transition region of the Similipal Biosphere Reserve, India. Random sampling of vegetation and soil was done in 30 plots of 50 × 20 m in size. A total of 41 adult tree species, 50 juvenile tree species and 28 climber species were recorded within the study area. The average carbon stock of the forest was 179.54 ± 9.56 Mg ha−1, of which adult trees were the highest contributors (55%) followed by soil organic carbon (36%), woody climbers (6%) and juvenile trees (3%). There was a significant effect of lopping, cutting of trees and soil properties on forest structure and carbon stock. This study confirms that anthropogenic disturbances and edaphic factors play a significant role in the variation of carbon stocks of biomass and soils in the forest.

113	Panda, S. S., Sahoo, K., Das, R., & Dhal, N. K. (2012). Pectinolytic and cellulolytic activity of soil fungal isolates from similipal bioreserve forest. *World Environ*, *2*(2), 1-3.	Twenty five fungal strains were isolated from soil of Similipal Bioreserve Forest and screened for pectinase and cellulase activity. Aspergillus sp. was found to be predominant in the sample. Out of which, Aspergillus niger and A. flavus showed high cellulolytic and pectinolytic activity having potency index of 4.5 for IFcel and 4.1 for IFpect, respectively. Parameters like pH and temperature were optimized for the potent strains. The present study concludes that both of the strains can be further utilized for large scale industrial purpose.
114	Das, S., & Das, B. P. (2008). Similipal biosphere: genesis of historicity. *Orissa review*, 1-80.	There is one distasteful aspect that this developmental process has its appelling arrogance both towards nature as well as traditional culture. The main point is to be considered here is to find out the means of integral yoga of economic advancement together with environmental protection. With the development of civilisation, Justice as social goal has been fundamentally recognised.
115	Behera, D., Tayung, K., & Mohapatra, U. Á. (2013). PCR-based identification of endophytes from three orchid species collected from Similipal Biosphere Reserve, India. *American International Journal of Research in Formal, Applied and Natural Sciences*, *3*, 10-17.	In the present study endophytic fungi associated with an orchid species, Acampe praemorsa was investigated. Samples (root and leaf) were collected from different sites of Similipal Biosphere Reserve. Isolation was carried out by surface sterilization procedure and inoculating the surface sterilized fragments in MS and PDA media. Altogether 50 endophytic fungal isolates were isolated from root and leaf tissues belong to 9 different species. A sterile endophytic fungus (sterile mycelia sp.1) was isolated from all the three Orchid species and was found to be dominant with highest colonization frequency in Acampe praemorsa (7.5%) followed by Vanda testacea (3%) and Cymbidium aloifolium (2%). Since the fungus could not identified by morphological features, molecular characterization was carried out by partial rDNA-ITS sequence analysis. Based on BLAST search analysis the fungus was found closest homolog to Colletotrichum sp, with maximum identity of 98%, maximum score of 913 and E- value of 0.0. The sequence has been deposited in GenBank database with an accession number JQ765411.1. The BLAST phylogeny along with 46 isolates of best hits of Colletotrichum species revealed that the fungus was found to be closest homolog to Colletotrichum sp. IP-77 with an accession number DQ780451.1 and maximum identity of 96%.
116	Mishra, R. K., Nayak, A. K., Sahu, H. K., & Palei, H. S. (2016). Ecology of Similipal biosphere reserve.	Plants and animals inhabited in different forest ecosystems of Similipal are changing continually in their composition and population due to deforestation, fragmentation, forest fire and other human activities. These activities have posed serious threat to the survival and future sustainability of the unique biodiversity of Similipal. Thus conservation of plants and animals of the reserve in their own habitats needs to know

		how they exploit the resources. In this context ecologists are playing a major role providing scientific inputs in conservation efforts. Therefore, there has been a need to compile and collate the research findings of ecological research and other allied disciplines and link ecological research with biodiversity conservation. The scope of this book has been able to gather ecological information on phytosociology and phenology of various plant groups, litter decomposition and nutrient turn over on the forest floor, distribution of animals and their status, and the threats imposed on them. The said ecological information compiled about the plants and animals of Similipal in this volume will help the researchers, practitioners and forest managers to formulate management action plans for future sustainability of its biodiversity
117	Upadhyay, H. S., Behera, S., Dutta, S. K., Sahu, H. K., & Sethy, J. (2019). A viable tiger population in Similipal Tiger Reserve, India? Calculating if the ungulate prey base is limiting. *Wildlife Biology*, *2019*(1), 1-7.	Low ungulate density can be a factor in limiting tiger populations, so to better manage tiger reserves one must be able assess if this is the case or if other factors might be more important. Here, we quantify ungulate density in a tiger reserve in India, compare it to other reserves, and estimate the tiger carrying capacity in order to assess this reserve can support a viable tiger population. Specifically, we studied the Similipal Tiger Reserve (STR), Odisha, India, from 2011 to 2014. The line transect method was used to estimate population density of available major ungulate prey species, i.e. sambar *Rusa unicolor*, wild pig *Sus scrofa*, barking deer *Muntiacus muntjac*, chital *Axis axis* and mouse deer *Moschiola indica*. A remarkable increase in ungulate prey density was noted in the intensive study area over the study period from 4.3 animals per km2 in the pre-monsoon season of 2011 to 28.9 animals per km2 in the post-monsoon season of 2014. This estimated ungulate density is very low compared to other tiger reserves of India. Density figures of ungulates when multiplied with the average weight of the respective species gave a biomass density of 1599.4 kg km-2. This data was then used in two published empirical models to obtain estimates of tiger carrying capacity in STR. We used two empirical models from the published literature and concluded that the tiger carrying capacity of Similipal Tiger Reserve ranges between 1.3 and 3.8 tigers per 100 km2, much lower than our current estimates of tiger density. This suggests that the tiger population is below carrying capacity or that the estimated tiger population in critical tiger habitat falls below the threshold number. We suggest that the creation of large meadows for herbivores and the establishment of suitable fenced areas to augment breeding of the prey species chital and sambar are necessary to support a viable tiger population in the Similipal Tiger Reserve.

118	Jena, M. K., Seeland, K., & Patnaik, K. K. (1997). *Where trees do matter for society: the socio-cultural aspects of sal (Shorea robusta) and salap (Caryota urens L.) in the Similipal Hills of Orissa, India* (pp. 79-89). Intermediate Technology Publications Ltd (ITP).	It is shown that trees are an integral part of the social and socioeconomic life of rural communities, and this is demonstrated in the culture of Hill Kharia people, who collect honey from beehives in sal trees, and the Kuttia Kondh, who extract wine from the salap tree (the kittul or fish-tail sago palm). Specific aspects considered are: the habitat of sal; Similipal - a forest reserve in Orissa; the method of collecting honey, marketing honey, and causes of decreasing honey yields; salap - the place of the species in the world of the Kuttia Kondh, a description of the tree and its uses (collecting sago from the pith, making 'toddy' from the inflorescence and pith and fermenting it, and preparing drums and water pipelines from the root base and stems), ownership of salap trees and their role in social intercourse, salap tree lore, and conservation management of salap.
119	Laha, A., Singh, S., Mishra, U., & Singh, M. (2021, April). Estimating spatiotemporal dynamics of forest fire hazard using analytical hierarchy process and geostatistical methods in similipal biosphere reserve, India. In *EGU General Assembly Conference Abstracts* (pp. EGU21-890).	The phytogeography of Similipal Biosphere Reserve (SBR), Odisha, India, reveals very interesting information on distribution of tree species. Phytogeographical affinities of tree species of SBR has been analysed by obtaining the information about the species distribution at local and global scale. A total of 240 tree species were recorded and their phytogeographical affinities were compiled with different countries of the globe. An analysis of the affinities revealed that SBR has strong affinity with Sri-Lanka (46.66%) and Myanmar (45.83%) followed by China, Malaysia, Thailand, Australia and Africa. SBR has also affinity with Himalayan vegetation possessing several trees and orchids find distribution in both the areas. The phytogeographical affinity of SBR supports the migration, establishment and naturalization of flora from/to SBR. This hypothesis needs further study for biogeographical mapping of Indian sub-continent.
120	Jena, M. K. (2003). Economical and biological potential of non-timber forest products (NTFP) in the Similipal Hills of Orissa. *Indigenous knowledge, forest management and forest policy in South Asia. Proceedings*, 81-103.	An assessment of non-timber forest products (NTFP) was carried out between May and June 1998 just before the monsoon in 3 different areas of the Similipal hills in Mayurbhanj district, Orissa, India. The areas studied were beyond the boundary of Similipal Biosphere Reserve and comprised 6 villages. Resource inventories were conducted to understand the distribution, use and management of NTFP in different areas. Field observations showed that there were villages from where people visited distant forests to collect NTFP, requiring long walks of up to 20 km to collect easily marketable NTFP such as sal (Shorea robusta) leaves. It was observed that resources become strained when many people, sometimes from up to 25 villages, depend on the same reserve. The study focused on identifying resource-rich zones, verifying standards of exploitation or collection, listing the main items exploited and assessing the extent of pressure

		on the forest. It is concluded that like the socio-economic environment, the role of forest resources is changing in a way that demands compatible management strategies and plans. KEYWORDS: TROPAG | land use | nonwood forest products | markets | surveys | South Asia | India | Orissa.
121	Patra, J. K. (2017). Country Liquors of Similipal Biosphere Reserve, Odisha, India: A Staple Fermented Food of the Tribal Communities. *EC Microbiology*, *9*, 140-145.	The Similipal biosphere reserve (SBR) is a home to number of tribal communities who prepare fermented foods, beverages such as rice wine, palm wine and many more for their consumption. These fermented beverages are rich in a number of microorganisms and bioactive compounds. This short note aims to capture and document the traditional beverages of the tribal of SBR, and their preparation procedure along with storing and preservation. This traditional information will be helpful for the industries in the development of medicinal fermented drinks.
122	Dash, J. (1998). Ecology, Culture and the Changing Behaviour Pattern of the Food-Gathering and Hunting Peoples: The Hill Kharia Situation in Similipal Hills. *Journal of Human Ecology*, *9*(6), 545-549.	Any change in the physical environment has direct or indirect bearing on way of life of the people depending on it During the pre-independence time. Mill Kharias were recognized as a specialized food-gathering and hunting tribe by the-then-kings and granted rights. exploit the renewable forest resources in Similipal Hills for the maintenance of livelihood But during the just-independence period, the loss of their right to exploit such resources due to the changing forest polices, made them intruders in their own territory. The loss of their exclusive night, on the other hand, encouraged the neighbouring agriculturist tribes to intrude into the forest and compete for the collection of natural ensources. With ample number of empirical facts, ultimate consequences of the above-stated situations have been reflected in the paper which show not only their adverse impact on the Mill Kharia economy and social structure leading to the emergence of idiosyncratic leniencies but also highlight similar impact on the culture and behaviour of the people due to the disruption of people's emotional attachment with the natural and supernatural environments.
123	Pattnaik, S. (2022). Ecologies of Tradition and Transformation: An Anthropological Study on Hill Khadia women of Similipal. *IJAR*, *8*(4), 172-178.	In the context of time and evident social change, gender inequality continues to haunt the paradigm of development across the world. As per various studies undertaken by researchers globally, reveals that women of the forest dependent indigenous communities continue to face multi faceted issues on the grounds of access and control of resources. The paper looks at the post-structural aspects of an ongoing process relating to social transformations with the community living around the forests, communities economy based on forest use

		and abuse, role of various reforms/policies relating to ownership of forests by the forest-dependent Hill Khadia communities living in Gudgudiya village in Similipal region of Mayurbhanj. The paper will attempt to portray the scenario of gender-lenses, the socio-cultural profile of Khadia women and their dependence on the forest. The study will also highlight the forest based policy implementation struggles and rights assertion by these women as a part of the Hill Khadia Community, a Particularly Vulnerable Tribal Group (PVTG) living in Similipal while highlighting some evident traditional knowledge with respect to their dependence and eco-sustainable management of forest. Along with this it will also highlight the various peripheral concerns in the form of conflicts surfacing time and again by the Hill Khadia women of Gudgudiya. However, no specific studies have been made up so far on this aspect, hence making it very crucial in the current context. The study is a part of the doctoral research that the author has carried out
124	DAS, I., PANDA, M. K., & RATH, C. C. (2019). In vitro antimicrobial activity and molecular characterization of Bacillus amyloliquefaciens isolated from similipal biosphere reserve, Odisha, India. *IN VITRO*, *12*(3).	e: The purpose of our study was to isolate and identify the bacteriocinogenic strain exhibiting broad range antimicrobial activity and to analyze the effect of different culturing conditions on the production of an antimicrobial metabolites isolated from the soil of Simlipal Biosphere Reserve, India.
125	Singh, J. N., & Sastry, A. R. K. (1988). A note on the quality of waters of Tiger Project area, Similipal (Orissa). *Nelumbo*, *30*(1-4), 180-181.	Similipal National Park, located in Mayur- - bhanj district, Orissa, is one of the tiger project areas in our country. Geographically it belongs to the region of Northern plateau of Orissa and has a slope from North to South. The forests occupy an area -of 2091 square km and harbour four distinct types of vegetation, namely (i) Evergreen (ii) Moist evergreen (iii) Dry deciduous and (iv) Savanna.
126	Saha, D., & Agarwalla, S. (2021). People's Forest Dependence: A Case Study of Similipal Biosphere Reserve, India. *Review of Development and Change*, *26*(1), 63-82.	A forest, as a rich ecosystem, is the source of livelihood of a large number of people residing in its fringe areas. Forest dwellers' dependence on the forest varies across forest zones due to several factors, such as natural features and socio-economic-demographic characteristics of the people in different zones. Using econometric tools, this study evaluates the forest dependence of people residing in and around the Similipal Biosphere Reserve in India, constructs an index, and determines key factors affecting the extent of the forest dependence. The study explores household size and non-forest income as sources of alternative livelihood. Forest-zonal characteristics have significant impact on determining the extent of the forest dependence. People's forest dependence is likely to be more in the periphery compared to the core zone. Therefore, in any initiative for reducing people's forest dependence, zone-wise differentiation is needed to ensure sustainable development.

127	Bhakta, S., Dutta, P., Sahu, E., & Bastia, A. K. (2015). Soil crust algae of Similipal Biosphere Reserve (SBR), Odisha. *J Adv Microbiol*, *2*, 54-63.	Cyanobacteria and microalgae are important components of biological soil crusts (BSC) as they improve soil structure, stabilize soil erosion, enhancing plant seedling establishment and increase of infiltration of rain water into soil. During present study, algal samples were collected from 3 sampling sites namely Badamakabadi, Chahala and Barehipani of the Similipal Biosphere Reserve (21°28" and 22°08" N; 86°04" and 86°37" E) and documented. A total of 14 algal taxa were recorded comprised of 9 species of cyanobacteria and 5 green algae. The major dominant cyanobacterial taxa were Scytonema (3) followed by single species each of genera Gloeocapsa, Psudocapsa, Leptolyngbya, Porphyrosiphon, Synechocystis and Tolypothrix. Chlorophyta occurred both in coccid and filamentous forms were recorded single species each of Coccomyxa, Microspora, Cylindrocapsopsis, Ulothrix and Trentepohlia. The light and the humidity of the forest type may be the factors of the cyanobacterial abundance than the green algal forms. Cyanobacterial species under genera Scytonema, Tolypothrix and Leptolyngbya, one green algae Coccomyxa were isolated into pure form for the purpose of germplasm collection.
128	Dey, H., & Bastia, A. K. (2021). ANTIMICROBIAL POTENTIALS OF TWO FRESHWATER HETEROCYSTOUS CYANOBACTERIA WESTIELLOPSIS PROLIFICA AND NOSTOCHOPSIS LOBATUS COLLECTED FROM SIMILIPAL BIOSPHERE RESERVE, ODISHA, INDIA. *Journal of Advanced Scientific Research*, *12*(04), 241-247.	The Similipal Biosphere Reserve, an unique ecosystem in the eastern part of India, occupy the northern boundary of Odisha state, lies between 21°28´ to 22°08´ North latitude and 86°04´ to 86°37´ East longitude, covering a vast area of 5578 sq. km in the district of Mayurbhanj. Westiellopsis prolifica and Nostochopsis lobatus, are a group of heterocystous, true branched, filamentous cyanobacteria belonging to the order Stigonematales, rarely found in the aquatic bodies of this region in the state of Odisha. In the present investigation, an attempt has been made to evaluate the antimicrobial potentials of Westiellopsis prolifica and Nostochopsis lobatus collected from flowing streams of Similipal Biosphere Reserve. The organisms were cultured in nitrogen free BG-11 medium and raised to axenic state. Crude metabolites were extracted from cultured test organisms in late log phase using organic solvents of different polarity viz. methanol and chloroform. The metabolites were tested against some clinically significant microorganisms including bacteria and fungi using agar cup diffusion method and the results of antimicrobial activity of cyanobacteria are summarized. The findings revealed that pattern of inhibition varied with respect to the cyanobacterial strains used, nature of solvent extracts and the pathogenic microorganisms tested. Westiellopsis prolifica was found to be more potent that inhibit all the pathogenic bacteria and fungi both in methanol and chloroform extract. This study illustrates that heterocystous cyanobacteria from freshwater bodies could be a potent source of antimicrobial agents and

		further characterization of active metabolites and evaluation of their pharmacological potentials are also needed.
129	Hota, D. S., Patra, G. C., Satapathy, P. K., & Satapathy, S. (2014). Biochemical study on the host plant" Asan" (Terminalia tomentosa) leaves of tasar silkworm Antheraea mylitta D. collected from eco-pockets of similipal biosphere reserve, Mayurbhanj, Odisha. *The Bioscan*, *9*(2), 609-611.	The Tropical tasar silkworm *Antheraea mylitta* Drury is an economically sericigenous insect abundantly cultivated around Simliplipal Biosphere area of Mayurbhanj district in Odisha. The larvae are reared on the Asan (*Terminalia tomentosa*) plant as the primary host plants. The leaves of *T. tomentosa* were procured from the eco-pockets Thakurmunda, Kendujuani, Sarat, Jadida, Khadambeda and Kuliana of Similipal Biosphere Reserve. The concentration of protein, carbohydrate and ascorbic acid were analyzed. The analyses revealed that the leaves collected from Khadambeda showed highest concentration of protein (245.36 mg/g) and ascorbic acid (1.89 mg/g) whereas for the carbohydrate concentration in Kendujuani (4.63 mg/g) are the suitable among all the ecopockets studied. However, the rearing performance is concerned may be due to high concentration of protein ERR (51.1%) at Khadambeda compare to other eco-pockets.
130	Mishra, R. K., Pattanaik, S., & Mohanty, R. C. (2014). Effect of disturbance on seed germination and seedling growth of Cassia fistula (L.), Albizia lebbeck (L.) Benth. and Dalbergia sissoo Roxb. of Similipal Biosphere Reserve, Odisha, India. *Forest Research: Open Access*, *3*(4).	With the aim of restoring the disturbed sites on one of the premier tiger reserve of the country or the only biosphere reserve of the state, the study was planned to investigate the effect of disturbance on seed germination, early seedling growth and adaptation potential of *Cassia fistula* (L.), *Albizia lebbeck* (L.) and *Dalbergia sissoo* Roxb. in Similipal Biosphere Reserve (SBR), Odisha. The study sites of the biosphere reserve was categorised into disturbed, moderately disturbed and undisturbed stands on the basis of disturbance index. They differ from each other in forest floor light intensities along with other biophysical characters. High light intensity in the forest floor of Disturbed Stand (DS) than Undisturbed Stand (UDS) and Moderately Disturbed Stand (MDS) of the reserve was found suitable towards significantly higher rate of seed germination and seedling growth of the three investigated tree (over storey) species for all growth characteristics measured except S/R ratio. High soil nutrient content and low light intensity in the forest floor of undisturbed stand than disturbed and moderately disturbed stands of the reserve was not suitable for better seed germination and early stage of seedling growth. Moderate light intensity in the forest floor of moderately disturbed stand produced seed germination and seedling growth to come in the second order. All growth characteristic parameters of *Albizia lebbeck* seedlings had almost the highest values among species in all the forest stands of the reserve. Though *Cassia fistula* seedlings had lower growth characteristics than others, but its low S/R ratio in all the forest stands evidenced its higher adaptation potential.

131	Sahu, A. B., Kar, P. K., & Debata, P. R. (2020). Cocoon quantitative traits and grainage behaviour in Jhanji crop of wild Modal ecorace of Tasar silkworm in Similipal. *Journal of Entomological Research*, 44(4), 607-612.	The below ground biomass of a grassland community in Podadiha Forest Block (86o 27' E ; 21o 33' N) of Similipal Biosphere Reserve was studied from July 2015 to July 2016. Short term harvest method of Odum[1] was employed for the determination of various compartmental biomass values. The below ground biomass of the community exhibited a gradual increase in biomass value from July to December and attends a peak during January. Then, the value followed a decreasing trend till July. Thereafter, again an increase in below ground biomass value was observed at the end of sampling period. A minimum of 40.92 g m-2 and a maximum of 102.98 g m-2 of below ground biomass were observed in the month of July and January respectively. Compared to other grassland communities, maximum below ground biomass of the community did not show similarity. This variation is below ground biomass might be due to the variation in climatic condition, topography, soil characteristics, microbial activities in the soil, rate of decomposition and the biotic interference of the locality.
132	Bn	The live green biomass of a grassland community in Podadiha Forest Block (86o 27' E; 21o 33' N) of Similipal Biosphere Reserve was studied from July 2015 to July 2016. Short term harvest method of Odum (1960) was employed for the determination of various ompartmyHental biomass values. The live green biomass of the community showed gradual increase in biomass value from July to August, then to September, October and November, and attained a peak during December (255.88 g m-2). Thereafter, the value started a decreasing trend till May (72.92 g m-2). Again an increasing trend of value was observed till the end of the sampling period. The mean live green biomass of the community was found to be 125.34 g m-2 . Compared to other grassland communities the mean value of the community did not show any similarity with the value of others. The variation of live green biomass of a grassland community from place to place and from time to time might be due to the variability in climatic condition, topography, soil characteristics, microbial activities in the soil as well as the biotic interference of the locality.
133	Singh, R. S., Tripathi, N., & Singh, S. K. (2007). Impact of degradation on nitrogen transformation in a forest ecosystem of India. *Environmental monitoring and assessment*, *125*(1), 165-173.	A study was performed selecting one protected forest and an adjacent degraded forest ecosystem to quantify the impact of forest degradation on soil inorganic nitrogen, fine root production, nitrification, N-mineralization and microbial biomass N. There were marked seasonal variations of all the parameters in the upper 0–10 and lower 10–20 cm depths. The seasonal trend of net nitrification and net N-mineralization was reverse of that for inorganic nitrogen and microbial biomass N. Net nitrification, net N-mineralization and fine root biomass values were highest in both forests during rainy season.

		On contrary, inorganic nitrogen and microbial biomass N were highest during summer season.
134	Singh, A. K. (2020). *The Simlipal Complex, Singhbhum Craton, eastern India: remnant of a large Mesoarchean impact crater* (Doctoral dissertation, IIT Kharagpur).	The record of the early cratering history of the Earth is poorly preserved with no known crater of Archean age. In this dissertation, signatures of impact, of possible Mesoarchean age, have been documented from the Simlipal Complex, a circular/elliptical ring structure at the northeastern boundary of the Singhbhum Craton in eastern India
135	Singdevsachan, S. K., Patra, J. K., & Thatoi, H. (2013). Nutritional and bioactive potential of two wild edible mushrooms (Lentinus sajor-caju and Lentinus torulosus) from Similipal Biosphere Reserve, India. *Food Science and Biotechnology*, *22*(1), 137-145.	The nutritional and medicinal potential (antioxidant and antibacterial activities) of 2 wild edible mushroom species (*Lentinus sajor-caju* and *Lentinus torulosus*) of Similipal Biosphere Reserve were determined. The macronutrient profile of these mushrooms in general revealed high source of protein (27.31–28.36 g/100 g), carbohydrate (64.95–68.24 g/100 g), and low amounts of fat (1.36–2.42 g/100 g) and possessed good quantities of micronutrients (vitamins and carotenoids) and minerals (P, K, Mn, Ni, and Fe). The solvent extracts (ethanol, methanol, and water) of the mushrooms exhibited strong antioxidant properties (ABTS, DPPH, H2O2, and metal chelating activities) with scavenging activity upto 70.54% along with phenol, flavonoid, and total antioxidant capacity. Both the mushrooms showed moderate antibacterial activity (11.0–18.33 mm inhibition zones) against *Streptococcus aureus* and *Vibrio cholerae*. Being a rich source of nutritional and medicinal potential, these 2 studied mushrooms can be used in human diet as nutraceuticals and functional foods.
136	Mishra, R. K., Upadhyay, V. P., Nayak, P. K., Pattanaik, S., & Mohanty, R. C. (2012). Composition and Stand Structure of Tropical Moist Deciduous Forest of Similipal Biosphere Reserve, Orissa, India. *FOREST ECOSYSTEMS–MORE THAN JUST TREES*, 109.	The vast patch of forest covers of **Similipal** is one of the megabiodiversity zones of the because of good vegitation and a network of perennial streams Similipalis relatively moist
137	Kumar, C. R., & Shaktiprasad, S. (2018). OCCUPATION PROSPECTS FOR TRIBALS OF SIMILIPAL BIOSPHERE RESERVE FOREST IN ODISHA: AN ASSESSMENT. *Journal of Global Resources Volume*, 4(01), 46-52.	The present study analyzes various livelihood opportunities for forest dependent tribal, factors affecting livelihood, changing trends and policy interventions. The study has been conducted in four villages and hundred samples were collected from Similipal biosphere reserve, located in the tribal dominated Mayurbhanj district of Odisha state. Tribal people depending upon forests for their livelihood seem to be challenging from sustainability front. People practice diversified portfolios at the subsistence level. It is found that convergence of various Government sponsored schemes at the village level will play a crucial role in facilitating their access to the mainstream. Effort on increased use of technology and information on market intelligence is a must. Sustainable use of forest resources, harvesting of Non-Timber Forest Products (NTFP), imparting skill up gradation training,

		sensitization of the community by Government and private agencies are other essential factors for holistic development of tribal.
138	Saranya, K. R. L., Reddy, C. S., & Rao, P. P. (2016). Estimating carbon emissions from forest fires over a decade in Similipal Biosphere Reserve, India. *Remote Sensing Applications: Society and Environment*, 4, 61-67.	The forest fire is a well-recognized threat to biodiversity and a significant cause of ecological degradation. Fires emit significant amounts of CO2 to the atmosphere. Studies have found that greenhouse gas emissions from forest fires strongly influence climate change. In the present study, the spatio-temporal patterns of forest fires were examined from 2004 to 2013 in Similipal Biosphere Reserve, Eastern Ghats of India. This study focuses on estimation of carbon emissions from forest fires based on IPCC Guidelines for National Greenhouse Gas Inventories. The total area affected under forest fire has been estimated as 23.7% in 2004, 11.5% in 2005, 24.8% in 2006, 23.5% in 2007 and 18% in 2008, 27.9% in 2009, 16.4% in 2010, 16.3% km2 in 2011, 27% km2 in 2012 and 14% in 2013. CO2 emissions were estimated for tropical vegetation types i.e. semi-evergreen, moist deciduous, dry deciduous, high-level Sal, low-level Sal forest, scrub, savannah and grasslands. The total carbon emissions from forest fires in Similipal vary from 0.93 to 1.58 CO2 Tg yr–1 during the study. The mean annual rate of carbon emissions was observed to be 1.26 CO2 Tg yr–1. Similarly, other trace gases like CO, CH4, N2O and NOx has also been calculated. This study is helpful in formulating conservation plans and thus helps in mitigating the impact of climate change. Considering the global significance of Biosphere Reserves in the conservation of biodiversity, more scientific studies are required to understand the impact of ongoing fire regimes.
139	Saranya, K. R. L., Reddy, C. S., Rao, P. V. V., & Jha, C. S. (2014). Decadal time-scale monitoring of forest fires in Similipal Biosphere Reserve, India using remote sensing and GIS. *Environmental monitoring and assessment*, *186*(5), 3283-3296.	Analyzing the spatial extent and distribution of forest fires is essential for sustainable forest resource management. There is no comprehensive data existing on forest fires on a regular basis in Biosphere Reserves of India. The present work have been carried out to locate and estimate the spatial extent of forest burnt areas using Resourcesat-1 data and fire frequency covering decadal fire events (2004–2013) in Similipal Biosphere Reserve. The anomalous quantity of forest burnt area was recorded during 2009 as 1,014.7 km2. There was inconsistency in the fire susceptibility across the different vegetation types. The spatial analysis of burnt area shows that an area of 34.2 % of dry deciduous forests, followed by tree savannah, shrub savannah, and grasslands affected by fires in 2013. The analysis based on decadal time scale satellite data reveals that an area of 2,175.9 km2 (59.6 % of total vegetation cover) has been affected by varied rate of frequency of forest fires. Fire density pattern indicates low count of burnt area patches in 2013 estimated at 1,017 and high count at 1,916 in 2004. An estimate of fire risk area

		over a decade identifies 12.2 km2 is experiencing an annual fire damage. Summing the fire frequency data across the grids (each 1 km2) indicates 1,211 (26 %) grids are having very high disturbance regimes due to repeated fires in all the 10 years, followed by 711 grids in 9 years and 418 in 8 years and 382 in 7 years. The spatial database offers excellent opportunities to understand the ecological impact of fires on biodiversity and is helpful in formulating conservation action plans.
140	Swain, S. K., & Swain, K. C. (2019). Identification and assessment of forest fire in Similipal Tiger Reserve (STR) with GIS. *Indian Forester*, *145*(12), 1131-1138.	Forest fire is a major environmental issue, creating economical and ecological damage while endangering human lives. Similipal, situated at the Indian state of Odisha, is the only tiger reserve in the world, where the melanistic form of tiger is found and is properly conserved. The paper has tried to identify and evaluate the forest fire incidences in Similipal Tiger Reserve (STR) using Remote Sensing (RS) and GIS technique for four years, such as 2006, 2009, 2013 and 2016. Primary fire incidences data were collected from respective meteorological offices along with location co-ordinates with prevailing weather conditions. The forest fire incidences are mapped in Arc GIS 10.1 software environment. It shows unusual distribution of forest fire incidences in STR. The year 2009 has the maximum number of forest fire incidences in STR underlined by extremely hot weather and low precipitation condition. Ground truthing in the STR shows disturbances due to anti-social activities in some patches of the area, limiting the scope for preventive measures, caused large number of forest fires incidences. Forest fire caused by local people (man-made) associated with the presence of Particularly Vulnerable Tribal Groups (PVTGs) also are increased in numbers. Forest fire incidences can be reduced drastically with future planning and using modern technologies under most unfavourable climatic conditions.
141	Satapathy, K., Pradhan, S., & Upreti, D. K. (2021). Addition of 96 lichen species to the state of Odisha from Similipal Biosphere Reserve. *ARPHA Preprints*, *2*, e65955.	A total of 96 species of lichens taxa belonging to 45 genera and 20 families are enumerated from Similipal Biosphere Reserve, in Mayurbhanj district as an addition to the lichen biota of Odisha, India. Most of the crustose lichen taxa usually growing as epiphytes on different phorophytes of the biosphere reserve exhibit their dominance. Among crustose lichens the members of family Graphidaceae with 26 species of 14 genera shown their maximum dominance. Together with Graphidaceae the lichen genus Pyrenula represented by 15 species found growing luxuriantly on smooth barked trees of the biosphere reserve. The dominant trees in the biosphere such as Shorea robusta Gaertn. followed by Mangifera indica L., Simarouba glauca DC. and Madhuca longifolia (L.) J. F. Macbr., provided suitable habitat for a number of lichen taxa to colonize.

		The south-west (SW) region of Similipal Biosphere Reserve exhibits the maximum additions of lichens, followed by north-west (NW), north-east (NE) and south-east (SE) respectively
142	Lenka, M. K., & Mohanty, N. (2019). EFFECTS OF ALTITUDE, ROOT BIOMASS AND TEMPERATURE OF SOIL ON BIOMASS OF EARTHWORM IN SOUTH-EASTERN PART OF SIMILIPAL BIOSPHERE RESERVE, MAYURBHANJ, ODISHA. *Journal Of Advanced Zoology*, *40*(01), 97-103.	Earthworm is the most important invertebrate of soil. Since it involved in improving the soil quality, an attempt has been made to test the effects of root biomass and temperature of soil on density of earthworms in different altitudes of South-eastern part of Similipal Biosphere Reserve (SBR) (Balma: 133 mASL, Debkund: 190 mASL, Hadgut: 222 mASL, Katuria: 242 mASL and Nato: 326 mASL). It was observed that the biomass (weight) of earthworms is significantly different among different seasons. But among altitudes it was not significantly different (Tables: 1). More root biomass indicates higher earthworm biomass. Biomass of earthworm was highest at moderate temperature, i.e., in rainy season (since temperature of soil in rainy was more than that of winter and less than that of summer season). There was a significant difference ($p < 0.05$) in biomass of earthworm among different seasons of study areas.
143	Mohapatra, B., Parida, R., & Jena, M. K. AN ASSESSMENT OF FOLK MEDICINAL USE OF PLANTS BY TRIBES IN SIMILIPAL. *ADIVASI*, 9.	The tribal and non-tribal forest dwelling communities derive manifold benefits out of the flora in their environment. They have been using plants and their parts as medicine and in welfare purposes. In remote areas where the communities have least reach and access to modern and established systems of medicine there they continue to survive from diseases and ailments by using plant medicines in their folk methods. Magico-religious beliefs are often associated with their method of administering medicine. The present paper makes an assessment of certain medicinal plants used as medicine; both preventive and curative; for several diseases and ailments by Kolha and Santal tribes residing in and around Similipal Biosphere Reserve in Mayurbhanj district. The detailed process of administering the plant medicines by the said communities is beyond the scope of this paper. In this anthology, ethno-medicinal observations have been made on 29 trees, 14 shrubs and climbers and 17 herbs
144	Mishra, S. R., & Bisht, H. K. (2019). Distribution Pattern of Jungle Cat (Felis Chaus) In Similipal Tiger Resserve, Odisha, India. *Journal of Zoological Research*, *3*(2), 8-11.	A camera-trapping survey was carried out in Similipal Tiger Reserve in between February 2016 to May 2016 as a part of All Odisha Tiger estimation. Camera trapping exercise lasted for 119 days. Each camera was assigned a unique identification number, Date, time, and camera ID was recorded for every capture. Total 73 nos Photo capture during the exercise covering both the core and buffer division of similipal Tiger Reserve. Maximum photo captured in STR core division (55) followed by Baripada division (12), karanjia division (05) and Rairangpur division (01)

145	Mishra, S. P., Mishra, A., Kumar, C., Sahu, D. K., & Mishra, S. Distressed Lives and Livelihood in Biosphere Reserves during Anthropocene; Similipal Forest Blaze-2021.	Inland Biosphere reserves are mainly focusing on conservation of forests for a sustainable biodiversity that has. alerted the ecologists, and forest managers. The reserving forests were under jurisdiction of the state forest department. The aboriginal tribes were the forest savers, so the damages by the wild fire were less in past. Present investigation includes the wild forest blazes in India during 2021 with special attention to the Similipal forest fire 2021 in Mayurbhanj district, Odisha. The socio-biological impacts of the forest fire on the aboriginal communities are searched. The soft-wares used in the present study were ArcGIS, QGIS, GPS Visualizer, USGS Earth Explorer, Google Earth Pro-Paint, Bhuvan, AccuWeather, and ERDAS IMAGINE 11 for analyzing, image processing, and presentation. The assessment of the anthropogenic burnt area has been about 1000 Km2. The involvement of the ethnic communities is found to be the protectors of the fire in past are now oustees. The wild blaze management in forests can be done by public private partnership mode. The mass consciousness can be adopted involving the particularly vulnerable tribal group like, the Vana Suraksha Samiti, under the Forest Rights Act of the state government
146	Sahu, A., & Mallick, M. Relocation for the Survival of Wild: Reflection from Similipal Tiger Reserve. *Orissa Economic Journal*, 148.	The Similipal Forest was brought under Project Tiger and the Similipal Tiger Reserve was established in April 1973. There are 7 revenue villages inside the core area of Similipal Tiger Reserve out of which 3 villages namely Chahala, Daldali and Dhurdhurchampa are un-inhabited. The other 4 villages located in the core area are Jenabil, Jamuna, Kabatghai and Bakua. Initially there were 149 families in these four villages out of which 72 families were relocated at Ambadiha and Kopand Rehabilitation Colonies during the project 1994, 1998 and 2003. National Tiger Conservation Authority, Ministry of Environment and Forests, Government of India proposed a new package for village relocation/rehabilitation in February 2008. Under this scheme 61 families of Jenabil village were relocated at Ambadiha Rehabilitation Colony at the foothill of Similipal in March 2012. The shifting process of villagers of Jenabil started on 09.03.2010 and continued up to 11.03.2010. Rehabilitation benefits were provided to the shifted families which include house plot of Ac 0.08 dec and Ac 2.00 agricultural land to each, temporary sheds, drinking water with two PHED tankers, cooked food for 15 days, Anganwadi Center health checkup, electrification, road, etc. Our study covers the traditional dwellers of Jenabil village under the core area of Similipal forest in Mayurbhanj district of Odisha where successful rehabilitation work was done by the Forest Department and the families are now resettled at Ambadiha Rehabilitation Colony near Udala. Though they faced little problem in adjusting with

		the new environment, now they are quite happy with their improved standard of living. However, eventhough the first relocation is done successfully, the administration is still facing problems in shifting the other families living inside the core area. Therefore, it is suggested that help of some of the beneficiaries may be taken to convince them.
147	Jahagirdar, M. P. (1990). The hill Kharia of Similipal tiger reserve; problems and prospects of relocation. *Myforest*, *26*(2), 125-134.	The socioeconomic characteristics of this primitive (hunting and gathering) tribal community from the Mayurbhanj district of Orissa are described and strategies for their successful relocation following the implementation of Project Tiger Programme discussed.
148	Mohapatra, A., Reddy, C. S., & Biswal, A. K. Aquatic Plant Diversity of Similipal Biosphere Reserve, Orissa, India.	Aquatic plants have been used for diverse purposes since historical times and are used often particularly for the purpose of food, fibre and medicine. Similipal Biosphere Reserve (SBR) is located in Mayurbhanj district of Orissa comprising of an area about 5569 km2. It has varied topographical, edaphic and climatic conditions. The present study on aquatic plants of Similipal Biosphere Reserve report as many as 149 aquatic species, which include 79 species of dicotyledons belonging to 51 genera under 30 families, 69 species of monocotyledons belonging to 45 genera under 14 families and 4 species of Pteridophytes belonging to 4 genera under 4 families. Some of the useful aquatic plants in the study area include Bacopa monnieri, Centella asiatica, Hygrophila auriculata as medicine, Echinochloa colona, Hygrorhiza aristata, Oryza meyeriana ssp. granulata as fodder grasses, Oryza rufipogon as a wild relative of Oryza sativa, Ludwigia adscendens and Nymphaea nouchali as food plants for migratory birds.
149	Mishra, R. K., Nayak, P. K., & Mohanty, R. C. VEGETATION ANALYSIS OF OVER STOREY LAYER OF SOUTHERN CORE AREAS OF SIMILIPAL BIOSPHERE RESERVE: A MANAGEMENT IMPLICATION.	This paper reports diversity and distribution pattern of tree species at four different sites of southern core areas of Similipal Biosphere Reserve (SBR) at elevations ranging from 785-869 meter above sea level. Shorea robusta was the dominant tree species in all the study sites. The total basal area and diversity of trees recorded in the study sites showed a range of 78.47-104.92 m 2 ha-1 and 895-985 trees ha-1, respectively. Likewise, the species diversity and ß-diversity of the four study sites were between 1.798-3.107 and 3.0-4.425, respectively. As the species diversity and ß-diversity increased with altitude, ß-diversity showed a significant positive correlation with altitude. These two attributes also showed a negative correlation with maturity index, where the correlation established between species diversity and maturity index is statistically insignificant.
150	Dash, M. (2016). *Economic Analysis of Biodiversity Conservation: The Case of Similipal Tiger Reserve in Odisha, India* (Doctoral dissertation, IIT, Kharagpur).	The continued loss of biodiversity has compelled researchers and policy makers across the globe to rethink on the existing natural resource management practices and explore alternative approaches that are effective

		in preventing further ecosystem degradation. Forest dwelling communities and indigenous tribes have for centuries depended on PA resources for their livelihoods. The restrictions imposed both by the government on forest resources lead to clashes and confrontation between local people and PA managers and many times results in acute human-wildlife conflicts. Eviction of local traditional communities is often regarded as an extreme social outcome of biodiversity conservation which has the unintended consequence of displacing people and cutting them off from their principal source of economic livelihood. With the attempt to comprehensively investigate the possible factors for more effective policies towards participatory management and the avoidance of conflicts, the present study focuses on the complex interactions of local communities within PAs keeping the geographical scale of the study as the Similipal tiger reserve (STR) in Odisha. A variety of econometric techniques have been employed to analyze the data. The result reveals that rich communities are largely responsible for adopting degrading resource use practices, contrary to conventional thinking that poor degrades environment more in a subsistence economy. Households are found to be engaged in collection of variety of NTFPs; however, the extent and pattern of NTFPs collection differ widely across households that belong to different socioeconomic and demographic characteristics. The result also discloses that wealthy households prefer to use clean energy for lighting, while poor and illiterate households and households in the lower quartiles tend to use dirty sources of fuel. Besides, lack of adequate provision of technical and financial inputs for the creation of better agricultural livelihoods for the relocated people are found to be the principal cause of failure in recent relocation mechanism. Varieties of capacity building measures, skill development programmes and motivation for the stakeholders are required for successful collective action and institutional building. The study suggests that a 'bottom-up' approach rather than 'top-down' should be more effective while addressing the issue concerning biodiversity conservation and local livelihood improvement.
151	Behera, S. K., Das, D., Balasubramani, K., Chellappan, S., Rajaram, K., Mohanta, H. K., & Balabaskaran Nina, P. (2020). Seroprevalence and risk factors of brucellosis in livestock in the wildlife and livestock interface area of Similipal Biosphere Reserve, India, Veterinary World, 13 (3): 465-470. Abstract.	Brucellosis is an important zoonotic disease that affects fertility in farm animals. The risk factors of brucellosis have not been well studied. This study aimed to understand the seroprevalence and risk factors of brucellosis among livestock in Bangriposi block of Mayurbhanj district in Odisha, a region that borders Similipal wildlife reserve. Rose Bengal plate test (RBPT) was carried out to estimate the seroprevalence of the livestock in this region. Bivariate analysis was carried out to analyze the association

		between the variables and brucellosis. Binary logistic regression was performed to assess the risk factors associated with brucellosis in the livestock. Based on RBPT, the seroprevalence of brucellosis among cattle and goats was estimated to be 1.1% and 11.2%, respectively. Binary logistic regression analysis indicates that study area, age, goats, animals with a history of abortion, and rearing practices were the major risk factors in this region. This is one of the first studies in India to shed light on risk factors of brucellosis, an important neglected disease that affects the health of animals and humans and nation's economy.
152	Mishra, S. R., Mohan, M., & Pati, J. D. (2018). First Photographic Documentation and Distribution of the Smooth-Coated Otter Lutrogale perspicillata in Similipal Tiger Reserve, Odisha, India. *IUCN Otter Spec. Group Bull*, *35*(4), 186-192.	Decline in the populations of the Smooth-coated otter throughout its range of distribution is coupled with a perception that it is a key stone species for riverine ecosystem. The species inhabits major freshwater wetlands throughout the south and south-east Asia and often comes into the direct conflict with humans for food and habitat. Furthermore, the species is also suffering with neglectful attitude and mismanagement due to lack of baseline information. This paper presents the first camera trap evidence, and distribution pattern of, smooth-coated otters in Similipal Tiger Reserve as the result of a camera trap exercise.
153	Sahu, J. R., & Barik, K. L. (2017). Study of Standing Dead Biomass of a Grassland Community of Similipal Biosphere Reserve, Odisha.	The standing dead biomass of a grassland community in Podadiha Forest Block (86o 27" E ; 21o 33" N) of Similipal Biosphere Reserve was studied from July 2015 to July 2016. Short term harvest method of Odum (1) was employed for the determination of various compartmental biomass values. The standing dead biomass of the community exhibited a gradual increase in biomass value from July to March and attends a peak during April (142.88 g m-2). Thereafter, the value started a decreasing trend till the end of the sampling period. A minimum of 12.97 g m-2 of dead biomass was observed at the beginning of sampling period (i.e. July). The mean standing dead biomass of the community was found to be 58.41 g m-2 . Compared to other grassland communities, the mean value of the standing dead biomass did not show similarity with the value of others. This variation is standing dead biomass might be due to the variability in climatic condition, topography, soil characteristics, microbial activities in the soil and the biotic interference of the locality
154	Dash, P. K., Mohapatra, P. K., & Kar, M. BIODIVERSITY OF FRESHWATER AQUATIC MACROPHYTIC VEGETATION OF SIMILIPAL BIOSPHERE RESERVE, ORISSA, INDIA. *e-planet*, 17.	An extensive field survey and plant collection revealed the presence of 128 species of aquatic macrophytes belonging to 71 genera and 36 families in Similipal Biosphere Reserve (SBR). Out of them 13 families, 39 genera and 66 species are monocot; 20 families, 28 genera and 56 species are dicot and 04 families, 04 genera and 06 species are

		pteridophytes. Regarding the endemic plant wealth, the biosphere reserve does not show any significant position in the list of the endemic plant species of the country. However, Apanogeton natans and Coix aquatica are the 2 plant species found in Similipal are mentioned as endemic to India. Nymphoides parvifolia, a rooted floating hydrophyte was found to be new record for the Biosphere Reserve.
155	Sahu, J. R., & Barik, K. L. (2017). Study of Litter Biomass of a Grassland Community of Similipal Biosphere Reserve, Odisha.	The litter biomass of a grassland community in Podadiha Forest Block (86o 27" E ; 21o 33" N) of Similipal Biosphere Reserve was studied from July 2015 to July 2016. Short term harvest method of Odum (1) was employed for the determination of various compartmental biomass values. The litter biomass of the community exhibited a gradual increase in biomass value from August to March and attends a peak during April. Thereafter, the value started a decreasing trend till the end of the sampling period. A minimum of 12.20 g m-2 and a maximum of 24.62 g m-2 of litter biomass value were observed during the month of August and April respectively. The mean litter biomass of the community was found to be 18.06 g m-2. Compared to other grassland communities, the mean litter biomass value of the community did not show any similarity with the value of others. This variation is litter biomass might be due to the variation in climatic condition, topography, soil characteristics, microbial activities in the soil and the biotic interference of the locality
156	Sethy, P. G. S., Sahu, P., & Mishra, S. S. (2008). On the Occurrence of Two Balitorid Fishes of the Genus Schistura McClelland from Similipal Biosphere Reserve, Orissa. *Records of the Zoological Survey of India*, *108*(4), 37-40.	The Similipal Biosphere Reserve located in the North-East part of Orissa (Dist. Mayurbhanj) . is famous for its undulating terrain with diverse genetic resources (Patra and Triphaty, 1997). The biogeo~raphical conditions provide a high potential habitat for the variety of fish fauna inhabiting the locality. Previous studies pertaining to fish fauna of Similipal Biosphere Reserve (Anon, 1999) records 31 species only, of which the family Balitoridae (Order-Cypriniformes) is represented by an unidentified species of the genus Nemacheilus Bleeker, 1863. Ramakrishna et al. (2006) also included only one Balitorid fish as Nemacheilus species, with indication of it being a new distributional record. Incidentally, two species of fishes were collected during the study of invertebrate faunal groups in the Biosphere Reserve. On identification these two species turned out to belong to the genus Schistura McCelland, 1839, hitherto not reported. Its report earlier as Nemacheilus sp. is due to the fact that in earlier literature the genus Schistura was considered as a subgenus under Nemacheilus. The identified specimens were deposited with EBS, : lSI, Berhampur (presently at Gopalpur-on-Sea, Orissa). The taxonomic accounts of these two species are given here to record their occurrence from this Biosphere Reserve and as well as from Orissa state

157	Sahoo, D., Mishra, S. R., Sahu, H. K., & Upadhyay, H. S. (2015). Density and Distribution of Ungulates in Similipal Tiger Reserve, Orissa, India. *Journal of Wildlife Research*, *3*(2), 11-18.	A study was carried out on ecological density and distribution of ungulates in similipal tiger reserve, Orissa from the period of November 2010 to June 2011. Line transect method was used for estimation of ungulate density. During the study period 45 transects were laid in the core area of the tiger reserve covering five ranges i.e. upper Barakamuda, Jenabil, National Park, Nawana North and Chahala. The transect data was analyzed using Distance (version 6.0) soft ware. Density was estimated for five species of ungulates such as sambar, barking deer, wild pig and chital. The collected data and its analysis by Distance (version 6.0) soft ware show the highest density of ungulates in the form of wild pig (2.21) followed by mouse deer (1.94), sambar (1.36), barking deer (1.32) and chital (0.92). Analysis for estimation of range wise of ungulates show highest density of ungulates in Jenabil Range (26.05) followed by Nawana North (19.03), Chahala (16.9), Upper Barakamuda (10.58) and National park (4.53).
158	Sadual, M. K. A CRITICAL ANALYSIS ON THE STRESSED TRIBAL LIVELIHOOD IN THE SIMILIPAL BIO-SPHERE RESERVE, MAYURBHANJ, ODISHA DUE TO THE MULTIFACETED FOREST LEGISLATIONS.	Livelihood of tribals of Mayurbhanj predominantly depends on the gigantic Similipal Biosphere Reserve (SBR) as they had been benefited from this forest resource from the Princely State period up to 1949, after which extraction from forest became treated as exploitation. To curb this and maintain a sustainable atmosphere towards a balanced forest resource, many laws have enacted to promote sustainable development. But these enactments threaten the livelihood rights of the local tribals as they are forest dependants. It is determined after analysing different legislations that on the same platform sustainable development and tribal livelihood in the district cannot possible
159	SAHOO, H., MISRA, R., & MUKHERJEE, A. Wild edible fruits traditionally used by tribes of Similipal Biosphere Reserve, Odisha, India.	The present study was carried out in Similipal Biosphere Reserve, Odisha to assess the diversity and consumption pattern of wild edible fruit plants sustained by local tribal inhabitants. The study was based on extensive botanical survey, interview with traditional knowledge holders and documented information on indigenous traditional knowledge of major tribes of selected 30 villages of Similipal Biosphere Reserve. Altogether species diversity of 92 wild edible fruit plants belonging to 41 families and 67 genera were documented along with their local name, mode of consumption and income generating species maintained by the local tribes
160	Mishra, S. R., & Nayak, A. K. (2011). Mugger Crocodile (Crocodylus palustris) in Similipal Tiger Reserve, Odisha, India.	Census data on Mugger crocodile in Similipal Tiger Reserve was collected in 2014 and compiled with the census data of 2010-2014 to know population status of Mugger crocodile in this largest Tiger Reserve of Odisha. Data was collected from six rivers named West deo, East deo, Khairi, Khadekei, Budhabalnga and Palpala running through seven Ranges of Similipal Tiger Reserve. In all the years highest no. of crocodiles observed in West deo river.

		Only two crocodiles observed in the year 2011 in the river Palpala. The recorded size varies from individuals to individuals according to different age group and lies between 0.5m to 2.5m.
161	Jena, S. K., Das, I., & Rath, C. C. Enumeration of Bacterial Population of the Rhizopheric Soil by Culturable Method of Similipal Biosphere Reserve, Odisha, India.	In toto 100 soil samples were collected from 10 different sites of Similipal Biosphere reserve, Odisha, India. Soil samples were subjected to physico-chemical parameter analysis. The soil observed to be acidic in nature. The organic carbon content of the soil fluctuated from site to site. The highest percentage of organic carbon was reported at the site of chahala-1 to be 0.676 during winter season. Soil bacterial population in the collected samples ranged between 2.9x108 ± 9.2x107 to 1.69x106 ± 2.9x104 CFU/gm of soil when studied through culturable methods. The highest bacterial population was observed at the site Natto-1 followed by Joranda, and Chahala-2. Phosphate solubilizing bacterial population ranged between 4.4x106 ± 2.4x105 to 6.9x104 ± 1.2x103 CFU/gm of soil. Total 450 isolates were isolated and identified by gram's reaction and through a battery of biochemical characters. Out of 201 phosphate solubilizing isolates, 30 bacterial isolates were selected for studying their enzymatic activity. Isolates showed higher activities for phosphate, starch and protein digestion on solid medium with specific substrates.
162	Rath, S. K., Patra, J. K., Kanji, M. P., Thatoi, H. N., & Dutta, S. K. (2010). DPPH radical scavenging activity of three medicinal plants from similipal biosphere reserve: A study on antioxidant activity.	
163	Sahu, H. K., & Palei, H. S. Assessing Mammals' Abundance and Diversity Using Remotely Triggered Cameras in Similipal Tiger Reserve and Its Implications for Conservation.	Knowledge of the presence and distribution of species is crucial for designing and evaluating conservation strategies within a region. Similipal is one of the first nine tiger reserves to be declared in 1973, one of the first eight biosphere reserve constituted in India in 1994. In view of its biodiversity and cultural richness it has been included in World Network Biosphere Reserve (WNBR) by UNESCO since May, 2009.In this study,diversity and abundance of medium to large sized mammals and forest disturbances were surveyed in Similipal Tiger Reserve. Protected populations of wild mammals sharing resources and habitat with livestock and human in this tropical forest of Similipal provide an opportunity to evaluate mammal abundances and their interaction with livestock and other anthropogenic factors.Diversity of medium to large sized mammals has assessed in Similipal Tiger Reserve by conducting 6,413 camera trap days of 187 trap stations,between November 2012 and July 2013. Out of 3,763 independent photographs, 24 mammal species

		were recorded from 1721 independent photographs.Eight globally threatened species recorded including the tiger and Asian elephant in our study area.Anthropogenic activities like illegal hunting, livestock grazing and free ranging domestic dog may be the detrimental factors for the mammalian species. These activities should be addressed through conservation and development perception, and will require an interdisciplinary approach cautiously incorporating social and ecological components.
164	Reddy, C. S., Rout, D. K., Pattanaik, C., & Murthy, M. S. R. Mapping of Priority Areas of Conservation Significance in Eastern Ghats: A case study of Similipal Biosphere Reserve using Satellite Remote Sensing.	In the present study, Similipal Biosphere Reserve in Eastern Ghats of Orissa have been taken for mapping of spatial extent of vegetation cover types using satellite remote sensing data. IRS P6 LISS III two season data acquired on 8th January 2004 and 12th April 2004 along with other ancillary data were used. The visual interpretation of satellite images at 1: 50,000 scale resulted into nine vegetation and land cover classes. Of the total forest cover of 2,645 km2, moist deciduous forest covers about 2,368 sq. km, whereas semievergreen forest type is composed of 162.14 sq. km of the total area. The third most abundant forest type was dry deciduous forest (2.84% of area). Importance Value index (IVI) of dominant species of forest types also presented.
165	Pandit, J. K., Dey, D. G., & Satpathy, S. K. (2014). REPRODUCTIVE BEHAVIOUR OF SARIHAN ECORACE OF WILD TASAR SILKMOTH, ANTHEREA MYLITTA DRURY UNDER EX-SITU CONDITION IN SIMILIPAL BIOSPHERE RESERVE, ODISHA, INDIA.	Sarihan ecorace of Antherea mylitta Drury an endemic, predominant and wild ecorace of tropical Tasar silkworm is mainly found in the forests of Saraiahat in Dumka district of Jharkhand. It is a lepidopteran insect mainly feeds on plants like Terminalia arjuna (Arjun) Terminalia tomentosa (Asan) under in situ condition. Reproductively it behaves as trivoltine insect in nature. In the forest of Dumka it is distributed between 100 mASL to 200 mASL altitude. As Saraiahat place in Dumka of Jharkhand and Jadida of Similipal Biosphere in Mayurbhanj of Odisha has the same ecoclimatic condition, so an attempt was taken to study reproductive behaviour (grainage => reproductive efficiency and rearing performance => productive efficiency) of Sarihan ecorace under ex-situ condition in Similipal Biosphere. From reproductive behaviour it has been concluded that Sarihan is less adaptive in Similipal Biosphere but it can be reared here in ex-situ condition as a substitute if any epidemic will broke out in its natural abode of this insect in Saraiahat of Dumka region.
166	Reddy, C. S., & Pattanaik, C. Conservation status of the endemic plant Hypericum gaitii (Hypericaceae) on Similipal Biosphere Reserve of Orissa, India.	Hypericum gaitii, an endemic shrub to Orissa, India, which is located in Similipal Biosphere Reserve of Mayurbhanj district, appears to be restricted to five extant subpopulations with a total population of c. 770 individuals. Major threats to the existence of the species include deforestation, grazing pressure from cattle in nearby villages, largescale fire and utilization of the species by tribal people. The information currently

		available for the species indicates that it should be categorized as Critically Endangered on the IUCN Red List. For conservation of the species it needs to be included on National Red Data Book on threatened flowering plants of India, and its habitat designated as an ecological reserve. Intensive surveys are required in order to establish whether there are any other extant subpopulations exist in other part of Orissa, and the presently known subpopulations require habitat monitoring and continuous protection.
167	Mishra, S. R., Bisht, H. K., & Pati, J. D. Unusual sighting of four horned antelope (Tetraceros quadricornis) at Similipal tiger reserve by camera trap.	During early 1970s the four-horned Antelope occurred in Similipal in open woodlands along the edge of large Valleys to the south. During a reconnaissance survey in Bachurichara valley in May 1972, two FHAs were seen and in May 1973 five dung-heaps were found. From November 1987 to January 2002 information on Chousingha was collected through different sources. These are from direct observations of Chousingha, observations of their dung heaps and second-hand information made available by staff through their diary
168	Pandit, J. K., Satpathy, S. K., & Dey, D. G. (2014). Studies on reproductive behaviour of Raily ecorace of wild tasar silkmoth A. mylitta Drury under ex-situ condition at Similipal Biosphere Reserve, Odisha, India. *Bulletin of Indian Academy of Sericulture*, *18*(1/2), 19-25.	Raily ecorace of *Antherea mylitta* D an endemic, predominant and wild variety of tropical Tasar silkmoth is mainly found in the forests of Bastar District of Chhattisgarh. It is a lepidopteran polyphagus insect feeds on plants like *Shorea robusta* (Sal), *Terminalia tomentosa* (Asan), *Anogeissus latifolia* (Sidha), *Largerstromia parviflora* (Dhaw). However, mainly it favours *Shorea robusta* about 72.23% under *in situ* condition. Reproductively it behaves as bivoltine insect in nature. In Darbha forest of Bastar it is distributed between 450 m ASL to 600 m ASL altitude. As Bastar of Chhattisgarh and Sarat of Similipal Biosphere of Mayurbhanj are belong to same altitude and climatological parameters so an attempt was taken to study reproductive behaviour of Raily under *ex-situ* condition in Similipal Biosphere. From reproductive behaviour (grainage and rearing performance) it has been concluded that Raily is less adaptive in Similipal Biosphere but it can be reared here in *ex-situ* condition as a substitute if any epidemic will broke out in its natural abode of this insect at Bastar.
169	Mandloi, C., Desai, D., Jaiswal, A., Kushwah, N., & Sharma, D. (2017). A Review on Potential and Traditional Use of Dioscorea Species (A Wild Edible Tuber) by the Local People of Similipal Biosphere Reserve, India. *International Journal of Pharmacy & Life Sciences*, *8*(11).	A number of wild crops remain unexplored in this world and among them some have excellent medicinal and nutritional properties. India is a harbour of biodiversity in general and phytodiversity in particular. The plant diversity is distributed from the Western Ghats to Eastern Ghats, along with the North- Eastern region and from the Greater Himalayas to the plain of Ganga. Among these distributed floral regions of the country, the Eastern Ghats are important due to their rich floral diversity. The forests of Odisha form a major part of Eastern Ghats in general and the Similipal Biosphere Reserve (SBR) in particular.

		The SBR is inhabited by many local communities. The food and medicinal habits of these communities are not fully explored even today. They are dependent on the forests of SBR for their food and medicine. Among their collections from forests, root and tuberous plants play a significant role. The local communities of SBR use about 89 types of tuberous plants for various purposes. Dioscorea is one such tuber, having maximum use among the local of SBR. However, less documentation and no specific reports are available on the food and medicinal values of the species available in this part of the World. Dioscorea species, popularly known as Yam worldwide and as Ban Aalu in Odisha, India, is a prime staple medicinal-food substitute for the majority of rural and local people of the state of India. Of the 13 Dioscorea species available in SBR, 10 species are known to be bitter in taste and unpalatable when taken raw. Since less documentation is available on the Dioscorea species of SBR and their traditional uses, the present study was focused on the ethnobotany, nutritional and pharmacological values of these species along its nutraceutical importance.
170	Sagar, V., Kaelin, C. B., Natesh, M., Reddy, P. A., Mohapatra, R. K., Chhattani, H., ... & Ramakrishnan, U. (2021). High frequency of an otherwise rare phenotype in a small and isolated tiger population. *Proceedings of the National Academy of Sciences*, *118*(39), e2025273118.	Most endangered species exist today in small populations, many of which are isolated. Evolution in such populations is largely governed by genetic drift. Empirical evidence for drift affecting striking phenotypes based on substantial genetic data are rare. Approximately 37% of tigers (*Panthera tigris*) in the Similipal Tiger Reserve (in eastern India) are pseudomelanistic, characterized by wide, merged stripes. Camera trap data across the tiger range revealed the presence of pseudomelanistic tigers only in Similipal. We investigated the genetic basis for pseudomelanism and examined the role of drift in driving this phenotype's frequency. Whole-genome data and pedigree-based association analyses from captive tigers revealed that pseudomelanism cosegregates with a conserved and functionally important coding alteration in *Transmembrane Aminopeptidase Q* (*Taqpep*), a gene responsible for similar traits in other felid species. Noninvasive sampling of tigers revealed a high frequency of the Taqpep p.H454Y mutation in Similipal (12 individuals, allele frequency = 0.58) and absence from all other tiger populations (395 individuals). Population genetic analyses confirmed few (minimal number) tigers in Similipal, and its genetic isolation, with poor geneflow. Pairwise FST (0.33) at the mutation site was high but not an outlier. Similipal tigers had low diversity at 81 single nucleotide polymorphisms (mean heterozygosity = 0.28, SD = 0.27). Simulations were consistent with founding events and drift as possible drivers for the observed stark difference of allele frequency. Our results highlight the role of stochastic processes in the evolution of rare phenotypes. We highlight an unusual evolutionary trajectory in a small and isolated population of an endangered species.

171	Swain, D., & Behura, B. K. (2013). Human impact on tropical deciduous forests: a case study of Indian sal (Shorea robusta) forests of Similipal Biosphere Reserve. *Indian Forester*, *139*(11), 988-994.	With the aim of evaluating the impact of fuelwood collection for household and commercial use like sale in the urban centres and use in brick kilns on tropical deciduous forests, Similipal Biosphere Reserve in India was taken as a case study. There was a decrease of 418.07 ha dense forest (canopy cover more than 40 per cent) in compartments P3, P4 and P5 of the Reserve from 1997 to 2006 due to unsustainable removal of fuelwood by the local people. Everyday on an average 214 (s.d.19) bicycle-loads of fuelwood were transported to Baripada city from the above three compartments which was estimated to be 9538.39 m3 wood annually against annual increment of 4797.63 m3 only. The paper stresses on introduction of modern cooking fuels and stoves in and around the forest fringe villages, massive energy tree plantation, and alternative avocation to the people dependant on fuelwood sale.
172	Mishra, S. R., Maloth, M., & Jangyadatta, P. (2018). Density of the Indian Peafowl Pavo cristatus and Red Junglefowl Gallus gallus (Galliformes) in Similipal Tiger Reserve, Odisha, India. *Journal homepage: www. wesca. net*, *13*(2).	We used line transect method to estimate the density of the Indian Peafowl Pavo cristatus and Red Junglefowl Gallus gallus in the Similipal Tiger Reserve, Odisha, India during May and November 2016. Each forest beat was taken as sampling unit. Transect lines of 2km distance laid in the intensive study area. Each transect was covered three times (total 738km) during pre-monsoon (May) and post-monsoon (November) of 2016. Transects were walked early in the morning in the first two hours after the sunrise when usually birds are most active. Totally 75 transect lines were covered in a random sampling method.
173	Misra, R. C., Sahoo, H. K., Mahapatra, A. K., & Reddy, R. N. (2011). Additions to the flora of Similipal Biosphere Reserve, Orissa, India. *Journal of the Bombay Natural History Society (JBNHS)*, *108*(1), 69-76.	
174	Rath, S. K., Patra, J. K., Gouda, S., Dutta, S. K., & Thatoi, H. N. (2014). CHEMICAL PROFILING AND EVALUATION OF BIOACTIVITY OF SOLVENT EXTRACTS OF PTEROSPERMUM ACERIFOLIUM LINN: AN ETHNOMEDICINAL PLANT OF SIMILIPAL BIOSPHERE RESERVE.	Pterospermum acerifolium Linn (Sterculiaceae) commonly known as Muchukunda in Odisha is a deciduous tree widely used in traditional medicine. Flowers of Pterospermum acerifolium is reported to be used for different medicinal purposes like antimicrobial and other health disorders. However, few theories are available on the use of its bark. The present study aims at phytochemical profiling and screening of different solvent extracts for itsantioxidant and antibacterial potential. The study reveals that bark extracts of P. acerifolium are a rich source of bioactive constituents like phenolic compounds (2.36%), alkaloids (2.10%), flavonoids (1.84%) and tannin (2.16%) per dry weight. The antioxidant evaluation of the extracts showed that acetone extract are high in total phenol, total ascorbic and total antioxidant content whereas, the DPPH free radical scavenging, ABTS and the Metal chelating activity

		assay were recorded to be higher in the ethanol extract, followed by acetone in comparison to standard antioxidant BHT. It was also found that the acetone extract have strong antibacterial properties against all the nine human pathogenic strains with MIC and MBC values of 1.25 to 2.5 mg/ml. The results of the present study validate the medicinal potential of the plant which can be further utilized in pharmaceutical industries for drug discovery.
175	Sarojinee, B., Subrat, S., & Bastia, A. K. (2014). Studies on crop performance of tropical tasar silkworm Antheraea mylitta (Drury) in Ziziphus mauritiana Lam.(Ber), an available secondary food plant in Similipal Biosphere Reserve, Odisha for commercial exploitation. *The Bioscan*, *9*(2), 621-623.	The availability of food plants and their nutritional status play a pivotal role for successful tasar culture both in commercial and seed crops. In the present investigation an experimental rearing of Indian tasar silkworm *Antheraea mylitta* Drury was carried out during commercial season in the Kalapathar village of Tasar Rears Co-Operative Society (TRCS), Bhuasuni in the district Mayurbhanj of Odisha state located in the peripheral zone of Similipal Biosphere Reserve. The experiment was undertaken to study the effect of *Ziziphus mauritiana* Lam. (Ber), a secondary food plant on cocoon crop performance. The rearing performance of the silkworm on *Z. mauritiana* in terms of cocoon per DFLS and silk ratio was found comparable to that with *Terminalia tomentosa* (Asan), a primary food plant species of *A. mylitta* Drury. It is seen that the crop production (yield) is about 18 to 21% in terms of ERR and is comparable to that of traditional primary food plant i.e. 24-28%. This study indicates the commercial perspective and feasibility of *Ziziphus mauritiana* as alternate food plant of tasar silkworm rearing in the period of exigency.
176	Prasad, B. L. V., & Vemavarapu, S. (2021, December). Development of Forest Fire Risk Map for Budhabalanga River basin in India using Analytical Hierarchical Process. In *AGU Fall Meeting Abstracts* (Vol. 2021, pp. NH25A-0529).	In recent decades, major growth is observed in wildfire incidents across the globe. These ecological disasters, triggered by natural and/or anthropogenic factors, can have long-lasting effects on the environment, ecosystems, and biodiversity. Advancements in remote sensing technology provided an impetus to forest fires research, enabling precise determination of the geographical locations susceptible to fire and assess fire risk. This study focuses on India, whose total forest cover (71.22 Mha) is about 21.67% of the country's total geographical area. Around 90% of the forest fires in India are attributable to anthropogenic factors. Therefore, the generation of a forest fire risk map (FRM) is essential for devising strategies to mitigate/manage forest fires and avert their disastrous impacts. An attempt is made to develop FRM for the Budhabalanga river basin, which contains the Similipal national park, a part of the UNESCO World Network of Biosphere Reserves

177	Jena, P. K. (2021). Factor productivity and marketed surplus of non-timber forest products in Similipal forest of Odisha. *Journal of Public Affairs*, *21*(1), e2116.	The article examined the factor productivity and the marketed surplus of non-timber forest products (NTFPs) in the Smilipal forest of Mayurbhanj district of Odisha, India by using the econometric models. It is found that more than 90% of households earned their livelihood from NTFPs in the study area, where the women's participation is more than the male in the production/collection of NTFPs. Most of the households are illiterate, working-age people, and have more than 30 years of experience in the production of NTFPs. The production of NTFPs is highly seasonal and households produce or collect NTFPs during the winter season. Households having more family members produce or collect higher quantities of NTFPs than others. The marked surplus of NTFPs depends on the production or collection of NTFPs as well as the retention amount and wastes. The higher factor productivity indicates the NTFPs are the best source of livelihood in this area.
178	Biswal, A. (2013). Ecological significance of core, buffer and transition boundaries in biosphere reserve: A remote sensing study in Similipal, Odisha, India. *Computational Ecology and Software*, *3*(4), 126.	Protected areas and national parks need periodic assessment and monitoring for evaluating natural resources, effectiveness of management and studying the effects of global climate change. The present work has been undertaken to prepare the multi-date vegetation density maps in terms of Normalised vegetation index (NDVI) and to monitor the changes in and around the areas close to transition, buffer and core boundaries of Similipal Biosphere Reserve (SBR) using digital remote sensing and GIS techniques. Time series Landsat images covering a period of 30 years are used for change detection studies.
179	Biswal, A., Jeyaram, A., Mukherjee, S., & Kumar, U. (2013). Analysis of temporal and spatial changes in the vegetation density of Similipal Biosphere Reserve in Odisha (India) using multitemporal satellite imagery. *International Journal of Ecology*, *2013*.	National parks and protected areas require periodic monitoring because of changing land cover types and variability of landscape contexts within and adjacent to their boundaries. In this study, remote sensing and GIS techniques were used to analyse the changes in the vegetation density particularly in the zones of higher anthropogenic pressure in the Similipal Biosphere Reserve (SBR) of Odisha (India), using Landsat imagery from 1975 to 2005. A technique for the detection of postclassification changes was followed and the change in vegetation density as expressed by normalized difference vegetation index was computed. Results indicate that high dense forest in the core zone has been conserved and the highest reforestation has also occurred in this zone of SBR. The results also reveal that anthropological interventions are more in the less dense forest areas and along the roads, whereas high dense forest areas have remained undisturbed and rejuvenated. This study provides baseline data demonstrating alteration in land cover over the past three decades and also serves as a foundation for monitoring future changes in the national parks and protected areas.

180	Mohanta, K., & Nandi, D. (2017). Monitoring vegetation and land surface temperature dynamics in similipal biosphere reserve, Odisha. *International Journal of Geosciences*, *8*(11), 1344-1360.	The Moderate Resolution Imaging Spectroradiometer (MODIS) has provided an improved capability for moderate resolution land surface monitoring and for studying surface temperature variations. Surface temperature is a key variable in the surface energy balance. The knowledge of surface temperature is important to a range of issues and themes in earth sciences central to urban climatology, global environmental change, and human-environment interactions. In the study, an attempt has been made to estimate surface temperature over Simlipal Biosphere Reserve. The particular significance of this study is due to the large scale effect of Similipal in the local microclimate of this region. From the study, we found that the north-western part of SBR, there is a greening up tend particularly in the dense forest where NDVI value is supposed to be higher than 0.4. in some part, near to transition and buffer boundary, the open forest (<0.2 NDVI) is increasing over the period. LST mean and LST max curves have more or less same value throughout the year except for the duration DOY161 to DOY257. Except the few occasional deeps which may be data error, the maximum NDVI curves are more or less similar in all the observed periods. The temporal trend of minimal NDVI does not follow any definite pattern and very much irregular in its annual course compared to maximal and mean NDVI. There exists a negative correlation between NDVI and LST with correlation coefficient is below 0.4 in all the observed years.
181	Srivastava, S. S., & Singh, L. A. K. (1997). Monitoring of precipitation and temperature in Similipal Tiger Reserve. *Similipal: A natural habitat of unique biodiversity. Orissa Environmental Society, Bhubaneswar*.	Meteorological information constitute one of the basic data about a habitat, which therefore, is a regular feature that appears in Management Plans for forest and wildlife management. The information include data on regimes of minimum and maximum temperatures, the rainfall and the relative humidit

ANNEXURE XXV

LIST OF RIVERS & STREAMS

Kalo	Budhabalanga
Sonai	Khadkei
Bhabagrahi nallah	Bhandan
Thakthaki	Khairi
East Deo	West Deo
Sanjo	Telnadi
Gadsa	Simanadi
Chekamara nallah	Gobarjhara
Kendujharan nallah	Kantiali
Palpala	Salandi

ANNEXURE XXVI

LIST OF WATER HARVESTING STRUCTURES

CORE AREA

SL.No.	Name of the Division	Name of Range	Name of Beat	Name of Site	Type of Structure	Remarks
1	Similipal South WL	Pithabata South WL	Bhajam	Bhajam	Masonry Anicut	
2		National Park WL	Kabatghai-II	Near Watch tower	Earthen	
3			Nuagaon	Near Nuagaon beat	Earthen	
4			Mhabirsal-II	Near Mahabirsal-ii beat	Earthen	
5		Nawana South WL	Gadsimilipal	Chherabil	Masonry	
6			Bakua	Athardeuli	Earthrn dam	
7		UBK WL	Matughara	Matughara Meadow		
8			Dhudram	Dhudram		
9			Meghasini	Meghasini	Earthen Tank	
10			Debasthali	Debasthali	Masonry Tank	
11			Balidal	Balidar	Masonry	
12			UBK	UBK		
13		Jenabil WL	Hatighara-II	Dalkikocha		
14			Jamuna	1 No Dam		
15			Jamuna	2 No Dam		
16			Kulipal	Kulipal		
17		Bhanjabasa WL	Balidar	Balidar Forest	WSH	

18	Similipal North WL	Nawanan North WL	Joranda	Joranda watch tower in ring road	Masonry Anicut	In good condition
19			Nigirdha	Panasia	Earthen Dam	Need maintenance
20			Kusumbani	Kusumbani	Earthen Dam	In good condition
21			Nigirdha core	Nigirdha	Masonry Anicut	In good condition
22			Khadkei	Khadkei	Masonry Anicut	In good condition
23		Chahala WL	kairakacha	Kairakacha	Dam	Need renovation
24			Chahala	Solabhadi	Pond	Need maintenance
25			Jodadiha	Jodadiha	Check dam	New construction
26			Chahala	Brundban	Check dam	New construction
27			Alhapani	Pondabandha	Check dam	Need renovation
28			Mathurakharei	Mathurakharei	Pond	Need renovation
29			Karkachia	Karkachia	Check Dam dam	Damaged

BUFFER AREA

SL.No.	Name of the Division	Name of Range	Name of Beat/Location	Forest Block	GPS Reading					
					Latitude			Longitude		
1	Similipal South WL	Pithabata South WL	Chandanchaturi	Similipal RF	21	50	52.14	86	36	44.1
2		Pithabata North WL	Chakidi-I	Similipal RF	22	0	8.4	86	24	35.4
3			Chakidi-I	Similipal RF	22	0	6.3	86	24	37
4			Badgaon	Similipal RF	22	0	27.8	86	29	50.2
5			Badgaon	Similipal RF	22	0	8.1	86	30	12.1
6	Similipal North WL	Gurguria WL	Beat- Bilapagha, At Khairakocha Nala	Similipal RF	21	53	49	86	15	26
7			Khejuri	Similipal RF	21	48	27	86	17	20.9
8			Khejuri	Similipal RF	21	48	47.7	86	18	22.5
9			Barigaon	Similipal RF	21	49	27.4	86	14	58.4
10			Barigaon	Similipal RF	21	49	13.6	86	15	9.4
11		Talabandha North WL	Talabandha II	Similipal RF	22	1	33	86	22	59
12			Kusumtota II	Similipal RF	22	2	43	86	21	19
13		Braehipani WL	Phulbaria-I	Similipal RF	21	52	56	86	18	37

ANNEXURE XXVII

LIST OF GRASSLANDS AND MEADOWS

SL No	Name of Division	Name of Range	Name of Beat	Location	Area in Ha.	Area in Km^2	Species of Grass	Habitat of Wild Animal
1	Similipal South WL	Bhanja-basa WL	Bhanjabasa	Rajabhadi	0.346	0.003	Dhanantri (Cymbopogan fexu-osus), Chiru,(Dentella repens).	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
2	Similipal South WL	Bhanja-basa WL	Bhanjabasa	Dharuani	4.559	0.046	Dhanantri(Cymbopogan fexuo-sus), Chiru,(Dentella repens).	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
3	Similipal South WL	Bhanja-basa WL	Bhanjabasa	New Rajabhadi	5.284	0.053	Dhanantri(Cymbopogan fexuo-sus), Chiru,(Dentella repens).	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
4	Similipal South WL	Bhanja-basa WL	Balidhar	Ureinacha	1.301	0.013	Dhanantri(Cymbopogan fexuo-sus), Chiru,(Dentella repens).	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
5	Similipal South WL	Bhanja-basa WL	Balidhar	Similigadi	4.953	0.05	Dhanantri(Cymbopogan fexuo-sus), Chiru,(Dentella repens).	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
6	Similipal South WL	Bhanja-basa WL	Balidhar	Balidhar	2.59	0.026	Dhanantri(Cymbopogan fexuo-sus), Chiru,(Dentella repens).	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
7	Similipal South WL	Jenabil WL	Hatisal-I	Sonpokhari	4.283	0.043	Dhanantri(Cymbopogan fexuo-sus), Chiru,(Dentella repens).	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
8	Similipal South WL	Jenabil WL	Hatisal-II	Baunshadiha Meadow	3.457	0.035	Dhanantri(Cymbopogan fexuo-sus), Chiru,(Dentella repens).	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
9	Similipal South WL	Jenabil WL	Hatisal-II	Sambargoda Meadow	6.594	0.066	Mutha(Cyperus rotundus)	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
10	Similipal South WL	Jenabil WL	Hatisal II	Hatighar	1.06	0.011	Mutha(Cyperus rotundus)	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
12	Similipal South WL	Jenabil WL	Hatisal II	Dalki Meadow	2.201	0.022	Mutha(Cyperus rotundus)	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
11	Similipal South WL	Jenabil WL	Jamunagarh	Jenabil	125.657	1.257	Elephant grass (Pennisetum purpurium),Duba (cynodon dactylon,chiru	Gaurs, Elephants, Barking deer, wild pigs,rabbits.

13	Similipal South WL	Jenabil WL	Jamunagarh	Jumanaghar upper	3.134	0.031	Elephant grass (Pennisetum purpurium), Mutha, chiru	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
14	Similipal South WL	Jenabil WL	Jenabil	Senichaturi	19.644	0.196	Elephant grass (Pennisetum purpurium), Mutha, chiru	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
15	Similipal South WL	Jenabil WL	Hatighar-II	Kultapur Right	3.687	0.037	Elephant grass (Pennisetum purpurium), Mutha, chiru	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
16	Similipal South WL	Jenabil WL	Hatighar-II	Kultapur Left	2.228	0.022	Elephant grass (Pennisetum purpurium), Mutha, chiru	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
17	Similipal South WL	Jenabil WL	Gurandia-I	Gurandia	10.404	0.104	Elephant grass (Pennisetum purpurium),Duba (cynodon dactylon,chiru	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
19	Similipal South WL	Jenabil WL	Sarua	Gaurakantha	35.876	0.359		
20	Similipal South WL	Jenabil WL	Tiktali	Tiktali Meadow	7.292	0.073	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).,Mutha(Cyperus rotundus),	Gaurs, Elephants, Barking deer, wild pigs,rabbits.
22	Similipal South WL	National Park WL	Kabatghai II	Kabatghai	57.969	0.58	Dhanantri, Kasatandi(Saccharum spotaneum), Chiru	Sambar,Barking deer,spotted deer,Elephant, mouse deer, rabbit
23	Similipal South WL	National Park WL	Ganapati	Chandraposai	5.616	0.056	Do	Do
24	Similipal South WL	National Park WL	Ganapati	Rushibasa	2.302	0.023	Do	Do
25	Similipal South WL	National Park WL	Mahavirsal	Merelgoda Meadow	5.06	0.051	Do	Do
26	Similipal South WL	National Park WL	Nuagaon	Nuagaon	16.55	0.165	Do	Do

21	Similipal South WL	National Park WL	Nuagaon	Jumanaghar	41	0.41	Do	Do
27	Similipal South WL	National Park WL	Ranasa	Patulisila	5.165	0.052	Do	Do
28	Similipal South WL	National Park WL	Bakua I	Pitalusila	5.155	0.052	Mutha,Chiru	Spotted deer,Barking deer
30	Similipal South WL	Nawana South WL	Bakua II	Chheribil Meadow	3.333	0.033	Mutha,Chiru	Spotted deer,Barking deer
29	Similipal South WL	Nawana South WL	Chatadanda	Bhadragoda	8.493	0.085	Mutha,Chiru	Spotted deer,Barking deer
31	Similipal South WL	Nawana South WL	Dhudruchampa	Rajabasa	4.846	0.048	Mutha,Chiru	Spotted deer,Barking deer
32	Similipal South WL	Nawana South WL	Jodapal I	Ashoknala meadow	30	0.3	Mutha,Chiru	Spotted deer,Barking deer
18	Similipal South WL	Nawana South WL	Jodapal I	Jodapal Meadow 1	5.181	0.052	Mutha,Chiru	Spotted deer,Barking deer
33	Similipal South WL	Nawana South WL	Jodapal I	Jodapal Meadow 2	13.5	0.135	Mutha,Chiru	Spotted deer,Barking deer
34	Similipal South WL	Nawana South WL	Jodapal-I	Khadiabasa	5.084	0.051	Mutha,Chiru	Spotted deer,Barking deer
35	Similipal South WL	Nawana South WL	Badmakabadi II	Lengdakacha	5.45	0.054	Mutha,Chiru	Spotted deer,Barking deer
36	Similipal South WL	Pithabata South WL	Badamakabadi I	Badmakabadi	12.588	0.126	Chiru(Dentella repens)	Elephants,Sambar, Wild-pigs.
37	Similipal South WL	Pithabata South WL	Namtidhar II	Sambarchara	1.245	0.012	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
74	Similipal South WL	UBK WL	Bahaghar	Eucalyptus Plantation 2	3.131	0.031	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.

75	Similipal South WL	UBK WL	Bahaghar	Eucalyptus Plantation 1	5.072	0.051	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
76	Similipal South WL	UBK WL	Bahaghar	Bathudibasa 2	0.381	0.004	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
77	Similipal South WL	UBK WL	Bahaghar	Niamadara B	7.508	0.075	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
71	Similipal South WL	UBK WL	Bahaghar	Khainchia	20.381	0.204	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
117	Similipal South WL	UBK WL	Bengapani	Bathudibasa 1	6.705	0.067	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
119	Similipal South WL	UBK WL	Bengapani	Bengapani	4.001	0.04	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
38	Similipal South WL	UBK WL	Debasthali I	Murumkhadan	3.748	0.037	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
39	Similipal South WL	UBK WL	Debasthali I	Devasthali Daldali Meadow	11.268	0.113	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
43	Similipal South WL	UBK WL	Devasthali I	Bachurichara Bhitoro Podia small	2.336	0.023	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
44	Similipal South WL	UBK WL	Devasthali I	Bachurichara Bhitoro Podia Big	3.9	0.039	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
45	Similipal South WL	UBK WL	Devasthali I	Mancha banka Small	0.583	0.006	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
46	Similipal South WL	UBK WL	Devasthali I	Mancha banka Big	1.496	0.015	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
47	Similipal South WL	UBK WL	Devasthali I	Devasthali Saltlick Meadow	21.357	0.214	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.

48	Similipal South WL	UBK WL	Devasthali I	Sarudala Nala Meadow	12.108	0.121	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
49	Similipal South WL	UBK WL	Devasthali I	Sarudala Daldali Upper Meadow	4.081	0.041	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
41	Similipal South WL	UBK WL	Devasthali I	Check Dam Nala Meadow	12.432	0.124	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
55	Similipal South WL	UBK WL	Devasthali I	Patching Nala Meadow	10.854	0.109	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
62	Similipal South WL	UBK WL	Devasthali I	Bachurichara jungle Meadow	2.789	0.028	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
51	Similipal South WL	UBK WL	Devasthali I	Old Trench Meadow	19.376	0.194	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
50	Similipal South WL	UBK WL	Devasthali II	Devasthali Nala 1	10.344	0.103	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
56	Similipal South WL	UBK WL	Devasthali II	Devasthali Nala 2	10.944	0.109	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
57	Similipal South WL	UBK WL	Devasthali II	Golkund Bhitar	3.825	0.038	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
58	Similipal South WL	UBK WL	Devasthali II	Golkund middle	7.078	0.071	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
59	Similipal South WL	UBK WL	Devasthali II	Golkund Daldali East 1	12.153	0.122	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
60	Similipal South WL	UBK WL	Devasthali II	Golkund Upper Meadow	5.883	0.059	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
63	Similipal South WL	UBK WL	Devasthali II	Bamandiha Small	0.944	0.009	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
64	Similipal South WL	UBK WL	Devasthali II	Bamandiha Big	2.457	0.025	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.

61	Similipal South WL	UBK WL	Devasthali III	Sasang goda 2	3.576	0.036	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
42	Similipal South WL	UBK WL	Devasthali III	Golkund Daldali West	10.654	0.107	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
40	Similipal South WL	UBK WL	Devasthali III	Tringle Meadow	1.183	0.012	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
52	Similipal South WL	UBK WL	Devasthali III	Sasang Goda 1	6.538	0.065	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
53	Similipal South WL	UBK WL	Devasthali III	Salmundi Right	4.03	0.04	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
54	Similipal South WL	UBK WL	Devasthali III	Golkund Daldali East 2	14.68	0.147	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
65	Similipal South WL	UBK WL	Silda	Chatursila 1	2.253	0.023	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
66	Similipal South WL	UBK WL	Silda	Chatursila 2	1.042	0.01	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
72	Similipal South WL	UBK WL	Silda	Ginahaja	1.525	0.015	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
79	Similipal South WL	UBK WL	Silda	Wooden Bridge 2	1.543	0.015	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
67	Similipal South WL	UBK WL	Kandadhenu	Mankada darah	1.235	0.012	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
68	Similipal South WL	UBK WL	Kandadhenu	Gayalkacha Left	4.661	0.047	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
69	Similipal South WL	UBK WL	Kandadhenu	Bachurichora	18.504	0.185	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
70	Similipal South WL	UBK WL	Kandadhenu	Ankurbasa	9.55	0.095	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.

73	Similipal South WL	UBK WL	Kandadhenu	Gayalkacha Right	5.513	0.055	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
78	Similipal South WL	UBK WL	Kandadhenu	Wooden Bridge 1	10.591	0.106	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
80	Similipal South WL	UBK WL	Kandadhenu	Baladaghar 1	1.961	0.02	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
81	Similipal South WL	UBK WL	Kandadhenu	Baladaghara 2	6.95	0.07	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
82	Similipal South WL	UBK WL	Kandadhenu	Baladaghara 3	5.093	0.051	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
83	Similipal South WL	UBK WL	Kandadhenu	Baladaghara 4	2.018	0.02	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
84	Similipal South WL	UBK WL	Meghasini	Phulbadi	11.767	0.118	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
85	Similipal South WL	UBK WL	Meghasini	Mandadarah	0.408	0.004	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
86	Similipal South WL	UBK WL	Matughar	Sambardhara 1	1.392	0.014	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
87	Similipal South WL	UBK WL	Matughar	KankaJadi	8.232	0.082	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
88	Similipal South WL	UBK WL	Matughar	Sambardhara 2	0.528	0.005	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
89	Similipal South WL	UBK WL	Matughar	Matughar	16.065	0.161	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
95	Similipal South WL	UBK WL	Patbil	Niamadara A	2.537	0.025	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
96	Similipal South WL	UBK WL	Patbil	Tinadiha	9.857	0.099	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.

97	Similipal South WL	UBK WL	Patbil	U Banka Eucalyptus Plantation	3.862	0.039	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
98	Similipal South WL	UBK WL	Patbil	U Banka Left	4.64	0.046	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
99	Similipal South WL	UBK WL	Patbil	U Banka Right	3.426	0.034	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
100	Similipal South WL	UBK WL	Patbil	Banka Darha Left	3.671	0.037	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
101	Similipal South WL	UBK WL	Patbil	Banka Darha Right	0.873	0.009	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
102	Similipal South WL	UBK WL	Patbil	Patbil	4.287	0.043	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
103	Similipal South WL	UBK WL	Patbil	Chakasil	11.989	0.12	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
105	Similipal South WL	UBK WL	Patbil	Pine plantation	1.094	0.011	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
106	Similipal South WL	UBK WL	Patbil	Niamadarasana	0.674	0.007	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
118	Similipal South WL	UBK WL	Patbil	Bachurichora	4.567	0.046	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
90	Similipal South WL	UBK WL	Tinadiha	Gudikhadan Right	1.252	0.013	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
91	Similipal South WL	UBK WL	Tinadiha	Gudikhadan Left	0.72	0.007	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
92	Similipal South WL	UBK WL	Tinadiha	Sapoghara-II A	1.712	0.017	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
93	Similipal South WL	UBK WL	Tinadiha	Sapoghara-II B	0.997	0.01	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.

94	Similipal South WL	UBK WL	Tinadiha	Bengapani Chhak	2.298	0.023	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
104	Similipal South WL	UBK WL	Tinadiha	Bathudiha	0.569	0.006	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
107	Similipal South WL	UBK WL	Tinadiha	Dudram Left	1.313	0.013	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
108	Similipal South WL	UBK WL	Tinadiha	Dudram Front	3.37	0.034	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
109	Similipal South WL	UBK WL	Tinadiha	Dudram Right	2.375	0.024	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
110	Similipal South WL	UBK WL	Tinadiha	Uthani Right	0.254	0.003	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
111	Similipal South WL	UBK WL	Tinadiha	Uthani Left	0.906	0.009	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
112	Similipal South WL	UBK WL	Tinadiha	Dhudram WHS	1.845	0.018	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
113	Similipal South WL	UBK WL	Tinadiha	Sapoghara-I	0.805	0.008	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
114	Similipal South WL	UBK WL	Tinadiha	Tangaramala	4.723	0.047	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
115	Similipal South WL	UBK WL	Tinadiha	Mgddlle Pokor	0.861	0.009	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
116	Similipal South WL	UBK WL	Tinadiha	Pokhori Danda	6.043	0.06	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
120	Similipal South WL	UBK WL	Taranibila	Bandhamuha	2.963	0.03	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
121	Similipal South WL	UBK WL	Taranibila	Chandansil-II	0.336	0.003	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.

122	Similipal South WL	UBK WL	Taranibila	Daktarbasa	2.628	0.026	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
123	Similipal South WL	UBK WL	Taranibila	Chandansil-I	2.207	0.022	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
124	Similipal South WL	UBK WL	Taranibila	Tarinibila danda	1.341	0.013	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
125	Similipal South WL	UBK WL	Taranibila	Tarinibila	2.738	0.027	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
126	Similipal South WL	UBK WL	Taranibila	Hatimara	4.006	0.04	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
127	Similipal South WL	UBK WL	Taranibila	Kiabasa	1.397	0.014	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
128	Similipal South WL	UBK WL	Taranibila	Dehurimara	0.944	0.009	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
129	Similipal South WL	UBK WL	Taranibila	Luhabita	0.145	0.001	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
130	Similipal South WL	UBK WL	Taranibila	Chandansil Danda	7.001	0.07	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
131	Similipal South WL	UBK WL	Taranibila	Baunsdiha	1.719	0.017	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
132	Similipal South WL	UBK WL	Taranibila	Baghamara	2.942	0.029	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
133	Similipal South WL	UBK WL	Taranibila	Baunsdiha danda	12.237	0.122	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
134	Similipal South WL	UBK WL	UBK	Baragodia-II	3.548	0.035	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
135	Similipal South WL	UBK WL	UBK	Baragodia-I	0.315	0.003	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.

136	Similipal South WL	UBK WL	UBK	UBK	21.928	0.219	Dhanantri(Cymbopogan fexuosus), Chiru,(Dentella repens).	Elephants,Sambar, Wild-pigs.
Total Meadow area	981.629	9.816						
137	Similipal North WL	Chahala WL	Chahala	Solabadi	5.797	0.058	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
138	Similipal North WL	Chahala WL	Chahala	Chahala	8.135	0.081	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
139	Similipal North WL	Chahala WL	Chahala	Brundaban Right side	13.703	0.137	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
140	Similipal North WL	Chahala WL	Chahala	Brundaban Left side	12.29	0.123	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
141	Similipal North WL	Chahala WL	Chahala	Brundaban-Chahala Left side	1.723	0.017	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant

142	Similipal North WL	Chahala WL	Chahala	Brundaban-Chahala Right side	3.116	0.031	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
143	Similipal North WL	Chahala WL	Chahala	Patapulia	1.921	0.019	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
144	Similipal North WL	Chahala WL	Chahala	Haldia No Entry	3.017	0.03	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
145	Similipal North WL	Chahala WL	Chahala	Rajabhadi Right Side	9.279	0.093	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
146	Similipal North WL	Chahala WL	Chahala	Rajabhadi Left Side	4.192	0.042	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
147	Similipal North WL	Chahala WL	Rajpal	Brundaban Front	0.619	0.006	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
148	Similipal North WL	Chahala WL	Karkachia	Karkachia meadow	8.356	0.084	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant

149	Similipal North WL	Chahala WL	Allapani	Pandabandha Meadow	3.377	0.034	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
150	Similipal North WL	Chahala WL	Jodadiha	Tiger Footpath	14.808	0.148	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
151	Similipal North WL	Kendumundi WL	Kiajhari	Kiajhari Meadow	35.632	0.356	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
152	Similipal North WL	Nawana North WL	Kusumbani	Budhiabasa Meadow	8.117	0.081	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
153	Similipal North WL	Nawana North WL	Kusumbani	Budhiabasa Meadow-2	45.041	0.45	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
154	Similipal North WL	Nawana North WL	Kusumbani	Budhiabasa Meadow-1	22.793	0.228	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
155	Similipal North WL	Nawana North WL	Joranda	Joranda Meadow	6.294	0.063	Elephant grass (Pennisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant

156	Similipal North WL	Nawana North WL	Khadkei	Pandabandha Meadow	2.247	0.022	Elephant grass (Penisetum Purpureum), (Paspalum scrobiculatum), Arthraxon lanceolatus Mutha (Cyperus rotundus)	Barking Deer, Spotted Deer, Sambar, Elephant
Total Meadow area	210.457	2.103						
G.Total Meadow area	1192.086	11.919						

ANNEXURE XXVIII

LIST OF SWAMPS (DALDALI) IN CORE AREA

Division	Range	Beat	Compartment	Name of the Daldali	Latitude			Longitude		
					Deg.	Min.	Sec.	Deg.	Min.	Sec.
Similipal South WL	Pithabata South WL	Namti-I	P2	Asan Daldali	21	58	37.8	86	31	9.9
		Namti-I	P2	Palasidaldali	21	55	52.2	86	31	0.3
		Kachudahan	P11	Kalikendu Daldali	21	53	0.9	86	30	22.4
		Kachudahan	P11	Pindra Daldali	21	53	8.5	86	30	46.6
		Andharitota-I	P15	Jojochati daldali	21	51	29.1	86	31	20.7
		Andharitota-II	P16	Haladimati Daldali	21	50	38	86	30	4.5
		Badmakabadi	P19	Meadow Daldali	21	49	28.9	86	29	17.3
		Badmakabadi	P19	Asan Daldali	21	49	15.1	86	29	64.8
		Badmakabadi	P19	Champa Daldali	21	49	10.2	86	29	48.8
		Badmakabadi	P19	Jasu Daldali	21	49	20	86	29	52.11
		Badmakabadi	P19	Sardam Daldali	21	59	20.8	86	29	6.5
		Badmakabadi	P19	Othhei Daldali	21	49	30.8	86	31	7.7
		Badmakabadi	P19	Tobho Daldali	21	49	49.1	86	29	29.1
		Badmakabadi	P19	Salabana Daldali	21	49	46.2	86	29	29.3
Similipal South WL	Dukura (WL)	Chandanchaturi-II	SJ-4	-	21	51	23.2	86	33	9.9
		Sapanchua	SJ-5	-	21	48	57.8	86	33	19.8
		Bahalda	SJ-6	-	21	46	58.5	86	30	38.6
		Dengam	SJ-16 (P1), SJ-18	-	21	46	23	86	27	26
		Nuagaon-I	SJ-9(P2), SJ-10	Ranibhol	21	46	17	86	27	59
		Nuagaon-II	SJ-11 & 12	Sarjam	21	45	27	86	29	1
		Taldiha	ED-12 & 13	-	21	39	21	86	26	52
		Manikpur	ED-14	Tunangdah	21	39	19	86	28	23

		Phulbadia	ED-7(P2), ED-8	Phul-Dalki Kachha	21	40	44	86	26	22
Similipal South WL	National Park WL	Nuagaon	KH-24	Mohantahana Daldali	21	44	9.4	86	19	44.4
		Mahabiursal-II	WD-18	Nimia Daldali	21	46	8.5	86	13	9.5
		Ranasa	KH-22	Ganapati Daldali	21	44	51.4	86	15	48.3
		Badmakabadi-II	PP-18	Dalkikacha	21	49	18.0	86	28	1.5
		Badmakabadi-II	PP-18	Jamudaldali	21	49	35.1	86	27	28.1
		Badmakabadi-II	PP-17	Sikaribasa	21	49	25.9	86	27	35.8
		Badmakabadi-II	PP-17	Daudaldali	21	49	10.3	86	27	7.4
		Jodapal-I	BLE-24	Sarudaldali	21	47	20.2	86	25	8.2
		Jodapal-II	BLE-24	Sarudaldali	21	47	20.2	86	25	8.2
		Dhudruchampa	BLE-23	Kandhia	21	49	21.1	86	25	6.5
		Dhudruchampa	BLE-23	Pajapata	21	49	17.4	86	25	12.1
		Dhudruchampa	BLE-23	Galei Darah	21	49	13.6	86	25	14.2
		Dhudruchampa	BLE-23	Rajabasa	21	48	43.9	86	25	29.2
		Chhatadanda	BLW-19	Sikaribasa	21	46	36.6	86	22	37.9
Similipal South WL	UBK WL	Tarinibila	WD-29	Bandhamuha Daldali	21	41	0.2	86	20	57.3
		Tarinibila	WD-29	Tarinibila Daldali	21	40	19.8	86	20	56.9
		Tarinibila	WD-29	Baghamara Daldali	21	39	56.3	86	21	13.5
		Tarinibila	WD-29	Daktorbasa Daldali	21	40	31.1	86	20	48.2
		Patbil	WD-24	U Banko Daldali	21	40	46.4	86	14	52.6
		Patbil	WD-24	Chakasil Daldali	21	40	44.1	86	15	36.9
		Patbil	WD-24	Bachhurichora Daldali	21	41	38.7	86	15	23.5
		Devasthali-3	WD-22	Sarudala Daldali	21	42	58.9	86	16	1.9

		Bahaghara	WD-26	Dola Daldali	21	38	47.9	86	15	13.7
		Kandadhenu	WD-20	Ankurbasa Daldali	21	41	54.7	86	13	16.2
		Silda	WD-23	Batabasa Daldali	21	41	32.6	86	13	2.3
		Gamuchha-jharan	TL-4 P2	Burusahi Footpath Daldali	21	40	37.5	86	18	15.4
		Gamuchha-jharan	WD-19	Badma Daldali	21	42	26.4	86	10	5.4
Similipal South WL	Jenabil WL	Hatisal-I	ED-2	Dalkikacha	21	42	37.4	86	25	28.6
		Hatisal-I	ED-1	Pokharibadi	21	42	22.0	86	23	37.0
		Tiktali	ED-10	Dalki Banka	21	39	46.7	86	23	23.1
		Tiktali	ED-10	Nageswar Daldali	21	39	33.9	86	22	52.3
		Tiktali	ED-10	Barha Dal-dali	21	38	50.9	86	22	18.4
		Sonpokhari-II	SJ-15	Sizughara Daldali	21	44	46.2	86	24	54.3
		Kulipal	SJ-17	Simili Dal-dali	21	43	51.6	86	26	25.8
		Sonpokhari-I	SJ-13	Hatimara Daldali	21	45	58.0	86	24	31.0
		Gurandia-I	KH-21 (P1)	Baichua Daldali	21	46	44.9	86	21	16.2
		Gurandia-III	KH-23 (P1)	Sarkula Dal-dali	21	45	51.0	86	20	13.9
		Hatighara-II	KH-25	Dalkikocha Daldali	21	42	50.7	86	20	11.4
		Jenabil	KH-25	Jenabil Daldali	21	44	04.2	86	21	22.0
		Jamuna	KH-27	W.T. Daldali	21	43	50.6	86	21	37.8
		Jamuna	KH-27	Near 1 No Dam	21	43	59.7	86	21	51.9
Similipal South WL	Bhanjabasa WL	Bhanjabasa	TK - 7	Dharuani Daldali	21	35	31	86	22	42
		Balidar	Sl -11	Champach-ua Daldali	21	35	2.3	86	20	48.8
Similipal North WL	Gurguria WL Range	Barigaon	KH 15 (p1)	Sunpokhuri						
		Barigaon	KH 15 (p1)	Badpokhuri						
		Barigaon	KH 15 (p1)	Ambamulia						

	Nawana WL Range	Pandabandha	BLE-18	Pandaband-ha	22	0	31.9	86	17	31.1
		Bhandadhar	P.P-6	Gayalmara	21	55	21.6	86	27	52.3
		Nigirdha Core	BLE 19 (P-2)	Kelamela	21	54	14	86	26	2
	Chahala WL Range	Chahala	KD-10	Ring road daldali						
		Pondabandha	KD 7 (P-1)	Priti jagdha						
		Chahala	KD-11	Rajabhadi daldali	21	58	23	86	17	17
		Bhatunia	BLW-13	Chirudalki						
		Rajpal	BH 4 (P-1)	Machine-nalla daldali						

ANNEXURE XXIX

LIST OF SALT LICKS IN CORE AREA

Name of Range	Compt. No.	Name of the Place	Type of Salt lick	Latitude			Longitude	
				Deg	Min	Sec	Deg	Min
National Park WL	KH-24	Nuagaon	Artificial	21	42	52.2	86	18
	KH-24	Janamburu Forest	Natural	21	44	24.3	86	18
	KH-22	Murumghati forest	Natural	21	45	3.1	86	16
Nawana South WL	SJ-9(P-1)	Marang pakhori Janogoda-I	Natural	21	48	10.7	86	27
	PP-17	Janogoda-II	Natural	21	48	55.9	86	27
	PP-17	Janogoda-II	Natural	21	48	54.6	86	27
	BLE-24	Balidhara	Natural	21	45	59.0	86	26
	BLW-19	Sarang Susung	Natural	21	46	44.2	86	22
Podadi-ha WL	TK-5	Baunsa Ghati	Natural	21	35	12	86	24
	TK-9	Kantiali	Natural	21	34	21	86	25
	TK-11	Tulukabhadi bhula	Natural	21	32	36	86	23
UBK WL	WD27	RO UBK	Artificial	21	39	46	86	17
	WD21	Devasthali	Artificial	21	42	15.6	86	16
	WD-30	Baghamara	Natural	21	39	58.2	86	20
	WD-26	U Banko	Natural	21	41	49.6	86	15
	WD-24	Mayurnocha	Natural	21	41	14.7	86	15
	WD-24	Bamandiha	Natural	21	41	22.1	86	16
	WD-26	Mayurnocha	Natural	21	39	12.5	86	15
	WD-26	Makada Danda	Natural	21	38	44.2	86	15
	WD-26	Raibhol	Natural	21	38	30.3	86	14
	TL-7	Patta Pacheri	Natural	21	39	27.5	86	12
	TL-7	Tagamora	Natural	21	39	15.1	86	13
	TL-7	Anladhipa	Natural	21	38	53.3	86	13
	WD-20	Nimia	Natural	21	42	30.2	86	12
	WD-17 P1	Mayurnocha	Natural	21	42	37.4	86	12
	WD-20	Meralgoda	Natural	21	42	33.3	86	12
	WD-23	Mayurnocha	Natural	21	39	53.6	86	11
	WD-23	Makaramundi	Natural	21	40	51.7	86	12
	WD-19	Badama	Natural	21	42	28.4	86	9
	TL-4 P2	Near Gamuchhajharan	Natural	21	41	13.7	86	10

Jenabil WL	SJ-16 (P2)	Salapadia	Natural	21	45	23.1	86	26
	SJ-16 (P2)	Jodidanda	Natural	21	45	39.4	86	26
	SJ-15	Saladanda	Natural	21	44	10.9	86	24
	KH-26	Jenabil	Artificial	21	44	05.6	86	21
	KH-27	Jenabil WT	Artificial	21	43	53.5	86	21
Bhanja-basa WL	TK4	Sapaghara Forest	Natural	21	36	37.9	86	23
	TK4	Bankasala	Natural	21	36	41.2	86	23
	TK7	Rajabhadi	Natural	21	35	50.2	86	22
Pithaba-ta South WL	P 11	Kalikendu	Natural	21	54	23	86	29
	P 15	Jamjhari	Natural	21	52	53.2	86	39
	P2	Pundibaidi	Natural	21	56	47.1	86	31
	BLE8	Kalasiduba	Natural	21	58	7.6	86	28
	BLE 9	Murmuranighati	Natural	21	59	34.1	86	28
Nawana North WL	BLE-16 (P-1)	Joranda	Artificial	21	56	7.8	86	24
	BLE-18	Pandabandha	Artificial	21	55	33.8	86	27
	BLE-14	Khadkei	Natural					
		Edelkacha	Natural					
	P-6	Ashadala	Natural					
Chaha-la WL Range	KD-11	Chahala	Artificial	21	59	8.9	86	17
	KD-11	Chahala	Artificial	21	59	4.2	86	17
	BH-4	Brundaban	Artificial	21	58	20.6	86	16
	BH-4	Brundaban	Artificial	21	58	16.4	86	16
	BLW-11	Rajabhadi	Artificial	21	59	59.8	86	17

ANNEXURE XXX

LIST OF ANTI-POACHING CAMPS IN SIMILIPAL TIGER RESERVE

SL No	Division	RANGE	SECTION	BEAT	Camps	Compartment	Latitude	Longitude
1	Similipal South WL	BHANJABASA WL	BHANJABASA	GUNDURIA	Gunduria	TK1	21°38'39.4" N	86°24'36.8" E
2					Marwari Bandha		21°39'09.0" N	86°25'29.0" E
3				BHANJABASA	Bhanjabasa	TK4,TK7	21°36'10.3" N	86°22'31.0" E
4			DHOBIGHAT	BARHAGARHA I	Barhagarha-I	SL8	21°34'04.8" N	86°17'17.1" E
5				BARHAGARHA II	Barhagarha-II	SL13	21°32'57.1" N	86°17'48.6" E
6				DHOBIGHAT	Dhobighat	SL9,SL10(p2)	21°34'51.8" N	86°19'18.2" E
7			GHAGRA	GHAGRA I	Ghagra-I	SL10(p1)	21°33'26.9" N	86°19'46.9" E
8				GHAGRA II	Ghagra-II	SL18(p2)	21°33'13.2" N	86°21'18.2" E
9			NEKDANACHA	PUTULDIHA	Putuldiha	TK3	21°37'23.0" N	86°21'58.0" E
10				NEKDANACHA	Nekdancha	SL6	21°36'38.3" N	86°19'06.9" E
11				MATHASILA	Mathasila	TK2	21°36'35.6" N	86°20'34.8" E
12				BALIDHAR	Balidar	SL11	21°35'15.2" N	86°21'03.7" E
13	Similipal South WL	DUKURA WL	BAHALDA	CHANDANCHATURI II	Chandanchaturi-II	SJ4	21°50'05.2" N	86°35'25.6" E
14				SAPANCHUA	Sapanchua	SJ5	21°48'07.4" N	86°34'15.6" E
15				BAHALDA	Bahalda	SJ6	21°46'57.7" N	86°32'50.0" E
16			DENGAM	NUAGAON I	Nuagaon-I	SJ9(p2), SJ10	21°45'13.0" N	86°29'08.0" E
17				DENGAM	Dengam	SJ16(p1), SJ18	21°45'13.6" N	86°29'07.6" E
18				NUAGAON II	Nuagaon-II	SJ11, SJ12	21°45'45.5" N	86°31'54.7" E
19			PHULBADIA	PHULBADIA	Phulbadia	ED7(p2), ED8	21°40'42.0" N	86°28'45.0" E
20				PATSANIPUR	Patsanipur	ED4	21°43'22.0" N	86°30'44.0" E
21			TALDIHA	TALDIHA	Taldiha	ED12, ED13	21°40'33.2" N	86°28'30.7" E
22				MANIKPUR	Manikpur	ED14	21°40'17.6" N	86°28'06.7" E

23	Similipal South WL	JENABIL WL	GURANDIA	GURANDIA I	Gurandia	KH21(p1	21°46'06.8" N	86°20'45.7" E
24				GURANDIA II	Gayalgoda	KH20	21°45'58.0" N	86°18'31.7" E
25				GURANDIA III	Manasi	KH23(p1),KH21 (p2	21°46'35.5" N	86°19'40.7" E
26			HATISAL	HATISAL I	Charichhak	ED1, ED2	21°42'43.6" N	86°25'51.8" E
27				HATISAL II	Hatishal	ED5, ED9	21°42'04.8" N	86°24'03.7" E
28			JENABIL	JAMUNAGARH	Jamuna	KH27, Village	21°42'42.4" N	86°19'54.4" E
29				JENABIL	Jenabil	KH26	21°44'06.2" N	86°21'38.5" E
30					Senichaturi		21°45'38.7" N	86°22'44.5" E
31				HATIGHAR I	Mohantah-ana	KH23(p2)	21°44'11.2" N	86°19'59.4" E
32				HATIGHAR II	Hatighar	KH25	21°43'58.6" N	86°20'56.8" E
33			KULIPAL	SUNPOKHARI I	Sarabasa	SJ13	21°45'18.1" N	86°23'42.7" E
34				SUNPOKHARI II	Sizughar	SJ15, SJ16(p2)	21°44'33.0" N	86°25'15.8" E
35				KULIPAL	Kulipal	ED3, SJ17	21°43'28.9" N	86°26'05.1" E
36					Chhanum-ber		21°44'54.9" N	86°26'49.0" E
37			TIKTALI	TIKTALI	Tiktali	ED10	21°39'08.1" N	86°23'16.7" E
38				SARUA	Sarua	ED6, ED7(p1)	21°41'15.8" N	86°25'14.7" E
39					Gourakan-tha		21°41'01.5"	86°23'48.8"
40				CHOUDHARI-GARH	Choudhuri-garh	ED11	21°39'39.0" N	86°24'48.2" E
41					Rusibasa	ED11	21°40'09.1" N	86°26'02.9" E
42	Similipal South WL	NATIONAL PARK WL	KABAT-GHAI	KABATGHAI I	Kabatghai I	KH17(p1), KH17(p2)	21°48'42.3" N	86°15'39.6" E
43				KABATGHAI II	Kabatghai II	KH18	21°47'53.5" N	86°15'47.4" E
44					Doligoda		21°46'11.6" N	86°14'58.7" E
45			KHEJURI	KHAJURI I	Khejuri	KH19(p1), KH19(p2)	21°48'16.0" N	86°18'20.9" E
46				BAKUA I	Cheruanali	KH14	21°48'49.3" N	86°20'21.5" E
47			MAHAVIR-SAL	GANAPATI	Ganapati	WD15	21°44'57.0" N	86°15'52.6" E
48					Rusibasa		21°45'19.9" N	86°14'10.3" E
49				MAHAVIRSAL	Mahabirsal	WD18	21°43'36.7" N	86°13'47.6" E
50					Nimia		21°43'34.1" N	86°12'05.9" E
51				BUDHIGAON I	Khadicha-turi	WD8(p2), WD14, WD16	21°45'02.9" N	86°12'18.1" E
52					Panianla		21°46'24.0" N	86°13'03.0" E
53			NUAGAON	RANASA	Ransa	KH22	21°44'47.5" N	86°17'49.4" E
54				NUAGAON	Nuagaon	KH24	21°42'52.2" N	86°18'10.9" E

55	Similipal South WL	NAWANA SOUTH WL	BAKUA	CHATADANDA	Bhadragoda	BLW19,BLE24	21°48'14.7" N	86°22'28.3" E
56				BAKUA II	Bakua-II	BLW18(p2),Village	21°49'09.7" N	86°21'26.0" E
57					Chherabil		21°49'56.1" N	86°21'03.4" E
58			DHUDRUCHAMPA	RAJABASA	Rajabasa	BLE(21p2A), BLE(22p2)	21°49'38.6" N	86°24'41.6" E
59				DHUDRUCHAMPA	Kandiajharan	BLE23(p2)	21°48'37.3" N	86°23'43.0" E
60			JODAPAL	JODAPAL I	Khadiabasa	SJ7	21°47'08.5" N	86°23'39.2" E
61				JODAPAL II	Jodapal-II	SJ14	21°46'13.2" N	86°24'03.9" E
62			LENGAKOCHA	DHUNDUBASA	Dhundubasa	SJ8, SJ9(P1)	21°47'57.9" N	86°27'14.4" E
63					Kaniabasa		21°47'22.6" N	86°25'47.2" E
64				BADMAKABADI II	Lengdakacha	P17,P18	21°49'42.9" N	86°26'14.7" E
65	Similipal South WL	PITHABATA NORTH WL	BADGAON	BADGAON	Chapadihi	BLE10, BLE11(P1)	22°00'04.4" N	86°30'27.2" E
66					Badgaon		22°01'23.9" N	86°30'44.6" E
67				KANTASOLA	Mahalisahi	BLE11(P2)	22°00'01.1" N	86°32'32.3" E
68			CHAKADI	CHAKIDI I	Chakidi	BLE4(P1),BLE4(P2)	22°00'08.5" N	86°24'37.0" E
69				PHULJHARI	Phuljhari	BLE5(P1),BLE5(P2)	22°01'07.2" N	86°25'04.6" E
70			HALDIBANI	BALDIHA	Jadapal	P5	21°58'16.0" N	86°36'45.0" E
71				HALDIBANI	Alubani	BLE12(p2)	22°00'37.0" N	86°35'34.0" E
72				GENDA POKHARI	Gendapokhari	BLE12(p1)	22°01'54.9" N	86°35'21.7" E
73			PITHABATA	CHAMPAGARHA	Champagarh	P4	21°57'56.0" N	86°32'50.8" E
74				PITHABATA	Pithabata	P3	21°56'25.2" N	86°34'40.5" E
75			RANGAMATIA	RANGAMATIA I	Rangamatia I	BLE1,Village	22°05'11.9" N	86°27'43.6" E
76				RANGAMATIA II	Masanibila	BLE2, BLE3	22°02'09.0" N	86°27'59.0" E
77					Nedam		22°03'39.0" N	86°27'11.0" E
78	Similipal South WL	PITHABATA SOUTH WL	ANDHERITOTA	BADMAKABADI I	Bada Makabadi	P19	21°49'24.9" N	86°29'02.9" E
79				ANDHERITOTA II	Sabarbasa	P16	21°49'33.5" N	86°30'58.4" E
80			BALIKHAL	GOPINATHPUR	Gopinathpur	P14(p2)	21°51'10.7" N	86°27'42.3" E
81				BALIKHAL	Balikhal	P10	21°51'51.2" N	86°28'53.4" E
82			BHAJAM	NAMTIDAR I	Namti-I	P2	21°55'58.0" N	86°32'06.1" E
83				NAMTIDAR II	Namti-II	P7	21°55'58.0" N	86°32'06.1" E
84				BHAJAM	Bhajam	P1	21°57'37.0" N	86°29'33.2" E
85				BAUNSKHAL I	Baunsakhal	BLE8, BLE9	21°59'08.4" N	86°28'07.7" E
86					Kalasiduba		21°58'15.0" N	86°28'38.0" E
87			DIGDIGA	DIGDIGA	Digdiga	SJ1, P13	21°53'33.0" N	86°36'09.4" E

88				CHANDANCHA-TURI I	Chandan-chaturi-I	SJ2, SJ3	21°50'05.2" N	86°35'25.6" E
89			KACHUD-HAN	KACHUDAHAN	Kachudhan	P11	21°52'16.0" N	86°30'33.0" E
90				ANDHERITOTA I	Andharitota	P15	21°50'55.3" N	86°29'30.9" E
91			PITHABA-TA	PALASIBEDA	Palasibeda	P12	21°54'51.0" N	86°31'26.0" E
92				PITHABATA I	Pithabata-I	P8(p1), P8(p2)	21°56'25.2" N	86°34'40.5" E
93				PITHABATA II	Pithabata-II	P9	21°56'25.2" N	86°34'40.5" E
94	Similipal South WL	PODADIHA WL	DANGADI-HA	DANGADIHA I	Dangadiha I	SL15	21°29'49.5" N	86°16'51.4" E
95				DANGADIHA II	Dangadiha II	SL16	21°30'58.8" N	86°17'42.0" E
96				DANGADIHA III	Dangadi-ha-III	SL17	21°30'35.0" N	86°19'41.5" E
97			PODADIHA	BAGHANTA	Baghanta	TK5, TK8p2	21°35'10.6" N	86°24'59.6" E
98				ANANTAPUR	Antapur	TK6, TK9, TK8(p1)	21°37'32.7" N	86°28'24.6" E
99					Kantiali		21°34'20.0" N	86°25'24.0" E
100				MANBHANGA	Nalakhanja	TK10, TK11, SL18(p1)	21°32'06.8" N	86°21'53.3" E
101					Nachipur		21°33'59.1" N	86°24'47.7" E
102	Similipal South WL	UBK WL	DEVASTH-ALI	DEVASTHALI I	Debasthali-I	WD21,WD22, WD25	21°42'12.0" N	86°16'09.0" E
103			JATIANI	JATIANI	Jatiani	WD17(p2)	21°42'41.7" N	86°10'27.3" E
104				GAMUCHHA JHARAN	Gamucha-jharan	WD19,TL4(p2)	21°41'11.8" N	86°10'04.1" E
105					Bisipur Check gate		21°44'13.3" N	86°09'22.5" E
106			KANDAD-HENU	BAHAGHAR	Bahaghar	WD26	21°39'11.4" N	86°14'35.0" E
107				SILDA	Silda	WD23	21°40'21.2" N	86°10'51.1" E
108				KANDADHENU	Baladaghara	WD17(p1), WD20(p2), WD20(p1)	21°42'27.0"N	86°13'43.0"E
109					Kandad-henu		21°41'36.5" N	86°11'39.1" E
110			MATUGHAR	MATUGHAR	Matughar Watch Tower	WD31	21°37'36.0" N	86°18'15.0" E
111				MEGHASANI	Meghasani	WD32	21°38'13.0" N	86°21'18.2" E
112			PANASKU-DAR	CHAMPAGARH	Champaghar	TL7,TL9(p2)	21°38'42.7" N	86°12'58.9" E
113					Malabasa		21°37'06.3" N	86°14'12.5" E
114				PANASKUDAR	Panaskudar	TL5(p2)	21°39'19.1" N	86°11'15.4" E
115			PATBIL	BENGAPANI	Bengapani	WD30	21°38'30.2" N	86°17'10.7" E
116				PATBIL	Patbil	WD24	21°41'01.1" N	86°14'11.4" E

117				TINADIHA	Dhuduram	WD27	21°40'03.0" N	86°16'12.8" E
118			UBK	TARANIBILA	Taranibila	WD29	21°40'24.1" N	86°20'46.5" E
119				UBK	UBK	WD28	21°39'05.2" N	86°18'00.4" E
120	Similipal North WL	Gurguria WL	Gurguria	Barigoan	Barigaon	KH15,KH16	21°49'16.0"N	86°15'22.0"E
121					Barigaon Core		21°48'41.3"N	86°13'26.2"E
122				Gurguria	Gurguria	KH9,KH10,Village	21°51'20.0"N	86°14'51.7"E
123			Kaliani	Bilapagha	Bilapagha	KH3,KH4,Village	21°53'08.0"N	86°14'32.0"E
124				Kaliani	Ka-likaprasad	KH1,KH2	21°53'56.0"N	86°11'23.0"E
125					Kaliani		21°55'14.0"N	86°09'35.0"E
126			Khejuri	Khejuri II	Khejuri	KH13, Village	21°48'16.0"N	86°18'20.9"E
127				Kuanribil	Kuanribil	KH11,KH12, Village	21°51'17.0"N	86°17'44.0"E
128			Utras	Ektali	Kumudaba-di	KH5	21°53'37.0"N	86°07'23.0"E
129				Utras	Utras (Poda-god)	KH6,KH7,KH8	21°54'57.0"N	86°08'41.0"E
130	Similipal North WL	Thakurmunda WL	Bahaghar	Bahaghar I	Kani-yanagari	SL12	21°31'58.0"N	86°15'43.0"
131				Bahaghar II	Sudarshan-pur	SL 14	21°29'59.0"N	86°13'08.0"E
132			Mituani	Mituani	Karkatbeda	SL3,TL10	21°53'55.1"N	86°11'24.4"E
133				Purunapani	Mandaljhari	SL7,SL4	21°34'26.0"N	86°15'15.2"E
134			Mandal-jhari	Chanpajhar	Sadananda	SL1,SL2	21°37'16.4"N	86°16'07.9"E
135				Mandaljhari	Tobacol	SL5	21°36'39.0"N	86°17'02.0"E
136			Badali-posi	Badamahukli-ha II	Khaparkhai	TL6(p1), TL5(p2), TL6(p2)	21°37'09.5"N	86°11'13.8"E
137				Badaliposi II	Ranibhol	TL8,TL9(p2)	21°37'29.1"N	86°12'11.1"E
138					Asankudar		21°36'46.0"N	86°12'09.0"E
139	Similipal North WL	Nawana North WL	Baunskhal	Baunskhal II	Baunskahal	BLE7	21°59'08.8"N	86°26'08.0"E
140				Chakidi II	Chakidi-II	BLE6	22°00'08.5"N	86°24'37.0"E
141			Joranda	Joranda	Joranda	BLE16,BLE17	21°56'08.5"N	86°24'12.1"E
142				Kusumbani	Budhiabasa	BLE13	21°57'16.7"N	86°24'47.3"E
143					Kusumbani		21°58'32.0"N	86°24'46.3"E
144				Nigirdha Core	Nigirdha core	BLE19	21°53'34.3"N	86°26'16.7"E
145			Khadkei	Pandabandha	Pandaband-ha	BLE18	21°56'15.3"N	86°26'08.1"E
146				Khadkei	Palotiki	BLE14,BLE15	21°57'00.5"N	86°29'04.6"E
147					Khadkei		21°55'33.9"N	86°27'15.2"E
148				Bhundadar	Bhandada-dhar	P6	21°54'18.1"N	86°28'33.6"E

149			Nawana	Budhabalanga	Budhaba-langa	BLE21p2, BLE22 p2, BLE23 p2, BLW17p3, BLW18p2, Village	21°51'28.5"N	86°23'10.5"E
150				Nigirdha Buffer	Nigirdha buffer	BLE20,Village	21°51'11.0"N	86°27'42.0"E
151				Nawana	Nawana	BLW16(p), BLW17p2 Village	21°53'20.0"N	86°23'06.1"E
152	Similipal North WL	Barehipani WL	Barehi-pani	Barehipani I	Uski	BH9, BH10, Village	21°55'20.7"N	86°18'18.4"E
153				Barehipani II	Barehipani	BH5, BH6 (p2,BH7 (p2,BLW14(p2,Vil-lage	21°56'53.3"N	86°20'51.7"E
154			Jamuani	Mohanpur		BH13,BH14		
155				Jamuani	Jamuani	BH3(p2,BH8	21°57'36.4"N	86°13'27.9"E
156			Matighati	Matighati I	Matighati-I	BLW15	21°54'45.1"N	86°22'40.1"E
157				Matighati II	Matighati-II	BH11	21°55'19.0"N	86°20'47.0"E
158			Tamal-bandha	Sansialinai Buffer	Sansialinai	KD8	22°00'08.6"N	86°08'42.7"E
159				Tamalbandha Buffer	Tamalbandh	KD6 (p2,KD9 (p2	22°01'11.0"N	86°12'46.0"E
160			Tulasibani	Chadripahadi	Chadripa-hadi	BH12	21°57'18.2"N	86°08'57.1"
161				Tulasibani	Tulasibani	BH1,BH2	21°58'07.0"N	86°09'16.3"E
162			Uski	Phulbaria II		BH17,Village		
163				Phulbaria I	Lembugoda	BH16,BH18,Vil-lage	21°51'24.3"N	86°20'17.9"E
164					Bandirabasa		21°53'54.4"N	86°18'34.8"E
165				Uski	Uski	BH15,Village	21°54'19.5"N	86°18'36.9"E
166	Similipal North WL	TalabandhaWL	Bankidihi	Bankidihi	Barkidihi	KD5,KD7(p2	22°06'34.9"N	86°17'29.2"E
167				Chatani		KD1,KD2		
168				Asadola	Asadola	KD3,KD4	22°05'23.0"N	86°18'17.0"E
169			Ghat-kuanri	Ghatkuanri	Ghatkuanri	BLW1,BLW2	22°03'04.4"N	86°23'04.7"E
170				Kanchhinda	Kanachinda	BLW3,BLW4	22°05'29.0"N	86°26'56.0"
171			Talaband-ha	Kusumtota II	Kusumtota II (Chora-bandha)	BLW8(p2),BLW 9,BLW10,BLW12 (p2),BLW13(p2) Village	22°00'12.0"N	86°22'07.0"E
172				Talabandha I	Talaband-ha-I	BLW5,BLW7(p2)	22°01'44.0"N	86°20'36.0"E
173				Talabandha II	Talaband-ha-II	BLW6	22°01'43.0"N	86°20'35.0"E
174			Baghlata	Baghlata	Baghlata	WD10	21°43'59.2"N	86°05'19.2"E
175				Bisipur	Bisipur	TL1,TL2	21°43'10.6"N	86°07'20.0"E

176	Similipal North WL	Kendumundi WL	Baraka-munda	Barakamunda	Barahka-munda	WD5,WD6	21°48’14.0”N	86°06’28.9”E
177				Hatibari	Hatibari	WD11,WD12	21°45’43.0”N	86°08’39.0”E
178			Dudhiani	Budhigaon II	Pahadpur	WD8(p2),WD13	21°48’00.1”N	86°10’25.3”E
179					Budhigaon		21°45’55.3”N	86°10’01.5”E
180				Dudhiani	Dudhiani	WD7,WD9	21°47’48.9”N	86°09’25.9”E
181			Kendu-mundi	Kendumundi I	Kendumun-di	TL3(p1)TL4(p2)	21°41’12.0”N	86°06’23.0”E
182				Kendumundi II	Sanranibhol	TL3(p2)	21°41’10.4”N	86°08’20.7”E
183			Ranipat	Kiajhari	Lanjabasa	WD1,WD2,WD3,Village	21°51’09.3”N	86°09’29.3”E
184					Kaleitumba		21°52’13.2”N	86°06’18.3”E
185					Kiajhari		21°50’04.7”N	86°07’58.8”E
186				Ranipat	Ranipat	WD4	21°51’00.6”N	86°04’07.6”E
187	Similipal North WL	Chahala WL	Chahala	Chahala	Chahala	KD11	21°59’08.8”N	86°17’34.6”E
188				Kairakacha	Kairakacha	BLW11	21°58’50.5”N	86°18’52.7”E
189			Haldia	Sansialinai Core	Sansialinai Core	KD9(p1)	21°59’30.5”N	86°12’53.0”
190				Haldia	Haldia	KD10	21°59’44.8”N	86°14’43.8”E
191				Tamalbandha		KD6(p1)		
192			Rajpal	Rajpal	Brundaban	BH3(p1),BH4	21°58’19.5”N	86°16’45.8”E
193					Rajpal		21°57’44.0”N	86°15’23.4”E
194					Rajpal		21°55’45.8”N	86°14’58.1”E
195				Jodadiha	Jodadiha	BH5,BH6(p1)	21°58’02.2”N	86°18’07.1”E
196			Karkachia	Karkachia	Karkachia	BLW12(p1	21°58’49.9”N	86°21’29.6”E
197				Bhatunia	Bhatunia	BLW13(p1)	21°58’08.6”N	86°23’09.2”E
198				Barehipani Core	Machinena-la	BLW14(p1)	21°57’55.7”N	86°20’22.0”E
199					Barehipani core		21°56’28.0”N	86°21’43.1”E
200			Mathura-karei	Allapani	Allapani	KD7(p1)	22°02’35.9”N	86°19’49.2”E
201					Pondaband-ha		22°01’03.8”N	86°16’49.7”E
202				Mathurakarei	Mathura-kharei	BLW8(p1), BLW7(p1)	22°01’02.8”N	86°18’35.1”E

ANNEXURE XXXI

LIST OF BUILDINGS IN PA

SL No	Division	RANGE	SECTION	BEAT	Building	Location	Latitude	Longitude
1	Similipal South WL	BHANJABASA WL	BHANJABASA	GUNDURIA		Gunduria	21°38'39.4" N	86°24'36.8" E
2	Similipal South WL				APC	Marwari Bandha	21°39'09.0" N	86°25'29.0" E
3	Similipal South WL			BHANJABASA	APC/Forest Rest House/Range Office/Residence	Bhanjabasa	21°36'10.3" N	86°22'31.0" E
4	Similipal South WL		DHOBIGHAT	BARHAGARHA I	Forest Guard Quarter	Barhagarha-I	21°34'04.8" N	86°17'17.1" E
5	Similipal South WL			BARHAGARHA II	Forest Guard Quarter	Barhagarha-II	21°32'57.1" N	86°17'48.6" E
6	Similipal South WL			DHOBIGHAT	APC/Forester Quarter	Dhobighat	21°34'51.8" N	86°19'18.2" E
7	Similipal South WL		GHAGRA	GHAGRA I	Forester Quarter	Ghagra-I	21°33'26.9" N	86°19'46.9" E
8	Similipal South WL			GHAGRA II	Forest Guard Quarter	Ghagra-II	21°33'13.2" N	86°21'18.2" E
9	Similipal South WL		NEKDANACHA	PUTULDIHA		Putuldiha	21°37'23.0" N	86°21'58.0" E
10	Similipal South WL			NEKDANACHA	Forester Quarter	Nekdancha	21°36'38.3" N	86°19'06.9" E
11	Similipal South WL			MATHASILA	Forest Guard Quarter	Mathasila	21°36'35.6" N	86°20'34.8" E
12	Similipal South WL			BALIDHAR		Balidar	21°35'15.2" N	86°21'03.7" E
13	Similipal South WL	DUKURA WL	BAHALDA	CHANDANCHATURI II		Chandanchaturi-II	21°50'05.2" N	86°35'25.6" E
14	Similipal South WL			SAPANCHUA	Forester Quarter	Sapanchua	21°48'07.4" N	86°34'15.6" E
15	Similipal South WL			BAHALDA	APC	Bahalda	21°46'57.7" N	86°32'50.0" E
16	Similipal South WL		DENGAM	NUAGAON I	Forest Guard Quarter	Nuagaon-I	21°45'13.0" N	86°29'08.0" E
17	Similipal South WL			DENGAM	Forester Quarter	Dengam	21°45'13.6" N	86°29'07.6" E
18	Similipal South WL			NUAGAON II	Forester Quarter	Nuagaon-II	21°45'45.5" N	86°31'54.7" E
19	Similipal South WL		PHULBADIA	PHULBADIA	APC/Forest Guard Quarter	Phulbadia	21°40'42.0" N	86°28'45.0" E

20	Similipal South WL			PATSANIPUR	APC	Patsanipur	21°43'22.0" N	86°30'44.0" E
21	Similipal South WL		TALDIHA	TALDIHA	Seizure Yard	Taldiha	21°40'33.2" N	86°28'30.7" E
22	Similipal South WL			MANIKPUR		Manikpur	21°40'17.6" N	86°28'06.7" E
23	Similipal South WL				Range Officer Residence	Dukura RO	21°47'18.1" N	86°39'32.1" E
24	Similipal South WL	JENABIL WL	GURANDIA	GURANDIA I		Gurandia	21°46'06.8" N	86°20'45.7" E
25	Similipal South WL			GURANDIA II	Forest Guard Quarter	Gayalgoda	21°45'58.0" N	86°18'31.7" E
26	Similipal South WL			GURANDIA III		Manasi	21°46'35.5" N	86°19'40.7" E
27	Similipal South WL			HATISAL I	APC	Charichhak	21°42'43.6" N	86°25'51.8" E
28	Similipal South WL			HATISAL II		Hatishal	21°42'04.8" N	86°24'03.7" E
29	Similipal South WL		JENABIL	JAMUNAGARH		Jamuna	21°42'42.4" N	86°19'54.4" E
30	Similipal South WL			JENABIL	Range Office	Jenabil	21°44'06.2" N	86°21'38.5" E
31	Similipal South WL				Forest Guard Quarter	Senichaturi	21°45'38.7" N	86°22'44.5" E
32	Similipal South WL			HATIGHAR I		Mohantahana	21°44'11.2" N	86°19'59.4" E
33	Similipal South WL			HATIGHAR II	APC	Hatighar	21°43'58.6" N	86°20'56.8" E
34	Similipal South WL		KULIPAL	SUNPOKHA-RI I		Sarabasa	21°45'18.1" N	86°23'42.7" E
35	Similipal South WL			SUNPOKHA-RI II	Forest Guard Quarter	Sizughar	21°44'33.0" N	86°25'15.8" E
36	Similipal South WL			KULIPAL		Kulipal	21°43'28.9" N	86°26'05.1" E
37	Similipal South WL					Chhanumber	21°44'54.9" N	86°26'49.0" E
38	Similipal South WL		TIKTALI	TIKTALI		Tiktali	21°39'08.1" N	86°23'16.7" E
39	Similipal South WL			SARUA		Sarua	21°41'15.8" N	86°25'14.7" E
40	Similipal South WL				Forest Guard Quarter	Gourakantha	21°41'01.5"	86°23'48.8"
41	Similipal South WL			CHOUDHARI-GARH		Choudhurigarh	21°39'39.0" N	86°24'48.2" E
42	Similipal South WL				APC	Rusibasa	21°40'09.1" N	86°26'02.9" E
43	Similipal South WL		KABATGHAI	KABATGHAI I		Kabatghai I	21°48'42.3" N	86°15'39.6" E

44	Similipal South WL	NATIONAL PARK WL		KABATGHAI II	Range Office /Forester Quarter/Range Officer Residence	Kabatghai II	21°47'53.5" N	86°15'47.4" E
45	Similipal South WL					Doligoda	21°46'11.6" N	86°14'58.7" E
46	Similipal South WL		KHEJURI	KHAJURI I	Forester Quarter	Khejuri	21°48'16.0" N	86°18'20.9" E
47	Similipal South WL			BAKUA I		Cheruanali	21°48'49.3" N	86°20'21.5" E
48	Similipal South WL		MAHAVIRSAL	GANAPATI		Ganapati	21°44'57.0" N	86°15'52.6" E
49	Similipal South WL					Rusibasa	21°45'19.9" N	86°14'10.3" E
50	Similipal South WL			MAHAVIRSAL	Forester Quarter	Mahabirsal	21°43'36.7" N	86°13'47.6" E
51	Similipal South WL				Forest Guard Quarter	Nimia	21°43'34.1" N	86°12'05.9" E
52	Similipal South WL			BUDHIGAON I	F. G. Quarter	Khadichaturi	21°45'02.9" N	86°12'18.1" E
53	Similipal South WL					Panianla	21°46'24.0" N	86°13'03.0" E
54	Similipal South WL		NUAGAON	RANASA		Ransa	21°44'47.5" N	86°17'49.4" E
55	Similipal South WL			NUAGAON		Nuagaon	21°42'52.2" N	86°18'10.9" E
56	Similipal South WL	NAWANA SOUTH WL	BAKUA	CHATADANDA	Kitchen shed	Bhadragoda	21°48'14.7" N	86°22'28.3" E
57	Similipal South WL			BAKUA II		Bakua-II	21°49'09.7" N	86°21'26.0" E
58	Similipal South WL				APC	Chherabil	21°49'56.1" N	86°21'03.4" E
59	Similipal South WL		DHUDRU-CHAMPA	RAJABASA	Range Officer Residence	Rajabasa	21°49'38.6" N	86°24'41.6" E
60	Similipal South WL			DHUDRU-CHAMPA	Seizure Yard	Kandiajharan	21°48'37.3" N	86°23'43.0" E
61	Similipal South WL		JODAPAL	JODAPAL I	APC/Forester Quarter	Khadiabasa	21°47'08.5" N	86°23'39.2" E
62	Similipal South WL			JODAPAL II	APC	Jodapal-II	21°46'13.2" N	86°24'03.9" E
63	Similipal South WL		LENGAKOCHA	DHUNDUBA-SA		Dhundubasa	21°47'57.9" N	86°27'14.4" E
64	Similipal South WL				Forest Guard Quarter/Forest Guard Quarter	Kaniabasa	21°47'22.6" N	86°25'47.2" E
65	Similipal South WL			BADMAKABA-DI II		Lengdakacha	21°49'42.9" N	86°26'14.7" E

66	Similipal South WL	PITHABATA NORTH WL	BADGAON	BADGAON	F. G. Quarter/ Seizure Yard	Chapadihi	22°00'04.4" N	86°30'27.2" E
67	Similipal South WL				Range Office	Badgaon	22°01'23.9" N	86°30'44.6" E
68	Similipal South WL			KANTASOLA	APC/Barrack	Mahalisahi	22°00'01.1" N	86°32'32.3" E
69	Similipal South WL		CHAKADI	CHAKIDI I		Chakidi	22°00'08.5" N	86°24'37.0" E
70	Similipal South WL			PHULJHARI		Phuljhari	22°01'07.2" N	86°25'04.6" E
71	Similipal South WL			BALDIHA	Forest Guard Quarter	Jadapal	21°58'16.0" N	86°36'45.0" E
72	Similipal South WL			HALDIBANI	APC	Alubani	22°00'37.0" N	86°35'34.0" E
73	Similipal South WL			GENDA POKHARI	Forester Quarter	Gendapokhari	22°01'54.9" N	86°35'21.7" E
74	Similipal South WL		PITHABATA	CHAMPAGAR-HA	Barrack/Forest Guard Quarter	Champagarh	21°57'56.0" N	86°32'50.8" E
75	Similipal South WL			PITHABATA		Pithabata	21°56'25.2" N	86°34'40.5" E
76	Similipal South WL		RANGAMATIA	RANGAMA-TIA I	Forester Quarter	Rangamatia I	22°05'11.9" N	86°27'43.6" E
77	Similipal South WL			RANGAMA-TIA II	Forest Guard Quarter	Masanibila	22°02'09.0" N	86°27'59.0" E
78	Similipal South WL					Nedam	22°03'39.0" N	86°27'11.0" E
79	Similipal South WL	PITHABATA SOUTH WL	ANDHERITOTA	BADMAKABA-DI I		Bada Makabadi	21°49'24.9" N	86°29'02.9" E
80	Similipal South WL			ANDHERITO-TA II	APC	Sabarbasa	21°49'33.5" N	86°30'58.4" E
81	Similipal South WL		BALIKHAL	GOPINATH-PUR		Gopinathpur	21°51'10.7" N	86°27'42.3" E
82	Similipal South WL			BALIKHAL		Balikhal	21°51'51.2" N	86°28'53.4" E
83	Similipal South WL		BHAJAM	NAMTIDAR I		Namti-I	21°55'58.0" N	86°32'06.1" E
84	Similipal South WL			NAMTIDAR II		Namti-II	21°55'58.0" N	86°32'06.1" E
85	Similipal South WL			BHAJAM		Bhajam	21°57'37.0" N	86°29'33.2" E
86	Similipal South WL			BAUNSKHAL I		Baunsakhal	21°59'08.4" N	86°28'07.7" E

87	Similipal South WL				APC	Kalasiduba	21°58'15.0" N	86°28'38.0" E
88	Similipal South WL		DIGDIGA	DIGDIGA		Digdiga	21°53'33.0" N	86°36'09.4" E
89	Similipal South WL			CHANDAN-CHATURI I		Chandanchaturi-I	21°50'05.2" N	86°35'25.6" E
90	Similipal South WL		KACHUDHAN	KACHUDA-HAN		Kachudhan	21°52'16.0" N	86°30'33.0" E
91	Similipal South WL			ANDHERITO-TA I	Forest Guard Quarter	Andharitota	21°50'55.3" N	86°29'30.9" E
92	Similipal South WL		PITHABATA	PALASIBEDA	Elephant Shed	Palasibeda	21°54'51.0" N	86°31'26.0" E
93	Similipal South WL			PITHABATA I	Seizure Yard	Pithabata-I	21°56'25.2" N	86°34'40.5" E
94	Similipal South WL			PITHABATA II		Pithabata-II	21°56'25.2" N	86°34'40.5" E
95	Similipal South WL	PODADIHA WL	DANGADIHA	DANGADIHA I	Forest Guard Quarter	Dangadiha I	21°29'49.5" N	86°16'51.4" E
96	Similipal South WL			DANGADIHA II	Forest Guard Quarter	Dangadiha II	21°30'58.8" N	86°17'42.0" E
97	Similipal South WL			DANGADIHA III		Dangadiha-III	21°30'35.0" N	86°19'41.5" E
98	Similipal South WL		PODADIHA	BAGHANTA	Forest Guard Quarter	Baghanta	21°35'10.6" N	86°24'59.6" E
99	Similipal South WL			ANANTAPUR	Forest Guard Quarter	Antapur	21°37'32.7" N	86°28'24.6" E
100	Similipal South WL					Kantiali	21°34'20.0" N	86°25'24.0" E
101	Similipal South WL			MANBHANGA		Nalakhanja	21°32'06.8" N	86°21'53.3" E
102	Similipal South WL				APC	Nachipur	21°33'59.1" N	86°24'47.7" E
103	Similipal South WL				Range Office /Seizure Yard/RO Residence	Podadiha RO		
104	Similipal South WL	UBK WL	DEVASTHALI	DEVASTHALI I		Debasthali-I	21°42'12.0" N	86°16'09.0" E
105	Similipal South WL		JATIANI	JATIANI	Forester Quarter	Jatiani	21°42'41.7" N	86°10'27.3" E
106	Similipal South WL			GAMUCHHA JHARAN	APC	Gamuchajharan	21°41'11.8" N	86°10'04.1" E
107	Similipal South WL					Bisipur Check gate	21°44'13.3" N	86°09'22.5" E

108	Similipal South WL		KANDADHENU	BAHAGHAR		Bahaghar	21°39'11.4" N	86°14'35.0" E
109	Similipal South WL			SILDA		Silda	21°40'21.2" N	86°10'51.1" E
110	Similipal South WL			KANDAD-HENU		Kandadhenu	21°41'36.5" N	86°11'39.1" E
111	Similipal South WL				APC	Baladaghar		
112	Similipal South WL		MATUGHAR	MATUGHAR		Matughar Watch Tower	21°37'36.0" N	86°18'15.0" E
113	Similipal South WL			MEGHASANI		Meghasani	21°38'13.0" N	86°21'18.2" E
114	Similipal South WL		PANASKUDAR	CHAMPA-GARH	Forest Guard Quarter	Champaghar	21°38'42.7" N	86°12'58.9" E
115	Similipal South WL					Malabasa	21°37'06.3" N	86°14'12.5" E
116	Similipal South WL			PANASKUDAR	APC/Forester Quarter	Panaskudar	21°39'19.1" N	86°11'15.4" E
117	Similipal South WL		PATBIL	BENGAPANI		Bengapani	21°38'30.2" N	86°17'10.7" E
118	Similipal South WL			PATBIL	Orchidarium/Forester Quarter	Patbil	21°41'01.1" N	86°14'11.4" E
119	Similipal South WL			TINADIHA		Dhuduram	21°40'03.0" N	86°16'12.8" E
120	Similipal South WL		UBK	TARANIBILA		Taranibila	21°40'24.1" N	86°20'46.5" E
121	Similipal South WL			UBK		UBK	21°39'05.2" N	86°18'00.4" E
122	Similipal North WL	Kendumundi W/L	Kendumundi	Kendumun-di I	Barrack	Kendumundi	21°41'12.0"N	86°06'23.0"E
123	Similipal North WL		Dudhiani	Dudhiani	Forester Quarter	Dudhiani	21°47'48.9"N	86°09'25.9"E
124	Similipal North WL		Barakamuda	Barakamuda	Forester Quarter	Barakamuda	21°48'14.0"N	86°06'28.9"E
125	Similipal North WL			Hatibari	Forest Guard Ouarter	Hatibari	21°45'43.0"N	86°08'39.0"E
126	Similipal North WL		Baghlata	Bisipur	Forest Guard Ouarter	Bisipur	21°43'10.6"N	86°07'20.0"E
127	Similipal North WL				Forest Guard Ouarter	Khaparkhai	21°50'04.7"N	86°07'58.8"E
128	Similipal North WL		Ranipat	Kiajhari	Watch Tower	Kiajhari		
129	Similipal North WL				MS Fabricated Watch Tower	Pandadapani		
130	Similipal North WL		Ranipat	Kiajhari	Forest Guard Ouarter	Lanjabasa	21°51'09.3"N	86°09'29.3"E

131	Similipal North WL		Badaliposi	Badaliposi II	APC	Asankudar	21°36'46.0"N	86°12'09.0"E
132	Similipal North WL	Gurguria WL Range		Gurguria	Range Office	Gurguria	21°51'20.0"N	86°14'51.7"E
133	Similipal North WL		Gurguria	Gurguria	Range Officer Residence	Gurguria	21°51'20.0"N	86°14'51.7"E
134	Similipal North WL		Kaliani	Kaliani	Beat House	Kaliani	21°55'14.0"N	86°09'35.0"E
135	Similipal North WL			Bilapagha	Forest Guard Ouarter	Bilapagha	21°53'08.0"N	86°14'32.0"E
136	Similipal North WL		Gurguria	Barigaon II	Forest Guard Ouarter	Barigaon Core	21°48'41.3"N	86°13'26.2"E
137	Similipal North WL		Kaliani	Kaliani	Forest Check gate	Kaliani	21°55'14.0"N	86°09'35.0"E
138	Similipal North WL			Kaliani	Forester Check gate	Kalikaprasad	21°55'14.0"N	86°09'35.0"E
139	Similipal North WL			Bilapagha	Beat House	Bilapagha	21°53'08.0"N	86°14'32.0"E
140	Similipal North WL		Gurguria	Gurguria	FRH	Gurguria	21°51'20.0"N	86°14'51.7"E
141	Similipal North WL			Gurguria	Forester Quarter	Gurguria	21°51'20.0"N	86°14'51.7"E
142	Similipal North WL		Kaliani	Kaliani	Forester Quarter	Kalikaprasad	21°55'14.0"N	86°09'35.0"E
143	Similipal North WL		Utras	Utras	Forester Quarter	Utras	21°54'57.0"N	86°08'41.0"E
144	Similipal North WL		Gurguria	Gurguria	Interpretation Center cum Display unit of Orchidarium	Gurguria	21°51'20.0"N	86°14'51.7"E
145	Similipal North WL			Gurguria	Santhali Cottage-01 Cluster	Gurguria	21°51'20.0"N	86°14'51.7"E
146	Similipal North WL			Gurguria	Cottage, 02 nos	Gurguria	21°51'20.0"N	86°14'51.7"E
147	Similipal North WL			Gurguria	Pine Villa	Gurguria	21°51'20.0"N	86°14'51.7"E
148	Similipal North WL			Gurguria	VHF Room	Gurguria	21°51'20.0"N	86°14'51.7"E
149	Similipal North WL			Gurguria	Driver & Guide Rest Hall	Gurguria	21°51'20.0"N	86°14'51.7"E
150	Similipal North WL			Gurguria	Bamboo Cottage	Gurguria	21°51'20.0"N	86°14'51.7"E
151	Similipal North WL			Gurguria	Dining Hall	Gurguria	21°51'20.0"N	86°14'51.7"E
152	Similipal North WL			Barigaon II	Forest Guard Ouarter	Barigaon	21°49'16.0"N	86°15'22.0"E
153	Similipal North WL		Khejuri	Kumaribil	Forest Guard Ouarter	Kumaribil	21°51'17.0"N	86°17'44.0"E
154	Similipal North WL			Khejuri	Forest Guard Ouarter	Khejuri	21°48'16.0"N	86°18'20.9"E
155	Similipal North WL		Utras	Utras	Forest Guard Ouarter	Utras	21°54'57.0"N	86°08'41.0"E
156	Similipal North WL			Ektali	Anti Poaching Camp	Kumudabadi	21°53'37.0"N	86°07'23.0"E

157	Similipal North WL		Gurguris	Gurguris	Santhali Cottage, 03 nos cluster	Kumari	21°51'37.0"N	86°15'24.0"E
158	Similipal North WL				Dining Room	Kumari	21°51'37.0"N	86°15'24.0"E
159	Similipal North WL				Sovenier Shop	Kumari	21°51'37.0"N	86°15'24.0"E
160	Similipal North WL				Eco Bamboo Cottage, 04 nos.	Kumari	21°51'37.0"N	86°15'24.0"E
161	Similipal North WL				Bamboo Machan, 02 nos	Kumari	21°51'37.0"N	86°15'24.0"E
162	Similipal North WL				Officer Camp Shed	Kumari	21°51'37.0"N	86°15'24.0"E
163	Similipal North WL				Staff Room	Kumari	21°51'37.0"N	86°15'24.0"E
164	Similipal North WL				Driver Shed/ Security Cabin	Kumari	21°51'37.0"N	86°15'24.0"E
165	Similipal North WL	Talabandha North WL Range	Talabandha	Talabandha I	Forest Range Office	Talabandha	22°01'44.0"N	86°20'36.0"E
166	Similipal North WL			Talabandha II	Range officer's residence	Talabandha	22°01'43.0"N	86°20'35.0"E
167	Similipal North WL		Bankidihi	Asadola	Forest beat quarter	Asadola	22°05'23.0"N	86°18'17.0"E
168	Similipal North WL		Talabandha	Kusumtota II	Forest beat quarter	Kusumtota II	22°00'12.0"N	86°22'07.0"E
169	Similipal North WL		Ghatkuanri	Kanachinda	Forest beat quarter	Kanachinda	22°05'29.0"N	86°26'56.0"
170	Similipal North WL			Ghatkuanri	Forest beat quarter	Ghatkuanri	22°03'04.4"N	86°23'04.7"E
171	Similipal North WL			Ghatkuanri	Forester quarter	Ghatkuanri	22°03'04.4"N	86°23'04.7"E
172	Similipal North WL		Talabandha	Talabandha I	Forest beat quarter	Talabandha I	22°01'44.0"N	86°20'36.0"E
173	Similipal North WL		Bankidihi	Bankidihi	Forester quarter	Bankidihi	22°06'34.9"N	86°17'29.2"E
174	Similipal North WL		Talabandha	Talabandha I	Forester quarter	Talabandha I	22°01'44.0"N	86°20'36.0"E
175	Similipal North WL			Talabandha - I	Forest Guard Quarter	Talabandha - I	22°01'44.0"N	86°20'36.0"E
176	Similipal North WL	Nawana North WL Range	Nawana	Nawana	FRH	Nawana	21°53'20.0"N	86°23'06.1"E
177	Similipal North WL				Pine Villa (Damaged)	Nawana	21°53'20.0"N	86°23'06.1"E
178	Similipal North WL				Range office	Nawana	21°53'20.0"N	86°23'06.1"E
179	Similipal North WL				Dormitory	Nawana	21°53'20.0"N	86°23'06.1"E
180	Similipal North WL		Joranda	Joranda	FRH	Joranda	21°56'08.5"N	86°24'12.1"E

181	Similipal North WL		Nawana	Nawana	Range Office	Nawana	21°53'20.0"N	86°23'06.1"E
182	Similipal North WL		Khadkei	Pandaband-ha	Forester quarter	Pandabandha	21°56'15.3"N	86°26'08.1"E
183	Similipal North WL		Joranda	Joranda	Forester quarter	Joranda	21°56'08.5"N	86°24'12.1"E
184	Similipal North WL		Nawana	Nawana	Forester quarter	Nawana	21°53'20.0"N	86°23'06.1"E
185	Similipal North WL		Baunskhal	Chakidi-II	Forest Guard quarter	Chakidi-II	22°00'08.5"N	86°24'37.0"E
186	Similipal North WL		Joranda	Kusumbani	Forest Guard quarter	Kusumbani	21°58'32.0"N	86°24'46.3"E
187	Similipal North WL		Baunskhal	Baunskhal	Forest Guard quarter	Baunskhal	21°59'08.8"N	86°26'08.0"E
188	Similipal North WL			Gopinathpur	Forest Guard quarter	Gopinathpur		
189	Similipal North WL		Joranda	Nigirdha core	Forest Guard quarter	Nigirdha core	21°53'34.3"N	86°26'16.7"E
190	Similipal North WL		Nigirdha	Nigirdha buffer	Forest Guard quarter	Nigirdha buffer	21°51'11.0"N	86°27'42.0"E
191	Similipal North WL		Khadkei	Bhandadhar	Anti-poaching camp	Bhandadhar	21°54'18.1"N	86°28'33.6"E
192	Similipal North WL		Joranda	Kusumbani	Forest Guard quarter	Kusumbani	21°58'32.0"N	86°24'46.3"E
193	Similipal North WL		Khadkei	Khadkei	Forest Guard quarter	Palotiki	21°57'00.5"N	86°29'04.6"E
194	Similipal North WL			Pandaband-ha	Anti-poaching camp	Pandabandha	21°56'15.3"N	86°26'08.1"E
195	Similipal North WL	Chahala WL Range	Chahala	Chahala	FRH	Chahala	21°59'08.8"N	86°17'34.6"E
196	Similipal North WL				Range Officer Residence	Chahala	21°59'08.8"N	86°17'34.6"E
197	Similipal North WL				Staff Barrrack Building	Chahala	21°59'08.8"N	86°17'34.6"E
198	Similipal North WL				Forester quarter	Chahala	21°59'08.8"N	86°17'34.6"E
199	Similipal North WL		Haldia	Haldia	Forester quarter	Haldia	21°59'44.8"N	86°14'43.8"E
200	Similipal North WL		Chahala	Chahala	Sal villa	Chahala	21°59'08.8"N	86°17'34.6"E
201	Similipal North WL				E.villa	Chahala	21°59'08.8"N	86°17'34.6"E
202	Similipal North WL				C. villa	Chahala	21°59'08.8"N	86°17'34.6"E
203	Similipal North WL		Rajpal	Jodadiha	Anti Poaching camp	Jodadiha	21°58'02.2"N	86°18'07.1"E
204	Similipal North WL		Karkachia	Karkachia	Forest Guard quarter	Karkachia	21°58'49.9"N	86°21'29.6"E

205	Similipal North WL			Bhatunia	Forest Guard quarter	Bhatunia	21°58'08.6"N	86°23'09.2"E
206	Similipal North WL		Chahala	Kairakacha	Forest Guard quarter	Kairakacha	21°58'50.5"N	86°18'52.7"E
207	Similipal North WL		Rajpal	Rajpal	Forest Guard quarter	Rajpal	21°55'45.8"N	86°14'58.1"E
208	Similipal North WL		Mathurakharei	Mathurakha-rei	Forest Guard quarter	Mathurakharei	22°01'02.8"N	86°18'35.1"E
209	Similipal North WL			Alahapani	Forest Guard quarter	Pondabandha	22°01'03.8"N	86°16'49.7"E
210	Similipal North WL			Alahapani	Forest Guard quarter	Alahapani	22°02'35.9"N	86°19'49.2"E
211	Similipal North WL		Haldia	Haldia	Forest Guard quarter	Haldia	21°59'44.8"N	86°14'43.8"E
212	Similipal North WL		Mathurakharei	Mathurakha-rei	Forest Guard quarter	Mathurakharei	22°01'02.8"N	86°18'35.1"E
213	Similipal North WL		Rajpal	Rajpal	Forest Guard quarter	Rajpal	21°57'44.0"N	86°15'23.4"E
214	Similipal North WL		Haldia	Sansialinai Core	Forest Guard quarter	Sansialinai Core	21°59'30.5"N	86°12'53.0"
215	Similipal North WL		Karkachia	Barehipani Core	Anti Poaching camp	Machinenalla	21°56'28.0"N	86°21'43.1"E
216	Similipal North WL		Chahala	Chahala	Watch Tower	Brundaban	21°58'20.6"N	263°25'49.9"E
217	Similipal North WL		Rajpal	Jodadiha	MS Fabricated Watch Tower	Porogoda	21°57'22.6"N	86°16'39.3"E
218	Similipal North WL		Chahala	Chahala		Rajabhadi	22°00'03.0"N	86°17'37.0"E
219	Similipal North WL		Rajpal	Jodadiha		Jodadiha Meadow	21°58'31.6"N	86°18'12.9"E
220	Similipal North WL	Thakurmunda WL Range			Antipoaching Barrack Building	Thakurmunda W/L Range		
221	Similipal North WL		Mituani	Mituani	Forester Quarter	Karkatbeda	21°37'09.5"	86°11'13.8"
222	Similipal North WL				Forest Guard quarter	Sudarsanpur		
223	Similipal North WL				Forest Guard quarter	Sankhachua		
224	Similipal North WL				Range Officer Residence	Thakurmunda		
225	Similipal North WL				Forest Range Office	Thakurmunda		
226	Similipal North WL		Matighati	Matighati II	Watch Tower	Matighati	21°55'19.0"N	86°20'47.0"E
227	Similipal North WL		Tamalbandh	Tamalbandh	Forester quarter	Tamalbandh	22°01'11.0"N	86°12'46.0"E

228	Similipal North WL	Barehipani WL Range		Sansialinai	Forest Guard quarter	Sansialinai	22°00'08.6"N	86°08'42.7"E
229	Similipal North WL		Uski	Uski	Forester quarter	Uski	21°54'19.5"N	86°18'36.9"E
230	Similipal North WL			PHULBARIA I	Forest Guard quarter	Bandirabasa	21°53'54.4"N	86°18'34.8"E
231	Similipal North WL		Barehipani	Barehipani	Forester quarter	Barehipani	21°56'53.3"N	86°20'51.7"E
232	Similipal North WL		Matighati	Matighati-II	Forest Guard quarter	Matighati-II	21°55'19.0"N	86°20'47.0"E
233	Similipal North WL		Uski	Uski	Forest Guard quarter	Uski	21°54'19.5"N	86°18'36.9"E
234	Similipal North WL				Forest Guard quarter	Lembugoda		
235	Similipal North WL				FRH	Barehipani & Jamuani Nature Camp		
236	Similipal North WL		Barehipani	Barehipani II	Range Office	Barehipani	21°56'53.3"N	86°20'51.7"E
237	Similipal North WL			Barehipani I	Antipoaching Barrack	Barehipani	21°55'20.7"N	86°18'18.4"E
238	Similipal North WL			Barehipani I	Range Officer Residence	Barehipani	21°55'20.7"N	86°18'18.4"E
239	Similipal North WL			Barehipani II	Forest Guard quarter	Barehipani	21°56'53.3"N	86°20'51.7"E
240	Similipal North WL			Barehipani II	VHF Room	Barehipani	21°56'53.3"N	86°20'51.7"E
241	Similipal North WL		Barehipani	Barehipani	Eco-Tourism Nature Camp	Barehipani & Jamuani Nature Camp	21°56'58.1"N	86°20'53.8"E
242	Similipal North WL				Dining Hall	Barehipani & Jamuani Nature Camp	21°56'58.1"N	86°20'53.8"E
243	Similipal North WL				Sovenier Shop	Barehipani & Jamuani Nature Camp	21°56'58.1"N	86°20'53.8"E
244	Similipal North WL				Staff Room	Barehipani & Jamuani Nature Camp	21°56'58.1"N	86°20'53.8"E
245	Similipal North WL				Security Cabin	Barehipani & Jamuani Nature Camp	21°56'58.1"N	86°20'53.8"E

246	Similipal North WL		Jamuani	Jamuani	Forester quarter	Jamuani	21°57'36.4"N	86°13'27.9"E
247	Similipal North WL				Forest Guard quarter	Jamuani	21°57'36.4"N	86°13'27.9"E
248	Similipal North WL				VHF Room	Jamuani	21°57'36.4"N	86°13'27.9"E
249	Similipal North WL				Santali Cottage-09nos.	Jamuani	21°57'36.4"N	86°13'27.9"E
250	Similipal North WL				Bamboo Cottage-01no.	Jamuani	21°57'36.4"N	86°13'27.9"E
251	Similipal North WL				Tent-4nos.	Jamuani	21°57'36.4"N	86°13'27.9"E
252	Similipal North WL				Antipoaching Check Gate	Jamuani chhaka	21°57'36.4"N	86°13'27.9"E

ANNEXURE XXXII

LIST OF CHECK POSTS

SL. No.	Division	Location of barriers (check gate)	Type	Range	Latitude			Longitude		
					Deg	Min	Sec	Deg	Min	Sec
1	Similipal South WL Division	Gunduria	Wooden	Bhanjabasa WL	21	38	39.4	86	24	36.8
2	Similipal South WL Division	Taldiha (Devkund)	Iron	Dukura WL	21	40	33.2	86	28	30.7
3	Similipal South WL Division	Baniabasa	Iron	Dukura WL	21	45	12.1	86	29	8
4	Similipal South WL Division	Kulipal	Iron	Jenabil WL	21	43	28.9	86	26	5.1
5	Similipal South WL Division	Kandeyar	Wooden	National Park WL	21	48	42.3	86	15	39.6
6	Similipal South WL Division	Kabatghai	Iron	National Park WL	21	47	53.6	86	15	47.4
7	Similipal South WL Division	Khejuri	Iron	National Park WL	21	48	20.8	86	18	35.1
8	Similipal South WL Division	Khejuri	Wooden	National Park WL	21	48	16	86	18	20.9
9	Similipal South WL Division	Barigaon	Wooden	National Park WL	21	49	16.3	86	15	22.1
10	Similipal South WL Division	Nawana South WL RO(Rajabasa)	Wooden	Nawana South WL	21	49	38.6	86	24	41.6
11	Similipal South WL Division	Pithabata South WL /Gate	Iron	Pithabata South WL	21	56	25.2	86	34	40.5
12	Similipal South WL Division	Tarajodi	Wooden	Pithabata South WL	21	57	3.1	86	34	24.5
13	Similipal South WL Division	Namti(Lulung)	Iron	Pithabata South WL	21	55	59.5	86	32	55.6
14	Similipal South WL Division	Bhajam	Iron	Pithanata South WL	21	57	37	86	29	33.2
15	Similipal South WL Division	Manbhanga Gate	Iron	Podadiha WL	21	32	20.7	86	24	11.6
16	Similipal South WL Division	Dangadiha Gate	Iron	Podadiha WL	21	30	43.5	86	19	55.4
17	Similipal South WL Division	Kantiali Hudisahi	Wooden	Podadiha WL	21	34	20	86	25	24
18	Similipal South WL Division	Bisipur Check gate	Iron	UBK WL	21	44	13.3	86	9	22.5
19	Similipal South WL Division	Malabasa	Iron	UBK WL	21	37	6.3	86	14	12.5

20	Similipal North WL Division	Kaliani	Manned	Gurguria WL Range	21	55	14	86	9	35
21	Similipal North WL Division	Kalikaprasad	Manned	Gurguria WL Range	21	53	56	86	11	23
22	Similipal North WL Division	Gurguria	Manned	Gurguria WL Range	21	51	20	86	14	51.7
23	Similipal North WL Division	Talabandha	Un-manned	Talabandha WL Range	22	1	44	86	20	36
24	Similipal North WL Division	Nawana	Un-manned	Nawana WL Range	21	53	20	86	23	6.1
25	Similipal North WL Division	Nigirdha	Manned	Nawana WL Range	21	51	11	86	27	42
26	Similipal North WL Division	Brundaban	Manned	Chahala WL Range	21	58	19.5	86	16	45.8
27	Similipal North WL Division	Machinenala	Manned	Chahala WL Range	21	57	55.7	86	20	22
28	Similipal North WL Division	Mathurakharei	Manned	Chahala WL Range	22	1	2.8	86	18	35.1
29	Similipal North WL Division	Chahala (no-entry)	Un-manned	Chahala WL Range	21	59	8.8	86	17	34.6
30	Similipal North WL Division	Ranibhol	Manned	Thakurmunda WL Range	21	37	29.1	86	12	11.1
31	Similipal North WL Division	Karkatbeda	Manned	Thakurmunda WL Range	21	53	55.1	86	11	24.4
32	Similipal North WL Division	Tulsibani	Manned	Barehipani WL Range	21	58	7	86	9	16.3
33	Similipal North WL Division	Jamuani chhaka(New)	Manned	Barehipani WL Range	21	57	36.4	86	13	27.9
34	Similipal North WL Division	Barakammunda	Manned	Kendumundi WL Range	21	48	14	86	6	28.9

ANNEXURE -XXXIII

WATCH TOWERS IN CORE AREA OF SIMILIPAL TIGER RESERVE

SL No	Division	Range	Section	Beat	Name of the Camp	Latitude	Longitude	Remark
1	Similipal South WL	Jenabil WL	Jenabil	Jamunagarh	Jenabil Watch Tower	21°43'42.3" N	86°21'35.3" E	Watch tower
2		Jenabil WL	Kulipal	Kulipal	Kulipal Watch Tower	21°43'08.1" N	86°25'49.6" E	Watch tower
3		National Park WL	Kabatghai	Kabatghai II	Kabatghai II Watch Tower	21°47'27.4" N	86°16'12.7" E	Watch tower
4		UBK WL	Matughar	Matughar	Matughar Watch Tower	21°37'36.0" N	86°18'15.0" E	Watch tower cum anti-poaching camp
5		UBK WL	Devasthali	Devasthali	Devasthali Watch Tower	21°42'12.0" N	86°16'09.0" E	Watch tower cum anti-poaching camp
6	Similipal North WL	Kendumundi WL	Ranipat	Ranipat	Kiajhari	21°50'04.7"N	86°07'58.8"E	CAMPA APO-2020-21
7		Nawana North WL	Joranda	Joranda	Joranda	21°56'08.5"N	86°24'12.1"E	
8		Chahala WL	Karkachia	Karkachia	Machiniala	21°57'55.7"N	86°20'22.0"E	CAMPA APO 2019-20
9			Rajpal	Rajpal	Rajpal	21°55'45.8"N	86°14'58.1"E	
10			Chahala	Chahala	Chahala	21°59'08.8"N	86°17'34.6"E	For Animal Sighting
11			Rajpal	Rajpal	Brundaban	21°58'19.5"N	86°16'45.8"E	For Animal Sighting
12		Barehipani WL	Matighati	Matighati II	Matighati	21°55'19.0"N	86°20'47.0"E	
13		Chahala WL	Rajpal	Jodadiha	Porogoda	21°57'22.6"N	86°16'39.3"E	MS Fabricated Watch Tower for Forest Fire Monitoring
14			Rajpal	Jodadiha	Jodadiha Meadow	21°58'31.6"N	86°18'12.9"E	
15			Chahala	Chahala	Rajabhadi	22°00'03.0"N	86°17'37.0"E	
16		Kendumundi WL	Baghlata	Bisipur	Pandadapani	21°43'24.2"N	86°08'17.0"E	

ANNEXURE XXXIV

LIST OF ROADS

Name of the Division	Name of the C.D Block	Name of the Forest Road	From	To	Type of Road					New constructed road in km. Specify	Total lenght in Kms
					Surfaced Road in Kms			Un-surfaced Road in Kms			
					Warer Bound Macadam	Black Top	Cement Concrete	Motorable	Non-Motarable		
1	3	4	5	6	7	8	9	10	11	12	13
Similipal South WL	Core Area	Jenabil	Jamuna	Kulipal	-	-	-	19	-	-	19
Similipal South WL	Core Area	Kulipal	Kulipal	6No.	-	-	-	8	-	-	8
Similipal South WL	Core Area	6No.	6No.	Bhospal Chhaka	-	-	-	7	-	-	7
Similipal South WL	Core Area	Mahantahana	Hatighara Causeway	Mohantahana	-	-	-	4	-	-	4
Similipal South WL	Core Area	Gurandia	Hatighara Causeway	Dhalamati	-	-	-	12	-	-	12
Similipal South WL	Core Area	Manasi	Gurandia	Manasi	-	-	-	3	-	-	3
Similipal South WL	Core Area	Srnichaturi	Dove Chhaka	Jenabil Border	-	-	-	10	-	-	10
Similipal South WL	Core Area	Sarabasa	Sarabasa Ch-haka	Jadapal	-	-	-	8	-	-	8
Similipal South WL	Core Area	Sendhakila	WT Chhaka	Tarinibila Board-er	-	-	-	9	-	-	9

Similipal South WL	Core Area	Hatisal	Sendhakila Chhaka	Hatisal Chhaka	-	-	-	13	-	-	13
Similipal South WL	Core Area	Gourakantha	Sarua Chhaka	Gourakantha	-	-	-	2	-	-	2
Similipal South WL	Core Area	Sarua	Gourakantha	Sarua	-	-	-	6	-	-	6
Similipal South WL	Core Area	Tiktali	Gourakanta	Tiktali	-	-	-	8	-	-	8
Similipal South WL	Core Area	Gunduria	Sarua	Gunduria Chhaka	-	-	-	6	-	-	6
Similipal South WL	Core Area	Choudhrigarg	Tiktali	Gunduria Chhaka	-	-	-	4	-	-	4
Similipal South WL	Core Area	Rusibasa	Rusubasa Chhaka	Rusibasa	-	-	-	6	-	-	6
Similipal South WL	Core Area	Kiabasa	Gourakanta	Kiabasa	-	-	-	6	-	-	6
Similipal South WL	Core Area	Tiktali	Tiktali	Meghasani Hill Down	-	-	-	5	-	-	5
Similipal South WL	Core Area	Edelkocha	Ringroad	Edelkocha	-	-	-	5	-	-	5
Similipal South WL	Core Area	Sizughara	Sizughara Chhaka	Sizughara manchan	-	-	-	-	5	-	5
Similipal South WL	Core Area	Charichhaka	Kulipal WT	Charichhaka	-	-	-	3	-	-	3
Similipal South	Udala	Devkund Forest Road	Budhamara	Devkund	-	-	-	7	-	-	7
Similipal South WL	Core Area	Jamunadanda	UBK	Jamunadanda	-	-	-	9	-	-	9
Similipal South WL	Core Area	Matughar	UBK	Narangamula	-	-	-	4	-	-	4

Similipal South WL	Core Area	Meghasan	Meghasani Chhaka	Meghasan	-	-	-	10	-	-	10
Similipal South WL	Core Area	Tarinibila	UBK	Tarinibila	-	-	-	7	-	-	7
Similipal South WL	Core Area	Tarinibila	Tarinibila	Jampanidanda	-	-	-	5	-	-	5
Similipal South WL	Core Area	Dhuduram	UBK	Dhuduram Chhaka	-	-	-	5	-	-	5
Similipal South WL	Core Area	Dhuduram	Dhuduram Chhaka	(Dhuduram)WHS	-	-	-	3	-	-	3
Similipal South WL	Core Area	Patbil	Dhuduram Chhaka	Patbil	-	-	-	5	-	-	5
Similipal South WL	Core Area	Devasthali	Patbil	Debasthali	-	-	-	5	-	-	5
Similipal South WL	Core Area	Devasthali	Debasthali	Nuagan	-	-	-	5	-	-	5
Similipal South WL	Core Area	Devasthali	Salmundi	Sarudala	-	-	-	6	-	-	6
Similipal South WL	Core Area	Bahaghara	Patbil	Bahaghar	-	-	-	6	-	-	6
Similipal South WL	Core Area	Bahaghar	Bahaghar Chhaka	Amboghati	-	-	-	7	-	-	7
Similipal South WL	Core Area	Champagoda	Bahaghra Chhaka	Pokharibadi	-	-	-	7	-	-	7
Similipal South WL	Core Area	Champagoda	Pokharibadi	Silda	-	-	-	3	-	-	3
Similipal South WL	Core Area	Silda	Silda Camp	Silda Chhaka	-	-	-	3	-	-	3
Similipal South WL	Core Area	Silda	Silda Chhaka	Gamuchha Jharan	-	-	-	2	-	-	2

Similipal South WL	Core Area	Kandadhenu	Patbil	Kandadhenu	-	-	-	8	-	-	8
Similipal South WL	Core Area	Kandadhenu	Kandadhenu	Silda Chhaka	-	-	-	6	-	-	6
Similipal South WL	Core Area	Jatiani	Kandadhenu	Hatidhar	-	-	-	14	-	-	14
Similipal South WL	Core Area	Baladaghara	Patbil wooden bridge	Baladaghar	-	-	-	2.5	-	-	2.5
Similipal South WL	Core Area	Baladaghara	Baladaghara-Chhaka	Mohabirsal	-	-	-	6	-	-	6
Similipal South WL	Core Area	Bahaghara	Bahaghra Chhaka	Bahaghara	-	-	-	2	-	-	2
Similipal South WL	Core Area	Bahaghara	Malabasa	Sadananda	-	-	-	3.5	-	3.5	3.5
Similipal South WL	Core Area	Dhudruchampa-Kandhia Jharan	Dhuduruchampa	Kandhia Jharan	-	-	-	4	-	-	4
Similipal South WL	Core Area	Dhudruchampa-Lengdakocha	Dhudruchampa	Lengdakocha	-	-	-	4	-		4
Similipal South WL	Core Area	Dhuduruchompa-Budhabalanga bridge	Dhuduruchompa	Budhabalanga brdge	-	-	-	1	-	-	1
Similipal South WL	Core Area	Bhadragoda chhak-Jharanaghati	Bhadragoda chhak	Jharanaghati	-	-	-	10	-	-	10
Similipal South WL	Core Area	Bakua-Godsimilipal chhak	Bakua	Godsimilipal chhak	-	-	-	6	-	-	6
Similipal South WL	Core Area	Bakua-Lembugoda via chherabil camp	Bakua	Lembugoda via chherabil camp	-	-	-	5	-		5
Similipal South WL	Core Area	Bakua-Dhalamati	Bakua	Dhalamati	-	-	-	6	-	-	6
Similipal South WL	Core Area	Lengda Kacha-Bad makabadi	Lengda Kacha	Bad makabadi	-	-	-	6	-	-	6

Similipal South WL	Core Area	Lengda Kacha-San makabadi	Lengda Kacha	San makabadi	-	-	-	4	-	-	4
Similipal South WL	Core Area	Dhundubasa ch-hak-Dhundubasa	Dhundubasa chhak	Dhundubasa	-	-	-	7	-	-	7
Similipal South WL	Core Area	Jodapal chhak-Jodapal	Jodapal chhak	Jodapal camp	-	-	-	7	-	-	7
Similipal South WL	Core Area	Kandiajharan-Jenabil border	Kandiajharan	Jenabil border	-	-	-	9	-	-	9
Similipal South WL	Core Area	Tiger Hill Chhak-Tiger Hill	Tiger Hill Chhak	Tiger Hill	-	-	-	3	-	3	3
Similipal South WL	Core Area	Kaniabasa Chhak-Ka-niabasa	Kaniabasa Chhak	Kaniabasa	-	-	-	3	-	3	3
Similipal South WL	Core Area	Dhundubasa -Bhaspal Ghati	Dhundubasa	Bhaspal Ghati-	-	-	-	2	-	2	2
Similipal South WL	Core Area	Mahabirsal-Nimia	Mohabirsal	Nimia	-	-	-	5	-	-	5
Similipal South WL	Core Area	Mahabirsal Camp-Khadichaturi	Mahabirsal	Khadichaturi	-	-	-	4	-	-	4
Similipal South WL	Core Area	Mahabirsal-Sarudala	Mahabirsal	Sarudala	-	-	-	3	-	-	3
Similipal South WL	Core Area	Matiaghat - Sarudala	Matiaghat	Sarudala	-	-	-	9	-	-	9
Similipal South WL	Core Area	Chandraposi - Rusibasa	Chandraposi	Rusibasa	-	-	-	5	-	-	5
Similipal South WL	Core Area	KH-16 - Doligoda	KH-16	Doligoda	-	-	-	5	-	-	5
Similipal South WL	Core Area	Doligoda - Rusibasa Chhaka	Doligoda	Rusibasa Chhaka	-	-	-	4	-	-	4
Similipal South WL	Core Area	Matiaghat- Nuagaon	Matiaghat	Nuagaon	-	-	-	6	-	-	6

Similipal South WL	Core Area	Nuagaon - Jamuna	Nuagaon	Jamuna	-	-	-	3	-	-	3
Similipal South WL	Core Area	Kabatghai - Matiaghat	Kabatghai	Matiaghat	-	-	-	8	-	-	8
Similipal South WL	Core Area	Khejuri-Bakua	Khejuri	Bakua	-	-	-	6	-	-	6
Similipal South WL	Core Area	Bakua-Dhalamati	Bakua	Dhalamati	-	-	-	6	-	-	6
Similipal South WL	Core Area	Murumghati-Mahantahana	Murumghati	Mahantahana	-	-	-	7	-	-	7
Similipal South WL	Core Area	Khadichaturi-Panianalo-Rusibasa	Khadichaturi	Rusibasa	_	-	-	7	-	7	7
Similipal South WL	Core Area	Bankapani-Pokharidhipa	Bankapani	Pokaharidhipa	-	-	-	2	-	2	2
Similipal South WL	Core Area	Khadichaturi-Towerghati	Khadichaturi	Towerghati	-	-	-	2	-	2	2
Similipal South WL	Core Area	Bhanjabasa - Tangiria Manchan	Bhanjabasa	Tangiria Manchan	-	-	-	5	-	-	5
Similipal South WL	Core Area	Rajabhadi-Chadheichua	Rajabhadi	Chadheichua	-	-	-	2	-	-	2
Similipal South WL	Core Area	Tangiria Manchan-Sarua Chhaka	Tangiria Manchan	Sarua Chhaka	-	-	-	4	-	-	4
Similipal South WL	Core Area	Champachua Chhaka-Chidia Chaturi	Champachua Chhaka	Chidia Chaturi	-	-	-	3	-	-	3
Similipal South WL	Core Area	Chidia Chaturi-Ghagra Nala	Chidia Chaturi	Ghagra Nala	-	-	-	3	-	-	3
Similipal South WL	Core Area	Ghagra Camp-Ghagra Causeway	Ghagra Camp	Ghagra Causeway	-	-	-	2	-	-	2
Similipal South WL	Core Area	Marwadi Bandha Chhaka-Marwadi Bandha Camp	Marwadi Bandha Chhaka	Marwadi Bandha Camp	-	-	-	3	-	-	3

Similipal South WL	Core Area	Amba Chhaka-Mathasila Forest	Amba Chhaka	Mathasila Forest	-	-	-	4	-	-	4
Similipal South WL	Core Area	Mathasila Forest-Bhanjabasa Camp	Mathasila Forest	Bhanjabasa Camp	-	-	-	4	-	-	4
Similipal South WL	Core Area	Amba Chhaka-Champachua Chhaka	Amba Chhaka	Champachua Chhaka	-	-	-	7	-	-	7
Similipal South WL	Core Area	Champachua Chhaka-Nachipurdiha Chhaka	Champachua Chhaka	Nachipurdiha Chhaka	-	-	-	5	-	-	5
Similipal South WL	Core Area	Dhobighat Chhaka-Dhobighat Forest	Dhobighat Chhaka	Dhobighat Forest	-	-	-	2	-	-	2
Similipal South WL	Core Area	Matughara-Amba Chhaka	Matughara	Amba Chhaka	-	-	-	4	-	-	4
Similipal South WL	Core Area	Meghasani Chhaka-Meghasani Peak Down	Meghasani Chhaka	Meghasani Peak Down	-	-	-	3	-	-	3
Similipal South WL	Core Area	Ghagra Camp-Ghagra 1 Camp	Ghagra Camp	Ghagra 1 Camp	-	-	-	3.8	-	3.8	3.8
Similipal South WL	Core Area	Dhobighat Camp-Bahaghara-I	Dhobighat Camp-	Bahaghara-1	-	-	-	5.4	-	5.4	5.4
Similipal South WL	Core Area	Bahaghara-II ch-hak-Bahaghara-II	Bahaghara-II chhak	Bahaghara-II	-	-	-	5.8	-	5.8	5.8
Similipal South WL	Core Area	Babjibasa chhak-Bad-achaturi	Babjibasa chhak	Badachaturi	-	-	-	2	-	2	2
Similipal South WL	Core Area	Bhajam Coreline	Bhajam Coreline	Nawna Border	-	-	-	5	-	-	5
Similipal South WL	Core Area	Lulung Gate-Namti	Lulung Gate	Namti	-	-	-	2	-	-	2
Similipal South WL	Core Area	Bhajam-Baunskhal	Bhajam	Baunskhal	-	-	-	12	-	-	12
Similipal South WL	Core Area	Namti-Kachudahan	Namti	Kachudahan	-	-	-	12	-	-	12

Similipal South WL	Core Area	Kachudahan-Bhandadar	Kachudahan	Bhandadar	-	-	-	12	-	-	12
Similipal South WL	Core Area	Kachudahan-Andharitota	Kachudahan	Andharitota	-	-	-	6	-	-	6
Similipal South WL	Core Area	Kachudahan-Domuhani	Kachudahan	Domuhani	-	-	-	2	-	-	2
Similipal South WL	Core Area	Kachudahan-Charichhak	Kachudahan	Charichhak	-	-	-	-	7	-	7
Similipal South WL	Core Area	Andharitota-Badmakabadi	Andharitota	Badmakabadi	-	-	-	6	-	-	6
Similipal South WL	Core Area	Andharitota-Sabarbasa	Andharitota	Sabarabasa	-	-	-	5	-	-	5
Similipal South WL	Core Area	Badmakabadi-Bahalda Core Line	Badmakabadi	Bahalda Coreline	-	-	-	5	-	-	5
Similipal South WL	Syamakhunta	Laxmiposi-Besarpani	Laxmiposi	Besarpani	-	-	-	13	-	-	13
Similipal South WL	Core Area	Balikhal Chhaka-Domunhani Nala	Balikhal Chhaka	Domuhani Nala	-	-	-	10	-	-	10
Similipal South WL	Jashipur	Gopinathpur-Balikhal	Gopinathpur Camp	Balikhal Road	-	-	-	2	-	-	2
Similipal South WL	Shyamakhunta	Pithabata-Bhajam tourist road	Pithabata	Bhajam	-	-	-	18	-	-	18
Similipal South WL	Shyamakhunta	Lulung tourist road	Munidara Chhaka	Lulung Gate	-	-	-	3	-	-	3
Similipal South WL	Bangriposi	Purnapani Chhaka-Chakidi	Purnapani Chhaka	Chakidi Beat	-	-	-	2	-	-	2
Similipal South WL	Bangiriposi	Nedam-Baribeda	Nedam	Baribeda	-	-	-	4	-	-	4

Similipal South WL	Thakur-munda	Dangadiha-I	Golasahi	Ambajharana	-	-	-	2	-	2	2
Similipal South WL	Thakur-munda	Dangadiha-II	Patrapada	Kaprajodi	-	-	-	5	-	5	5
Similipal South WL	Kapti-pada	Dahisahi-Baghaanta	Dahisahi	Baghaanta	-	-	-	3	-	-	3
Similipal South WL	Kapti-pada	Manabhanga-Danga-diha	Manabhanga Forest Gate	Dangadiha Forest Gate	-	-	0.25	14.25	-	-	14.5
Similipal South WL	Kapti-pada	Banjhikusum-Rajapola	Banjhikusum	Tajapola	-	-	-	1	-	-	1
						Total:-	668.5				
Similipal North WL Division	Thakur-munda	Karkatbeda - Sadanan-da A.P Camp	Karkatbeda	Sadananda A.P Camp	-	-	-	10	-	-	10
Similipal North WL Division	Thakur-munda	Sadananda A.P Camp - UBK Core Line	Sadananda	UBK Core LIne	-	-	-	2	-	-	2
Similipal North WL Division	Thakur-munda	Ghodabindha - Sand-haghati	Ghodabindha	Sandhaghati	-	-	-	7	-	-	7
Similipal North WL Division	Thakur-munda	Kirkichipal - Kaniya Nagari A.P Camp	Kirkichipal	Kaniyanagari A.P Camp	-	-	-	2	-	-	2
Similipal North WL Division	Karanjia	Kendumundi - Kan-dadhenu	Kendumundi	Gamucha Jharan	-	-	-	8	-	-	8
Similipal North WL Division	Karanjia	Rangamatia - Jatiani	Rangamatia	Bisipur Camp (Core Line)	-	-	-	9	-	-	9
Similipal North WL Division	Karanjia	Barahkamunda - Kia-jhari	Barakamunda	Kiajhari	-	-	-	7	-	-	7
Similipal North WL Division	Jashipur	Kalikaprasad - Gur-guria	Kalikaprasad	Gurguria	-	-	-	11	-	-	11
Similipal North WL Division	Jashipur	Kalikaprasad - Gur-guria	Gurguria	Kabatghai	-	-	-	12	-	-	12
Similipal North WL Division	Jashipur	Lanjighasara - Kolha	Lanjighasara	Kolha	-	-	-	5	-	-	5

Similipal North WL Division	Jashipur	Barigaon - Khejuri	Barigaon	Khejuri	-	-	-	8	-	-	8
Similipal North WL Division	Jashipur	Tulsibani-Badghati	Tulasibani	Badaghati	-	-	-	17.5	-	-	17.5
Similipal North WL Division	Jashipur	Machinnala-Hata Chhak	Machininenala	Hata Chhak	-	-	-	3	-	-	3
Similipal North WL Division	Jashipur	Barehipani Forest Road	Kolha Ridge	Barehipani Hata Chhak	-	-	-	14	-	-	14
Similipal North WL Division	Jashipur	Bandirabasa Forest Road	Kolha Ridge	Bandirabasa	-	-	-	10	-	-	10
Similipal North WL Division	Jashipur	Chahala-Brundaban Forest Road	Chahala	Brundaban	-	-	-	3	-	-	3
Similipal North WL Division	Jashipur	Brundaban-Machinenala Forest Road	Brundaban	Machinenala	-	-	-	8	-	-	8
Similipal North WL Division	Jashipur	Barehipani hata chhak-Bulbul Beat Forest Road	Barehipani hata chhak	Bulbul Beat	-	-	-	3	-	-	3
Similipal North WL Division	Jashipur	Badghati-Brundaban Forest Road	Badghati	Brundaban	-	-	-	5	-	-	5
Similipal North WL Division	Jashipur	Bulbul Beat-Fall view Forest Road	Bulbul Beat	Fall view	-	-	-	3	-	-	3
Similipal North WL Division	Jashipur	Bulbul Beat-Champaghati Forest Road	Bulbul Beat	Champaghati	-	-	-	8	-	-	8
Similipal North WL Division	Jashipur	Chahala Ring road			-	-	-	14	-	-	14
Similipal North WL Division	Jashipur	Pandabandha road	Ring road	Pandabandha	-	-	-	3	-	-	3
Similipal North WL Division	Jashipur	Kairakacha	Chahala	Kairakacha	-	-	-	3	-	-	3
Similipal North WL Division	Jashipur	Jodadiha	Chahala	Jodadiha	-	-	-	4.5	-	-	4.5

Similipal North WL Division	Jashipur	Rajpal road	Rajpal chhak	Rajpal	-	-	-	12	-	-	12
Similipal North WL Division	Jashipur	Karkochia	Karkachia Chhak	Karkachia Beat				9	-	-	9
Similipal North WL Division	Jashipur	Karkachia -Bhartunia	Karkachia	Bhatunia	-	-	-	12	-	-	12
Similipal North WL Division	Jashipur	Mathurakharei road	Jojo chhak	Mathurakharei	-	-	-	10	-	-	10
Similipal North WL Division	Jashipur	Haldia	Cement polia	Haldia beat	-	-	-	6	-	-	6
Similipal North WL Division	Jashipur	Kairakacha dam	Chahala	Dam	-	-	-	1.5	-	-	1.5
Similipal North WL Division	Jashipur	Banglow road	Chahala	Banglow	-	-	-	0.5	-	-	0.5
Similipal North WL Division	Jashipur	Nawana-Champaghati	Nawana	Champaghati	-	-	-	3	-	-	3
Similipal North WL Division	Jashipur	Nawana-Bhajam hill Top	Nawana	Bhajam Hill top	-	-	-	20	-	-	20
Similipal North WL Division	Jashipur	Gitilpidhi-Joranda	Gitilpidhi	Joranda	-	-	-	6	-	-	6
Similipal North WL Division	Jashipur	Kusumbani - Bhartunia	Kusumbani	Bhartunia	-	-	-	8	-	-	8
Similipal North WL Division	Jashipur	Kusumbani-Pand-abandha Ring Road	Kusumbani	Pandabandha Ring Road	-	-	-	6	-	-	6
Similipal North WL Division	Jashipur	Khadkei-Baunskhal	Khadkei	Baunskhal	-	-	-	12	-	-	12
Similipal North WL Division	Jashipur	Joranda Ring Road			-	-	-	8	-	-	8
Similipal North WL Division	Jashipur	Panasia Chhak - Pana-sia Dam	Panasia Chhak	Panasia Dam	-	-	-	1	-	-	1

Similipal North WL Division	Jashipur	Pandabandha Ring Road			-	-	-	2	-	-	2
Similipal North WL Division	Jashipur	Panasia Chhak-Bhandadhar	Panasia Chhak	Bhandadhar Camp	-	-	-	5	-	-	5
Similipal North WL Division	Jashipur	Bhandadhar-Khadkai Ghati	Bhandadhar	Khadkai Ghati	-	-	-	4	-	-	4
Similipal North WL Division	Jashipur	Nigirda-Sanmakabadi	Nigirda	Sanmakabadi	-	-	-	4	-	-	4
Similipal North WL Division	Jashipur	Nawana-Bakua Chhak	Nawana	Bakua Chhak	-	-	-	7	-	-	7
Similipal North WL Division	Jashipur	Bakua Chhak-Dhudurchampa	Bakua Chhak	Dhudurchampa	-	-	-	8	-	-	8
Similipal North WL Division	Jashipur	Panasia-Kusumbani	Panasia	Kusumbani	-	-	-	5	-	-	5
Similipal North WL Division	Bangiriposi	Talabandha-Chahala	Talabandha	Chahala	-	-	-	13	-	-	13
							Total	343			
						G.Total:-	1011.500				

ANNEXURE XXXV

LIST OF VEHICLES

SL. No.	Name of Division	Registration No. of vehicle/ Make model & Type of vehicle	Date of purchase	Present condition of vehicle	Remarks
1	Baripada Circle	OD-02AK-4500 Toyota Innova	08.02.2017	Running	Field Director Office, STR
2		OD-11R-6414 / Govt. Scorpio S-11 BS4	24.04.2019	Running	Field Director Office, STR
3	Similipal South WL	OD-11R-6413 / Govt. Scorpio S-11 BS4	24.04.2019	Running	Dy. Director Office, STR
4		OD-02Q-0313 / Govt. Mahindra Scorpio	20.04.2014	Running	Similipal South WL Division Office
5		OD-11G-4747 / Govt. Mahindra Bolero GLX	18.04.2016	Running	Pithabata North WL Range
6		OD-11Z-0695 / Govt. Mahindra Bolero B4 BS	29.03.2022	Running	Similipal South WL Division Office
7		OR-11K-9659 / Govt. Mahindra Bolero Camper	15.03.2012	Running	Nawana(S) Range
8		OR-11K-9660 / Govt. Mahindra Bolero Camper	15.03.2012	Running	National Park Range
9		OD-11C-1791 / Govt. Mahindra Thar jeep	29.05.2014	Running	Bhanjabasa Range
10		OD-11G-5424 / Govt. Mahindra Thar jeep	04.05.2016	Running	Jenabil Range
11		OD 11R-6412 / Govt. Mahindra Bolero Camper	24.04.2019	Running	Jenabil Range
12		OD-11G-5425 / Govt. Mahindra Thar jeep	04.05.2016	Running	Pithabata South Range
13		OD 11Y-9109 / ICICI Foundation. Mahindra Bolero Camper	24.03.2022	Running	Pithabata South Range
14		OR-11H-1802 / WWF. Mahindra Bolero Camper	23.02.2010	Running	UBK Range
15		OD 11R-6411 / Govt. Mahindra Bolero Camper	24.04.2019	Running	UBK Range
16		OD-33A-2686 / Govt. Mahindra Bolero DI	04.08.2014	Running	UBK Range
17	Similipal North WL	OD-11K-5252 / Govt. Scorpio	06.05.2021	Running	Similipal North WL Division
18		OR-02AU-1583 / Govt. Scorpio	08.09.2008	Running	Similipal North WL Division
19		OD-11-6566 / Govt. Camper	16.04.2013	Required Maintenance	Talabandha WL Range

20		OR-11L-1384 / Govt. Camper	29.05.2012	Required Maintenance	Thakurmunda North WL Range
21		OR-11J-7206 / Govt. Camper	13.01.2012	Required Maintenance	Kendumundi WL Range
22		OR-11H-1803 / Govt. Camper	04.03.2010	Required Maintenance	Nawana North WL Range
23		OD-11Y-9128/ Govt. Camper	26.05.2022	New Govt. Vehicle (Good condition)	
24		OR-11D-2490 / Govt. Camper	08.04.2005	Unserviceable	Barehipani WL Range
25		Mahindra Thar	21.06.2014	Required Maintenance	Gurguria WL Range
26		OD-11C-1792 / Govt. Mahindra Thar jeep	29.05.2014	Running	STPF, Gurguria WL Range

ANNEXURE XXXVI

LIST OF V.H.F. STATIONS OF SIMILIPAL TIGER RESERVE

Sl. No.	Name of Range/ Division	Name of place	Name of the Station	Frequency	Status
1	Bhanjabasa WL Range/ Similipal South WL Division	Gunduria	Gaur	159.9 MHz	Static
2		Marwari Bandha	Marwari Bandha	159.9 MHz	Static
3		Bhanjabasa	Baza	159.9 MHz	Static
4		Barhagarha-I	Barhagarha-I	159.9 MHz	Static
5		Barhagarha-II	Barhagarha-II	159.9 MHz	Static
6		Dhobighat	Dhobighat	159.9 MHz	Static
7		Ghagra-I	Ghagra-I	159.9 MHz	Static
8		Ghagra-II	Ghagra-II	159.9 MHz	Static
9		Putuldiha	Putuldiha	159.9 MHz	Static
10		Nekdancha	Naja	159.9 MHz	Static
11		Mathasila	Mathasila	159.9 MHz	Static
12		Balidar	Belara	159.9 MHz	Static
13	Dukura WL Range/ Similipal South WL Division	Chandanchaturi-II	Chandanchaturi-II	159.9 MHz	Static
14		Sapanchua	Sapanchua	159.9 MHz	Static
15		Bahalda	Bahalda	159.9 MHz	Static
16		Nuagaon-I	Nuagaon-I	159.9 MHz	Static
17		Dengam	Bandhan	159.9 MHz	Static
18		Nuagaon-II	Nuagaon-II	159.9 MHz	Static
19		Phulbadia	Pangolin	159.9 MHz	Static
20		Patsanipur	Porcupine	159.9 MHz	Static
21		Taldiha	Taldiha	159.9 MHz	Static
22		Manikpur	Manikpur	159.9 MHz	Static
23		Baniabasa	Bandhan	159.9 MHz	Static
24		Dukura RO	Dhaura	159.9 MHz	Static
25	Jenabil WL Range/ Similipal South WL Division	Gurandia	Gurandia	159.9 MHz	Static
26		Gayalgoda	Gayalgoda	159.9 MHz	Static
27		Manasi	Manasi	159.9 MHz	Static
28		Charichhak	Charichhak	159.9 MHz	Static
29		Hatishal	Hatishal	159.9 MHz	Static
30		Jamuna	Jamuna	159.9 MHz	Static
31		Jenabil	Hatighar	159.9 MHz	Static
32		Senichaturi	Senichaturi	159.9 MHz	Static
33		Mohantahana	Mohantahana	159.9 MHz	Static

34		Hatighar	Jackle	159.9 MHz	Static
35		Sarabasa	Sarabasa	159.9 MHz	Static
36		Sizughar	Sizughar	159.9 MHz	Static
37		Kulipal	Kulipal	159.9 MHz	Static
38		Chhanumber	Chhanumber	159.9 MHz	Static
39		Tiktali	Tiktali	159.9 MHz	Static
40		Sarua	Stag	159.9 MHz	Static
41		Choudhurigarh	Choudhurigarh	159.9 MHz	Static
42		Gourakantha	Gourakantha	159.9 MHz	Static
43		Rusibasa	Rusibasa	159.9 MHz	Static
44	National Park WL Range/ Similipal South WL Division	Kabatghai I	Barigaon	159.9 MHz	Static
45		Kabatghai II	Kabatghai	159.9 MHz	Static
46		Doligoda	Doligoda	159.9 MHz	Static
47		Khejuri	Khejuri	159.9 MHz	Static
48		Cheruanali	Cheruanali	159.9 MHz	Static
49		Ganapati	Ganapati	159.9 MHz	Static
50		Rusibasa	Rusibasa	159.9 MHz	Static
51		Mahabirsal	Mahabirsal	159.9 MHz	Static
52		Nimia	Nimia	159.9 MHz	Static
53		Khadichaturi	Khadichaturi	159.9 MHz	Static
54		Panianla	Panianla	159.9 MHz	Static
55		Ransa	Ransa	159.9 MHz	Static
56		Nuagaon	Nilo	159.9 MHz	Static
57	Nawana South WL Range/ Similipal South WL Division	Bhadragoda	Bhadragoda	159.9 MHz	Static
58		Bakua-II	Bakua	159.9 MHz	Static
59		Chherabil	Chherabil	159.9 MHz	Static
60		Rajabasa RO	Dove	159.9 MHz	Static
61		Kandiajharan	Kandiajharan	159.9 MHz	Static
62		Jodapal-II	Jodapal	159.9 MHz	Static
63		Dhundubasa	Dhundu	159.9 MHz	Static
64		Kaniabasa	Kaniabasa	159.9 MHz	Static
65		Jodapal-I (Khadiabasa)	Khadiabasa	159.9 MHz	Static
66		Lengdakacha	Lengdakacha	159.9 MHz	Static
67	Pithabata North WL Range/ Similipal South WL Division	Chapadihi	Chapadihi	159.9 MHz	Static

68		Badgaon	Badgaon	159.9 MHz	Static
69		Mahalisahi	Kantasola	159.9 MHz	Static
70		Chakidi	Chakidi	159.9 MHz	Static
71		Phuljhari	Phuljhari	159.9 MHz	Static
72		Jadapal	Bela	159.9 MHz	Static
73		Alubani	Haldibani	159.9 MHz	Static
74		Gendapokhari	Genda	159.9 MHz	Static
75		Champagarh	Champa	159.9 MHz	Static
76		Pithabata	Pine	159.9 MHz	Static
77		Rangamatia I	Rangamatia I	159.9 MHz	Static
78		Masanibila	Rangamatia II	159.9 MHz	Static
79		Nedam	Rangamatia	159.9 MHz	Static
80	Pithabata South WL Range/ Similipal South WL Division	Bada Makabadi	Makabadi	159.9 MHz	Static
81		Sabarbasa	Sabarbasa	159.9 MHz	Static
82		Gopinathpur	Gopinathpur	159.9 MHz	Static
83		Balikhal	Balikhal	159.9 MHz	Static
84		Namti-I	Namti	159.9 MHz	Static
85		Namti-II	Namti-II	159.9 MHz	Static
86		Bhajam	Balia	159.9 MHz	Static
87		Baunsakhal	Barasingha	159.9 MHz	Static
88		Kalasiduba	Kalasiduba	159.9 MHz	Static
89		Digdiga	Dingo	159.9 MHz	Static
90		Chandanchaturi-I	Cobra	159.9 MHz	Static
91		Kachudhan	Kachudhan	159.9 MHz	Static
92		Andharitota	Andharitota	159.9 MHz	Static
93		Palasibeda	Palasibeda	159.9 MHz	Static
94		Pithabata-I	Pithabata-I	159.9 MHz	Static
95		Pithabata-II	Pithabata-II	159.9 MHz	Static
96		Pithabata RO	Python	159.9 MHz	Static
97	Podadiha WL Range/ Similipal South WL Division	Dangadiha I	Dangadiha I	159.9 MHz	Static
98		Dangadiha II	Dangadiha II	159.9 MHz	Static
99		Dangadiha-III	Dangadiha-III	159.9 MHz	Static
100		Baghanta	Baghanta	159.9 MHz	Static
101		Antapur	Antapur	159.9 MHz	Static
102		Kantiali	Kantiali	159.9 MHz	Static
103		Nalakhanja	Nageshar	159.9 MHz	Static
104		Nachipur	Nachipur	159.9 MHz	Static
105		Podadiha RO	Pia Sala	159.9 MHz	Static

106	UBK WL Range/ Similipal South WL Division	Debasthali-I	Deer	159.9 MHz	Static
107		Jatiani	Jatiani	159.9 MHz	Static
108		Gamuchajharan	Gamuchajharan	159.9 MHz	Static
109		Bisipur Check gate	Bisipur Check gate	159.9 MHz	Static
110		Bahaghar	Bear	159.9 MHz	Static
111		Silda	Silda	159.9 MHz	Static
112		Kandadhenu	Krait	159.9 MHz	Static
113		Matughar Watch Tower	Matughar	159.9 MHz	Static
114		Meghasani	Maina	159.9 MHz	Static
115		Champaghar	Champaghar	159.9 MHz	Static
116		Malabasa	Malabasa	159.9 MHz	Static
117		Panaskudar	Panaskudar	159.9 MHz	Static
118		Bengapani	Bengapani	159.9 MHz	Static
119		Patbil	Panthar	159.9 MHz	Static
120		Dhuduram	Dhal	159.9 MHz	Static
121		Taranibila	Turtle	159.9 MHz	Static
122		Baladaghara	Baladaghara	159.9 MHz	Static
123		UBK	Barha	159.9 MHz	Static
124	Gurguria WL Range / Similipal North WL Division	Gurguria	Gurguria	159.9 MHz	Servicable
125	Nawana WL Range / Similipal North WL Division	Khadkei	Khairi	159.9 MHz	Servicable
126		Pandabandha	Pandabandha	159.9 MHz	Servicable
127		Bhandadhar	Bhandadhar	159.9 MHz	Servicable
128		Joranda	Jaguar	159.9 MHz	Servicable
129		Nigirdha core	Nigirdha	159.9 MHz	Servicable
130		Kusumbani	Kusum	159.9 MHz	Servicable
131		Baunskhal	Barasinga	159.9 MHz	Servicable
132		Chakidi-II	Chakidi	159.9 MHz	Servicable
133	Chahala WL Range / Similipal North WL Division	Chahala	Chahala	159.9 MHz	Servicable
134		Kairakacha	Kairakacha	159.9 MHz	Servicable
135		Mathurakharei	Mathurakharei	159.9 MHz	Servicable
136		Pondabandha	Pondabandha	159.9 MHz	Servicable
137		Alahapani	Alahapani	159.9 MHz	Servicable
138		Haldia	Haldia	159.9 MHz	Servicable
139		Rajpal	Rajpal	159.9 MHz	Servicable
140		Jodadiha	Jodadiha	159.9 MHz	Servicable
141		Karkachia	Karkachia	159.9 MHz	Servicable

142		Bhatunia	Bhatunia	159.9 MHz	Servicable
143		Barehipani core	Barehipani core	159.9 MHz	Servicable
144		Brundaban	Brundaban	159.9 MHz	Servicable
145		Machinenalla	Machinenalla	159.9 MHz	Servicable
146	Thakurmunda WL Range /Similipal North WL Division	Tabbakal	Tabbakal	159.9 MHz	Servicable
147		Sadananda	Sadananda	159.9 MHz	Servicable
148		Kaniyanagari	Kaniyanagari	159.9 MHz	Servicable
149		Sudarsanpur	Sudarsanpur	159.9 MHz	Servicable
150		Thakurmunda W/L Range Office	Thakurmunda W/L Range Office	159.9 MHz	Servicable
151	Kendumundhi WL Range, / Similipal North WL Division	Kiajhari	Kiajhari	159.9 MHz	Servicable

ANNEXURE - XXXVII

LIST OF FRH/TOURIST LODGES

Sl No	Name of Nature Camp	Name of the Cottage	No. of Suit	Bed	Total Room	Total Bed	Remarks
1	Kumari Nature Camp	Bamboo Cottage (Double Beded)	4	8	20	40	
		Santali Cottage (Double Beded)	12	24			
		Sanatali Cottage+	4	8			
2	Gurguria Nature Camp	Pinevilla -01 (Double Bed)	2	4	14	28	
		Pinevilla -02 (Double Bed)	2	4			
		Cottage (Double Bed)	2	4			
		Santali Cottage (Double Beded)	4	8			
		Cottage (Double Bed)-New	4	8			
3	Jamuani Nature Camp	Santali Cottgae (Double Beded)	9	18	15	30	
		Tent (Double Beded)	4	8			
		Luxurious Tree House (Double Beded)	2	4			
4	Barehipani Nature Camp	Santali Cottage (Double Beded)	8	16	12	24	
		Santali cottage+	4	8			
5	Ramatirtha Nature Camp	Debasthali Cottage (Double Beded)	4	8	10	44	AC
		Tribal Hut (Double Beded)	3	6			AC
		Dormitory (Ten Beded)	3	30			02 AC and 01 NON-AC
		Total in Similipal Nature Camp			71	166	

Sl. No	Name of the Range	Nature Camp	Name of the EDC	Name of the Cottages	No. of Room	Capacity
Night stay inside buffer						
1	Barehipani WL Range	Barehipani	Barehipani EDC	Santal Cottage	8	16
				Nawa Santal Olla-h	4	8
2	Gurguria WL Range	Gurguria	Gurguria EDC	Santal Cottage	4	8

				Pine villa-A	2	4
				Pine villa-B	2	4
				Khairi Bosa	2	4
3	Gurguria WL Range	Kumari	Kumari EDC	Santal cottage	12	24
				Bamboo Cottage	4	8
				Nawa Santal Olla-h	4	8
Night stay outside buffer						
4	Barehipani WL Range	Jamuani	Jamuani EDC	Santal Cottage	9	18
				Tent	4	8
				Tree Top House	2	4
5	Ecotourism Range	Ramthirtha	(Departmentally)	Debasthali Cottage	4	8
				Dormitory	3	30
				Tribal Cottage	1	6
				Total	65	158
Proposed Night stay within buffer						
6	Nawana North WL Range	Nawana	Nawana EDC	Eco Friendly Cottages	14	28
Sl. No	Name of the Range	Nature Camp	Name of the EDC	Name of the Cottages	No. of Room	Capacity
Night stay inside buffer						
1	Barehipani WL Range	Barehipani	Barehipani EDC	Santal Cottage	8	16
				Nawa Santal Olla-h	4	8
2	Gurguria WL Range	Gurguria	Gurguria EDC	Santal Cottage	4	8
				Pine villa-A	2	4
				Pine villa-B	2	4
				Khairi Bosa	2	4
3	Gurguria WL Range	Kumari	Kumari EDC	Santal cottage	12	24
				Bamboo Cottage	4	8
				Nawa Santal Olla-h	4	8
Night stay outside buffer						
4	Barehipani WL Range	Jamuani	Jamuani EDC	Santal Cottage	9	18
				Tent	4	8
				Tree Top House	2	4

5	Ecotourism Range	Ramthirtha	(Departmentally)	Debasthali Cottage	4	8
				Dormitory	3	30
				Tribal Cottage	1	6
				Total	65	158
Proposed Night stay within buffer						
6	Nawana North WL Range	Nawana	Nawana EDC	Eco Friendly Cottages	14	28

ANNEXURE - XXXVIII

TIGER AND LEOPARD CENSUS: 2023-2024

Tiger Estimation

The State of Odisha is a part of Central Indian and Eastern Ghats Landscape and the forest cover accounts for 33.50% of the state's total geographic area (India State of the Forest Report, 2021). There is one national park, one proposed national park and nineteen wildlife sanctuaries in Odisha. As per the All India Tiger Estimation (AITE), 2022 report, minimum 17 tigers were camera trapped in Odisha, which was largely confined to Similipal Tiger Reserve. In order to keep a close track of its tiger population and develop appropriate management strategy, the All Odisha Tiger Estimation (AOTE), 2023-2024 was conducted, which spanned across 47 forest divisions, aimed at much more intensive state-level tiger monitoring. A State-level field survey was conducted to look for tiger signs such as pugmarks, scrapes, scats, rakes, urine spray, vocalization and livestock

depredation. Sites where the direct and indirect signs of tigers were found with certainty, were intensively camera- trapped to arrive at the minimum number of unique adult tigers based on their distinctive stripe pattern. Camera- trap image based identification of tigers is a scientifically accepted methodology and is also used in the All India Tiger Estimation exercises.

Summary of all Odisha Tiger Estimation 2023-24 at a glance

1	Total No. of camera traps used	1432
2	Camera trapping exercise	15th October, 2023 to 10th Feb, 2024
3	No. of Divisions	47 (except Bhadrak, Mangrove Forest Division (WL) Rajnagar, Puri and Chilika)
4	Total No. of tiger photographs captured and analyzed	567
5	Total No. of tigers in State	30 with 8 cubs (less than one year).

The findings of the 1 st All Odisha Tiger Estimation, (location wise break up) are enclosed below.

SI. No.	Tiger Reserve/ Division	No. of Usual morph Tigers	No. of pseudo -melanistic Tigers	Total unique adults	Tiger Cubs
1.	Similipal Tiger Reserve	7 Females, 4 Males	7 Females, 6 Males	24	8
2.	Keonjhar Territorial and Keonjhar Wildlife	1 Male	-	1	-
3.	Paralakhemundi Territorial	1 Male	-	1	-
4.	Hirakud Wildlife	1 Male	-	1	-
	Odisha State Total (Minimum Camera Trapped)	14 (7 females +7 males)	13 (7 females+ 6 males)	27 (14 females + 13 males)	8

A total of 27 unique adult tigers were camera trapped in Odisha during the AOTE exercise, comprising 14 females and 13 males. Evidence of another 3 adult tigers were also seen in the Similipal tiger reserve, which have not been camera trapped. With 24 adult unique tigers, Similipal Tiger Reserve currently holds the largest share of the state's tiger population. Similipal currently holds all the adult female tigers of the state. In total, 13 adult tigers (seven females and six males) were found to be pseudo- melanistic in Similipal, and no other wild habitat in the world has pseudo-melanistic tigers. Eight cubs which were of less than 1 year also photo-captured in Similipal. Apart from Similipal, the Hirakud Wildlife Division and Paralakhemundi Territorial Forest Division, each holds one adult male tiger. Another adult male tiger was also found to utilize Greater Similipal tiger Landscape.

The tiger abundance has increased in Odisha from the previous estimate of AITE, 2022. Similipal Tiger Reserve, which currently harbours 27 unique adult individuals, has

also witnessed an increase from 16 tigers captured through Camera Traps in 2021-2022. This growth has resulted from strict management actions and scientific conservation practices. The images of eight unique tiger cubs during AOTE, 2023, indicate a recovering population in Similipal landscape. Similipal is the only place on earth to have the pseudo- melanistic tigers.

The presence of three unique adult male tigers camera-trapped in Hirakud Wildlife Divison, Paralakhemundi Territorial Division, Keonjhar Territorial and Keonjhar Wildlife Division looks promising and provides hope for a better future for tigers in these habitats. Apart from these regions, there is excellent potential for tiger recovery in Satkosia Tiger Reserve and Sunabeda Wildlife Sanctuary.

Leopard Estimation

The leopard (Panthera pardus) is one of the most widespread members of the family Felidae, but it is still considered vulnerable according to the IUCN Red List. In India, after tigers and lions, leopards occupy the subsequent trophic level in the food chain alongside dholes. In areas devoid of other charismatic large carnivores, leopards can act as an umbrella species for biodiversity conservation.

Compared to other large carnivores, leopards are highly adaptable to various habitats and food sources. They can be found in agricultural areas, plantations, and even near human settlements, including both rural and urban environments. This behavioural plasticity also results in conflicts with humans and is a conservation challenge in its distributional range.

As per the latest NTCA report, the leopard population in India stands at 13874 ± 1258. In India, the leopard population has dwindled by 75-90% in the last 120-200 years. According to WPSI, around 1485 leopards were poached in the country in the last ten years. The state of Odisha is a part of Central Indian and Eastern Ghats Landscape and the forest cover accounts for 33.50% of the state's total geographic area (India State of the Forest Report, 2021). There is one National Park, nineteen Wildlife Sanctuaries and two Conservation Reserves in Odisha. The state has potential to harbour multiple viable leopard populations and thus keeping a close track of the population trend is vital to develop suitable conservation strategies.

Therefore, the All Odisha Leopard Estimation-2024 was conducted, which spanned across 47 Forest Divisions, aimed at much more intensive statelevel leopard monitoring. A statewide field survey was conducted to identify leopard presence through various signs, including pugmarks, scrapes, scats, rakes, urine spray, vocalizations, and livestock depredation. Sites with confirmed direct or indirect evidence of leopard were monitored using camera traps to estimate the minimum number of unique adult leopards based on their distinctive rosette patterns. Camera trap identification of leopard is a scientifically recognized method and is used in national level leopard population assessments.

Year	Unique Leopards Photographed	Leopard Population Estimate	Estimation Exercise Conducted by
2018	63	760 (727-793)	WII-NTCA
2022	162	568 (533-603)	WII-NTCA
2024	284	696 (668-724)	Forest Department, Odisha

Protected Areas proved to be the regions with the highest leopard abundance in the state. Similipal Tiger Reserve has the largest leopard population in Odisha. Due to its extensive size, Similipal landscape plays a crucial role as a source population for leopards in the surrounding region. It is connected to Hadagarh Wildlife Sanctuary and Kuldiha Wildlife Sanctuary, which is essential for leopards to disperse from Similipal to these other Protected Areas.

Satkosia landscape turned out to be another promising site for leopard and boasts second highest leopard population in the state. Hirakud Wildlife Division which includes Debrigarh Wildlife Sanctuary is another key habitat for leopards and has significant leopard population.

Forty five percent of leopard population in Odisha is located outside the Protected Area network and thus the territorial Forest Divisions have considerable leopard presence. The rare melanistic leopard morph was recorded from three Forest Divisions.

From the next year, this camera trap based All Odisha Leopard Estimation exercise will be synchronized with the annual All Odisha Tiger Estimation exercise. This comprehensive exercise will involve collecting data on both the big cat occupancy, prey base estimation, and assessments of vegetation structure and human disturbance in the state.

ANNEXURE XXXIX

2011 POPULATION CENSUS OF SANCTUARY VILLAGES WITHIN SIMILIPAL NORTH WL IVISION

SL. No.	Name of the Division	Name of the Range	Village	Total population 2011
1	Similipal North WL	Gurguria WL Range	Badkasira	387
2			Barigaon	262
3			Bilapagha	317
4			Gurguria	654
5			Khejuri	420
6			Kuanribil	447
7			Kumari	365
8			Kusumi	371
9			Lanjighosara	150
10			Sankasira	312
11			Saharpat	426
12			Chandikhaman	220
13			Kandibil	569
14			Khediadunguri	154
15			Bharadachua	139
16			Barehipani	582
17			Asanbani	191
18			Bad uski	255
19			San uski	354
20			Bandirabasa	312
21			Barsia	521
22	Similipal North WL	Barehipani WL Range	Chakundakacha	51
23			Haldia	161
24			Jojodiha	181
25			Kolha	275
26			Kolajhari	86
27			Nuniagoda	223
28			Phulbaria	146
29			Rautola	318
30			Chorabandha	560
31			Dhadipani	131
32	Similipal North WL	Talabanda WL Range	Danteikocha	116
33			Jamtolia	342
34			Khadighati	410

35			Kusumtota	360
36			Kukurbhuka	474
37			Balarampur	628
38			Astokumar	704
39			Budhabalanga	456
40			God Similipal	389
41	Similipal North WL	Nawana North WL	Gopinathpur	349
42			Makabadi	450
43			Nawana	510
44			Nigirda	94
45			Saruda	273
46	Similipal South WL	Nawana South	Bakua	104
47		Pithabata North WL	Aahalapani	117
48			Amdapani	182
49			Barubera	176
50			Chakri	152
51			Basilakacha	62
52			Bhaduakacha	15
53			Fuljhara	162
54			Jerkani	105
55			Kukurbhuka	183
56			Purunapani	257

ANNEXURE XL

LIVESTOCK POPULATION OF SANCTUARY VILLAGE

SL. No.	NAME OF THE RANGE	NAME OF THE VILLAGE	CATTLE	GOAT	BUFFALO	SHEEP	TOTAL GRAZING LIVESTOCKS
1	Gurguria WL Range	Badkasira	42	142	0	0	184
2	Gurguria WL Range	Barigaon	76	53	0	0	129
3	Gurguria WL Range	Bhadrachua	26	26	0	12	159
4	Gurguria WL Range	Bilapagha	173	131	14	7	325
5	Gurguria WL Range	Chandikhaman	110	105	0	0	215
6	Gurguria WL Range	Gurguria	195	227	28	20	470
7	Gurguria WL Range	Khadiadunguri	79	68	0	0	147
8	Gurguria WL Range	Khejuri	196	209	0	29	434
9	Gurguria WL Range	Kondibil	264	225	5	27	523
10	Gurguria WL Range	Kumaribil	316	261	0	0	577
11	Gurguria WL Range	Kumari	138	139	0	0	277
12	Gurguria WL Range	Kusumi	189	145	0	0	334
13	Gurguria WL Range	Nanjighosara	73	63	0	30	166
14	Gurguria WL Range	Sankasira	110	124	0	0	234
15	Gurguria WL Range	Saharpat	322	282	0	0	604
16	Gurguria WL Range	Astakumar	288	235	17	19	559
17	Gurguria WL Range	Balarampur	192	177	2	0	371
18	Gurguria WL Range	Godsimilipal	340	213	0	46	599
19	Gurguria WL Range	Kukurbhuka	205	152	10	0	367

20	Gurguria WL Range	Makabadi	178	140	0	0	318
21	Nawana WL Range	Nawana	215	211	2	0	428
22	Nawana WL Range	Nigirdha	73	63	0	0	136
23	Nawana WL Range	Budhabalanga	140	111	2	0	253
24	Nawana WL Range	Gopinatpur	114	106	0	0	220
25	Nawana WL Range	Saruda	94	105	0	0	199
26	Nawana WL Range	Barehipani	317	117	0	0	434
27	Nawana WL Range	Asanbani	0	0	0	0	0
28	Nawana WL Range	Bad uski	44	131	0	8	183
29	Nawana WL Range	San uski	85	87	10	28	210
30	Nawana WL Range	Bandirabasa	60	100	15	17	192
31	Nawana WL Range	Barsia	97	189	7	11	304
32	Nawana WL Range	Chakundakacha	20	48	0	0	68
33	Barehipani WL Range	Haldia	54	48	0	9	111
34	Barehipani WL Range	Jojodiha	21	61	0	0	82
35	Barehipani WL Range	Kolha	74	137	0	0	211
36	Barehipani WL Range	Kolajhari	21	62	6	0	89
37	Barehipani WL Range	Nuniagoda	67	110	0	0	177
38	Barehipani WL Range	Phulbaria	23	68	0	0	91
39	Barehipani WL Range	Rautola	146	269	7	0	422
40	Barehipani WL Range	Chorabandha	128	250	15		393
41	Barehipani WL Range	Dhadipani	81	235			316

42	Talabandha WL Range	Danteikocha	12	100			112
43	Talabandha WL Range	Jamtolia	85	150	4		239
44	Talabandha WL Range	Khadighati	68	130			198
45	Talabandha WL Range	Kusumtota	70	120			190
46	Nawana South WL	Bakua	37	49		17	103
47	Pithabata North WL	Aahalapani	60	85		37	182
50	Pithabata North WL	Chakri	52	78		35	165
52	Pithabata North WL	Bhaduakacha	79	108		42	229
55	Pithabata North WL	Kukurbhuka	47	98			145
56	Pithabata North WL	Purunapani	64	87		54	205

ANNEXURE XLI

LAND USE OF SANCTUARY VILLAGES

SL. No.	Division	Name of the Range	Village	Area (in Ha)	No. of house hold	Land use (i.e. area under different types of land used in Ha. tares rounded up to 2 decimal places)				
						Forest	Irrigated by source	Un-irrigated	Culturable waste (including gouher & greves)	Area not available for cultivation
1	Similipal North WL	Gurguria WL Range	Badkasira	97.77	40	14.16	-	46.85	30.03	6.73
2			Barigaon	136.08	29	34.99	-	71.8	19.74	9.48
3			Bhadrachua	35.98	13	3.26	-	26.3	3.55	2.87
4			Bilapagha	84.71	46	10.15	-	51.71	20.55	2.3
5			Chandikhaman	58.26	25	8.13	-	41.78	5.82	2.53
6			Gurguria	159.52	94	41.05	-	71.29	33.33	13.85
7			Khadiadunguri	142.05	19	72.36	-	14.92	46.2	8.57
8			Khejuri	171.43	68	3.23	-	85.89	34.65	16.66
9			Kondibil	182.9	61	41.56	-	79.54	50.14	11.66
10			Kumaribil	265.66	62	27.63	-	126.18	19.68	92.17
11			Kumari	168.84	59	59.24	-	80.48	14.63	14.49
12			Kusumi	129.95	52	56.9	-	55.46	62.91	11.58
13			Nanjighosara	112.55	20	8.28	-	6.59	19.14	16.54
14			Sankasira	102.11	31	33.04	-	28.17	30.62	10.28
15			Saharpat	148.01	33	18.19	-	69.14	10.35	50.33
16		Nawana WL Range	Astokumar	432.9	79	175.11	...	169.1	28.58	60.11
17			Balarampur	357.75	61	132.54	....	92.77	33.66	98.78
18			Budhabalanga	318.53	39	133.51	...	33.85	36.8	114.37
19			Godsimilipal	405.14	70	136.12	...	77.23	95.48	96.31
20			Gopinathpur	476.4	25	255.55	...	47.8	134.16	65.89
21			Kukurbhuka	874.3	39	96.94	...	38.18	164.85	574.33
22			Makabadi	267.03	33	25.19	...	78.31	93.08	70.45
23			Nawana	539.74	51	231.59	...	98.98	62.57	146.6
24			Nigirdha	304.46	8	230.19	...	37.46	22.23	14.58
25			Saruda	177.31	23	56.64	...	28.14	53.83	38.7

26	Similipal South WL	Nawana South	Bakua							
27		Pithabata North	Aahalapani	72.03	23	12	-	40	16	1.02
28			Amdapani	79.9	17	15	-	26	10	9.71
29			Barubera	69.02	35	6	-	20	20	10
30			Chakri	56.74	23	2	-	36	12	6.74
31			Basilakacha	17.52	8	2	-	20	20	30.03
32			Bhaduakacha	56	4	6	-	20	20.8	10
33			Fuljhara	75.86	23	29	-	14	28	4.86
34			Jerkani	60.71	13	15	-	26	10	9.71
35			Kukurbhuka	77.87	26	6	-	43	26	2.87
36			Purunapani	57.68	44	2	-	35	12	8.68

ANNEXURE XLII

LIST OF RANGE, SECTION, BEAT AND COMPARTMENT OF SIMILIPAL NORTH WL DIVISION

SL No	Name of the Division	Name of the Range	Name of the Section	Name of the Beat	Compartment No	Area (km^2)	Core Area (km^2)	Buffer Area (km^2)
1	Similipal South WL	Bhanjabasa WL	BHANJABASA	GUNDURIA	TK1	8.82	8.82	-
2				BHANJABASA	TK4, TK7	16.59	16.59	-
3			DHOBIGHAT	BARHAGARHA I	SL8	9.36	9.36	-
4				BARHAGARHA II	SL13	12.95	12.95	-
5				DHOBIGHAT	SL9,SL10(p2)	7.69	7.69	-
6			GHAGRA	GHAGRA I	SL10(p1)	14.22	14.22	-
7				GHAGRA II	SL18(p2)	4.25	4.25	-
8			NEKDANACHA	PUTULDIHA	TK3	11.34	11.34	-
9				NEKDANACHA	SL6	13.24	13.24	-
10				MATHASILA	TK2	7.21	7.21	-
11				BALIDHAR	SL11	10.25	10.25	-
		Total	4	11		115.92	115.92	-
12	Similipal South WL	Dukura WL	BAHALDA	CHANDANCHATURI II	SJ4	11.76	-	11.76
13				SAPANCHUA	SJ5	14.98	-	14.98
14				BAHALDA	SJ6	14.28	-	14.28
15			DENGAM	NUAGAON I	SJ9(p2), SJ10	13.67	-	13.67
16				NUAGAON II	SJ11, SJ12	20.79	-	20.79
17				DENGAM	SJ16(p1), SJ18	19.99	-	19.99
18			PHULBADIA	PHULBADIA	ED7(p2), ED8	15.45	-	15.45
19				PATSANIPUR	ED4	10.52	-	10.52
20			TALDIHA	TALDIHA	ED12, ED13	15.78	-	15.78
21				MANIKPUR	ED14	9.8	-	9.8
		Total	4	10		147.02	-	147.02
22	Similipal South WL	Jenabil WL	GURANDIA	GURANDIA I	KH21(p1	7.71	7.71	-
23				GURANDIA II	KH20	10.9	10.9	-
24				GURANDIA III	KH23(p1), KH21(p2	7.07	7.07	-
25			HATISAL	HATISAL I	ED1, ED2	16.29	16.29	-
26				HATISAL II	ED5, ED9	14.62	14.62	-
27			JENABIL	JAMUNAGARH	KH27, Village	13.58	13.58	-
28				JENABIL	KH26	12.05	12.05	-

29				HATIGHAR I	KH23(p2)	5.35	5.35	-
30				HATIGHAR II	KH25	10.8	10.8	-
31			KULIPAL	SUNPOKHARI I	SJ13	10.14	10.14	-
32				SUNPOKHARI II	SJ15, SJ16(p2)	15.39	15.39	-
33				KULIPAL	ED3, SJ17	19.89	19.89	-
34			TIKTALI	TIKTALI	ED10	11.16	11.16	-
35				SARUA	ED6, ED7(p1)	11.89	11.89	-
36				CHOUDHARIGARH	ED11	13.16	13.16	-
		Total	5	15		180	180	-
37	Similipal South WL	National Park WL	KABATGHAI	KABATGHAI I	KH17(p1), KH17(p2)	10.65	10.65	0.93
38				KABATGHAI II	KH18	15.84	15.84	-
39			KHEJURI	KHAJURI I	KH19(p1), KH19(p2)	8.33	8.33	0.97
40				BAKUA I	KH14	10.63	10.63	-
41			MAHAVIRSAL	GANAPATI	WD15	7.99	7.99	-
42				MAHAVIRSAL	WD18	13.44	13.44	-
43				BUDHIGAON I	WD8(p2), WD14, WD16	17.42	17.42	-
44			NUAGAON	RANASA	KH22	16.97	16.97	-
45				NUAGAON	KH24	11.83	11.83	-
		Total	4	9		113.1	113.1	1.9
46	Similipal South WL	Nawana South WL	BAKUA	CHATADANDA	BLW19,BLE24	15.29	15.29	-
47				BAKUA II	BLW18(p2),Village	11.57	11.57	-
48				GARH SIMILPAL	BLW16(p2), BLW(17p2), BLE21(p2B)	7.23	7.23	-
49			DHUDRU-CHAMPA	RAJABASA	BLE (21p2A), BLE (22p2)	13.36	13.36	-
50				DHUDRUCHAMPA	BLE23(p2)	7.43	7.43	-
51			JODAPAL	JODAPAL I	SJ7	9.46	9.46	-
52				JODAPAL II	SJ14	8.27	8.27	-
53			LENGAKOCHA	DHUNDUBASA	SJ8, SJ9(P1)	13.28	13.28	-
54				BADMAKABADI II	P17, P18	17.49	17.49	-
		Total	4	9		103.38	103.38	-
55	Similipal South WL	Pithabata North WL	BADGAON	BADGAON	BLE10, BLE11(p1)	21.71	-	21.71
56				KANTASOLA	BLE11(p2)	8.07	-	8.07
57			CHAKADI	CHAKIDI I	BLE4(p1), BLE4(p2)	10.24	8.44	1.8

58				PHULJHARI	BLE5(p1), BLE5(p2)	11.25	9.65	1.6
59			HALDIBANI	BALDIHA	P5	13.67	-	13.67
60				HALDIBANI	BLE12(p2)	7.39	-	7.39
61				GENDA POKHARI	BLE12(p1)	7.77	-	7.77
62			PITHABATA	CHAMPAGARHA	P4	12.25	-	12.25
63				PITHABATA	P3	7.45	-	7.45
64			RANGAMATIA	RANGAMATIA I	BLE1, Village	17.06	-	17.06
65				RANGAMATIA II	BLE2, BLE3	23.14	-	23.14
		Total	5	11		140	18.09	121.91
66	Similipal South WL	Pithabata South WL	ANDHERITOTA	BADMAKABADI I	P19	12.92	12.92	-
67				ANDHERITOTA II	P16	10.05	10.05	-
68			BALIKHAL	GOPINATHPUR	P14(p2)	14.15	14.15	-
69				BALIKHAL	P10	12.21	12.21	-
70			BHAJAM	NAMTIDAR I	P2	8.7	8.7	-
71				NAMTIDAR II	P7	9.52	9.52	-
72				BHAJAM	P1	10.61	10.61	-
73				BAUNSKHAL I	BLE8, BLE9	13.53	13.53	-
74			DIGDIGA	DIGDIGA	SJ1, P13	13.48	-	13.48
75				CHANDANCHA-TURI I	SJ2, SJ3	19.59	-	19.59
76			KACHUDHAN	KACHUDAHAN	P11	14.59	14.59	-
77				ANDHERITOTA I	P15	8.06	8.06	-
78			PITHABATA	PALASIBEDA	P12	9.29	9.29	-
79				PITHABATA I	P8(p1), P8(p2)	10.97	7.2	3.77
80				PITHABATA II	P9	9.84	-	9.84
		Total	6	15		177.51	130.83	46.68
81	Similipal South WL	Podadiha WL	DANGADIHA	DANGADIHA I	SL15	15.33	-	15.33
82				DANGADIHA II	SL16	10.47	-	10.47
83				DANGADIHA III	SL17	7.59	-	7.59
84			PODADIHA	BAGHANTA	TK5, TK8p2	14.08	14.08	-
85				ANANTAPUR	TK6, TK9, TK8(p1)	23.28	-	23.28
86				MANBHANGA	TK10, TK11, SL18(p1)	20	-	20
		Total	2	6		90.75	14.08	76.67
87	Similipal South WL	UBK WL	DEVASTHALI	DEVASTHALI I	WD21	11.49	11.49	-
88				DEVASTHALI II	WD25	7.59	7.59	-
89				DEVASTHALI III	WD22	7.57	7.57	-
90			JATIANI	JATIANI	WD17(p2)	9.82	9.82	-

91				GAMUCHHA JHA-RAN	WD19,TL4(p2)	15.65	15.65	-
92			KANDADHENU	BAHAGHAR	WD26	10.95	10.95	-
93				SILDA	WD23	10.82	10.82	-
94				KANDADHENU	WD17(p1), WD20(p2), WD20(p1)	12.56	12.56	-
95			MATUGHAR	MATUGHAR	WD31	11.24	11.24	-
96				MEGHASANI	WD32	11.43	11.43	-
97			PANASKUDAR	CHAMPAGARH	TL7,TL9(p2)	12.28	12.28	-
98				PANASKUDAR	TL5(p2)	7.42	7.42	-
99			PATBIL	BENGAPANI	WD30	8.61	8.61	-
100				PATBIL	WD24	7.57	7.57	-
101				TINADIHA	WD27	12.88	12.88	-
102			UBK	TARANIBILA	WD29	9.38	9.38	-
103				UBK	WD28	10.74	10.74	-
			7	17		178	178	-
104	SSimilipal North WL	Gurguria WL	Gurguria	Barigoan	KH15,KH16	22.33	18.87	3.46
105				Gurguria	KH9,KH10,Village	36.41	19.65	16.76
106			Kaliani	Bilapagha	KH3,KH4,Village	25.65	-	25.65
107				Kaliani	KH1,KH2	29.2	11.97	17.23
108			Khejuri	Khejuri II	KH13, Village	12.42	-	12.42
109				Kuanribil	KH11, KH12, Village	25.71	-	25.71
110			Utras	Ektali	KH5	17.79	-	17.79
111				Utras	KH6,KH7,KH8	30.49	22.86	7.63
		Total Area	4	8		200	73.35	126.65
112	Similipal North WL	Thakur-munda WL	Bahaghar	Bahaghar I	SL12	6.65	-	6.65
113				Bahaghar II	SL 14	10.26	-	10.26
114			Mituani	Mituani	SL3,TL10	17.27	-	17.27
115				Purunapani	SL7,SL4	19.46	-	19.46
116			Mandaljhari	Chanpajhar	SL1,SL2	14.4	-	14.4
117				Mandaljhari	SL5	9.84	-	9.84
118			Badaliposi	Badamahukliha II	TL6(p1), TL5(p2), TL6(p2)	15.56	-	15.56
119				Badaliposi II	TL8,TL9(p2)	8.58	-	8.58
		Total Area	4	8		102.02		102.02

120	Similipal North WL	Nawana North WL	Baunskhal	Baunskhal II	BLE7	8.76	8.76	-
121				Chakidi II	BLE6	10.57	10.57	-
122			Joranda	Joranda	BLE16,BLE17	14.64	11.49	3.15
123				Kusumbani	BLE13	9.26	9.26	-
124				Nigirdha Core	BLE19	10.04	8.4	1.4
125			Khadkei	Pandabandha	BLE18	10.93	10.93	-
126				Khadkei	BLE14,BLE15	16.65	16.65	-
127				Bhundadar	P6	13.46	13.46	-
128			Nawana	Budhabalanga	BLE21p2, BLE22p2, BLE23p2, BLW17p3, BLW18p2, Village	11.17	-	11.17
129				Nigirdha Buffer	BLE20,Village	17.22	-	17.22
130				Nawana	BLW16(p),BLW17p2 Village	26.39	-	26.39
		Total Area	4	11		149.09		59.33
131	Similipal North WL	Barehi-pani WL	Barehipani	Barehipani I	BH9,BH10,Village	20.75	-	20.75
132				Barehipani II	BH5, BH6(p2,BH7(p2, BLW14p2), Village	10.87	-	10.87
133			Jamuani	Mohanpur	BH13,BH14	20.49	-	20.49
134				Jamuani	BH3(p2,BH8	12.1	-	12.1
135			Matighati	Matighati I	BLW15	13.03	-	13.03
136				Matighati II	BH11	12.08	-	12.08
137			Tamalbandha	Sansialinai Buffer	KD8	9.4	-	9.4
138				Tamalbandha Buffer	KD6(p2,KD9(p2	6.29	-	6.29
139			Tulasibani	Chadripahadi	BH12	10.28	-	10.28
140				Tulasibani	BH1,BH2	18.19	-	18.19
141			Uski	Phulbaria II	BH17,Village	9.69	-	9.69
142				Phulbaria I	BH16,BH18,Village	21.43	-	21.43
143				Uski	BH15,Village	12.4	-	12.4
		Total Area	6	13		177	-	177
144	Similipal North WL	Talaband-haWL	Bankidihi	Bankidihi	KD5,KD7(p2	12.22	-	12.22
145				Chatani	KD1,KD2	14.64	-	14.64
146				Asadola	KD3,KD4	22.06	-	22.06
147			Ghatkuanri	Ghatkuanri	BLW1,BLW2	20.78	-	20.78
148				Kanchhinda	BLW3,BLW4	16	-	16
149			Talabandha	Kusumtota II	BLW8(p2), BLW9,BLW10, BLW12(p2), BLW13 (p2) Village	22.67	-	22.67
150				Talabandha I	BLW5,BLW7(p2)	13.48	-	13.48
151				Talabandha II	BLW6	10.87	-	10.87

		Total Area	3	8		132.72		132.72
152	Similipal North WL	Kendu-mundi WL	Baghlata	Baghlata	WD10	9.27	-	9.27
153				Bisipur	TL1,TL2	21.3	8.28	13.02
154			Barakamunda	Barakamunda	WD5,WD6	18.65	14.27	4.38
155				Hatibari	WD11,WD12	19.36	-	19.36
156			Dudhiani	Budhigaon II	WD8(p2),WD13	19.59	-	19.59
157				Dudhiani	WD7,WD9	19.36	13.41	5.95
158			Kendumundi	Kendumundi I	TL3(p1)TL4(p2)	16.34	4.19	6.37
159				Kendumundi II	TL3(p2)	6.6	-	12.38
160			Ranipat	Kiajhari	WD1,WD2,WD3,Village	24.25	10.09	14.16
161				Ranipat	WD4	15.48	-	15.48
		TotalArea	5	10		170.2	50.24	119.96
162	Similipal North WL	Chahala WL	Chahala	Chahala	KD11	11.56	11.56	-
163				Kairakacha	BLW11	14.18	14.18	-
164			Haldia	Sansialinai Core	KD9(p1)	10.23	10.23	-
165				Haldia	KD10	11.19	11.19	-
166				Tamalbandha	KD6(p1)	6.48	6.48	-
167			Rajpal	Rajpal	BH3(p1),BH4	14.11	14.11	-
168				Jodadiha	BH5,BH6(p1)	12.18	12.18	-
169			Karkachia	Karkachia	BLW12(p1	11.64	11.64	-
170				Bhatunia	BLW13(p1)	8.81	8.8	-
171				Barehipani Core	BLW14(p1)	13.62	13.62	-
172			Mathurakarei	Allapani	KD7(p1)	6.79	6.79	-
173				Mathurakare	BLW8(p1), BLW7(p1)	7.21	7.21	-
		Total Area	5	12		128		-
174	Karanjia	SATKOSIA WL	GODBHANGA	DHATIKIDIHA 1	-	7.3	-	7.3
175				DHATIKIDIHA 2	-	4.78	-	4.78
176				GODBHANGA	-	8.11	-	8.11
177			MAHULDIHA	JHARJHARI	-	23.94	-	23.94
178				MAHULDIHA	-	17.86	-	17.86
179				BHALIADAL	-	16.72	-	16.72
180			NODA	BALIDIHA	-	17.33	-	17.33
181				NODA	-	13.06	-	13.06
182			SATKOSIA	SATKOSIA 1	-	17.7	-	17.7
183				SATKOSIA II	-	2.17	-	2.17
184				SALCHUA	-	17.84	-	17.84
		Total Area	4	11	-	146.81	-	146.81

185	Karanjia	THAKUR-MUNDA	CHAMPAJHARA	BHEJIDIHI	-	3.11	-	3.11
186				CHAMPAJHARA	-	3.69	-	3.69
187			KENDUJHIANI	KHAPARKHAI	-	1.27	-	1.27
188				KENDUJHIANI	-	10.5	-	10.5
189			KENDUMUNDI	KENDUMUNDI	-	8.33	-	8.33
190				BISIPUR	-	4.57	-	4.57
191			KESHDIHA	PURUNAPANI	-	1.26	-	1.26
192			THAKURMUN-DA	THAKURMUNDA I	-	10.81	-	10.81
193				THAKURMUNDA II	-	5.99	-	5.99
		Total Area	5	9	-	49.53	-	49.53
194	Rairangpur	Bisoi WL	Bisoi	Gardari	-	18.8	-	18.8
195				Pokharia	-	7.44	-	7.44
196			Chadeipahadi	Chadeipahadi	-	19	-	19
197				Luhasila	-	35.2	-	35.2
198			Rajabasa	Rajabasa	-	17.5	-	17.5
199				Manada	-	21.8	-	21.8
200			Saragada	Joka	-	16.9	-	16.9
201				Saragadi I	-	10.42	-	10.42
202				Saragada II	-	12.94	-	12.94
203			Nischinta	Nischinta	-	16.76	-	16.76
204				Deopata	-	10.52	-	10.52
		Total Area	5	11	-	187.28	-	187.28
205	Baripada	Baripada	Haladibani	Haladibani	-	0.78	-	0.78
206			Digdiga	Khasadiha	-	4.01	-	4.01
207		Kaptipada	Noto	Sandai	-	31.8	-	31.8
208				Sarat	-	25.46	-	25.46
209				Noto	-	19.07	-	19.07
		Total Area	3	5		81.12		81.12

ANNEXURE XLIII

CADRE STRENGTH & VACANCY POSITION OF ESTABLISHMENT OF SIMILIPAL TIGER RESERVE

Name of the Tiger Reserve	Name of the Post	Group	Total Sanction Strength (All ranks)	Total Man in position (All ranks)	Total Vacancy (All ranks)
Field Director, Similipal Tiger Reserve	RCCF	A	1	1	0
	ACF/ACF(STPF)	A	3	2	1
	Forest Ranger(STPF)	B	3	3	0
	Forest Guard(STPF)	C	81	52	29
	Total	88	58	30	
Similipal South WL Division	Deputy Director	A	1	1	0
	ACF	A	4	2	2
	Forest Ranger	B	10	7	3
	Dy. Ranger	C	5	1	4
	Forester	C	48	41	7
	Forest Guard	C	109	51	58
	Total	177	103	74	
Similipal North WL Division	Deputy Director	A	1	1	0
	ACF	A	3	2	1
	Forest Ranger	B	9	3	6
	Dy. Ranger	C	4	1	3
	Forester	C	40	14	26
	Forest Guard	C	81	0	81
	Total	138	21	117	
Karanjia Forest Division(Satkosia & Thakurmunda WL Range)	DFO	A	1	1	0
	ACF	A	2	1	1
	Forest Ranger	B	2	2	0
	Forester	C	9	9	0
	Forest Guard	C	20	19	1
	Total	34	32	2	
Baripada Division (Baripada & Kapati-pada Range)	DFO	A	1	1	0

	ACF	A	3	3	0
	Forest Ranger	B	2	2	0
	Forester	C	2	2	0
	Forest Guard	C	5	4	1
	Total	13	12	1	
Rairangpur Division (Bisoi Range)	DFO	A	1	1	0
	ACF	A	2	2	0
	Forest Ranger	B	1	1	0
	Forester	C	5	3	2
	Forest Guard	C	11	8	3
	Total		20	15	5

ANNEXURE XLIV

SENSITIVE SITES OF POACHING AND TIMBER SMUGGLING IN CORE AREA

Division	Range	Name of the sites
Similipal North WL	Gurguria WL	Badkasira, Barigaon, San Kasira, Saharpat, Kuanribil, Utras, Kaliani, Kandibil,
	Nawana North WL	Palatiki, Bhajam, Baunskhal, Pandabandha, Khadkei, Joranda, Bhandadhara
	Chahala WL	Chorabandh, Tamalbandh, sansialinai, Jodadiha, Alhapani, Asanbani, Barsia, Kuljhari, Burudihi
	Thakurmunda WL	Karkatbeda, Chirupada, Mandaljhari New Keshdiha, Bad Ranibhol, Khaparkhai, Bad Mahuldiha, San Mahuldiha, Asankudar, Asanbani, Salaibeda
	Kendumundi WL	Bisipur, Bad Baliposi, San Ramchandrapur, Barakamuda, Purunapani, Dudhiani, Edelbeda, Asanbani, Bargadia, Koleitumba, Kadalibadi, Ranibhol, Pahadpur, Budhigaon, Khalpoda, Anlakota, Rangamatia
Similipal South WL	Upper Barakamuda WL	Malabasa, Tinadiha, Kiabasa, Bansodiha, Chandrachil, Baladaghar, Tarinibilla, Munibasa, Bengapani, Silda, Pokharibari, Sadananda Core line, Jatani, Nimia Footpath, Ankurbasa, Matughar
	Jenabil WL	Hatisal, Gurandia, Sarabasa, Tiktali, Sarua, Gourakantha, Rushibasa, Choudhurigarh, Sunpokhari
	National Park WL	Mahavirsal, Ransa, Ganapati, Kalkam,Nimia, Paniowala, Khadichutri, Khejuri
	Nawana South WL	Chhatadanda, Chherabil, Jadapal, Langdakacha, Balikhal, Dhundubasa, Kaniabasa
	Pithabata South WL	Bhajam, Baunskhal, Jaldiha Footpath, Sabarbasa, Palasibera, Kachudahan, Badamakabadi, Bhundadar, Sikaribasa, Kalipahar
	Bhanjabasa WL	Daruani, Putuldiha, Tangria, Baragarh, Dhubighat, Mondaljhari Core line, Tiktali FP,
	Podadiha WL	Dahisahi, Baghanta, Kantalia
	Pithabata North WL	Chakadi, Sarisupokhari, Phuljhari

ANNEXURE XLV

ILLEGAL ENTRY PONITS TO SIMILIPAL TIGER RESERVE

Name of the Division	Name of the Range	Name of the route to be inspected
Similipal North W/L Division	Kendumundi WL Range	Kadalibadi, Kasipokh ari to Tuniaghutu
		Jalda, Kantabainsi to Barakamuda
		Budhigan to Mahabirsal
		Budhigan to Burudi
		Budhigan to Khadichaturi
		Khalpada to Jatiani Camp
		Rangamatia, Mandama to Jatiani
		Ranibhol, Hatibari to Rangamatia
		Budhigan, Ambaghati to Dhalamati
		Kaleitumba, Daluasuni to Kiajhari
		Kiajhari, Kasi pokhari to Ring Road
		Kiajhari to Banjhi kususm
		Kiajhari Badpahd to Baragadia
		Kiajhari Ramakacha to Kiajhari
		Kiajhari to Khandiadar
		Kiajhari ti Kaleitumba
		Gamuchhajharan, Mandama to Bishipur
		Bishipur to Sanramachandrapur
		Bishipur to Baghlata
		Bishipur, Atharadeula to Sunaposi
		Kendumundi, Mandama to Jatiani
		Kendumundi, Barakatichaturi to Gandhisahi
		Kendumundi, Gamuchhajhara to Edelbeda
		Kendumundi to Sanranibhol
		Burusahi to Silda
		Landusahi to Panaskudar
		Landusahi to Gamuchhajharan
		Ramjudi to Bhandarghati
		Sahu bhandar to Ambaghati
		Pahadpur to Saruadanda
		Katihaja to Champa ghati
		Simtala to Nimia

Similipal North WL Division	Gurguria WL Range	Kaliani- Alkudar-Chandraposi-Kumudabadi footpath
		Kuanribil,Lenjighiosra-Kulha Ridge (Piasal Patch),Podagod,Kalikaprasad,
Similipal North WL Division	Talabandha WL Range	Ghatkuanri- Talabandha- Chorabandha- Kairakocha'
		Bankidihi- Allhapani- Daldali
Similipal North WL Division	Nawana WL Range	Gopinathpur footpath, Nigirdha footpath, Badgan footpath, Chakidi footpath, Kukurbhuka footpath, Nawana footpath, Chakidi, Kusumbani, Kukurbhuka,
Similipal North WL Division	Chahala WL Range	Chorabandh, Tamalbandh, Asanbani, Burudihi footpath to Core
Similipal North WL Division	Thakurmunda WL Range	Ranibhol to Malabasa, Sarupani to Sadananda, Botom sahi to Janahchaturi, Mandaljhari to Dangua ghati, Badmahuldiha to Pokhoribadi, Asankudar to Champagoda, Mat kocha to Bahaghar Road
Similipal North WL Division	Barehipani WL Range	Rajpal to Barehipani, Bhadusal, Kundagarh footpath.
		Sansialinai, Tamalabandha footpath.
		Bandriabasa, Lembuguda to Uski
		Bandriabasa, Phulbaria to Kolha Ridge
Similipal South WL	Pithabata North WL	1.Jaldiha-Chapdihi-Baunskhal
		2.Chakidi-Baunskhal-Kusumbani-Pansia
Similipal South WL	Pithabata South WL	1.Lalpani-Kalipahad-Palasibeda-Satnalia-Bhajam
		2.Baldiha-Chadripahar-Ghudagandha-Bhajam
		1.Sitakunda-Kalipahar-Satnalia-Rakashamara.
		2.Namati-Munibasa-Jhimirkhal-Satnalia
		3.Digdiga-Chhetiajharan-Jambhirakhal
		4.Chandanchaturi-Gurusudar-Andharitota-Kukudakhumpi
		5.Kachudahan-Campabarehi-Matihudi-Balikhal
		6.Badmokabadi-Sabarbasa-Andhari-Murari-Gurusudar
		7.Bhajam-Baunskhal-Ghadagandha-Jhimirkhal-Bhandadarah
Similipal South WL	Dukura WL	1.Sapanchua-Sunpokhari-Murari-Badmokabadi-Belpanidanda-Rajabasa
		2.Bahalda-Gurusadar-Murari-Andhari-Kukudakhumpi
		3.Chandanchaturi-Champagarh-Kachudahan
		4.Digdiga-Baleda-Tikarpani-Sunpokhari-Kachudahan
		1.Balma-Mallichua-Maruadibandha-Tiktali
		2.Deokund-Jogeidhia-Adhamukha&Ambaghati-Sarua
		3.Tarupdara-Bhasapal-Balidar-Jodapal

Similipal South WL	Podadiha WL	1.Bhejidiha-Bhanjhikusum-Ghagara-Nekedana-cha-Meghasini
		2.Manabhanga-Kalianichaturi-Seltingghati-Bali-dar-Ghaighat
		3.Nachhipur-Badghati-Kumbhaghai-Guniamba
		4.Junapal-Talsorei-Mahulhudi-Gunduria & Zo-ka-Kadalibadi-Ujiapinda
		5.Balinal-Barhapal-Chaturi-Gunduria
		6.Barjupal-Manikpur-Mallichua-Bijilichati-Gunduria
		7.Kaprajodi-Golasah-Kanianagari-Champajhar
Similipal South WL	Jenabil WL	1.Jenabil-Adhamukhi-Ratokacha-Oldsikaricamp,-Jogeidihanala
		2.Hatisal-Jogeidiha-WaterFall DeokundFP
		3.Tktali-Ashokanala-Khairiburu-Kiabasa-Bounsdiha
		4.Sarua-Ambaghati-Patharghar-Sahebchati-Gour-kanta-Mankdiabasa-Bounsdiha
		5.Sarabasa-Balidar-Chatadanda
		6.Hatighar-Sarupani-Basudeve
		7.Gurandia-Basudev,Gayalgada-Kobat-ghai-Deokund-Phulbadia FP
Similipal South WL	Nawana South WL	1.Chherabil-Bakua-Chhatadanda-Bhadarguda-
		2.Dhudurchampa-Bhadarguda-Kandhiajharan-Cha-tadanda –Kukudakhumpi
		3.Jodapal-Balidar-Bandhuakanala- Chhatadanda
		4.Dhundubasa-Rajabhadi-Belpanidanda
		5.Lengdakocha-Gopinathpur-FP-BadmokabadiFP
		6.Balikhal-Champabarehi-KukudakhumpiFP.
Similipal South WL	National Park WL	1.Kabatghai-Kalkam-Panianla-Ganapati
		2.Ranasa-KabatghaiFP
		3.Nuagan-Jamuna-Mohantahana FP
		4.Mohabirsal-Nemia-Khaduchaturi-Panionla
		5.Khejuri-Bakua- Khejuri FP-Gurandia-Bharadachua FP
Similipal South WL	Upper Barakamara WL	1.Kandadhanu-Ankurbasa-Baladghar-Sarudala
		2.Bahaghar-Bengapani-Dudhuram-Bachhurichora
		3.Silda-Kulchua-Ginahaja-Makarmundi
		4.Tarainibila-Kiabasa-Nuhabita-Taranibila-Boushdi-ha-Baragadia
		5.Matughar-Meghasini down peak
Similipal South WL	Bhanjabasa WL	1.Nekedanacha-Matughar—Mandaljhari-return in Dhubighat FP

		2.Balidar-Guniamba-Kukudakhumpi-Ptharghar.
		3.Bhanjabasa- Zoka- Kadalibadi- Ujiapinda-Putuli-diha
		4.Gunduria-Tiktali-Khairiburu-Kadalabadi
		5.Kanianagari-Champajhara-Kaprajori-baraghara

ANNEXURE XLVI

SENSITIVE VILLAGES IN AND AROUND SIMILIPAL

Name of the Division	Name of the Range	Name of the Fringe Village
Similipal South WL	Pithabata North WL	Alapani, Amdapani, Baribeda, Basilakacha, Bhaduakacha, Chakidi, Fuljhara, Jerkani, Kukurbhuka, Purunapani, Betjharan, Ghatiduba, Sannedam, Palasbani, Gothanida, Joka, Masinabila, Badgan, Gendapokhari, Gopalpur, Juha, Kantasala, Kundalbani, Rajabasa, Ramharipur, Alubani, Hinjalgadia, Jhinei, Kitadihi, Kochilaghaty, Lulung, Purunapani, Tarajodi
	Pithabata South WL	Pithabata, Lulung, Govindchandrapur, Kochilaghaty, Laxmiposi, Godipokhari, Kakarpani, Enayatpur, Kendujhari, Besarpani, Jadunathpur, Chandanchaturi, Gopinathpur, Makabadi, Nikhirda
	Dukura WL	Chandanchaturi, Agnikumari, Mahalibasa, Sunpokhari, Subarnamanjari, Sapanchua, Bahalda, Dabak, Srirampur, Dengam, Baniabasa, Jadidar, Ambikadeipur, Tentala, Jamudiha, upartaldiha, Manikpur, Anantapur,
	Podadiha WL	Anantapur, Sanjunpal Badajunpal, Kantiali, Kadamsul, Dangadiha, Nachhipur, Patarpada, Bhejidiha, Diliganj, Mankadabeda, Kirikichipal, Asanbani
	Nawana South WL	Gopinathpur, Makabadi, Kukurbhuka, Saruda, Budhabalanga, Similipal, Astakuanr, Lembujharan, Bakua, Baniabasa, Jadidar, Dengam
	National Park	Bakua, Khejuri, Bhradachua, Barigan, Badakasira, Sankasira, Burudihi, Ramjodi, Laxmiposi, Pahadpur, Jalada, Budhigan, Khalpada, Anlakata, Dudhiani, Rangamatia
	Jenabil WL	Bakua, Khejuri, Barigan, Bhradachua, Badakasira, Jadidar, Baniabasa, Dengam, Jamudiha, Tentala, upartaldiha, Anantapur, Manikpur
	Bhanjabasa WL	Anantapur, Badajunpal, Kadamsul, Kantiali, Nachhipur, Sanjunpal, Dangadiha, Diliganj, Kirikichipal, Patarpada, Chirupada, Mandal Jhari
	UBK WL	Budhigan, Khalpada, Sanramchandrapur, Bisipur, Ranibhol, Sunaposi, Baghalata, Thakurjharan, Asankudar, Badmahuldiha, Edelbeda, Khaparkhai, Ranibhol
Similipal North WL Division	Kendumundi WL	Bishipur, Barakamuda, Kaleitumba, Sunaposi, San Ramchandrapur, Rangamatia, Khalpoda, Budhigaon, Anlakota, Burudihi, Jalda, Pahadpur, Kadalibadi, Purunapani, Bargadia, Khandiadara, Raikabosa, Ujiabasa, Dudhiani, Ranibhol, Baghlata,
	Gurguria WL	Asanbani, Kumudabadi, Kanthikana, Basantpur, Ektali, Banabasa, Matiagad, Kaptira, Kaliani, Utras, Barigaon, Badkasira, Sankasira, Khejuri
	Talabandha WL	Chorabandh, Dantiaakacha, Allhapani, Chakidi, Ghatkuanri, Asadola, Bautia,Talabandha
	Nawana WL	Astokumar, Balarampur, Budhabalanga, Budhabalanga, Nawana, Godsimilipal, Gopinathpur, Kukurbhuka, Nigirdha, Saruda
	Chahala WL	Charabandh, Tamalbandh, Kuljhuri, Chakundakocha, Asanbani, Chakidi, Kusumtota, Majhigaon, Kadamdiha, Burudihi, Raikalkocha, Asadola, Allhapani,
	Barehipani WL	Baduski, Bandirabasa, Barsia, Chakundakocha, Gaiduba, Lembugoda, Koljhari, Mohanpur, Jamuani, Sanjhili, Badjhili, Rautala, Haldia, Rajpal, Chadripahadi, Sansialinai
	Thakurmunda WL	Ranibhol, Khediaposi, Karkatbeda, Sarupani, Chirupoda, Mandaljhari, Bhagana sahi, Purunapani, Sudarsanpur, Ashanbani, New Keshdiha

ANNEXURE XLVII

SENSITIVE ROUTES AND VILLAGES IN BUFFER AREA AND PROTECTION SARATEGY

SL No	Name of Range		Name of Section	Name of Beat	Timber smuggling sensitive village with GPS reading	The sensitive and smuggling routes.	Surveill ance patrolling days made during the last 6 months in
1	Similipal South WL	Dukura WL	Bahalda	Chandan-chaturi II	Agnikumari 21°49'30"N, 86°35'17"E Khundabura 21°50'2"N, 86°35'37"E	Agri-kunari-Khund-abura	Alternate day ve-hicle and night foot patrolling
2			Phulbadia	Phulbadia	Jamudihi 21°40'35"N, 86°29'4"E	Jamudiha-Tenta-la-khalarhi	-do-
3				Patsani-pur	Khalarhi 21°41'56"N, 86°31'38"E		
4			Taldiha	Taldiha	Upper Taldiha 21°40'0"N, 86°28'56"E	Manikpur- Upper Taldiha	-do-
5				Manikpur	Manikpur 21°38'58"N, 86°29'5"E		
6	Similipal South WL	Pithabata North WL	Badgaon	Badgaon	Badgano 22°1'23"N, 86°30'42"E	Kundalba-ni-Panasadiha	-do-
7				Kantasola	Kundabani 22°0'26"N 86°32'1"E		
8			Chakidi	Chakidi I	Purunapani 22°0'18"N, 86°24'21"E	Purunapa-ni-Kukurbhu-ka-allapami-Ba-ribera	-do-
9				Phuljhari	Baribera 22°1'42"N,86°26'9"E		
10			Haldibani	Baldiha	Jhenai 21°57'57"N,86°36'13"E	Jhenai-Ashanba-ni-Mudrajodi	-do-
11			Rangama-tia	Rangama-tia I	Masanibila 22°2'22"N, 86°28'1"E Palasbani 22°4'45"N, 86°27'49"E	Masanibila-Jo-ka-Palasibani	-do-
12				Rangama-tia II			
13	Similipal South WL	Pithabata South WL	Digdiga	Digdiga	Guripokhari 21°55'55"N 86°36'41"E	Besarpani-Ka-karpani-Gurip-okhari	-do-
14				Chandan-chaturi I	Besarpani 21°52'44"N 86°36'18"E		

15			Pithabata	Pithabata I	Gobinchandrapur 21°56'28"N,86°34'23"E Jhenai 21°57'57"N,86°36'13"E	Gobinchandrapur-Tarajodi-Jhenai	-do-
16				Pithabata Ii			
17	Similipal South WL	Podadiha WL	Dangadiha	Dangadiha I	Kirkichipal 21°30'41"N, 86°15'19"E	Dangadiha-Patrapara-Kirkichipal	-do-
18				Dangadiha II	Chatursahi 21°29'35"N, 86°18'45"E		
19				Dangadiha III	Dangadiha 21°30'32"N, 86°19'33"E		
20			Podadiha	Anantapur	Anantapur 21°37'35"N, 86°28'22."E	Kadambasul - Kantalia-Sanjumpal-Chakardharpur	-do-
21				Manbhanga	Nachipur 21°33'42"N, 86°25'14"E		
22	Similipal North WL Division	Kendumundi WL Range	Barakamuda	Hatibari	Simtala	Simtala to Nimia	Daily foot patrolling & night patrolling
23					N- 21.767443		
24					E- 86.127649		
25			Dudhiani	Dudhiani	Anlakata	Anlakata to Khadiadar	-do-
26					N- 21.781094		
27					E- 86.183222		
28			Kendumundi	Kendumundi-II	Gandhisahi	Gandhisahi to Jatiani	-do-
29					N- 21.698549		
30					E- 86.127139		
31		Gurguria WL Range	Utras		Asanbani	Matiagad Chak to Kaliani	-do-
32			Utras		Kanthikana	Jashipur road to Kaliani	-do-
33					(N 21 53 08, E 86 06 43)		
34			Utras		Basantpur	Basantpur to Asanbani, Kumudabadi, Ektali	-do-

35					(N 21 55 19, E 86 06 28)		
36			Utras		Ektali	Ektali to Kumudabadi	-do-
37			Utras		Kumudabadi	Kumudabadi to Kanthikna, Matiagarh	-do-
38					(N 21 53 57, E 86 06 33)		
39			Utras		Kaliani	Kaliani to Jashipur	-do-
40					(N 21 55 13, E 86 09 43)		
41		Talabandha WL Range	Bankidihi	Bankidihi	Allhapani	Allhapani- Pandabandh route	-do-
42			Talabandha	Kusumtota II	Choranbandha	Chorabandha-Kairakacha-Bandriposi	-do-
43						Chorabandha-Bhatunia	
44						Chorabandha-Karakachia- Chahala	
45						Chorabandha-Kusumtota -Bhatunia	
46						Chorabandha-Kusumtota -	
47			Talabandha	Talabandha I	Talabandha	Talabandha – Kairakacha-Balughar	-do-
48						Burudi-Mathurakherai-Chahala ring road	
49		Nawana WL Range	Nawana	Nigirdha buffer	N-21 49 28.5	Makabadi to Bhandadhar	-do-
50					E-086 29 21.1		
51		Chahala WL Range	Haldia	Haldia	Tamalbandh, Chorabandh	Tamalbandh FP, Chorabandh FP	-do-
52		Barehipani WL Range	-	-	-	-	-do-

53		Thakurmunda WL Range	Bahaghar	Bahaghar-I	N21° 31’ 58”	New Keshdiha	-do-
54					E86° 15’39”		
55			Mituani	Mituani	N21° 35’ 53.05”	Sarupani	-do-
56					E86° 14’ 22.14”		
57			Mituani	Purunapani	N21° 34’ 45”	Tuminda	-do-
58					E86° 16’ 39”		

ANNEXURE XLVIII

LIST OF FIRE PRONE FRINGE VILLAGES

Name of the Division	Name of the Range	Name of the Fringe Village
Similipal South WL	Pithabata North WL	Alapani, Amdapani, Baribeda, Basilakacha, Bhaduakacha, Chakidi, Fuljhara, Jerkani, Kukurbhuka, Purunapani, Betjharan, Ghatiduba, Sannedam, Palasbani, Gothanida, Joka, Masinabila, Badgan, Gendapokhari, Gopalpur, Juha, Kantasala, Kundalbani, Rajabasa, Ramharipur, Alubani, Hinjalgadia, Jhinei, Kitadihi, Kochilaghaty, Lulung, Purunapani, Tarajodi
	Pithabata South WL	Pithabata, Lulung, Govindchandrapur, Kochilaghaty, Laxmiposi, Godipokhari, Kakarpani, Enayatpur, Kendujhari, Besarpani, Jadunathpur, Chandanchaturi, Gopinathpur, Makabadi, Nikhirda
	Dukura WL	Chandanchaturi, Agnikumari, Mahalibasa, Sunpokhari, Subarnamanjari, Sapanchua, Bahalda, Dabak, Srirampur, Dengam, Baniabasa, Jadidar, Ambikadeipur, Tentala, Jamudiha, upartaldiha, Manikpur, Anantapur,
	Podadiha WL	Anantapur, Sanjunpal Badajunpal, Kantiali, Kadamsul, Dangadiha, Nachhipur, Patarpada, Bhejidiha, Diliganj, Mankadabeda, Kirikichipal, Asanbani
	Nawana South WL	Gopinathpur, Makabadi, Kukurbhuka, Saruda, Budhabalanga, Similipal, Astakuanr, Lembujharan, Bakua, Baniabasa, Jadidar, Dengam
	National Park	Bakua, Khejuri, Bhradachua, Barigan, Badakasira, Sankasira, Burudihi, Ramjodi, Laxmiposi, Pahadpur, Jalada, Budhigan, Khalpada, Anlakata, Dudhiani, Rangamatia
	Jenabil WL	Bakua, Khejuri, Barigan, Bhradachua, Badakasira, Jadidar, Baniabasa, Dengam, Jamudiha, Tentala, upartaldiha, Anantapur, Manikpur
	Bhanjabasa WL	Anantapur, Badajunpal, Kadamsul, Kantiali, Nachhipur, Sanjunpal, Dangadiha, Diliganj, Kirikichipal, Patarpada, Chirupada, Mandal Jhari
	UBK WL	Budhigan, Khalpada, Sanramchandrapur, Bisipur, Ranibhol, Sunaposi, Baghalata, Thakurjharan, Asankudar, Badmahuldiha, Edelbeda, Khaparkhai, Ranibhol
Similipal North WL Division	Kendumundi WL	Bishipur, Barakamuda, Kaleitumba, Sunaposi, San Ramchandrapur, Rangamatia, Khalpoda, Budhigaon, Anlakota, Burudihi, Jalda, Pahadpur, Kadalibadi, Purunapani, Bargadia, Khandiadara, Raikabosa, Ujiabasa, Dudhiani, Ranibhol, Baghlata,
	Gurguria WL	Asanbani, Kumudabadi, Kanthikana, Basantpur, Ektali, Banabasa, Matiagad, Kaptira, Kaliani, Utras, Barigaon, Badkasira, Sankasira, Khejuri
	Talabandha WL	Chorabandh, Dantiaakacha, Allhapani, Chakidi, Ghatkuanri, Asadola, Bautia,Talabandha
	Nawana WL	Astokumar, Balarampur, Budhabalanga, Budhabalanga, Nawana, Godsimilipal, Gopinathpur, Kukurbhuka, Nigirdha, Saruda
	Chahala WL	Charabandh, Tamalbandh, Kuljhuri, Chakundakocha, Asanbani, Chakidi, Kusumtota, Majhigaon, Kadamdiha, Burudihi, Raikalkocha, Asadola, Allhapani,
	Barehipani WL	Baduski, Bandirabasa, Barsia, Chakundakocha, Gaiduba, Lembugoda, Koljhari, Mohanpur, Jamuani, Sanjhili, Badjhili, Rautala, Haldia, Rajpal, Chadripahadi, Sansialinai
	Thakurmunda WL	Ranibhol, Khediaposi, Karkatbeda, Sarupani, Chirupoda, Mandaljhari, Bhagana sahi, Purunapani, Sudarsanpur, Ashanbani, New Keshdiha

ANNEXURE XLIX

LIST OF FIRE LINES IN CORE - BUFFER AREA OF SIMILIPAL TIGER RESERVE

Sl. No.	Division	Range	Name of the Beat	Name of the fire line	Length in km	Core-Buffer
1	Similipal South WL	Pithabata South WL	Pithabata-I	Sitakund to Hill top	9 Km	Buffer
2	Similipal South WL	Pithabata South WL	Pithabata-I	Mankadaghati to Raidipu	9.5 Km	Buffer
3	Similipal South WL	Pithabata South WL	Pithabata-I	Sitakund to Chelinendi nala	10 Km	Buffer
4	Similipal South WL	Pithabata South WL	Pithabata-II	Gobindpur coreline to Badpadia	3 Km	Buffer
5	Similipal South WL	Pithabata South WL	Pithabata-II	Kochilaghati coreline to Lalpani coreline via-Belghati	4 Km	Buffer
6	Similipal South WL	Pithabata South WL	Pithabata-II	Gobindpur coreline to Chhatapa-thar	4 Km	Buffer
7	Similipal South WL	Pithabata South WL	Pithabata-II	Dahukacha to Laxmiposi coreline	2 Km	Buffer
8	Similipal South WL	Pithabata South WL	Pithabata-II	Sitakund to Laxmiposi coreline	4 Km	Buffer
9	Similipal South WL	Pithabata South WL	Digdiga	Khadighati footpath to Chitiajhar nala(PP-13)	4 Km	Buffer
10	Similipal South WL	Pithabata South WL	Digdiga	Chitiajhara nala to Phatapani chhaka (PP-13)	3 Km	Buffer
11	Similipal South WL	Pithabata South WL	Digdiga	Dankadag nala to Asua ch-haka(SJ-1)	4 Km	Buffer
12	Similipal South WL	Pithabata South WL	Digdiga	Panchakunia chhaka to Ramsar-jam coreline (SJ-1)	3 Km	Buffer
13	Similipal South WL	Pithabata South WL	Digdiga	Kakarpani pukhuri to Asua dipu(SJ-1)	2 Km	Buffer
14	Similipal South WL	Pithabata South WL	Chandanchaturi	Mahalikalam forest to Chadrahudi	3 Km	Buffer
15	Similipal South WL	Pithabata South WL	Chandanchaturi	Bhalupani forest to Khadi ghati	2.5 Km	Buffer
16	Similipal South WL	Pithabata South WL	Chandanchaturi	Hatikut forest to Besarpani(S.J.-2)	3 Km	Buffer
17	Similipal South WL	Pithabata South WL	Chandanchaturi	Akashi jungle to Chitijhar forest	10 Km	Buffer
18	Similipal South WL	Pithabata South WL	Chandanchaturi	Reheda buru to Besarpani core-line	10 Km	Buffer
19	Similipal South WL	Pithabata South WL	Chandanchaturi	Serka duba to Godisa nala	5 Km	Buffer
20	Similipal South WL	Pithabata South WL	Chandanchaturi	Mundabadi nala to Chadrahudi footpath	2.42 Km	Buffer

21	Similipal South WL	Pithabata South WL	Namti-I	Khadiabasa to Damuru darh	1.5 Km	Core
22	Similipal South WL	Pithabata South WL	Namti-I	Dumuru darh to Raladhipu	1.19 km	Core
23	Similipal South WL	Pithabata South WL	Namti-I	Jhimirikhal to Munibasa	3.43 Km	Core
24	Similipal South WL	Pithabata South WL	Namti-I	Munibasa to Dahu kacha coreline	1.52 Km	Core
25	Similipal South WL	Pithabata South WL	Namti-I	Jhiliri bana to Dhaduakhal core-line	8.66 Km	Core
26	Similipal South WL	Pithabata South WL	Namti-I	Dhaduakhal coreline to Sapadarh coreline	3.38 Km	Core
27	Similipal South WL	Pithabata South WL	Namti-I	Janagada coreline to Dhaduakhal coreline	3.5 Km	Core
28	Similipal South WL	Pithabata South WL	Namti-I	Dhaduakhal footpath to Janadun-guri	2.11 Km	Core
29	Similipal South WL	Pithabata South WL	Namti-II	Mayurnacha to Bhjam khal	3.51 Km	Core
30	Similipal South WL	Pithabata South WL	Namti-II	Jhimirikhal to bhajamkhal chhaka	8.15 Km	Core
31	Similipal South WL	Pithabata South WL	Namti-II	Khadiabasa to Mayurnacha	1.49 Km	Core
32	Similipal South WL	Pithabata South WL	Palasibeda	Chelinendi to Darda nala	2 Km	Core
33	Similipal South WL	Pithabata South WL	Palasibeda	Hatitop Ghati to Sikaribasa	4.6 Km	Core
34	Similipal South WL	Pithabata South WL	Palasibeda	Soonpakhari danda to Chelinendi nala	9.7 Km	Core
35	Similipal South WL	Pithabata South WL	Palasibeda	Chelinendi nala to Duika basa	2 Km	Core
36	Similipal South WL	Pithabata South WL	Kachudahan	Domuhani to Sambarchara	5.11 Km	Core
37	Similipal South WL	Pithabata South WL	Kachudahan	Pindra forest to Khadiabasa nala	3.5 3Km	Core
38	Similipal South WL	Pithabata South WL	Kachudahan	Kamalabasa to Sikaribasa forest	4.26Km	Core
39	Similipal South WL	Pithabata South WL	Kachudahan	Sambarchara to Mankadaghati coreline	5.36Km	Core
40	Similipal South WL	Pithabata South WL	Kachudahan	Mankadaghati to Bhandadarh chhaka	7.3Km	Core
41	Similipal South WL	Pithabata South WL	Kachudahan	Kamalabasa to Chandralal dipu	4.11Km	Core
42	Similipal South WL	Pithabata South WL	Kachudahan	Domuhani to Satnalia	7 Km	Core
43	Similipal South WL	Pithabata South WL	Andharitota-I	Kachudahan to Charline	3.74 Km	Core

44	Similipal South WL	Pithabata South WL	Andharitota-I	Charline to Mahubhandar	3.60 Km	Core
45	Similipal South WL	Pithabata South WL	Andharitota-I	Mahubhandar to Ainsa bhol	3.61 Km	Core
46	Similipal South WL	Pithabata South WL	Andharitota-II	Jamu chhaka to Jajachati	4 Km	Core
47	Similipal South WL	Pithabata South WL	Andharitota-II	Marachati to Charichhaka	5.5 Km	Core
48	Similipal South WL	Pithabata South WL	Andharitota-II	Hill top to Jamuchhaka	4Km	Core
49	Similipal South WL	Pithabata South WL	Badmakabadi	Bahalda Chhaka-Ambadipu-Saman manjari	9.2Km	Core
50	Similipal South WL	Pithabata South WL	Badmakabadi	Suman manjari to Marachati	2.8Km	Core
51	Similipal South WL	Pithabata South WL	Badmakabadi	Ambadipu to Sahubandha	2.5Km	Core
52	Similipal South WL	Pithabata South WL	Badmakabadi	Suman manjari to Sabar basa	1.5Km	Core
53	Similipal South WL	Pithabata South WL	Badmakabadi	Kumbhaghati to Mahalimba Chaturipani	4.1Km	Core
54	Similipal South WL	Pithabata South WL	Badmakabadi	Salabana to Katia rimili	4.5Km	Core
55	Similipal South WL	Pithabata South WL	Badmakabadi	Amba chhaka-Jamu chhaka to Marachati	3.5Km	Core
56	Similipal South WL	Pithabata South WL	Badmakabadi	Rajkoli Chhaka to Champa lahar	3.8Km	Core
57	Similipal South WL	Pithabata South WL	Bhajam	Nawana boarder to Edel kachana la	3.66Km	Core
58	Similipal South WL	Pithabata South WL	Bhajam	Patapolia to Bhajamkhal nala	5.02Km	Core
59	Similipal South WL	Pithabata South WL	Bhajam	Mahubhandar to Balijhari	5.01Km	Core
60	Similipal South WL	Pithabata South WL	Bhajam	Mahubhandar to Saltlick nala	3.92 Km	Core
61	Similipal South WL	Pithabata South WL	Bhajam	Badgan footpath to Fundibadi	4.30 Km	Core
62	Similipal South WL	Pithabata South WL	Bhajam	Nawana boarder to Ghodagada main road	11 Km	Core
63	Similipal South WL	Pithabata South WL	Baunskhal	Tuarbeda to Baleladam	3.4 Km	Core
64	Similipal South WL	Pithabata South WL	Baunskhal	Mahaleda to Dhundipani	4.3 Km	Core
65	Similipal South WL	Pithabata South WL	Baunskhal	Dhundipani to Pandabandha darh	2.3 Km	Core
66	Similipal South WL	Pithabata South WL	Baunskhal	Mirughati to Rahal mundu	3.6 Km	Core

67	Similipal South WL	Pithabata South WL	Baunskhal	Paltiki to Khadiabasa	9.7 Km	Core
68	Similipal South WL	Pithabata South WL	Baunskhal	Salpo kacha to Rengal kacha	8.6 Km	Core
69	Similipal South WL	Pithabata South WL	Baunskhal	Tuarbeda to Sarjam paya	4.2 Km	Core
70	Similipal South WL	Pithabata South WL	Baunskhal	Baunskhal to Bhajam chhaka	10 Km	Core
71	Similipal South WL	Pithabata South WL	Baunskhal	CORE LINE		Core
72	Similipal South WL	Pithabata South WL	Baunskhal	Bhajam ghati chaka to Pand-abandha darh	12.3 Km	Core
73	Similipal South WL	Pithabata South WL	Gopinathpur	Hatikut forest to Coreline forest	3 Km	Core
74	Similipal South WL	Pithabata South WL	Gopinathpur	Hesel fata forest to Lakechampa forest	4 Km	Core
75	Similipal South WL	Pithabata South WL	Gopinathpur	Belghati forest to Burughati forest	6 Km	Core
76	Similipal South WL	Pithabata South WL	Gopinathpur	Kadamba forest to Khadiabasa forest	4 Km	Core
77	Similipal South WL	Pithabata South WL	Gopinathpur	Chhatini forest to Kafitanda forest	4 Km	Core
78	Similipal South WL	Pithabata South WL	Gopinathpur	Saraha landa to Panasa buru	4 Km	Core
79	Similipal South WL	Pithabata South WL	Balikhal	2no. Polia to Jalighati forest	6Km	Core
80	Similipal South WL	Pithabata South WL	Balikhal	Dudru uli to Kachudahan boarder	7Km	Core
81	Similipal South WL	Pithabata South WL	Balikhal	Adel baha dunka to 3no. Polia	5Km	Core
82	Similipal South WL	Pithabata South WL	Balikhal	Poto gada to Tarab buru	4Km	Core
83	Similipal South WL	Pithabata South WL	Balikhal	Champa barehi to Jamu nala	3Km	Core
84	Similipal South WL	Dukura WL	Chandancha-turi-II	Chatanasahi Khadan to Garisa Nala (Reserve Line)	2.41km	Buffer
85	Similipal South WL	Dukura WL	Chandancha-turi-II	Koilisuta-Kartiabasa-Karampani	3.21	Buffer
86	Similipal South WL	Dukura WL	Chandancha-turi-II	Ghodasila-Kendujhari-Barahgum-pha- Jambhirakhal Chhaka	5.5km	Buffer
87	Similipal South WL	Dukura WL	Chandancha-turi-II	Koilisuta Chhaka to Coreline- Asa-na Chhaka- Kadali Bagan	4.5km	Buffer
88	Similipal South WL	Dukura WL	Chandancha-turi-II	Gambhari Jungle to Mahadev Hudi- Marah Tapol- Ambapani-Charline	7km	Buffer

89	Similipal South WL	Dukura WL	Chandancha-turi-II	Marah Tapol to Bulumdah	2km	Buffer
90	Similipal South WL	Dukura WL	Sapanchua	Chapam to Ambapani- Jhaunri Chhaka- Core line	7km	Buffer
91	Similipal South WL	Dukura WL	Sapanchua	Masani Dunguri to Lamha Dungu-ri- Ambapani- Jhaunri Chhaka	5km	Buffer
92	Similipal South WL	Dukura WL	Sapanchua	Sijupani to Budhabudhi Tapol	3km	Buffer
93	Similipal South WL	Dukura WL	Sapanchua	Heselghutu to Beldunguri-Durmudur Chhaka	3km	Buffer
94	Similipal South WL	Dukura WL	Sapanchua	Sanatan Kachha to Chandra Dun-guri- Jhaunri Chhaka	6km	Buffer
95	Similipal South WL	Dukura WL	Sapanchua	Sanatan Kachha to Sunpukhuri danda- Gopalia Kachha	3km	Buffer
96	Similipal South WL	Dukura WL	Sapanchua	Ambakachha to Sunpukhuri dan-da- Baramkachha	3km	Buffer
97	Similipal South WL	Dukura WL	Sapanchua	Sapanchua Reserve line	12km	Buffer
98	Similipal South WL	Dukura WL	Bahalda	Fekal Sahi to Pirul Chhaka, Pin-daghati Core line	5km	Buffer
99	Similipal South WL	Dukura WL	Bahalda	Balipal to Pirul Chhaka, Ambadipu Core line	5km	Buffer
100	Similipal South WL	Dukura WL	Bahalda	Govei to Burunda Turtabasa	5km	Buffer
101	Similipal South WL	Dukura WL	Bahalda	Govei to Loadaghati, Katkarda, Thumpubasa, Govei	5km	Buffer
102	Similipal South WL	Dukura WL	Bahalda	Tunki to Fekal sahi, Balipal, Govei, Bindunguri, Chapam (Buffer Pillar Line) new boundary line	10km	Buffer
103	Similipal South WL	Dukura WL	Bahalda	Futkunikachha to Atnapal	2km	Buffer
104	Similipal South WL	Dukura WL	Bahalda	Badmakabadi	3km	Buffer
105	Similipal South WL	Dukura WL	Dengam	Compartment No-SJ-18	10.5km	Buffer
106	Similipal South WL	Dukura WL	Nuagaon-I	Kanyabasa	5km	Buffer
107	Similipal South WL	Dukura WL	Nuagaon-II	Kendughati to Tunki Nala	20km	Buffer
108	Similipal South WL	Dukura WL	Taldiha	Patharanala to Rusibasa Nala	4km	Buffer
109	Similipal South WL	Dukura WL	Taldiha	Charichhaka to Balma border	4km	Buffer
110	Similipal South WL	Dukura WL	Taldiha	Anantapur Gaon munda to Anan-tapur Nala	5km	Buffer

111	Similipal South WL	Dukura WL	Taldiha	Anantapur Gaon munda to Paintchira	4km	Buffer
112	Similipal South WL	Dukura WL	Manikpur	Polandarah to Ashok Plantation	6km	Buffer
113	Similipal South WL	Dukura WL	Manikpur	Khandachira to Anantapur	6km	Buffer
114	Similipal South WL	Dukura WL	Manikpur	Balma camp to Charichhaka via Kenduchua	8km	Buffer
115	Similipal South WL	Dukura WL	Manikpur	Khandachira to Charichhaka via Piasalghati	12km	Buffer
116	Similipal South WL	Dukura WL	Phulbadia	Garden Khual to Sarua	4km	Buffer
117	Similipal South WL	Dukura WL	Patsanipur	Babajimatha to Sabla Footpath	3km	Buffer
118	Similipal South WL	Dukura WL	Patsanipur	Phulbadia to Lash Nala	2km	Buffer
119	Similipal South WL	Pithabata North WL	Chakidi-I	Karamdarh to Bhadua nala	5km	Core
120	Similipal South WL	Pithabata North WL	Chakidi-I	Burudihi Chhaka to Charpabale	4km	Core
121	Similipal South WL	Pithabata North WL	Chakidi-I	Pakhoridihi to Bhadua Nala	3km	Core
122	Similipal South WL	Pithabata North WL	Chakidi-I	Kukurbhuka to Pindartapal	3km	Core
123	Similipal South WL	Pithabata North WL	Chakidi-I	Dadhiadihi to bingtuka	3km	Core
124	Similipal South WL	Pithabata North WL	Chakidi-I	Jara Dunguri to Badapathara	4km	Core
125	Similipal South WL	National Park WL	Budhigaon-i	Panianla to Mankada	4 km	core
126	Similipal South WL	National Park WL	Budhigaon-i	Pokhoridhipa to Burudhi footpath chhak	3 km	core
127	Similipal South WL	National Park WL	Budhigaon-i	Pokhorodhipa to Towerghati	2 km	core
128	Similipal South WL	National Park WL	Budhigaon-i	Pokhoridhipa to Bankapani	3 km	core
129	Similipal South WL	National Park WL	Budhigaon-i	Panianla to Khadichaturi	4 km	core
130	Similipal South WL	National Park WL	Budhigaon-i	Rushibasa to Panianla	4 km	core
131	Similipal South WL	National Park WL	Budhigaon-i	Towerghati to Merelgoda	3.5 km	core
132	Similipal South WL	National Park WL	Budhigaon-i	Khadichaturi to Jadapathar	4.5 km	core
133	Similipal South WL	National Park WL	Budhigaon-i	Towerghati to Pokhiridhipa	1 km	core

134	Similipal South WL	National Park WL	Mahabirsal -ii	Merelgoda to Kalkam	3 km	core
135	Similipal South WL	National Park WL	Mahabirsal -ii	Mahabirsal to Pansakacha	3 km	core
136	Similipal South WL	National Park WL	Mahabirsal -ii	Nimia to Merelgoda	2 km	core
137	Similipal South WL	National Park WL	Mahabirsal -ii	Nimia to Baghajoda	3 km	core
138	Similipal South WL	National Park WL	Mahabirsal -ii	Nimia danda to Nimia Daldali	2 km	core
139	Similipal South WL	National Park WL	Mahabirsal -ii	Nimia Daldali to Merelgoda	3 km	core
140	Similipal South WL	National Park WL	Ganapati-i	Kumbhiradora to Daktarburu	2 km	core
141	Similipal South WL	National Park WL	Ganapati-i	Daktarburu to Chandraposi	4 km	core
142	Similipal South WL	National Park WL	Khejuri	Chandraposi to Debtaghar	4 km	core
143	Similipal South WL	National Park WL	Khejuri	Tentulidhipa to Chhamudia Pula-goda	8 km	core
144	Similipal South WL	National Park WL	Khejuri	Chandraposigoda to Chatamburu	4 km	core
145	Similipal South WL	National Park WL	Khejuri	Ranidarh to Bhalugumpha	3 km	core
146	Similipal South WL	National Park WL	Kabatghai-ii	Rajabhadi to Rushibasa chhaka, Nedajaunri to Kusumpahad, Bha-lughar to Kutarikota	12 km	core
147	Similipal South WL	National Park WL	Kabatghai-ii	Chakadarh to Jadighati	7 km	core
148	Similipal South WL	National Park WL	Kabatghai-ii	Tamakdhiri to Nedajaunri	5 km	core
149	Similipal South WL	National Park WL	Kabatghai-ii	Doligoda chhak to Rushibasa chhaka	5 km	core
150	Similipal South WL	National Park WL	Bakua -i	Khejuri nala - Heseldhipa to Sar-jamghati, Chherabil -Bakua Gaon munda	8 km	core
151	Similipal South WL	National Park WL	Bakua -i	Cheruanali to Pitalusila forest	4 km	core
152	Similipal South WL	National Park WL	Bakua -i	Chatamburu to Ranidarh forest	4 km	core
153	Similipal South WL	National Park WL	Bakua -i	Sarjomgoda to Ranipokhori	3 km	core
154	Similipal South WL	National Park WL	Kabatghai-I	Budhidarh to Kusumdhipa forest	8 km	core
155	Similipal South WL	National Park WL	Kabatghai-i	Jalabasa to Gayalgoda	5 km	core

156	Similipal South WL	National Park WL	Kabatghai-i	Baunshbania to Jalabasa	4 km	core
157	Similipal South WL	National Park WL	Nuagaon	Dangapani nala to Sapramburu	3.5 km	core
158	Similipal South WL	National Park WL	Nuagaon	Dangapani footpath to Sukuram kacha	3.5 km	core
159	Similipal South WL	National Park WL	Nuagaon	Jamunadanda to Jamuna Nala	1 km	core
160	Similipal South WL	National Park WL	Nuagaon	Kankada nala to Nuagaon wooden bridge	1 km	core
161	Similipal South WL	National Park WL	Nuagaon	Old Ganapati footpath to Debas-thali nala	1 km	core
162	Similipal South WL	National Park WL	Ranasa	Chaturitangor to Jambhiranala	5 km	core
163	Similipal South WL	National Park WL	Ranasa	Nedajaunri to Kusum Banka	5 km	core
164	Similipal South WL	Nawana South WL	Rajabasa	Lengdakacha Footpath to Mank-daghati	6 km	core
165	Similipal South WL	Nawana South WL	Rajabasa	Saruda Footpath to Sarjom goda	4 km	core
166	Similipal South WL	Nawana South WL	Rajabasa	Chhitiasahi Footpath to Khadia-basa	3km	core
167	Similipal South WL	Nawana South WL	Dhudruchampa	Laxmimora Footpath to Kandhia-jharan	5km	core
168	Similipal South WL	Nawana South WL	Dhudruchampa	Dhudruchampa nala to Dhiricha-turi	4km	core
169	Similipal South WL	Nawana South WL	Dhudruchampa	Dhudruchampa nala to Tiger hill	6km	core
170	Similipal South WL	Nawana South WL	Lengdakacha	Mankadaghati Footpath to Bhans-pal Footpath	4km	core
171	Similipal South WL	Nawana South WL	Lengdakacha	Dhundubasa Chhakla to Ambanala	5km	core
172	Similipal South WL	Nawana South WL	Lengdakacha	Lengdakacha to Badmakabadi	6km	core
173	Similipal South WL	Nawana South WL	Lengdakacha	Dhundubasa Chhakla to Sanamirili	5km	core
174	Similipal South WL	Nawana South WL	Dhundubasa	Mankadaghati to Kaniabasa Ch-haka	5km	core
175	Similipal South WL	Nawana South WL	Dhundubasa	Gotedipu to Janogoda Footphat	4km	core
176	Similipal South WL	Nawana South WL	Dhundubasa	Kaniabasa Footpath Chhaka to Khass nala	4km	core
177	Similipal South WL	Nawana South WL	Bakua	Bakua to Bhadragoda Footpath	4km	core
178	Similipal South WL	Nawana South WL	Bakua	Bakua to Samamancha	5km	core

179	Similipal South WL	Nawana South WL	Bakua	Bagdega Footpath to Susilbasa	4km	core
180	Similipal South WL	Nawana South WL	Gadsimilipal (Chherabil)	Kumkum pakhari to Kadachapal	6km	core
181	Similipal South WL	Nawana South WL	Gadsimilipal (Chherabil)	Bagdega Footpath to Jharan Ghati	3km	core
182	Similipal South WL	Nawana South WL	Gadsimilipal (Chherabil)	Dhuliupada to Bangla Ghutu	3km	core
183	Similipal South WL	Nawana South WL	Gadsimilipal (Chherabil)	Chherabil Padam to Bagdega	2km	core
184	Similipal South WL	Nawana South WL	Bhadragoda (Chhatadanda)	Chhatadanda to Susilbasa	6km	core
185	Similipal South WL	Nawana South WL	Bhadragoda (Chhatadanda)	Bhadragoda to Maranghasa	6km	core
186	Similipal South WL	Nawana South WL	Jodapal-I	Jodapal to Sanmiridi	4km	core
187	Similipal South WL	Nawana South WL	Jodapal-I	Magaburu to Kaniabasa	3km	core
188	Similipal South WL	Nawana South WL	Jodapal-I	Gilirighati to Dholamati	3km	core
189	Similipal South WL	Nawana South WL	Jodapal-II	Dholamati to Ambanala	5km	core
190	Similipal South WL	Nawana South WL	Jodapal-II	Balidar W.F to Kaniabasa	6km	core
191	Similipal South WL	Nawana South WL	Jodapal-II	Jodapal to Balidar Dhipa	7km	core
192	Similipal South WL	Nawana South WL	Jodapal-II	Balidar Footpath to Kendunala	5km	core
193	Similipal South WL	Nawana South WL	Jodapal-II	Jodapal to Dukura Dhipa	4km	core
194	Similipal South WL	Podadiha WL	Manabhanga	Manabhanga gate to kalapathara	6km	Buffer
195	Similipal South WL	Podadiha WL	Manabhanga	Kalapathara to jaunri nala area	7km	Buffer
196	Similipal South WL	Podadiha WL	Manabhanga	Jaunri nala area to Sorisobila area	8km	Buffer
197	Similipal South WL	Podadiha WL	Manabhanga	Bajikusum area to Amba banka	4km	Buffer
198	Similipal South WL	Podadiha WL	Manabhanga	Banjikusum area to Roja pulo	1.5km	Buffer
199	Similipal South WL	Podadiha WL	Manabhanga	Banjikusum area to Roja pulo(ma-tiachua hill side area)	1.5km	Buffer
200	Similipal South WL	Podadiha WL	Manabhanga	Amba banka to Dhirichata	5km	Buffer
201	Similipal South WL	Podadiha WL	Manabhanga	Pandesahi area to Haladibasa nala	2km	Buffer

202	Similipal South WL	Podadiha WL	Anantapur	Hudisahi, Bghaanta to Sagara-bandha	10km	Buffer
203	Similipal South WL	Podadiha WL	Anantapur	Sanjunpal to Dubigardh	7km	Buffer
204	Similipal South WL	Podadiha WL	Anantapur	Anantapur to Paliaghai	8 km	Buffer
205	Similipal South WL	Podadiha WL	Anantapur	Panichaturi to Khumbha FP	3 km	Buffer
206	Similipal South WL	Podadiha WL	Anantapur	Hudisahi, Bghaanta to Sagara-bandha	10km	Buffer
207	Similipal South WL	Podadiha WL	Anantapur	Sanjunpal to Dubigardh	7km	Buffer
208	Similipal South WL	Podadiha WL	Anantapur	Anantapur to Paliaghai	8 km	Buffer
209	Similipal South WL	Podadiha WL	Anantapur	Panichaturi to Khumbha FP	3 km	Buffer
210	Similipal South WL	Podadiha WL	Baghanta	Baghaanta to Kandachakha, Du-bigad, Pithamundia, Mahulahudi, Kunduria Fire line to back Palba-nia, hudikaema Baghaanta	17 km	core
211	Similipal South WL	Podadiha WL	Baghanta	Baghaanta, Chhelikunduli Ghati, Runcha Ghati, Jaleita Ghati, Bar-ahamunda, Nepti Patharaghara, Mahulahudi	15 km	core
212	Similipal South WL	Podadiha WL	Baghanta	Baghaanta to Bansulighati	3 km	core
213	Similipal South WL	Podadiha WL	Baghanta	Baghaanta to Panasagadi,	9 km	core
214	Similipal South WL	Podadiha WL	Baghanta	Talasarei to Jaleita	4 km	core
215	Similipal South WL	Podadiha WL	Baghanta	Talosorei Nala to Palbania	7 km	core
216	Similipal South WL	Podadiha WL	Baghanta	Chheligudhudi to Barhamunda Nala	9 km	core
217	Similipal South WL	Podadiha WL	Baghanta	Khandasal to Kumbhaghai Nala	10 km	core
218	Similipal South WL	Podadiha WL	Baghanta	Baghaanta to Badaghati	4 km	core
219	Similipal South WL	Podadiha WL	Dangadiha - I	Patrapada to Gula sahi	4.5 km	Buffer
220	Similipal South WL	Podadiha WL	Dangadiha - I	Sapanalua to Sana mankada beda	6.5 km	Buffer
221	Similipal South WL	Podadiha WL	Dangadiha - I	Nekta kuturu to Akpadi	8 km	Buffer
222	Similipal South WL	Podadiha WL	Dangadiha - I	Mahula hudi to Buruguthu	7.9 km	Buffer

223	Similipal South WL	Podadiha WL	Dangadiha - I	Sapanadua to Pandabaga	8.5 km	Buffer
224	Similipal South WL	Podadiha WL	Dangadiha - I	Babunduba to Kaprajodi	8.5 km	Buffer
225	Similipal South WL	Podadiha WL	Dangadiha - I	Patrapada to Dangada	11.5 km	Buffer
226	Similipal South WL	Podadiha WL	Dangadiha - I	Crossbandha to Kanyanagari	14 km	Buffer
227	Similipal South WL	Podadiha WL	Dangadiha - I	Dangadiha - I New beat to Chaturia	15 km	Buffer
228	Similipal South WL	Podadiha WL	Dangadiha -II	Patrapada forest to Old Contractor Road	8 km	Buffer
229	Similipal South WL	Podadiha WL	Dangadiha -II	Old Contractor to Dhalapathara	9 km	Buffer
230	Similipal South WL	Podadiha WL	Dangadiha -II	Dhalapathara to Matregha	9 km	Buffer
231	Similipal South WL	Podadiha WL	Dangadiha -II	Matregha Nala - Bengadumbri	3km	Buffer
232	Similipal South WL	Podadiha WL	Dangadiha -III	Dangadiha gate to Ekk padi hudi	11km	Buffer
233	Similipal South WL	Podadiha WL	Dangadiha -III	Tungerbasa to Chaturisahi Forest	9 km	Buffer
234	Similipal South WL	Podadiha WL	Dangadiha -III	Bada chaturi hill to Bela hudi	10 km	Buffer
235	Similipal South WL	UBK WL	Matughar	Narangamula- Sadananda Chaka	8 km	core
236	Similipal South WL	UBK WL	Matughar	Chandiniambo- Narangamula	8 km	core
237	Similipal South WL	UBK WL	Tinadiha	Jamunadanda Main road-Niyamdarah	5 km	core
238	Similipal South WL	UBK WL	Tinadiha	Patuagoda-Jamunadanda	6 km	core
239	Similipal South WL	UBK WL	Bengapani	Dhudram Bridge to Badapathar	4 km	core
240	Similipal South WL	UBK WL	Bengapani	Bhatudibasa Nala to Sadananda Chaka	4 km	core
241	Similipal South WL	UBK WL	Bengapani	Chari Chaka to Badapatthar	4 km	core
242	Similipal South WL	UBK WL	Bengapani	Jhankajhari Nala to Coreline	2 km	core
243	Similipal South WL	UBK WL	Bengapani	Bengapani Moncha to Sadananda Chaka	2 km	core
244	Similipal South WL	UBK WL	Bengapani	Bengapani Gadgodi to Chari Chaka	4 km	core
245	Similipal South WL	UBK WL	Patbil	Patbil Meadow- Bachuruchora	3 km	core

246	Similipal South WL	UBK WL	Patbil	Bhachuri Chora- Bamandiha	2 km	core
247	Similipal South WL	UBK WL	Patbil	Chakasil Chaka-Bamandiha	3 km	core
248	Similipal South WL	UBK WL	Patbil	Mayurnocha to Bamandiha	3 km	core
249	Similipal South WL	UBK WL	Devastali	Bachurichara-Mutura ghati	6 km	core
250	Similipal South WL	UBK WL	Devastali	Chaturibasa Manchan-Baladaghara Danda	2 km	core
251	Similipal South WL	UBK WL	Devastali	Kankadanala-Jamunadanda	2 km	core
252	Similipal South WL	UBK WL	Devastali	Nuagan Chaka-Chandraposi	6 km	core
253	Similipal South WL	UBK WL	Devastali	Ghantalkocha-Badapatthar	5 km	core
254	Similipal South WL	UBK WL	Devastali	Ghantalkocha Phone Point-Gayalakocha Bridge	2 km	core
255	Similipal South WL	UBK WL	Devastali	Ghantalkocha Hilltop- Patching Nala	3 km	core
256	Similipal South WL	UBK WL	Devastali	Dhudram Footpath Chaka- Bamandiha	4 km	core
257	Similipal South WL	UBK WL	Devastali	Patching Nala-Badapatthar	3 km	core
258	Similipal South WL	UBK WL	Devastali	Kadambanko- Golkund nala	2 km	core
259	Similipal South WL	UBK WL	Devastali	Nuagan Chaka-Jamunadanda Murrum Khadan	3 km	core
260	Similipal South WL	UBK WL	Devastali	Devastali Nala Meadow to Dhudram Foot Path Chaka	2 km	core
261	Similipal South WL	UBK WL	Devastali	Jamunadanda-Bamandiha	5 km	core
262	Similipal South WL	UBK WL	Tarinibila	Mondarah Chaka-Jampani Chaka	6 km	core
263	Similipal South WL	UBK WL	Tarinibila	Jampani chaka-Kiabasa Nala	6 km	core
264	Similipal South WL	UBK WL	Tarinibila	Kiabasa Nala-Luhabita Nala	4 km	core
265	Similipal South WL	UBK WL	Tarinibila	Luhabita-Fulbadi Nala	3 km	core
266	Similipal South WL	UBK WL	Tarinibila	Tiktali Fireline-Mondadarah	10 km	core
267	Similipal South WL	UBK WL	Meghasani	Kiabasa Nala- Sambar gutho Chaka	2 km	core
268	Similipal South WL	UBK WL	Meghasani	Sambargutho Nala-Ashok Nala	5 km	core

269	Similipal South WL	UBK WL	Meghasani	Ashok Nala - Putuldiha	4 km	core
270	Similipal South WL	UBK WL	Meghasani	Chandiniambo Main road-Luhabi-ta Nala	3 km	core
271	Similipal South WL	UBK WL	UBK	Baruladam-Sikaricamp-Khadichua	8 km	core
272	Similipal South WL	UBK WL	UBK	Baldi-Kusum Ghati	6 km	core
273	Similipal South WL	UBK WL	UBK	Khadichua-Baragodia	5 km	core
274	Similipal South WL	UBK WL	UBK	Khadichua Contractor road	3 km	core
275	Similipal South WL	UBK WL	Kandadhenu	Sarudala to Jalchinda	14 km	core
276	Similipal South WL	UBK WL	Kandadhenu	Ankurbasa to Bachirichara	6 km	core
277	Similipal South WL	UBK WL	Kandadhenu	Baladaghara to Bachurichara	5 km	core
278	Similipal South WL	UBK WL	Silda	Check Gate- Kulachua	9 Km	core
279	Similipal South WL	UBK WL	Silda	Ankurbasa to Makarmundi	5 km	core
280	Similipal South WL	UBK WL	Silda	Ankurbasa to Mayurnocha	5 km	core
281	Similipal South WL	UBK WL	Silda	Murrum ghati -Chandandhipa	9 Km	core
282	Similipal South WL	UBK WL	Bahaghar	Jhankajhari to Bahaghar Chaka	5 km	core
283	Similipal South WL	UBK WL	Bahaghar	Bahaghar Chaka to Chandan Dhi-pa Chaka	5 km	core
284	Similipal South WL	UBK WL	Bahaghar	Chandan Dhipa to Gina Hoja	3 km	core
285	Similipal South WL	UBK WL	Bahaghar	Bahaghar Nala to Bhatudibasa	4 km	core
286	Similipal South WL	UBK WL	Bahaghar	Bahaghar Nala to Eucally patus plantation	2 km	core
287	Similipal South WL	UBK WL	Jatiani	Jatiani to Gamuchajharan	8 km	core
288	Similipal South WL	UBK WL	Jatiani	Mayurnocha to Hatidarah	7 km	core
289	Similipal South WL	UBK WL	Jatiani	Hatidarah to Madamua	8 km	core
290	Similipal South WL	UBK WL	Jatiani	Modamua to Gamuchajharan	5 km	core
291	Similipal South WL	UBK WL	Jatiani	Murrum Ghati to Jadighati	6 km	core

292	Similipal South WL	UBK WL	Jatiani	Hatidarah to Baladaghara	3 km	core
293	Similipal South WL	UBK WL	Panasakudar	Pokhoribhadi to Amboghati	10 km	core
294	Similipal South WL	UBK WL	Panasakudar	Chandandhipa Chaka to Pokhoribadi	4 km	core
295	Similipal South WL	UBK WL	Panasakudar	Jodi ghati to Maath Kocha	5 km	core
296	Similipal South WL	UBK WL	Panasakudar	Ranga bhole to Bhalihudi	4 km	core
297	Similipal South WL	Jenabil WL	Gurandia-I	Meadow Chhaka to Jenabil Fireline	3 KM	core
298	Similipal South WL	Jenabil WL	Gurandia-I	Jenabil Fireline to Dholamati	9 KM	core
299	Similipal South WL	Jenabil WL	Gurandia-II	Goyalagoda to Ransa	9 KM	core
300	Similipal South WL	Jenabil WL	Gurandia-III	Manasi to Khejuri Footpath	3 KM	core
301	Similipal South WL	Jenabil WL	Gurandia-III	Dholamati to Manasi	5KM	core
302	Similipal South WL	Jenabil WL	Gurandia-III	Manasi to Goyalgoda	6 KM	core
303	Similipal South WL	Jenabil WL	Tiktali	Tiktali Meadow to Putuldiha Footpath	5 KM	core
304	Similipal South WL	Jenabil WL	Tiktali	Meghasani Chhaka to Meghasani Footpath	5 KM	core
305	Similipal South WL	Jenabil WL	Tiktali	Gayalghati to Gunduria Chhaka Footpath	5 KM	core
306	Similipal South WL	Jenabil WL	Tiktali	Tiktali to Khairiburu Footpath	5 KM	core
307	Similipal South WL	Jenabil WL	Tiktali	Gayalghati toTiktali Meadow	3 KM	core
308	Similipal South WL	Jenabil WL	Tiktali	Putuldiha Footpath to Meghasani Footpath	3 KM	core
309	Similipal South WL	Jenabil WL	Sarua	Champaghati to Ramei Footpath	5 KM	core
310	Similipal South WL	Jenabil WL	Sarua	Ramei Footpath toTangi Pahad	6 KM	core
311	Similipal South WL	Jenabil WL	Sarua	Tangi Pahad toTayandara	3 KM	core
312	Similipal South WL	Jenabil WL	Sarua	Sarua Camp to Devkunda Footpath	6 KM	core
313	Similipal South WL	Jenabil WL	Sarua	Rushibasa Chhaka toTangidarha	6 KM	core
314	Similipal South WL	Jenabil WL	Chaudhurigarh	Rushibasa Chhaka to Gunduria Chhaka	5 KM	core

315	Similipal South WL	Jenabil WL	Chaudhurigarh	Rushibasa Chhaka to Rushibasa Camp	5 KM	core
316	Similipal South WL	Jenabil WL	Chaudhurigarh	Anilbasa to Gunduria Chhaka Danda	4 KM	core
317	Similipal South WL	Jenabil WL	Chaudhurigarh	Manikpur Footpath to Rushibasa Camp	10 KM	core
318	Similipal South WL	Jenabil WL	Chaudhurigarh	Saladanda to Patharaghara (New)	6 KM	core
319	Similipal South WL	Jenabil WL	Jamuna	Jamuna to Edelkocha	3 KM	core
320	Similipal South WL	Jenabil WL	Jamuna	Jamuna to Bangadhiri Chhaka	5 KM	core
321	Similipal South WL	Jenabil WL	Jamuna	Jenabil Footpath toThakurani	6 KM	core
322	Similipal South WL	Jenabil WL	Jamuna	Thakurani to Singidanda	4 KM	core
323	Similipal South WL	Jenabil WL	Jamuna	Barhabasa to Sunari Chhaka	3 KM	core
324	Similipal South WL	Jenabil WL	Jamuna	Sunari Chhaka to UBK Boarder	1 KM	core
325	Similipal South WL	Jenabil WL	Jenabil	Gurandia Ghati to Dove Chhaka, Dhangoji	7 KM	core
326	Similipal South WL	Jenabil WL	Jenabil	Murumghati to Jodighati	3 KM	core
327	Similipal South WL	Jenabil WL	Jenabil	Edelkocha to Sendhakila	4 KM	core
328	Similipal South WL	Jenabil WL	Jenabil	Edelkocha to Kadambanala	3 KM	core
329	Similipal South WL	Jenabil WL	Jenabil	Dhangoji to Senichaturi	3 KM	core
330	Similipal South WL	Jenabil WL	Hatighara-II	Khejuri Footpath to Gayalaghati, Satmanala	7 KM	core
331	Similipal South WL	Jenabil WL	Hatighara-II	Hatighara to Kultapur Footpath	2 KM	core
332	Similipal South WL	Jenabil WL	Hatighara-I	Mohantahana to Gayalagoda	6 KM	core
333	Similipal South WL	Jenabil WL	Sonpokhari-I	Sarabasa to Kurkutghati, Barugha-ti	5.5 KM	core
334	Similipal South WL	Jenabil WL	Sonpokhari-I	Champaghati to Kurkutghati	2.5 KM	core
335	Similipal South WL	Jenabil WL	Sonpokhari-I	Kurkutghati to Hatibanka	5.5 KM	core
336	Similipal South WL	Jenabil WL	Sonpokhari-I	Sarabasa to Dhangoji	3 KM	core
337	Similipal South WL	Jenabil WL	Sonpokhari-I	Jhaunribanka to Senichaturi	4 KM	core

338	Similipal South WL	Jenabil WL	Sonpokhari-I	Senichaturi to Jodapal Ambaghati	5.5 KM	core
339	Similipal South WL	Jenabil WL	Sonpokhari-I	Sarabasa to Senichaturi Meadow	3.5 KM	core
340	Similipal South WL	Jenabil WL	Sonpokhari-I	Saguan Jharan to Jodapal Nallah	4 KM	core
341	Similipal South WL	Jenabil WL	Sonpokhari-I	Jodapal Meadow to Saladanda Phone Point	4.5 KM	core
342	Similipal South WL	Jenabil WL	Sonpokhari-II	Barughati to Sizughara Manchan	2.5 KM	core
343	Similipal South WL	Jenabil WL	Sonpokhari-II	Sizughara Manchan to Murum Banka	4 KM	core
344	Similipal South WL	Jenabil WL	Sonpokhari-II	Salaghati to Sanja River	2 KM	core
345	Similipal South WL	Jenabil WL	Sonpokhari-II	Baghia Darha to Balidarha Nala	6 KM	core
346	Similipal South WL	Jenabil WL	Sonpokhari-II	Salapadia to Kendunala	3.5 KM	core
347	Similipal South WL	Jenabil WL	Sonpokhari-II	Ambaghati, Saladanda to Kur-kutighati	4 KM	core
348	Similipal South WL	Jenabil WL	Sonpokhari-II	Saladanda to Sapaghati	1 KM	core
349	Similipal South WL	Jenabil WL	Hatisal-I	Sapaghati to Jhinkaghara	7 KM	core
350	Similipal South WL	Jenabil WL	Hatisal-I	Charichhaka to Adhamukha Nala	7 KM	core
351	Similipal South WL	Jenabil WL	Hatisal-II	Kiabasa Chhaka to Tarinibilla Boarder	8 KM	core
352	Similipal South WL	Jenabil WL	Hatisal-II	Janogoda to Kiabasa	6 KM	core
353	Similipal South WL	Jenabil WL	Hatisal-II	Kadua Nala to Jamu Dnada	6 KM	core
354	Similipal South WL	Jenabil WL	Hatisal-II	Baunsadiha toTarinibilla Road	6 KM	core
355	Similipal South WL	Jenabil WL	Kulipal	Bayanighati to Devkund	3 KM	core
356	Similipal South WL	Jenabil WL	Kulipal	Charichhaka to Thakurani Ghati, Via-Mundaghura	13 KM	core
357	Similipal South WL	Jenabil WL	Kulipal	Hasarehda to Sikaribasa Nala	2 KM	core
358	Similipal South WL	Jenabil WL	Kulipal	Charichhaka to Bayanighati	4 KM	core
359	Similipal South WL	Jenabil WL	Kulipal	Amba Banka to Kadamba Banka	4 KM	core
360	Similipal South WL	Jenabil WL	Kulipal	Kulipal to Kulipal Watch Tower	2 KM	core

361	Similipal South WL	Jenabil WL	Kulipal	Amba Banka to Charichhaka	2 KM	core
362	Similipal South WL	Bhanjabasa WL	Bhanjabasa	Kunbhaghati to Kusabhadra Nala & Chidiachaturi to Naugada	10 km	core
363	Similipal South WL	Bhanjabasa WL	Bhanjabasa	San Tangria to Badaghati	8 km	core
364	Similipal South WL	Bhanjabasa WL	Bhanjabasa	Dharuani to Thakthaki Nala & Chadheichua to Kunbhaghati	10 km	core
365	Similipal South WL	Bhanjabasa WL	Gunduria	Ampudapaka to Tangria Nala	2.2 km	core
366	Similipal South WL	Bhanjabasa WL	Gunduria	Maruadibondha Camp to Mahula Hudi Chhaka & Mahula hudi chhaka to Thakthaki River	11.8 km	core
367	Similipal South WL	Bhanjabasa WL	Nekedanacha	Nageswar Goda to Thakurani hudi	4 km	core
368	Similipal South WL	Bhanjabasa WL	Nekedanacha	Jhinka Ghara to Nekedanacha Footpath	5 km	core
369	Similipal South WL	Bhanjabasa WL	Nekedanacha	Nekedanacha to Dimiri Chua	6 km	core
370	Similipal South WL	Bhanjabasa WL	Mathasila	Ambachhaka to Meghasoni Peack Down & Jhinka Ghara to Meghasoni Peack Down	6 km	core
371	Similipal South WL	Bhanjabasa WL	Balidar	Similigadi Forest to Tikira Banka	7 km	core
372	Similipal South WL	Bhanjabasa WL	Balidar	Champachua to Chingudia Nala	4 km	core
373	Similipal South WL	Bhanjabasa WL	Balidar	Tiger Chhaka To Ranjit Pahada	3 km	core
374	Similipal South WL	Bhanjabasa WL	Balidar	Balidar Nala to Champachua daldali	4 km	core
375	Similipal South WL	Bhanjabasa WL	Nekedanacha	Narangamula to Nekedanacha Foot Path	6 km	core
376	Similipal South WL	Bhanjabasa WL	Balidar	Champachua hudi to Tikira Banka & Champachua nala to Ambaghati	4 km	core
377	Similipal South WL	Bhanjabasa WL	Balidar	Paushia Hudi to Mandachaturi & Charichhaka to Dimiri Chua	4 km	core
378	Similipal South WL	Bhanjabasa WL	Putuldiha	Putuldiha to Budha Simili	5 km	core
379	Similipal South WL	Bhanjabasa WL	Putuldiha	Bhanjabasa to Ujiapindi	3 km	core
380	Similipal South WL	Bhanjabasa WL	Putuldiha	Putuldiha To Dhara Chaturi	5 km	core
381	Similipal South WL	Bhanjabasa WL	Mathasila	Mathasila to Sikaribasa Nala	5 km	core
382	Similipal South WL	Bhanjabasa WL	Mathasila	Mathasila to Jhinkaghara	5 km	core

383	Similipal South WL	Bhanjaba-sa WL	Balidara	Dhobighat road to Babaji Basa	4 km	core
384	Similipal South WL	Bhanjaba-sa WL	Dhobighat	Dhobighat to Marebasa	6 km	core
385	Similipal South WL	Bhanjaba-sa WL	Dhobighat	Dhobighat to Ambachhaka	6 km	core
386	Similipal South WL	Bhanjaba-sa WL	Barhaghar-I	Lukui Buru to Kirkichipal	11.5 km	core
387	Similipal South WL	Bhanjaba-sa WL	Barhaghar-I	Amba chhaka to Lukui Buru		core
388	Similipal South WL	Bhanjaba-sa WL	Barhaghar-I	Kirkichipal to Dola Basaa		core
389	Similipal South WL	Bhanjaba-sa WL	Barhaghar-I	Kirkichpal to Barhaghar		core
390	Similipal South WL	Bhanjaba-sa WL	Barhaghar-II		15 km	core
391	Similipal South WL	Bhanjaba-sa WL	Ghagara-I		23.5 km	core
392	Similipal South WL	Bhanjaba-sa WL	Ghagara-II	Chidia chaturi to Ghagara culvert & Ghagara culvert to Marebasa & Marebasa to Dangadiha	12 km	core
Total Fire Line					2007.48	
393	Similipal North WL Division	Gurguria WL Range		Bhadrachua- Khejuri	3	
394		Nawana WL Range		Badadarh to Kirtanbasa nala	5 K.M	
395				Baunskhal Chhaka to Kirtanbasa nala	7 K.M	
396				Maranga sanga to Banaburu	6 K.M	
397				Domak footpath to Kusumbani	5 K.M	
398				Kusumbani to Tarapda	6 K.M	
399				Suni amaba to Charpabale	5 K.M	
400				Joranda soltlick to Murum ghati	3 K.M	
401				Tiril ghati to Murumghati	3 K.M	
402				Camera chhaka to Balidhara	1 K.M	
403				Hatimara Chhaka to Nawana footpath	1 K.M	
404				Kuanburu to Kudada footpath	3 K.M	
405				Chambra rastha to Diwani ghati	4 K.M	
406				Jojachati nala to Rolabasa nala	4 K.M	
407				Kendudarha to Jodauli	3 K.M	
408				Joranda nala to Lokeuli	2 K.M	
409				Panasia dam to Jilinghati	1.2 K.M	
410				Murum ghati to Kelamela	1 K.M	

411				Jilling ghati to Gopinathpur chhaka	3 K.M	
412				Nigirdha to Panasia dam	2 K.M	
413				Murumghati to Kelamela footpath	1 K.M	
414				Thakurani ghati to Second phone ghati	5 K.M	
415				Lamba ghati to Bhandadhara chhaka	3 K.M	
416				Murum khadan to Sandibunum	3 K.M	
417				Madkan buru to Dalaburu	5 K.M	
418				Dhiri buru to Dalaburu	5 K.M	
419				Kusum ghati to Ruli amba	5 K.M	
420				Panasagada nala to Baurijharan	5 K.M	
421				Khadiabasa nala to Pandabandha chhaka	5 K.M	
422				Panasia dam to Barudunguri	6 K.M	
423				Tuar footpath to Jillinghati	5 K.M	
424				Samamancha to Petrakacha	7 K.M	
425				Dabaghutu to Ramesh kacha	3.5 K.M	
426				Office nala to Jhikiundu	2 K.M	
427				Lagala jagda to Chitankacha	3.5 K.M	
428				Nigirdha Pula to Sereng sahi	2 K.M	
429				Champaghati to Bangla ghutu	2 K.M	
430				Dishulikacha to Amba jungle	2 K.M	
431				Diuriekir to Nawana Kacha	2 K.M	
432				Chambra rasta to Nima sahi Chhaka	4 K.M	
433				Pakhari chhaka to Guanburu	4 K.M	
434				Ghasapadia to Deulidarha	5 K.M	
435				Ralikhal to Badnadi	3.5 K.M	
436				Bhajam sima to Kalasi duba sima	5 K.m	
437		Chahala WL Range		Pondabandha ridge to Panasakacha via cement Polia	11Km	
438				Rajabhadi to Khadiabasa via-Murgabeda	21Km	
439				Pondabandha FT to Kadamdiha Nallo	5.5Km	
440				Jodadiha to Brundaban	04Km	
441				Janagada to Machinenalla	09Km	
442				Baruladam to Kuljhuri	08Km	
443				Baruladam to fallview(B. Pani)	6.5Km	

444		Thakur-munda WL Range		Badanala to Paparidah,	5 kms	
445				Damdarkocha to Sitajharan	5 kms	
446				Sadananda to Tasarbasa	2 km	
447				Malabasa Chhak to Malabasa Manchan	2 kms	
448						
449				Tasarbasa to Janahchaturi	1 km	
450				Mahalisahi to Sudarsanpur	2.5 kms	
451				Sudarsanpur to Baldia	3.5 kms	

ANNEXTURE L

CASES BOOKED IN LAST FIVE YEARS

Year	Division	Name of the Range	No. of cases			Timber seized in cum	Vehicles seized			Persons arrested
			OR	UD	Total		Motorized	Non-Motorized	Total	
2018-19	Similipal South WL	Pithabata North WL	0	0	0	0	0	0	0	0
2019-20			0	7	7	0.27	0	5	5	0
2020-21			1	13	14	0.78	0	5	5	2
2021-22			2	14	16	0.79	1	1	2	2
2022-23			1	6	7	0.32		7	7	1
2018-19	Similipal South WL	Pithabata South WL	0	10	10	0.21	0	2	2	0
2019-20			0	7	7	0.26	0	5	5	0
2020-21			3	9	12	0.05	0	1	1	8
2021-22			2	17	19	0.26	0	3	3	7
2022-23			5	42	47	0.62	4	24	28	7
2018-19	Similipal South WL	Dukura WL	0	0	0	0	0	0	0	0
2019-20			2	4	6	0	0	0	0	10
2020-21			10	18	28	0	0	0	0	21
2021-22			8	51	59	0	0	0	0	14
2022-23			1	16	17	0.2	0	0	0	2
2018-19	Similipal South WL	Podadiha WL	0	0	0	0	0	0	0	0
2019-20			0	6	6	0.13	0	0	0	0
2020-21			4	10	14	0.11	0	0	0	5
2021-22			1	9	10	0	0	0	0	1
2022-23			0	7	7	0.1	0	0	0	0
2018-19	Similipal South WL	Nawana South WL	0	0	0	0	0	0	0	0
2019-20			0	2	2	0	0	0	0	0
2020-21			1	2	3	0	0	0	0	2
2021-22			0	3	3	0	0	0	0	0
2022-23			0	0	0	0	0	0	0	0
2018-19	Similipal South WL	Jenabil WL	0	3	3	0	0	0	0	0
2019-20			1	3	4	0	0	0	0	3
2020-21			0	0	0	0	0	0	0	0
2021-22			2	4	6	2.78	0	0	0	6
2022-23			2	1	3	0	0	0	0	3
2018-19	Similipal South WL	National Park	0	1	1	0	0	0	0	0

2019-20			1	0	1	0	0	0	0	3
2020-21			2	1	3	0	0	0	0	2
2021-22			0	1	1	0	0	0	0	0
2022-23			1	0	1	0	0	0	0	1
2018-19	Similipal South WL	Bhanjabasa WL	0	0	0	0	0	0	0	0
2019-20			0	0	0	0	0	0	0	0
2020-21			0	0	0	0	0	0	0	0
2021-22			1	2	3	0	0	0	0	1
2022-23			0	0	0	0	0	0	0	0
2018-19	Similipal South WL	UBK WL	0	0	0	0	0	0	0	0
2019-20			1	0	1	0	0	0	0	2
2020-21			0	0	0	0	0	0	0	0
2021-22			0	2	2	0	0	0	0	0
2022-23			0	0	0	0	0	0	0	0
2019-20	Similipal North WL Division	Kendumundi WL Range	2		2	-	-	-	-	5
2020-21			1	2	3	0.56				2
2021-22			1	6	7	0.12	2	-	2	1
2022-23			3	2	5	-	-	-	-	6
2019-20	Similipal North WL Division	Thakurmunda WL Range	1	2	3	-	-	-	-	3
2020-21			-	4	4	-	-	-	-	-
2021-22			-	2	2	-	-	-	-	-
2022-23			-	1	1	0.54	-	-	-	-
2019-20	Similipal North WL Division	Gurguria WL Range	-	-	-	-	-	-	-	-
2020-21			1	-	1	-	-	-	-	1
2021-22			3	4	7	1.29	2	-	2	9
2022-23			2	-	2	-	-	-	-	2
2019-20	Similipal North WL Division	Barehipani WL Range	-	-	-	-	-	-	-	-
2020-21			1	2	3	0.02				2
2021-22			-	1	1	-	-	-	-	-
2022-23			-	-	-	-	-	-	-	-
2019-20	Similipal North WL Division	Talabandha WL Range	1	2	3	0.16	-	-	-	1
2020-21			3	8	11	1.86				3
2021-22			1	2	3	-	1	-	1	5
2022-23			1	1	2	-	-	-	-	2
2019-20	Similipal North WL Division	Chahala WL Range	-	-	-	-	-	-	-	-
2020-21			-	-	-	-	-	-	-	-
2021-22			1	-	1	0.47	-	-	-	3
2022-23			-	1	1	-	-	-	-	-

ANNEXURE LI

POACHING CASES IN LAST THREE YEARS

Year	Name of Division	Name of the Range	Name of the animal	No. of animal killed
2019-20	Similipal South WL Division	UBK WL Range	Chital	1
		National Park WL Range	Turtle	1
		National Park WL Range	Khejrafish mahasheer	1Kg
		Dukura WL Range	Rhesus monkey	1
2020-21		Pithabata South WL Range	Wild boar	1
		Podadiha WL Range		2
		Dukura WL Range	Giant squirrel	1
		Dukura	Barking deer	1
		National Park		1
		Podadiha WL Range	spotted deer	1
		Nawana South WL Range		1
		National Park WL Range		1
		Pithabata South WL Range	mouse deer	1
		Podadiha WL Range	Indian porcupine	1
2021-22		Dukura WL Range	Bariking deer	1
		Pithabata South WL Range	Red finned mahasheer	1Kg
		Dukura WL Range	Wild boar	1
2019-20	Similipal North WL Division	Kendumundi WL Range	Rabbit (M)	01 No.
2020-21			Sambara	01 No
2021-22			Sambara	01 No
2021-22		Talabandha WL Range	Sambara	01 No
2021-22	Similipal North WL Division	Gurguria WL Range	Barking Deer	1
2020-21			Spotted Deer	1
2019	Similipal North WL Division	Thakurmunda WL Range	Sambar	1 No.

ANNEXURE LII

TOURIST INFLOW OF SIMILIPAL

Year	Period	Indian	Foreigner	Total	Tourism closed Season
2014-15	01.11.2014 - 15.06.2015	25437	22	25459	16th June - 31st October
2015-16	01.11.2015 - 15.06.2016	30422	9	30431	16th June - 31st October
2016-17	01.11.2016 - 15.06.2017	29066	64	29130	16th June - 31st October
2017-18	01.11.2017 - 15.06.2018	31730	10	31740	16th June - 31st October
2018-19	01.11.2018 - 15.06.2019	30062	30	30092	16th June - 31st October
2019-20	01.11.2019 - 15.06.2020	28825	55	28880	16th June - 31st October
2020-21	01.11.2020 - 15.06.2021	43354	4	43358	16th June - 31st October
2021-22	01.11.2021 - 15.06.2022	29856	3	29859	16th June - 31st October
Total		248752	197	248949	

ANNEXURE LIII

REVENUE FROM TOURISM

Year	Revenue collected
2014-15	37,25,342
2015-16	38,44,430
2016-17	68,37,481
2017-18	95,66,349
2018-19	1,13,36,440
2019-20	27,19,860
2020-21	41,20,290
2021-22	29,56,280

ANNEXURE LIV

MAN- ELEPHANT CONFLICT

Name of the Division	Name of the Range	Year	Man Killed By Elephant	Human Injured By Elephant	House Damage By Elephant	Crop Damaged By Elephant Area in Acres	Death of Elephant
Similipal South WL Division	Jenabil WL Range	2017-18	-	-	-	-	1
	Jenabil WL Range	2018-19	-	-	-	-	1
	Nawana South WL Range	2019-20	-	-	-	-	1
	Jenabil WL Range		-	-	-	-	2
	Podadiha WL Range	2020-21	-	-	-	-	1
	Nawana South WL range		-	-	-	-	1
	Pithabta South WL Range		-	-	-	-	1
	National Park WL Range		-	-	-	-	1
	Pithabta North WL Range	2021-22	-	-	-	-	1
	National Park WL Range		-	-	-	-	1
	Jenabil WL Range		-	-	-	-	1
	Podadiha WL Range		-	-	-	-	1
Similipal North WL Division	Gurguria WL Range	2020-21	-	-	-	2.34	-
		2021-22	-	-	-	2.24	1
	Talabandha WL Range	2020-21	1	-	-	0.83	-
	Kendumundi WL Range	2020-21	-	-	-	2.2	-
	Barehipani WL Range	2020-21	-	-	-	-	1
	Nawana North WL Range	2021-22	-	-	-	-	1
	Kendumundi WL Range	2022-23	-	-	-	-	1

ANNEXURE LV

AREA DISTRIBUTION FOR TRADITIONAL USE ZONE

SL. No.	Name of the Division	Name of the Range	Name of the village /villages	Area in km^2
1	Similipal North WL Division	Gurguria WL Range	Bilapagha	1
2			Kuanribil	1.5
3			Nenjighosara	3
4			Gurguria	2
5			Chandikhaman	6
6			Kumari	
7			Saharpat	
8			Khadiadunguri	
9			Kundibil	5
10			Badkasira	
11			Bhadrachua	
12			Kusumi	1.13
13			Sankasira	3
14			Barigaon	
15		Talabandha WL Range	Dantiakacha	3
16			Chorabandh	3
17			Kusumtota	4.5
20			Budhabalanga	2.66
21			Godsimilipal	1.6
22			Gopinathpur	6.19
23			Kukurbhuka	
24			Makabadi	
25			Nawana	
26			Nigirdha	7.56
27			Saruda	1.4
28	Similipal South WL Division	Nawana South Pithabata North	Bakua	0.31
29			Aahalapani	0.71
30			Amdapani	0.79
31			Barubera	0.7
32			Chakri	0.58
33			Basilakacha	0.17
34			Bhaduakacha	0.56
35			Fuljhara	0.75
36			Jerkani	0.62
37			Kukurbhuka	0.8
38			Purunapani	0.5

ANNEXURE LVI

NAXALITE ATTACK IN SIMILIPAL TIGER RESERVE

28.03.2009: At night 3 groups of naxalites which included some ladies attacked upon the Chahala cpmplex and bomb blasted the Range Office and staff quarters. They also attacked the tourists staying there, robbed up their valuables and ransacked the tourist complex and Forest Rest hpuse at chahala at about 8.40 PM. The naxalite did not spare the labourers camping at Chahala for departmental works and robbed their money accumulated by earning their wages. In the same night one group attacked Range Office and staff quarters of Nawana South Range located at dhudurchampa and torched the buildings along with all the furniture and office records. One group of naxalite attacked the wireless infrastructure of STR and Police at Meghasani hill top and at 12.00 midnight torched the accommodation available there.

29.03.2009: At about 5.00 AM in the morning the naxalites attacked upon the Range Office at Upper Barakamuda, bomb blasted and burnt the building and all the office records along with the furniture. The Range Officer was out of headquarters as he had been to Karanjia to remand seven accused persons arrested on 28.03.2009 out of around 200 persons who entered the core area for poaching.

30.03.2009: During day time the watch tower at Gurandia in Jenabil Range was torched.

31.03.2009: There were a series of attacks at different places. The tourist complexes and Forest Guard quarters at Joranda in Nawana North Range, Forest Guard quarters at Dhundubasa and Lengedakacha in Nawana South Range were torched and the tourist complex along with the Forest Rest house at Gurguria under Karanjia Forest Division was damaged. In the same night the captive elephant Mahendra sustained injury on his body due to gun shots, which was inflicted by the miscreants.

01.04.2009: The log house (FRH) and Range Office with its complex at Jenabil was broken and torched. On the same night the naxals attempted to attack upon the Range Office of Nawana North Range at Nawana but failed due to presence of police protection force and SOG.

03.04.2009: The check gate at Kalikaprasad under National Park Range was damaged and the seized produce were taken away. The Beat house at Khejuri under gurguria Range of Karanjia Division was also damaged and seized produce taken away.

04.04.2009: The Forest Rest house at Jamuani was damaged and the seized produce were taken away by the miscreants.

05.04.2009: In Pithabata (Wildlife) Range in Similipal Tiger Reserve, the naxalite attempted to attack upon the Range Office and took away the seized produce. The Beat house at Namti was damaged and seized produce were taken away. In the same night the miscreants attacked Brundaban check gate of Chahala Range and damaged it.

06.04.2009: The Beat house at Ransa in National Park Range was damaged and doors and windows were burnt, the seized produce were taken away. In the night the wooden bridge in Gurguria-Nuagaon forest road was burnt, the seized produce were taken away. In the night the wooden bridge in Gurguria-Nuagaon forest road was burnt disrupting the communication.

07.04.2009: The miscreants torched the wooden bridge near Devasthali in UBK Range. On the same day the Beat house at Nuagaon, Kabatghai and Khejuri in National Park Range were torched and damaged. Bakua Beat house of Nawana South Range and Barehipani Beat house of Manada Range in Rairangpur Division were damaged and seized produce were taken away.

15.04.2009: The Beat house of Baniabasa in Udala Range of Baripada Division and check gate of Baniabasa under Jenabil Range were torched and damaged. The Forest Rest House and staff quarters at Bhanjabasa in UBK Range and staff quarters at Kachudahan in Pithabata (Wildlife) Range were damaged.

Chronology of attack by Naxals

Date & Time	Range	Place	Type of damages	Property damaged
28.03.09 (7.00 PM to 8.00 PM)	Nawana South	Dhudurchampa	Torched	Four buildings
28.03.09 (8.40 PM)	Chahala	Chahala	Bomb blast & torched	Range Office & staff quarters
			Broken	i.Doors, windows of FRH, C-villa, E-villa ii. 17 tourist were robbed of their valuables iii. Labourers camping at Chahala were robbed of their money
			Torched	VHF station
28.03.09 (10.45 PM)	UBK	Meghasani	Bomb blast	VHF machinery removed
29.03.09 (5.00 PM)	UBK	UBK	Bomb blast	Range & staff quarters
30.03.09 day time	Jenabil	Gurandia	Torched	Watch tower
31.03.09 (2.00 PM)	Nawana North	Joranda	Torched	Four nos tented accommodation and FG quarters
31.03.09 day time	Nawana South	Dhundubasa	Torched	FG quarters
31.03.09 day time	Nawana South	Lengdakacha	Torched	FG quarters
31.03.09 night	Gurguria	Gurguria	Broken	Doors, windows of FRH & Bamboo Hut
			Gun & Arrow shot	Captive elephant “Mahendra”
01.04.09 day time	Jenabil	Jenabil	Torched	Log house & Range Office
01.04.09 night	Nawana North	Nawana	Attempted to attack	Nawana Range Office
03.04.09 night	National Park	Kalikaprasad	Damaged	Check gate and seized produce taken away
	Gurguria	Khejuri	Damaged	Beat house damaged & seized produce taken away
04.04.09 night	Manada	Jamuani	Damaged	Jamuani FRH damaged & seized produce taken away
05.04.09 night	Pithabata	Pithabata	Attempted to attack	Pithabata WL Range Office and seized produce taken away
		Namti	Damaged	Beat house damaged & seized produce taken away
	Chahala	Brundaban	Damaged	Beat house & check gate damaged

06.04.09	National Park	Ransa	Damaged/ Torched	Beat house damaged, doors & windows torched/ seized produce taken away
		Gurguria- Nuagaon forest road	Torched	Wooden bridge before Ransa
07.04.09	UBK	Near Devasthali	Torched	Wooden bridge
	National Park	Nuagaon	Torched & damaged	Nuagaon beat house
	National Park	Kabatghai	Torched & damaged	Beat house
	National Park	Khejuri	Torched & damaged	Khejuri Beat house
	Nawana South	Bakua	Damaged	Beat house & seized produce taken away
	Manada	Barehipani	Damaged	Beat house & seized produce taken away
15.04.09	Jenabil	Baniabasa	Damaged	Torched damaged Beat house
Date not ascertained	UBK	Bhanjabasa	Damaged	FRH/ staff quarters
Date not ascertained	Pithabata WL	Kachudahan	Damaged	Beat house
All official records, govt store artiles and personal belongings of staff have bee looted and burnt				

ANNEXURE LVII

PAST EXPENDITURE OF PROJECT TIGER FUND

Year	Sanctioned	Released	Expenditure
2012-13	340.3	264.34	264.33814
2013-14	1015.32	709.13	709.13
2014-15	906.866	687.34325	664.30325
2015-16	664.16	663.96	663.87
2016-17	1123.198	1095.896	1083.0297
2017-18	1253.37	1253.37	1199.32477
2018-19	1283.49	1283.49	1264.3327
2019-20	1562.98	1250.38	1246.29454
2020-21	1370.42	1029.67	1027.86
2021-22	1418.4	1418.4	1336.43112
2022-23	1349.4	-	-
TOTAL	12287.904	9655.97925	9458.91422

ANNEXURE LVIII

LIST OF SURVEY OF INDIA TOPOSHEETS COVERING SIMILIPAL TIGER RESERVE

SL No	TOPO ID	OSM SHEET	Scale
1	73J4	F 45I4	1:50000
2	73J7	F 45I7	1:50000
3	73J8	F 45I8	1:50000
4	73J12	F 45I12	1:50000
5	73K1	F 45O1	1:50000
6	73K2	F 45O2	1:50000
7	73K3	F 45O3	1:50000
8	73K5	F 45O5	1:50000
9	73K6	F 45O6	1:50000
10	73K7	F 45O7	1:50000
11	73K9	F 45O9	1:50000
12	73K10	F 45O10	1:50000

ANNEXURE LIX

LIST OF THE SATELLITE IMAGERY WITH SPECIFICATIONS

1. False colour composite (FCC) image of Similipal – IRS 1D LISS-III (February, 1997).
2. False colour composite (FCC) image of Similipal – IRS 1D LISS-III (February, 2003).
3. False colour composite (FCC) image of Similipal – IRS 1D LISS-III (2012)

ANNEXURE LX

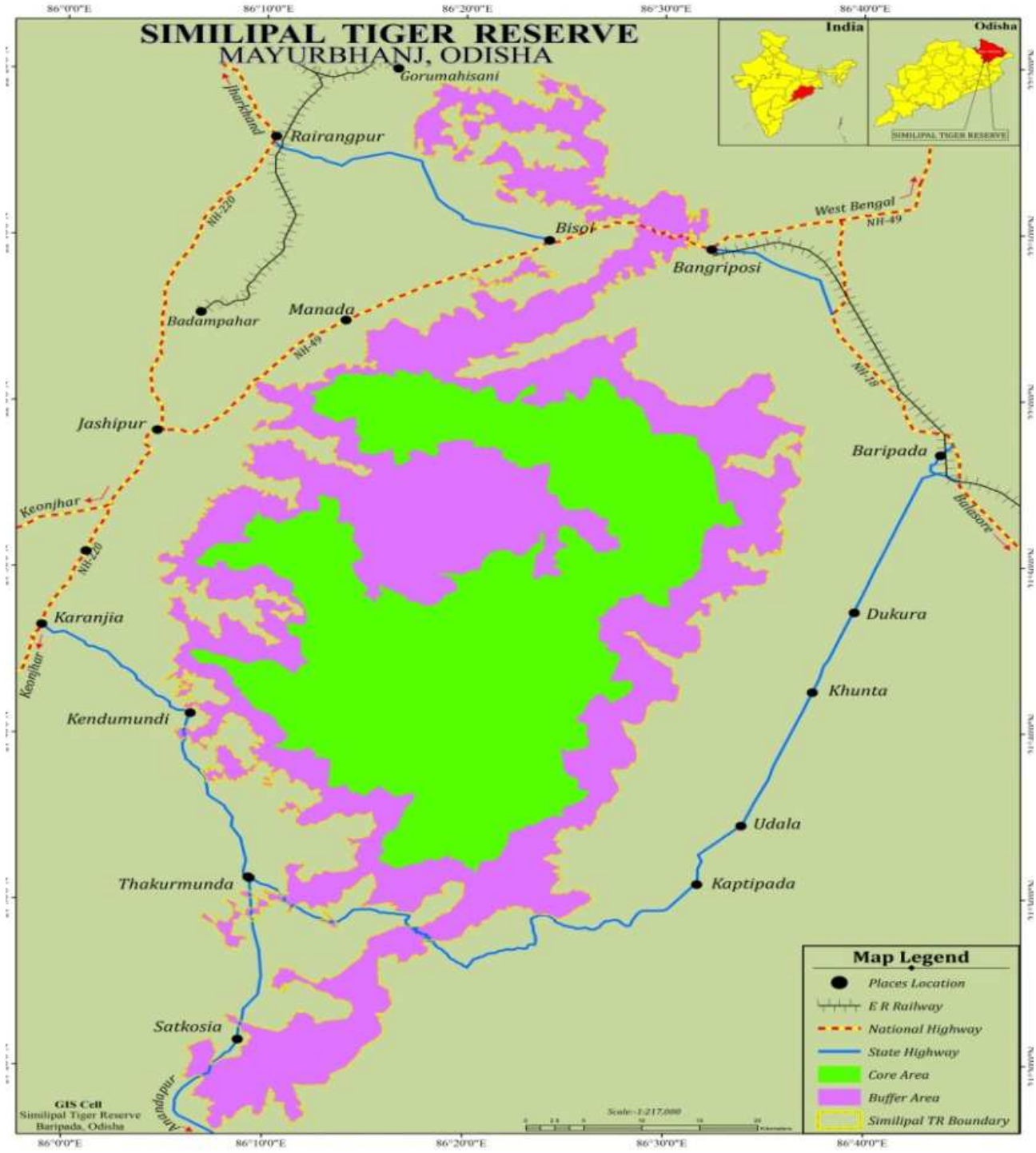
VILLAGE RELOCATION FROM SIMILIPAL TIGER RESERVE

1. Introduction:

Description of the Area:

Similipal Tiger Reserve covers an area of 2750 km² covering Similipal RF and the surrounding contiguous Reserved Forests, Proposed Reserved Forests and is located between 21° 16' 06.7" and 22° 19' 57.8" North Latitude and 86° 04' 35.1" and 86° 37' 09.5" East Longitude. It is situated within Mayurbhanj District the Northern-most part of Odisha state and part of Hadgarh WLS which is inside TR falls in the administrative jurisdiction of Keonjhar Revenue District.

Map: Similipal Tiger Reserve



Similipal Tiger Reserve is the epitome of tropical forest in our country. It encompasses a rich biodiversity of both flora and fauna. The structural diversity and interspersion both in standing state and standing crop make it a unique ecosystem. The forest is a unique composition of different types of forest such as northern tropical mixed deciduous forest, northern tropical semi-evergreen forest, mixed deciduous hill forest, high level sal forest, dry deciduous sal forest, plain sal forest, grassland and savannahs. The biodiversity rich Similipal constitutes vast treasure of diverse wild genes with wide adaptability to diverse climatic and ecological conditions prevailing here.

The landscape harbours 7% flowering plants, 8% orchids, 7% reptiles, 20% birds and 11% mammals of India. Similipal stands as a link between the flora and fauna of Southern India and Sub Himalayan North-east India. It is the abode of more than 1253 species of flowering plants, 99 species of non-flowering plants, 21 species of amphibians, 62 species of reptiles, 361 species of birds, 55 species of mammals and many species of flora and fauna still to be identified. 99 species of Ferns belonging to 31 Families & 43 Genera have also been documented inside Similipal.

It bears 104 species of orchids, few of them endemic to Similipal landscape and most of are endangered and endanger list, and 72 species are Himalayan species, many species of insects, ferns and medicinal plants. There are many species of rare, endangered, threatened and vulnerable plants and animals. Mahaseer, Hornbill, Chowsingha, Mouse deer, Giant squirrel, Flying squirrel, Ruddy mongoose, mugger crocodile and Rufus tailed hare are examples of this unique biodiversity.

Above all, Similipal is famous for its tigers and elephants. It alone is the home of 65% tiger, 16% leopards and 25% elephants of Odisha. Similipal is the only home of actively breeding population of unique melanistic tiger in the world.

Similipal is the original home of Birhors, Hill Khadias and Ujias which are some of the primitive tribes of Odisha. Similipal is a grand repository of indigenous knowledge pertinent to conservation of biodiversity, ethno botanical study and traditional ecological knowledge.

Relocation & Rehabilitation:

A total of 4 villages and 2 settlements (Jamunagarh, Jenabil, Kabatghai, Bakua, Barakamuda & Bahaghara) were located inside the present Core Area (Critical Tiger Habitat) of the tiger reserve. These inaccessible villages were dependent on the wildlife habitat, used passage through the Sanctuary, no connecting roads hence no development programs could reach them, curtailment of livelihood, man-animal conflicts due to competition for common resource & space, & presence of these villages was fragmenting the wildlife habitat. Also, the core area of the Tiger Reserve forms the crucial natal area and a critical tiger habitat. It is imperative that this area is made absolutely sacrosanct and free from any kind of human interference. After careful examination & in consultation with villagers, it was concluded that no other reasonable options for coexistence inside Sanctuary is available (as non-forestry activities like roads, laying of electric lines, other developmental infrastructures etc. are largely barred inside Sanctuary).

Out of these 4 villages and 2 settlements located inside the core area of Similipal TR 3 villages & 2 settlements consisting of 311 families have been successfully relocated by the then STR (Core) Division and present Similipal South WL Division and Mayurbhanj District Administration through convergence of different Government schemes/programmes. The first village where relocation efforts were started is Jamunagarh with 49 families and Kabatghai with 85 families in the year 1994. Kabatghai relocation was completed in 2016 and Jamunagarh village was completely relocated in the year 2022. One more village named Jenabil with 84 families was relocated in two phases starting from 1998 and completed in the year 2010. Another two hamlets one at Upper Barakamuda with 22 families and another at Bahaghar with 10 families were completely relocated in the year 2013. There after steps were taken for “Relocation, humane-Resettlement & Rehabilitation” with streamlined procedure by ensuring social & financial security, better standard of living with sustainable work opportunities for the relocated population. Initially the villages were shifted to

Temporary Colony constructed by forest department, during their stay here they were provided with land, house & other basic facilities through convergence by District Administration.

At present only one village namely Bakua is located in the core area of Similipal Tiger Reserve.

Table: Abstract of Relocated Villages

Village	Family	Year	Year-wise break up of Families relocated & rehabilitated in the Rehabilitation Colony							Balance family (as per survey)	Remarks
			Kapand	Ambadiha	Asankudar	Nabra	Manada	Anukulpur	Total		
Jamunagarh	49	1994	11	-	-				49	0	Completely relocated & rehabilitated
		2015	-	-	-	35					
		2022	-	1 (06 Units)	-	2 (07 Units)					
Jenabil	84	1998	-	23	-				84	0	Completely relocated & rehabilitated
		2010		61	-						
Kabatghai	85	1994	30	-	-				85	0	Completely relocated & rehabilitated
		2003	-	8	-						
		2016	-	-	-	-	40	7			
Bakua	61	-	-	-	-				-	61 (1998-Survey)	The village have expressed their un-willingness to vacate their land for which land Acquisition process could not be taken up. Process has been going on for relocation.

Barakamuda	22	2013	0	0	22				22	0	Completely relocated & rehabilitated
Bahaghara	10	2013	0	0	10				10	0	Completely relocated & rehabilitated
Total	**311**		**41**	**93**	**32**	**37**	**40**	**7**	**250**	**61**	

2. Government Guidelines:

Relocation & resettlement of 5 villages have been completed in accordance to the guidelines of Forest, Environment & CC Department, Govt. of Odisha vide letter No.8F(WL)-67/2016-12000/F&E, Dated.29.06.2016 (Annexure I) and guidelines for relocation/rehabilitation of villages from Sanctuaries issued by Forest, Environment & CC Department vide letter No. FE-WL-0021- 2016/12390/F&E,Dt.19.07.2021 (Annexure II). Definition of "family", as per Odisha Resettlement & Rehabilitation Policy 2006 & Relocation Policy of Govt of India (vide letter No.3-1/2003-PT, dt.19.03.2008 of NTCA, MoEFCC, GoI.

3. Tangible benefits post Relocation:

For safeguarding rights of human beings who lived difficult-life inside Sanctuary, relocation associated with rehabilitation is the best possible solution which prioritized wildlife conservation in a balanced way.
Transparent and hassle-free voluntary Relocation has helped strengthen trust between people & Government, also between people and wildlife authorities. Post Relocation, relocated populations have access to facilities such as electricity, drinking water, school, market place, healthcare centers & proximity to urban areas. Villagers of Jamunagarh, Jenabil, Kabatghai, Bakua, Barakamuda & Bahaghara who have lived long without basic amenities of life inside sanctuary got an opportunity towards healthy, happy and better life fulfilling all these basic requirements by resettlement outside Sanctuary & close to urban areas. All 311 families have been adequately financially compensated; village relocation programme has also empowered relocated villagers for securing their livelihood activities. Presently most of the relocated villagers have bought their own agricultural land, purchased valuable assets like tractors/transport vehicles, some have opened different shops. Their children are now having full opportunity for proper education and all families are able to earn sufficient for sustenance. Declaration of relocated villages as Revenue Village is under progress by District administration. During 2022 to 2024, consistent handholding support has been extended by Similipal South WL Division to the relocated population for acclimatization with new facilities & reviving their lives in new habitat, also to remove the scars of leaving their ancestral homes & forest due to displacement & make into effect that relocation is not their fate rather an opportunity. Smooth but faster settlement is essential to avoid the setbacks which other village relocation projects have witnessed earlier in different parts of nation.

Similipal Tiger Reserve (2750 Sq.Km) is now completely free from human habitations after successful relocation of 6 villages during 2021-22. Subsequently creation of Grasslands on the relocated space inside

Tiger Reserve has increased density of ungulates and herbivore congregation is visibly high in those patches which are also now frequented by carnivores. This in-turn has reduced human- animal conflicts in periphery villages adjoining Tiger Reserve due to availability of sufficient food inside.

Removal of Jamunagarh, Jenabil, Kabatghai, Bakua, Barakamuda and Bahaghara from Tiger Reserve overlapping areas has strengthened habitat restoration benefitting animals in a broader way.

4. Procedure of Relocation:

A. BARAKAMUDA & BAHAGHARA

The relocation of all families of settlements at Upper Barakamuda (22 families) and Bahaghara (10 families) was completed in 2013 in one phase. These families have been rehabilitated at Asankudar of Thakurmunda Block.

There were two tribal settlements at Upper Barakamuda and Bahaghara in the core area of Similipal Tiger Reserve where people of Khadia tribe had settled after creation of the Tiger Reserve. The villagers were being constantly persuaded for their relocation outside the Tiger Reserve by availing the package of NTCA and other govt. facilities. The villagers of these two settlements had submitted application dated 30.03.2013 and 13.04.2013 desiring to be resettled at a location selected by them at Asankudar village under Thakurmunda Tahasil. Then in coordination with District Administration the process of their relocation was initiated. The matter was discussed in the District Level Implementing Committee. Palli Sabha was held on 14.11.2013, where the villagers gave their consent to be relocated to the site selected by them in Asankudar village. All the villagers opted to avail Option-I package of NTCA. Apart from this, they had been promised to provide 10 Decimal homestead lands to each family in the resettled village and one house under Mo Kudia scheme of State Govt. of Odisha by Mayurbhanj District Administration.

Their rights under FRA were settled following due procedure in the DLC meeting held for the purpose on 19.11.2013. Project Level Rehabilitation and Resettlement Committee meeting was held on22.11.2013. Joint family survey was conducted by Revenue and Forest officials where 22 families of Upper Barakamuda and 10 families of Bahaghara settlement were identified as per guidelines of National Rehabilitation and Resettlement Policy-2007.

All the families of these two settlements were shifted to the resettlement site at Asankudar on 07.12.2013. Each family has already been allotted 10 decimal homestead land and the RoR of the said plots have been issued to them. Houses were construction under Mo Kudia scheme in their allotted plots.The package amount of Rs.10 Lakh to each family have been provided out of the available fund for relocation deposited with the Collector, Mayurbhanj. Free food grains will be provided to each family till they occupied their new houses. Health and Anganwadi facilities are provided to the villagers. Tube well has been dug at the resettled site for drinking water. The day to day post-relocation monitoring was done by a Sub-divisional Committee headed by the Sub-Collector, Karanjia.

RELOCATION OF 32 FAMILIES FROM BARAKAMUDA & BAHAGHARA SETTLEMENTS, 2013

B. JENABIL VILLAGE

Ambadiha Colony, Udala, 23 Families, 1998

In the year 1998, 23 families were relocated to Ambadiha Colony at Udala. Permanent house at Ambadiha rehabilitation colony 0.08 decimals of homestead land provided. Agriculture land of 2.00 Acre was provided to each of relocated family by Mayurbhanj District Administration. Maintenance allowance of Rs-500/- per month per family for a period of one was paid. Three dug wells and one pond constructed at the relocated colony. One Lift irrigation point was set up to irrigate the agriculture land. One canal to bring water from Kalo Dam to the field of resettle village was constructed.

Amabdiaha Colony, Udala, 58 Families, 2010

A meeting was conducted on 17.11.2009 in Jenabil village and with consensus of the villagers, a decision for relocation was taken in presence of ward member, Jenabil, wherein at 21 families opted for option-I and 40 families opted for Option-II as per the guidelines of National Tiger Conservation Authority, New Delhi. As per the above decision 61 families of Jenabil village were shifted to Ambadiha Rehabilitation Colony during March, 2010 out of which 21 families opted for Option-I and 40 families opted for Option-II as per guide line issued by the NTCA, Govt. of India. Out of 21 families of Option-I, two families left the place after marriage due to which they were not entitled to get compensation.

Out of 40 families of Option-II, one family got married and left the place and another one minor for which they are not entitled to get compensation as per NTCA guide line. Besides that, one person namely Sri Sarbeswar Naik, S/O Chaitanya Naik was included under Option-II as per decision taken in the District Level Implementing Committee meeting.

Out of 61 families of Jenabil village, 58 families are entitled to get compensation as per NTCA guide line and the following expenditure has been incurred for 58 families of Jenabil village rehabilitated at Ambadiha colony.

Following the relocation, the relocated families were provided with a Residential plot of 0.08 Ac and agriculture land 2.00 Ac was allotted to the families who had opted for option-II relocation package by Tahasildar, Udala under supervision of Sub-Collector, Udala. Provision of irrigation and formation of Pani Panchayat in the village has been done. Renovation of one existing pond was carried out at the relocated colony. One Anganwadi center is opened for the rehabilitated families at Ambadiha. Regular health checkups were carried by medical staff and ICDS staff. Electrification of The village road has been constructed under MGNREGS. All familes were supplied with seeds and fertilizers by agriculture department. IEC activities and awareness campaign was carried out by the medical staff. One new primary school was constructed at the Colony. Admission of 10 girls in Bahubandha Sevashram and 8 boys in Athanagaon Primary School hostel was facilitated. All eligible beneficiaries were distributed of Antodaya cards and BPL cards. Regular visit of local veterinary surgeon to the colony was ensured. One community toilet Constructed at the colony. A committee was formed under the Chairmanship of Sub-Collector, Udala to monitor developmental activities, release of fund from bank to beneficiaries and to provide help whenever needed by the beneficiaries.

C. KABATGHAI VILLAGE

Kapand Colony, 30 Families, 1994

In 1994, 30 families were shifted and rehabilitated at Kapand rehabilitation colony. Two tube-well has been installed at Kapand rehabilitation colony by RWSS, Baripada, Mayurbhanj. Two open-well were created for the villagers. One Tank has been created for the villagers. Maintenance allowance @ Rs-500/- per month family provided for one year. Miscellaneous expenditures made towards rehabilitation by Collector, Mayurbhanj.

The Hill Kharia & Mankidia Development Agency, Jashipur (ST & SC Development Department, Odisha) provided C.C. Road inside the colony and village connecting the road, Jahira for Sala Puja, poultry unit for 10 SHGs, pond for pisciculture for SHG, drinking water facility for the PVTGs with Solar based drinking water system, Gyana mandir for lactate mother & child, Educational facility both Boys & Girls at Angarpada Educational Complex, Anganwadi centre in the colony, Solar light (Street) on IAP fund and house hold Solar light supply, and Smokeless chullah for each house.

As per Govt. norms the eligible beneficiaries were provided with old age pension, widow pension & included under the Antadaya Yojana. All the 41 PVTG beneficiary were provided houses under Fire Proof Housing Yojona in the year 1996. After intervention of OPELIP programme they are provided with kitchen garden, Duckery unit, Poultry cluster, sweet corn cultivation, etc.

Ambadiha Colony, 8 Families, 2003

In the year 2003, 8 families were relocated from Kabatghai village to Ambadiha Colony at Udala. All the relocated families were provided with 0.08 decimals of homestead land and Permanent House. Agriculture land of area 2.00 Acre was provided to each relocated family by the Mayurbhanj District Administration. One Lift irrigation point was set up to irrigate their agriculture land. One canal to bring water from Kalo Dam to the field of resettle village was constructed. Three wells and one pond constructed for them. Maintenance allowance @ Rs-500/- per month per family for a period of one year was paid.

Manada Colony- 40 Families & Anukulpur Colony-7 Families, 2016

In the year 2016, the remaining 47 families were relocated from Kabatghai village and resettled at Manada and Anukulpur rehabilitation colonies. Each family has been provided with 10 decimal homestead lands at Manada. All were provided with houses under Biju Pucca Ghara Scheme of the State Govt. of Odisha. The compaensation Package amount of Rs.10.00 lakh to each family was provided out of the fund allotted under CAMPA (W.L) in Saving Bank Account of Bank of India, Jashipur Branch. Cooked food & dry ration was provided to each family for three months. One tube well was installed near the temporary Colony by RWSS, Mayurbhnaj. Health and Anganwadi facilities were provided to the villagers. Eight Solar street lights were installed in the temporary Colony & 47 solar Lanterns were supplied to the 47 families. Mosquito net, lantern and other items likes bucket, saree, towel, lungi, kitchen set, bed sheets, tarpaulin from Red Cross Society have been provided to each family. 14 Children were enrolled in English Medium School under Urban Education Programme at Karangia with residential facilities. Indian Gramin Service (IGS), an NGO, was engaged for necessary handholding support to the relocated families. The day to day post-relocation monitoring is being done by a Sub-divisional Committee headed by the Sub collector, Panchir, Karanjia.

MEETING ON RELOCATION OF KABATGHAI VILLAGE

RELOCATION WORK

D. JAMUNAGARH VILLAGE

The Jamunagarh village was relocated from the Core Area of Similipal TR in three phases. During the year 1994, 11 families have been shifted to Non-forest land at Kopand and compensation has already been paid. Land acquisition proceeding under Orissa Land Acquisition Act, 1894 has been finalized. During the year 2015 another 35 families are being relocated after obtaining their voluntary consensus and they are been given land to construct their house at Nabra village of Udala Tahasil. The left over 03 families (13 Units) were relocated to Nabra and Ambdiha resettlement colonies under Udala Tahasil during the year 2022. With this entire Jamunagarh village has been successfully relocated from the Core area of Similipal Tiger Reserve.

Kapand Colony (11 Families, 1994)

In 1994, 11 families were shifted and rehabilitated at Kapand rehabilitation colony. Two tube-wells have been installed at Kapand rehabilitation colony by RWSS, Baripada, Mayurbhanj. Two open-wells have been created in the village. One Tank has been created for the villagers. Maintenance allowance @ Rs-500/- per month family provided for one year. Other Miscellaneous expenditures made towards rehabilitation by the Collector, Mayurbhanj.

Many facilities have been provided to the rehabilitated families in the colony by Hill Kharia & Mankidia Development Agency, Jashipur (ST & SC Development Department, Odisha). The road inside the colony and the road connecting village have been made with cement concrete. One Xahira for Sala Puja has been provided. Poultry units for 10 SHG has been provided. One Pond for pisciculture by the SHG has been provided. Solar powered Drinking water supply facility has been provided. One Gyana mandir for lactating mother & their children has been provided. Facility for education of both Boys & Girls at Angarpada Educational Complex was provided. One Anganwadi centre in the colony was constructed. Solar Street light on IAP fund and house hold solar light supply was made. Smoke less challah was provided to the families. The eligible beneficiaries were provided with old age pension, widow pension & Antadaya Yojana as per Govt. norms and guidelines. All PVTG beneficiaries were provided pukka houses under Fire Proof Housing Yojona in the year 1996. 41 Nos of houses were made under the scheme.

The rehabilitated families were provided with kitchen garden, Duckery unit, Poultry cluster, sweet corn cultivation, etc. under the OPELIP programme.

Nabra Colony (35 families, 2015)

The villagers of Jamunagarh Village submitted their application on dt.17.06.2014 showing their willingness for relocation from the core area of Similipal Tiger Reserve. Following the receipt of the application the Process of their relocation was initiated in coordination with Mayurbhanj District Administration. The matter was discussed in the District Level Implementing Committee meeting held on 09.10.2014. The First Palli Sabha was held on 19.09.2014 by the Panchayat Raj Institute, Jashipur CD Block, where the villagers of Jamuanagarh gave their consent to be relocated from the core area of Similipal Tiger Reserve to outside the Tiger Reserve. In the second Palli Sabha held on 04.11.2014 where all families except 3 families opted to avail Option-I package as per protocol/guidelines for voluntary village relocation in notified core/critical tiger habitats of tiger reserves by NTCA, New Delhi, vide F. No. 15-4/2010-NTCA (Part-III).

The Family survey was jointly conducted by Revenue officials, Forests officials, Gram Panchayat Members and Sangram, NGO where 35 families were identified among the families who have given their option for R&R package-I in above Palli Sabha as per guidelines of NTCA. In the District Level Meeting for Rehabilitation and Resettlement of village Jamunagarh held on 26.12.2014, it was decided to resettle them at Nabra (Bahubandha) under Udala Tahasil. Each family will be provided with 10 Decimal homestead land one house under IAY/Biju Pucca Ghar Yojana scheme of State Govt. by District Administration at resettled village. Thus, 3 nos. families did not opt any option and left Palli Sabha.

The 35 families of Jamunagarh village were shifted to the resettlement site at Nabra (Bahubandha) on 09.09.2015. The package amount of Rs.350.00 lakh @ Rs.10.00 lakh to each family was provided out of the fund allotted under CAMPA (Wildlife) in their respective Savings Bank Accounts in United Bank of India,

Udala Branch. Initially temporary thatched & bamboo mud house were constructed for them till completion of construction of the pukka houses. Mosquito net, solar lantern and other items like bucket, lantern, saree, towel, lungi, kitchen set, bed sheets, tarpaulin, from Red Cross Society have been provided to each family. Cooked food to the relocated families was served initially for seven days and then extended up to 24.09.2015. Late dry ration was supplied free of cost. One tube-well was installed near the temporary Colony by RWSS, Mayurbhanj. Four Solar street lights have been installed in the temporary colony. Health and Anganwadi facilities were provided to the villagers at the resettled colony. The day to day post-relocation monitoring is being done by a Sub-divisional Committee headed by the Sub-collector, Kaptipada.

Nabra & Ambadiha Colony (3 Families, 13 Units, 2022)

The left over 03 families (13 Units) were relocated to Nabra and Ambdiha resettlement colonies under Udala Tahasil during the year 2022.

The relocation process was initiated in coordination with the Mayurbhanj District Administration. The First Palli Sabha was held on 26.02.2021 by the Panchayat Raj Institute, Jashipur CD Block, wherein the villagers of Jamunagarh gave their consent to be relocated from the core area of Similipal Tiger Reserve.

In the meanwhile, the voluntary relocation package package was enhanced by NTCA, New Delhi, from Rs.10 Lakhs per family to Rs.15 Lakhs per family vide F.No.15-3/2008-NTCA (Vol. III) on Dt. 08.04.2021. The Government of Odisha, F&E Dept. also released a revised guideline for relocation of villages from the sanctuaries/ National Park/Tiger Reserves/ Inaccessible Forest Areas including areas connecting wildlife habitat vide no. FE-WL-WLF-0021-2016/12390 dt.19.07.2021.

Following the changes made to guidelines and rules to relocation and rehabilitation, a second Palli Sabha was held on 02.10.2021 by the Panchayat Raj Institute, Jashipur CD Block where the villagers of Jamunagarh agreed to new relocation guidelines issued by NTCA and Govt. of Odisha to avail Option- I package.

Family Survey was jointly conducted by Revenue officials, Forest officials, Gram Panchayat Members and SPARDA, NGO, where 03 nos. of Household with 13 (units) were identified among the families who have given their option for R & R Option-I in above Palli Sabha as per guidelines of NTCA and Govt. of Odisha. The District Level Implementation Meetings for Rehabilitation and Resettlement of the 03 nos. of Household with 13 (units) of Jamunagarh Village held on 04.10.2021 and 29.12.2021. It was decided to resettle them at Nabra (Bahubandha) under Udala Tahasil and at Ambadiha (Kuarnpal) under Udala Tahasil. Each family (unit) will be provided with 10 Decimal homestead lands and one house under IAY/Pradhan Mantri Awas Yojana scheme by Mayurbhanj District Administration at resettled villages.

The Three (03 nos.) of families with 13 (units) of Jamunagarh Village were shifted to the resettlement site at Nabra (Bahubandha) under Udala Tahasil on 11.02.2022 and at Ambadiha (Kuarnpa) under Udala Tahasil on 21.02.2022.

Temporary thatched and bamboo mud house were constructed to settle the families till completion of construction of pukka houses. One tube-well was installed at the Ambadiha (Kuarnpal) temporary colony under Udala Tahasil by R.O, Udala Range, Baripada Forest Division and solar pump facilities has been provided at Nabra (Bahubanda) temporary colony under Udala Tahasil by R.O, Udala Range, Baripada Forest Division. Both the temporary camps have been provided with electricity connection. Solar lights, Bed Sheets,

Mats, Mattress, Kitchen Sets, Table Fans, Mosquito Nets, and Blankets were provided to the families from the contingency fund of the Deputy Director, Similipal South Wildlife Division. Cooked food was served initially for 15 days and later dry ration was supplied free of cost.

Health and Anganwadi facilities are being provided to the villagers by Mayurbhanj District Administration. The Vaccination & Immunization of Cattle and Goat of the relocated villagers were organized by BVO, Udala in co-ordination with VAS, Similipal Tiger Reserve.

PD, DRDA, Mayurbhanj, Baripada has been requested to include the displaced families relocated and rehabilitated at Nabra and Ambadiha with Housing Scheme Package, BPL Card, Ration Card, Job Card and Caste Certificate to be initiated by BDO, Udala. Allotment of 10 decimal homestead land per family (unit) is under progress and Tahasildar, Udala is being pursed to do the needful.

The Red Cross Society was requested to provide mosquito nets, solar lantern, kitchen set, bed sheets, towel, and tarpaulin to each family (unit).

The package amount of Rs.120,00,000/- and Rs.90,00,000/- has been deposited with Land Acquisition Officer, Mayurbhanj in O/o of Collector and District Magistrate, Mayurbhanj, Baripada vide Memo No. 825/Dt. 03.03.2022 and Memo No. 1044/Dt. 16.03.2022 from the O/o Deputy Director, Similipal South Wildlife Division for payment to 03 Families (13 units) beneficiaries displaced from Jamunagarh relocated and rehabilitated at Nabra and Ambadiha Relocation Colony.

The Day to Day post-relocation monitoring is being done by a Committee headed by R.O, Udala Range, Baripada Forest Division.

Following relocation of the left out families of Jamunagarh village, an area of 41 ha in Critical Tiger habitat has opened up for Meadow development in Nuagaon Beat, National Park Range, Similipal South Wildlife Division.

REHABILITATION OF 35 FAMILIES AT NABRA COLONY, 2015




DISTRIBUTION OF SOLAR LIGHTS

RELOCATION OF 3 FAMILIES (13 UNITS), 2022 FROM JAMUNAGARH VILLAGE, 2022






POST-RELOCATION MEADOW

POST-RELOCATION MEADOW USAGE (CAMERA TRAP IMAGES)

POST-RELOCATION WORK TEMPORARY SHED CONSTRUCTION

DISTRIBUTION OF FANS, BLANKETS, SOLAR LIGHTS, MOSQUITO NETS, COOKING UTENSILS

VACCINATION & IMMUNIZATION OF CATTLE

5. Financial Achievement

Sl. No.	Name of Village	No. of family Relocated	Year	Name of Rehabilitation Colony	Name of the Scheme (Budget-WL/CAMPA- WL)	Amount Spent (Rs. in lakhs)	Remarks
1	4	5	6	7	8	9	10
1	Jamunagarh	11	1994	Kapand	C.S.P. (PT), C.S.P. (NTCA), State Plan (SP)	1951.29	
2	Jenabil	23	1998	Ambadiha			
3	Kabatghai	30	1994	Kapand			
4	Kabatghai	8	2003	Ambadiha			
5	Jenabil	61	2010	Ambadiha			
6	Barakamuda	22	2013	Asankudar			
7	Barakamuda	10	2013	Asankudar			
8	Jamunagarh	35	2015	Nabra			
9	Kabatghai	47	2016	Manada-40Families , Anukulpur-07 Families			
10	Jamunagarh	3 families (13 Units)	2021-22	Nabra- 07 units, Ambadiha- 06 units	CAMPA(WL)-2022	228.45	

ANNEXURE-LXI

ESZ- DRAFT PROPOSAL FOR DELECTATION OF ECO-SENSITIVE ZONE AROUND SIMILIPAL AND HADGHARH WILDLIFE SANCTUARY

WHEREAS, the Similipal-Hadagarh Wildlife Sanctuaries and buffer part of Similipal Tiger reserve located in Mayurbhanj and Keonjhar districts in the State of Odisha is spread over an area of 2941.6 square kilometres. The Similipal Wildlife Sanctuary has an area of 2305 square kilometres, Similipal Tiger Reserve is spread over 2750 square kilometres and Hadagarh Wildlife Sanctuary covered an area of 191.60 square kilometres;

AND WHEREAS, the flora and fauna represent rich biological significance of these protected areas. As regards Similipal Wildlife Sanctuary, one of the largest tracts of contiguous forest with immeasurable ecosystem value and the largest watershed of northern Odisha, the rich diversity of habitats and mosaic of landscape supports a fascinating floral and faunal composition with 1253 flowering plant species, 99 non-flowering plant species, including 94 species of orchids, 55 species of mammals, 362 species of birds, 62 species of reptiles, 21 species of amphibians and many species of insects and micro flora; Similipal Wildlife Sanctuary supports the largest population of elephants as well as tigers in Odisha including the home for the unique melanistic tiger; As regards biodiversity of Hadagarh Wildlife sanctuary, it is habitat for 30 species of mammals, 37 species of birds, 15 species of reptiles and amphibians with a wetland named Hadagarh Dam and the forest type is of Northern Tropical Dry Deciduous forest dominated by Sal and its associates and the forest type belongs to (a) Dry Peninsular Sal Forest (5B/C 1C) (b) Northern dry mixed deciduous Forests (5B/C2);

AND WHEREAS, the mammals are represented by Asiatic elephant (*Elephas maximus),* Gaur *(Bos gaurus),* Sloth bear (*Melursus ursinus*), Wild pig (*Sus scrofa*), Chital *(Axis axis),* Sambar (*Rusa unicolor*), Hanuman langur *(Semnopithecus entellus),* Rhesus macaque *(Macaca mulatta),* Indian porcupine *(Hystrix indica),* Indian giant squirrel *(Ratufa indica),* Indian pangolin *(Manis crassicaudata),* etc. The carnivores are represented by Tiger *(Panthera tigris),* Leopard *(Panthera pardus),* Jungle cat (*Felis chaus*), Indian wolf (*Canis lupus*), Jackal (*Canis aureus*), Bengal fox (*Vulpes bengalensis*), Leopard cat *(Felis bengalensis)* etc.;

AND WHEREAS, Similipal Wildlife Sanctuary is having important connectivity with Kuldiha Wildlife Sanctuary in Balasore district and Hadgarh Wildlife Sanctuary in Keonjhar district for movement of elephants, tigers and other animals;

AND WHEREAS, minerals of strategic national importance like Iron, Platinum, Paladium etc. are available in close vicinity of the Similipal Tiger Reserve and Hadagarh Sanctuary; the people of the locality depend on the existing mines for their livelihood;

AND WHEREAS, the Eco-sensitive Zone of Kuldiha sanctuary is already separately notified;

AND WHEREAS, it is necessary to conserve and protect the area, the extent and boundaries of SimilipalHadagarh Wildlife Sanctuaries and buffer part of Similipal Tiger reserve which are specified in paragraph 1 as Ecosensitive Zone from ecological, environmental and biodiversity point of view and to prohibit industries or class of industries and their operations and processes in the said Eco-sensitive Zone;

NOW, THEREFORE, in exercise of the powers conferred by sub section (1) and clauses (v) and (xiv) of subsection (2) and sub-section (3) of Section 3 of the Environment (Protection) Act 1986 (29 of 1986) (hereafter in this notification referred to as the Environment Act) read with sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby notifies an area to an extent 1411.81 square kilometers around the boundary of Similipal-HadagarhWildlife Sanctuaries and buffer part of Similipal Tiger reserve, in Mayurbhanj and Keonjhar districts in the State of Odisha as Eco-sensitive Zone (here after in this notification referred to as the Eco-sensitive Zone) details of which are as under, namely: -

1. Extent and boundaries of Eco-sensitive Zone. – (1)The Eco-sensitive Zone shall be of 1411.81square kilometers with an extent varying from **0 (zero) kilometer** along the important habitation adjoining the boundary on Eastern and South-eastern side of Hadagarh Sanctuary, 500 meters on South and South-western side, 2.0

kilometers around Northern Boundary of the Hadagarh Wildlife Sanctuary boundary and **five kilometers** on the western side and **one kilometre** on the Eastern side from the boundary of the protected area of Similipal Wildlife Sanctuary and rest buffer including corridors of Similipal Tiger Reserve in the State of Odisha. The Eco-sensitive Zone area statement is:

a. Around Similipal WLS including STR buffer beyond (1-5) kilometres : 1332.72sq. km.

b. Around Hadagarh Wildlife Sanctuary : 79.09 sq. km.

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Total : 1411.81sq. km.

i. The maps of the protected areas demarcating Eco-sensitive Zone along with boundary details and latitudes and longitudes are appended as **Annexure-IIA, Annexure-IIB,** and **Annexure-IIC.**

ii. List of geo-coordinates of the boundary of Similipal-Hadagarh Wildlife Sanctuaryand Eco-sensitive Zone are given in table **A** and **B** of **Annexure-III.**

iii. The list of villages falling in the proposed Eco-sensitive Zone along with their geo co-ordinates at prominent points is appended as **Annexure-IV.**

2. Zonal Master Plan for Eco-sensitive Zone.-

a. The State Government shall, for the purposes of the Eco-sensitive Zone prepare a Zonal Master Plan within a period of two years from the date of publication of this notification in the Official Gazette, in consultation with local people and adhering to the stipulations given in this notification for approval of the Competent authority of State.

b. The Zonal Master Plan for the Eco-sensitive Zone shall be prepared by the State Government in such manner as is specified in this notification and also in consonance with the relevant Central and State laws and the guidelines issued by the Central Government, if any.

c. The Zonal Master Plan shall be prepared in consultation with the following Departments of the State Government, for integrating the ecological and environmental considerations into the said plan:-

iv. Environment and Forest,

v. Forest and Wildlife,

vi. Agriculture,

vii. Revenue,

viii. Urban Development,

ix. Tourism,

x. Rural Development,

xi. Irrigation and Flood Control,

xii. Municipal,

xiii. Panchayati Raj,

xiv. Public Works Department,

xv. Mines Department,

xvi. ST & SC Development Department, and

xvii. Odisha State Pollution Control Board

d. The Zonal Master Plan shall not impose any restriction on the approved existing land use, infrastructure and activities, unless so specified in this notification and the Zonal Master Plan shall factor in improvement of all infrastructure and activities to be more efficient and eco-friendly.

e. The Zonal Master Plan shall provide for restoration of denuded areas, conservation of existing water bodies, management of catchment areas, watershed management, groundwater management, soil and moisture conservation, needs of local community and such other aspects of the ecology and environment that need attention.

f. The Zonal Master Plan shall demarcate all the existing worshipping places, villages and urban settlements, types and kinds of forests, agricultural areas, fertile lands, green area, such as, parks and like places, horticultural areas, orchards, lakes and other water bodies with supporting maps giving details of existing and proposed land use features.

g. The Zonal Master Plan shall regulate development in Eco-sensitive Zone and adhere to prohibited and regulated activities listed in the Table in paragraph 4 and also ensure and promote eco-friendly development for security of local communities' livelihood.

h. The Zonal Master Plan shall be co-terminus with the Regional Development Plan.

i. The Zonal Master Plan so approved shall be the reference document for the Monitoring Committee for carrying out its functions of monitoring in accordance with the provisions of this notification.

3. Measures to be taken by the State Government.-The State Government shall take the following measures for giving effect to the provisions of this notification, namely:-

(1) Land use. – (a) Forests, horticulture areas, agricultural areas, parks and open spaces earmarked for recreational purposes in the Eco-sensitive Zone shall not be used or converted into areas for commercial or residential or industrial activities:

Provided that the conversion of agricultural and other lands, for the purpose other than that specified at part (a) above, within the Eco-sensitive Zone may be permitted on the recommendation of the Monitoring Committee, and with the prior approval of the competent authority under Regional Town Planning Act and other rules and regulations of Central Government or State Government as applicable and vide provisions of this Notification, to meet the residential needs of the local residents and for activities such as:-

i. widening and strengthening of existing roads and construction of new roads;

ii. construction and renovation of infrastructure and civic amenities;

iii. small scale industries not causing pollution;

iv. cottage industries including village industries; convenience stores and local amenities supporting eco-tourism including home stay; and

v. promoted activities given under paragraph 4:

Provided further that no use of tribal land shall be permitted for commercial and industrial development activities without the prior approval of the competent authority under Regional Town Planning Act and other rules and regulations of the State Government and without compliance of the provisions of article 244 of the Constitution or the law for the time being in force, including the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (2 of 2007):

Provided also that any error appearing in the land records within the Eco-sensitive Zone shall be corrected by the State Government, after obtaining the views of Monitoring Committee, once in each case and the correction of said error shall be intimated to the Central Government in the Ministry of Environment, Forest and Climate Change:

Provided also that the correction of error shall not include change of land use in any case except as provided under this sub-paragraph:

Efforts shall be made to reforest the unused or unproductive agricultural areas with afforestation and habitat restoration activities.

Natural water bodies.-The catchment areas of all natural springs shall be identified and plans for their conservation and rejuvenation shall be incorporated in the Zonal Master Plan and the guidelines shall be drawn up by the State Government in such a manner as to prohibit development activities at or near these areas which are detrimental to such areas.

Tourism or Eco-tourism.- (a) All new eco-tourism activities or expansion of existing tourism activities within the Eco-sensitive Zone shall be as per the Tourism Master Plan for the Eco-sensitive Zone.

a. The Eco-Tourism Master Plan shall be prepared by the State Department of Tourism in consultation with State Departments of Environment and Forests.

b. The Tourism Master Plan shall form a component of the Zonal Master Plan.

c. The activities of eco-tourism shall be regulated as under, namely:-

   iv. new construction of hotels and resorts shall not be allowed within one kilometre from the boundary of the Wildlife Sanctuary or upto the extent of the Eco-sensitive Zone whichever is nearer:

   v. Provided that beyond the distance of one kilometre from the boundary of the Wildlife Sanctuary till the extent of the Eco-sensitive Zone, the establishment of new hotels and resorts shall be allowed only in pre-defined and designated areas for eco-tourism facilities as per Tourism Master Plan;

   vi. all new tourism activities or expansion of existing tourism activities within the Eco-sensitive Zone shall be in accordance with the guidelines issued by the Central Government in the Ministry of Environment, Forest and Climate Change and the eco-tourism guidelines issued by National Tiger Conservation Authority (as amended from time to time) with emphasis on eco-tourism;

   vii. untill the Zonal Master Plan is approved, development for tourism and expansion of existing tourism activities shall be permitted by the concerned regulatory authorities based on the actual site specific scrutiny and recommendation of the Monitoring Committee and no new hotel, resort or commercial establishment construction shall be permitted within Eco-sensitive Zone area.

Natural heritage.- All sites of valuable natural heritage in the Eco-sensitive Zone, such as the gene pool reserve areas, rock formations, waterfalls, springs, gorges, groves, caves, points, walks, rides, cliffs, etc. shall be identified and a heritage conservation plan shall be drawn up for their preservation and conservation as a part of the Zonal Master Plan.

Man-made heritage sites.- Buildings, structures, artefacts, areas and precincts of historical, architectural, aesthetic, and cultural significance shall be identified in the Eco-sensitive Zone and heritage conservation plan for their conservation shall be prepared as part of the Zonal Master Plan.

Noise pollution. -Prevention and control of noise pollution in the Eco-sensitive Zone shall be complied with the provisions of the Noise Pollution (Regulation and Control) Rules, 2000 under the Environment Act.

Air pollution.- Prevention and control of air pollution in the Eco-sensitive Zone shall be carried out in accordance with the provisions of the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981) and the rules made thereunder.

Discharge of effluents.-Discharge of treated effluent in Eco-sensitive Zone shall be in accordance with the provisions of the General Standards for Discharge of Environmental Pollutants covered under the Environment Act and the rules made thereunder or standards stipulated by State Government whichever is more stringent.

Solid wastes.-Disposal and Management of solid wastes shall be as under:-

the solid waste disposal and management in the Eco-sensitive Zone shall be carried out in accordance with the Solid Waste Management Rules, 2016, published by the Government of India in the Ministry of Environment, Forest and Climate Change *vide* notification number S.O. 1357 (E), dated the 8th April, 2016; the inorganic material may be disposed in an environmental acceptable manner at site identified outside the Eco-sensitive Zone.

Safe and Environmentally Sound Management (ESM) of Solid wastes in conformity with the existing rules and regulations using identified technologies may be allowed within Eco-sensitive Zone.

Bio-Medical Waste.– Bio Medical Waste Management shall be as under.-

The Bio-Medical Waste disposal in the Eco-sensitive Zone shall be carried out in accordance with the BioMedical Waste Management, Rules, 2016 published by the Government of India in the Ministry of Environment, Forest and Climate Change *vide* notification number GSR 343 (E), dated the 28th March, 2016.

Safe and Environmentally Sound Management of Bio-Medical Wastes in conformity with the existing rules and regulations using identified technologies may be allowed within the Eco-sensitive Zone.

Plastic waste management.- The plastic waste management in the Eco-sensitive Zone shall be carried out as per the provisions of the Plastic Waste Management Rules, 2016, published by the Government of India in the Ministry of Environment, Forest and Climate Change *vide* notification number G.S.R. 340(E), dated the 18th March, 2016, as amended from time to time**.**

Construction and demolition waste management.-The construction and demolition Waste Management in the Eco-sensitive Zone shall be carried out as per the provisions of the Construction and Demolition Waste Management Rules, 2016 published by the Government of India in the Ministry of Environment, Forest and Climate Change *vide* notification number G.S.R. 317(E), dated the 29th March, 2016, as amended from time to time.

E-waste.-The e - waste management in the Eco-sensitive Zone shall be carried out as per the provisions of the E-Waste Management Rules, 2016, published by the Government of India in the Ministry of Environment, Forest and Climate Change, as amended from time to time.

Vehicular traffic.– The vehicular movement of traffic shall be regulated in a habitat friendly manner and specific provisions in this regard shall be incorporated in the Zonal Master Plan and till such time as the Zonal Master plan is prepared and approved by the Competent Authority in the State Government, the Monitoring Committee shall monitor compliance of vehicular movement under the relevant Acts and the rules and regulations made thereunder.

Vehicular pollution.-Prevention and control of vehicular pollution shall be incompliance with in accordance with applicable laws and efforts shall be made for use of cleaner fuels.

Industrial units.– (i) On or after the publication of this notification in the Official Gazette, no new polluting industries shall be permitted to be set up within the Eco-sensitive Zone.

(ii)Only non-polluting industries shall be allowed within Eco-sensitive Zone as per the classification of Industries in the guidelines issued by the Central Pollution Control Board in February, 2016, unless so specified in this notification, and in addition, the non-polluting cottage industries shall be promoted.

Protection of hill slopes.- The protection of hill slopes shall be as under:-

the Zonal Master Plan shall indicate areas on hill slopes where no construction shall be permitted;

Construction on existing steep hill slopes or slopes with a high degree of erosion shall not be permitted.

List of activities prohibited or to be regulated within Eco-sensitive Zone.- All activities in the Eco sensitive

Zone shall be governed by the provisions of the Environment Act and the rules made there under including the Coastal Regulation Zone, 2011 and the Environmental Impact Assessment Notification, 2006 and other applicable laws including the Forest (Conservation) Act, 1980 (69 of 1980), the Indian Forest Act, 1927 (16 of 1927), the Wildlife (Protection) Act 1972 (53 of 1972), and amendments made thereto and be regulated in the manner specified in the Table below, namely:-

TABLE

S. No.	Activity	Description
(1)	(2)	(3)
A.Prohibited Activities		
1.	Commercial mining, stone quarrying and crushing units	All new and existing mining (minor and major minerals), stone quarrying and crushing units are prohibited with immediate effect except for meeting the domestic needs of bona fide local residents including digging of earth for construction or repair of houses and for manufacture of country tiles or bricks for housing and for other activities; The mining operations shall be carried out in accordance with the order of the Hon'ble Supreme Court dated the 4th August 2006 in the matter of T.N. Godavarman Thirumulpad Vs. UOI in W.P.(C) No.202 of 1995 and dated the 21st April 2014 in the matter of Goa Foundation Vs. UOI in W.P.(C) No.435 of 2012.
2.	Setting of industries causing pollution (Water, Air, Soil, Noise, etc.).	New industries and expansion of existing polluting industries in the Ecosensitive Zone shall not be permitted: Provided that non-polluting industries shall be allowed within Ecosensitive Zone as per classification of Industries in the guidelines issued by the Central Pollution Control Board in February, 2016, unless otherwise specified in this notification and in addition the non-polluting cottage industries shall be promoted.
3.	Establishment of major hydro-electric project.	Prohibited (except as otherwise provided) as per the applicable laws.
4.	Use or production or processing of any hazardous substances.	Prohibited (except as otherwise provided) as per the applicable laws.
5.	Discharge of untreated effluents in natural water bodies or land area.	Prohibited (except as otherwise provided) as per the applicable laws.
6.	Setting up of new saw mills.	New or expansion of existing saw mills shall not be permitted within the Eco-sensitive Zone.
7.	Setting up of brick kilns.	Prohibited (except as otherwise provided) as per the applicable laws.
8.	Use of plastic bags.	Prohibited (except as otherwise provided) as per applicable laws.
9.	Commercial use of firewood.	Prohibited (except as otherwise provided) as per applicable laws.
B. Regulated Activities		

10.	Commercial establishment of hotels and resorts.	No new commercial hotels and resorts shall be permitted within one kilometer of the boundary of the protected area or upto the extent of Ecosensitive Zone, whichever is nearer, except for small temporary structures for eco-tourism activities: Provided that, beyond one kilometer from the boundary of the protected area or upto the extent of Eco-sensitive Zone whichever is nearer, all new tourist activities or expansion of existing activities shall be in conformity with the Tourism Master Plan and guidelines as applicable.

11.	Construction activities.	New commercial construction of any kind shall not be permitted within one kilometer from the boundary of the protected area or upto extent of the Eco-sensitive Zone, whichever is nearer: Provided that, local people shall be permitted to undertake construction in their land for their use including the activities mentioned in sub-paragraph (1) of paragraph 3 as per building byelaws to meet the residential needs of the local residents. Provided further that the construction activity related to small scale industries not causing pollution shall be regulated and kept at the minimum, with the prior permission from the competent authority as per applicable rules and regulations, if any. Beyond one kilometer it shall be regulated as per the Zonal Master Plan.
12.	Small scale non polluting industries.	Non polluting industries as per classification of industries issued by the Central Pollution Control Board in February, 2016 and non-hazardous, small-scale and service industry, agriculture, floriculture, horticulture or agro-based industry producing products from indigenous materials from the Eco-sensitive Zone shall be permitted by the competent Authority.
13.	Felling of trees.	There shall be no felling of trees in the forest or Government or revenue or private lands without prior permission of the Competent Authority in the State Government. The felling of trees shall be regulated in accordance with the provisions of the concerned Central or State Act and the rules made thereunder.
14.	Collection of Forest produce or Non Timber Forest produce	Regulated as per the applicable laws.
15.	Erection of electrical and communication towers and laying of cables and other infrastructures.	Regulated under applicable laws (underground cabling may be promoted).
16.	Infrastructure including civic amenities.	Taking measures of mitigation as per the applicable laws, rules and regulations available guidelines.
17.	Widening and strengthening of existing roads and construction of new roads.	Taking measures of mitigation as per the applicable laws, rules and regulation and available guidelines.

18.	Undertaking other activities related to tourism like over flying the Ecosensitive Zone area by hot air balloon, helicopter, drones, Microlites, etc.	Regulated as per the applicable laws.
19.	Protection of hill slopes and river banks.	Regulated as per the applicable laws.
20.	Movement of vehicular traffic at night.	Regulated for commercial purpose under applicable laws.
21.	Ongoing agriculture and horticulture practices by local communities along with dairies, dairy farming, aquaculture and fisheries.	Permitted as per the applicable laws for use of locals.
22.	Establishment of large-scale commercial livestock and poultry farms by firms, corporate and companies.	Regulated (except otherwise provided) as per the applicable laws except for meeting local needs.
23.	Discharge of treated waste water or effluents in natural water bodies or land area.	The discharge of treated waste water or effluents shall be avoided to enter into the water bodies and efforts shall be made for recycle and reuse of treated waste water. Otherwise the discharge of treated waste water or effluent shall be regulated as per the applicable laws.
24.	Commercial extraction of surface and ground water.	Regulated as per the applicable laws.
25.	Solid waste management.	Regulated as per the applicable laws.
26.	Introduction of exotic species.	Regulated as per the applicable laws.
27.	Eco-tourism.	Regulated as per the applicable laws.
28.	Commercial sign boards and hoardings.	Regulated as per the applicable laws.
29.	Open Well, Bore Well etc. for agriculture or other usage	Regulated and the activity should be strictly monitored by the appropriate authority.
30.	Migratory grazers.	Regulated under applicable laws and as per Zonal Master Plan.
31.	Public rights.	Regulated under applicable laws.
32.	Collection of small fodder.	Regulated under applicable laws.
C. Promoted Activities		
33.	Rain water harvesting.	Shall be actively promoted.
34.	Organic farming.	Shall be actively promoted.
35.	Adoption of green technology for all activities.	Shall be actively promoted.
36.	Cottage industries including village artisans, etc.	Shall be actively promoted.

37.	Use of renewable energy and fuels.	Bio-gas, solar light etc. shall be actively promoted.
38.	Agro-Forestry.	Shall be actively promoted.
39.	Plantation of Horticulture and Herbals.	Shall be actively promoted.
40.	Use of eco-friendly transport.	Shall be actively promoted.
41.	Skill Development.	Shall be actively promoted.
42.	Restoration of degraded land/ forests/ habitat.	Shall be actively promoted.
43.	Environmental awareness.	Shall be actively promoted.

Monitoring Committee for Monitoring the Eco-sensitive Zone Notification.- For effective monitoring of the provisions of this notification under sub-section (3) of section 3 of the Environment (Protection) Act, 1986, the Central Government hereby constitutes a Monitoring Committee, comprising of the following, namely:-

S. N.	Constituent of the Monitoring Committee	Designation
1.	Collector, Mayurbhanj	Chairman, ex officio
2.	Collector, Keonjhar/Representative of collector Keonjhar	Member;
3.	DFO cum Wildlife Warden- Baripada, Karanjia & Rairangpur & Keonjhar (WL) Division, Anandapur	Member;
4.	Superintendent of Police, Mayurbhanj	Member;
5.	Superintendent of Police, Keonjhar/Representative of Superintendent of Police, Keonjhar	Member;
6.	A representative of Non-governmental Organisation worked in the field of environment *(To be to be nominated by PCCF (Wildlife), Odisha for three years).*	Member;
7.	Representative of Member Secretary, Odisha State Pollution Control Board	Member;
8.	One representative from local Gram Panchayat body of Mayurbanj District	Member;
9.	One representative from local Gram Panchayat body of Keonjhar District, Anandapur Sub-Division	Member;
10.	One expert in the area of ecology and environment *(To be nominated by the Government of Odisha for a period of three Years)*	
11.	Deputy Director, Similipal South Wildlife Division	Member-Secretary.

Terms of reference. – (1) The Monitoring Committee shall monitor the compliance of the provisions of this notification.

The tenure of the Monitoring committee shall be for three years or till the re-constitution of the new Committee by the State Government and subsequently the Monitoring Committee shall be constituted by the State Government.

The activities that are covered in the Schedule to the notification of the Government of India in the erstwhile Ministry of Environment and Forest number S.O. 1533 (E), dated the 14th September, 2006, and are falling in the Eco-sensitive Zone, except for the prohibited activities as specified in the Table under paragraph 4

thereof, shall be scrutinised by the Monitoring Committee based on the actual site-specific conditions and referred to the Central Government in the Ministry of Environment, Forest and Climate Change for prior environmental clearances under the provisions of the said notification.

The activities that are not covered in the Schedule to the notification of the Government of India in the erstwhile Ministry of Environment and Forest number S.O. 1533 (E), dated the 14th September, 2006 and are falling in the Eco-sensitive Zone, except for the prohibited activities as specified in the Table under paragraph 4 thereof, shall be scrutinised by the Monitoring Committee based on the actual site-specific conditions and referred to the concerned regulatory authorities.

The Member-Secretary of the Monitoring Committee or the concerned Deputy Commissioner(s) shall be competent to file complaints under section 19 of the Environment Act, against any person who contravenes the provisions of this notification.

The Monitoring Committee may invite representatives or experts from concerned Departments, representatives from industry associations or concerned stakeholders to assist in its deliberations depending on the requirements on issue to issue basis.

The Monitoring Committee shall submit the annual action taken report of its activities as on the 31st March of every year by the 30th June of that year to the Chief Wildlife Warden in the State as per proforma appended at Annexure V.

The Central Government in the Ministry of Environment, Forest and Climate Change may give such directions, as it deems fit, to the Monitoring Committee for effective discharge of its functions.

7. The Central Government and State Government may specify additional measures, if any, for giving effect to provisions of this notification.

8. The provisions of this notification shall be subject to the orders, if any passed or to be passed by the Hon'ble Supreme Court of India or High Court or the National Green Tribunal.

Annexure- I

BOUNDARY DESCRIPTION OF ECO-SENSITIVE ZONE OF THE SIMILIPAL-HADAGARH WILDLIFE SANCTUARY

The boundary line starts from the Point No-1 with GPS Coordinate E 86°06'12.31" N 21°58'11.49" inside Badampahar R.F.about 2 kilometers from Jashipur, then passes through village Lohabera, Barapandugandi, Kukudajharan Nala,Gunduria, Saragada village, touches the Khadkei reservoir having GPS Coordinate E 86°13' 48.7" N 22°06'42.9" and leaves the same reservoir having GPS Coordinate E 86°13'49.91" N 22°06'43.30".Then it passes through village Rangamatia, Koilasuta, Polasbani, then crosses the Bankabahl reservoir near Nuadihi village. Then the line passes through Deodang and Parabhari village at PointNo-2 having GPS reading E 86°21'56.43" N 22°09'16.10" (400 Mtr. from parabari village). Then it crosses village Chhatan Sahi, Kudarsahi, Bisoi and crosses N.H-6, Kadapani and Pundida village and reaches nearPoint No-3 with GPS reading E 86°28'23.98" N 22°10'29.07". Then it runs along the S.T.R. buffer boundary line and then crosses villages Argalabindha, Gargari, Jamdiha, Luhasila having GPS Coordinate E 86°19'19.05" N 22°14'28.34", then crosses Chhatramandal and reaches Point No-4 having GPS Coordinate E 86°23'24.08" N 22°19'58.61" (200mtr from Kankarabera, adjoining village of STR boundary). Then it runs eastward along the common boundary of STR and Odisha-Jharkhand Inter-State boundary then merges with boundary of STR, then passes through the village Betajharan, Rundadihi, Duarsuni and passes through villages Tarana, Bhuyandihi, then it runs along Dongadakhal and along the STR boundary and crosses NH-6. Then it runs along the S.T.R. buffer boundary line, then crosses villages Baghiabera, Kitabeda and reaches Point No-5 having GPS Coordinate E 86°28'16.45" N 22°07'24.77"(50 mtr Gohirapal village). Then it passes through Gohirapal village and crosses Railway line and Budhabalang River near village Dukhiasahi. Then it passes through village Rangamatia, Hatnaberha, Baramtalia at GPS- Coordinate E 86°29'40.72" N 22°03'38.70" and crosses through village Barigaon, Kantasola, Jagannathpur, Kitadihi, Dungridihi, Ambdali and reaches Point No-6 having GPS Coordinate E 86°37'29.04" N 21°58'07.73" which further crosses Palpala river. Then it passes through village Baldiha, Sapanchua,

Digdiga and reaches village Besarpani near the Kanthal PF at GPS Coordinate E 86°36'43.23" N 21°52'13.97". Then it crosses through village Jadunathpur, Khandaburha, Malibasa, Sapanchua, Bahalda, Mahuldihi and then crosses Sanjo river having GPS Coordinate E 86°31'06.47" N 21°43'52.87". Then it crosses Mathasahi, Sarbasa, Taldiha village and crosses East Deo river. Then it passes through village Manikpur, Anantapur, Basukituta, Itagarh, Podadiha, Nuasahi, Sagadi, and reachesPoint No-7 having GPS Coordinate E 86°25'47.50" N 21°31'08.79" (near Barajhar village). Then it crosses through village Jamparha, Katuria, Khuntapada, Purunapani, Matkamsahi, Noto having GPS Coordinate E 86°16'23.53" N 21°25'42.51". Then the line crosses village Karanjagarhia and reaches Point No-8 having GPS Coordinate E 86°17'04.62" N 21°23'44.97" which is near the Sukuapada PRF. Then it crosses village Mathiachua and reaches Point No-9 having GPS Coordinate E 86°20'21.32" N 21°21'20.65" which is near the Jaunri RF. Then it passes Jaunri RF, Surang, Rugurhi village and reaches Point No-10 having GPS Coordinate E 86°22'34.91" N 21°19'12.63". Then it runs along the boundary of Sukuapada PRF and runs westwardtowards the Inter-district boundary between Mayurbhanj and Keonjhar, and reaches Point No-11 having GPS Coordinate E 86°21'15.16" N 21°19'16.68". Then it runs along the Inter-district boundary of Mayurbhanj and Keonjhar (Baula R.F.) and reaches the trijunction point of Mayurbhanj- Keonjhar-Balasore district at Point No-12 having GPS Coordinate E 86°21'28.47" N 21°17'57.08". Then it runs along the Inter-district boundary of Keonjhar-Balasore and reaches village Jarhabank then runs westward, crosses the Baula R.F. then passes through village Nuasahi, Sankana, Kusatikiri and runs along Hadgarh reservoir and Baula R.F. and reach Point No-13 near village Hadgarh having GPS Coordinate E 86°17'49.58" N 21°16'32.70" which is on the boundary line of Baula R.F. Then it reaches Point No-14 having GPS Coordinate E 86°18'05.42" N 21°16'24.20" which is situated inside village Hadgarh, then runs through village Madhuban, Hadrabari, Ambanalla, Purunapani, Sundarpal, Thunigan and reaches Point No-15 having GPS Coordinate E 86°14'12.06" N 21°11'42.45" which is in a dense scrub. Then it crosses village Chhenapadi, Baragharia,Malharpada, Chilajori, Kainphuta, Kathakata and reaches Point No-16 having GPS Coordinate E 86°12'31.55" N 21°16'47.43" near village Kantipal. Then it crosses the Ghagra nala and touches the common district boundary of Keonjhar and Mayurbhanj and reaches Point No-17 having GPS reading E 86°11'38.52" N 21°16'29.73" which is on the boundary line of Nada RF. Then it runs along the STR boundary outskirting village Shalachua, Dhatkidihaand crosses the Inter-district boundary of Mayurbhanj-Keonjhar having GPS Coordinate E 86°05'57.36" N 21°19'21.79" which is in open scrub.Then it runs along the STR boundary line and reachesPoint No-18 having GPS Coordinate E 86°12'28.00" N 21°23'00.06", then passes through Bhaliadal RFand village Bhaliadal. Then it runs along the STR boundary and reaches Point No-19 having GPS Coordinate E 86°13'57.72" N 21°23'56.37" near village Bhaliadal. Then it runs along the STR boundary up to Goudiabhal R.F and runs along the boundary of Khumthan R.F. Then it runs along the boundary line of Satkosia R.F and crosses village Banamunda and Banamunda R.F which further crosses Salandi River. Then the line runs through the Kathuarugan R.Fand touches the Jorka R.Fwhich furthercrosses Gobarjhara river then passes village Taramara and enters the Handiphuta R.F. Then it runs along the boundary line of Taramara R.F and touches the boundary line of Handiphuta R.F then runs along the boundary line of Handiphuta R.F and touches the Satkosia-Thakurmunda Road and moves along the boundary line of Handiphuta R.F and merges with the boundary line of Taramara R.F. Then it again touches the boundary line of Handiphuta R.F and runs along its boundary line. Then it moves northwardthrough Thakurmunda, Rurudibara village and crosses the Ruguribara R.F. Then it enters in to Chamkapur R.F and passes through Chainbansi village. Then it crosses the Simnadi and passes through Kalijiani village and enters in to Kalijiani R.F.The line crosses Kalijiani R.F and passes through Sonariposi village and meets the boundary line of Chheratangar R.F. Then it runs along the boundary line of Chheratangar R.F and passes through Kendujiani village which further crosses the Tel River. Then it passes through Sarubil village and Sarubil R.F and it further moves to touch the Point No-20 having GPS Coordinate E 86°04'22.15"N 21°40'08.38". Then it runs along the Inter-district boundary of Mayurbhanj and Keonjhar as well as Rengalbera R.F and crosses the Bhiral River and touches the Point No-21 having GPS Coordinate E 86°04'06.20" N 21°41'19.47" near villageChandposi. Then it enters in to Kenjhara R.F, Badsahi village, Poraidhora R.F and passes through Gopalpur village, Hatisalbera R.F, Koliposi, Rurag village. Then it crosses the West Deo river and passes Baghuakudar, Garidiha, Edalbeda, Kunjia, Dumurisahi village and enters in to Biunria RF. Then it reaches Gidhibasa, Haldiaposi, Kararia, Bakla, Singarpur village and crosses the Beguna R.F. Then the line crosses the Khairi river near Barasol village and crosses N.H-6 which further touchesthe starting Point No-1with GPS Coordinate E 86°06'12.31" N 21°58'11.49" inside Badampahar R.F.

REGISTERED No. O-14

The Orissa Gazette

PUBLISHED BY AUTHORITY

No. 9 CUTTACK, FRIDAY, FEBRUARY 29, 1980/FALGUNA 10, 1901

SEPARATE PAGING IS GIVEN TO THIS PART IN ORDER THAT IT MAY BE FILED AS A SEPARATE COMPILATION

PART III

Statutory Rules, Orders, Notifications, Rules, etc., issued by the Governor, Heads of Departments and High Court

FINANCE DEPARTMENT

NOTIFICATIONS

The 19th February 1980

S. R. O. No. 236/80—In exercise of the powers conferred by sub-section (3) of section 3 of the Orissa Sales Tax Act 1947 (Orissa Act, 14 of 1947), read with rule, 3 of the Orissa Sales Tax Rules', 1947, as amended from time to time, the State Government do hereby appoint Shri Bhimsen Mirdha as Inspector of Sales Tax to assist the Commissioner of Sales Tax, Orissa.

[No. 7776—CTC.-10/80-F.]

By order of the Governor

H. K. DAS

Deputy Secretary to Government

The 19th February 1980

S. R. O. No. 237/80—In exercise of the powers conferred by sub-section (3) of section 3 of the Orissa Sales Tax Act, 1947 (Orissa Act 14 of 1947), read with rule 3 of the Orissa Sales Tax Rules, 1947, the State Government do hereby appoint the following persons as Sales Tax Officers for the purpose of the said Act—

1. Shri Kumuda Chandra Pani, Additional Commercial Tax Officer, Bhanjanagar Check-gate under Ganjam-II Circle.
2. Shri Bharat Ranjan Mishra, Additional Commercial Tax Officer (L. R.), Koraput-I Circle.

[No. 7779—CTC.-10/80-F.]

By order of the Governor

H. K. DAS

Deputy Secretary to Government

REVENUE DEPARTMENT

NOTIFICATION

The 20th February 1980

S. R. O. No. 238/80—In exercise of the powers conferred by section 23 of the Orissa Estate Abolition Act, 1951 (Act 1 of 1952) and supersession of the Government of Orissa, Revenue Department notification No. 74472-R., dated the 7th October 1977, the State Government do hereby appoint Shri C. Patra, O. A. S., Touzi Officer, Sambalpur, to be the Compensation Officer in respect of all intermediary interests in the district of Sambalpur vested in the State in pursuance with the notification of Government of Orissa, Revenue Department, Nos. 6978-R., to 6999-R., dated the 27th November 1952, No. 421-R., dated the 6th March 1953, No. 1967-R., dated the 17th May 1954, No. 696-R., dated the 6th January 1960, No. 5591-R., dated the 16th April 1962, No. 5357-R., dated the 16th September 1963, No. 63561-R., dated the 20th September 1964, No. 63588-R., dated the 29th September 1964, No. 9592-R., dated the 21st February 1968, No. 17517-R., dated the 22nd April 1970 and No. 13699-R., dated the 18th March 1974.

[No. 12131—EAV-1/80-R.]

By order of the Governor

A. R. MISRA

Under-Secretary to Government

HEALTH & FAMILY WELFARE DEPARTMENT

NOTIFICATION

The 20th February, 1980

S. R. O. No. 235/80—In exercise of the powers conferred by section 8 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) and rules made thereunder, the State Government do hereby appoint Shri Raja Kishore Mohanty, the Deputy Director-*cum*-Public Analyst to the Government of Orissa as the Public Analyst with jurisdiction of all local areas of the State of Orissa.

[No. 5028—IV-Medl.-IL-18/79-H.]

By order of the Governor

Dr. S. S. AHMED

Additional Secretary to Government

FOREST, FISHERIES & ANIMAL HUSBANDRY DEPARTMENT

NOTIFICATION

The 6th December 1978

S. R. O. No. 213/80—In exercise of the powers conferred by section 18 of the Wild Life (Protection) Act, 1972 (53 of 1972), the State Government do hereby declare the area, limits of which are described in detail in the schedule below, including Satkosia Reserve Forests of Mayurbhanj district, Baula Reserve Forest of Keonjhar district and all other Government spread of Salandi Reservoir in the district of Mayurbhanj and Keonjhar, to a sanctuary for the purpose of protecting, propagating and developing wild life with effect from the date of publication of this notification and to be called Hadgarh Sanctuary.

SCHEDULE

The northern boundary starts from Boundary Pillar No. 82 of Satkosia Reserve Forest in Thakurmunda police-station of Panchpir Subdivision in the district of Mayurbhanj and then runs along the Satkosia Reserved Forests boundary line in a clock wise direction up to Boundary Pillar No. 38 of the said Reserved Forest forming the village boundary of Bhaliadol village of Thakurmunda, police-station in Panchpir Subdivision of Mayurbhanj district and thence follows Bhaliadol-Malipose extraction path till it meets the inter-district boundary line between Mayurbhanj and Keonjhar districts up to the trijunction point of Panchpir, Kaptipada and Anandpur Civil Subdivision.

From there it follows the inter-district boundary line between Mayurbhanj and Keonjhar and then Keonjhar and Balasore up to the point where the inter-district boundary line finally leaves Baula Reserve Forests line of police-station Anandpur, Subdivision Anandapur west wards to meet the Salandi Dam axis near Hadgar in Anandapur police-station Subdivision Anandapur, district Keonjhar. From there it runs along the Dam axis and then along the Baula Reserve Forests line till it meets the nala on the south of Rangamatia village of police-station Thakurmunda of Panchpir Subdivision in the district of Mayurbhanj to meet the Khagra nalla at a point where another nalla joins Khagra nalla forming the inter-district boundary of Mayurbhanj and Keonjhar to the west of Mirgichua village of Thakurmunda police-station in Panchpir Subdivision of Mayurbhanj district in Karanjia Forest Division.

Then it follows the nalla to the highest point of Kundipal Hill of police-station Thakurmunda of Panchpir Subdivision of Mayurbhanj district and thence along ridge till it meets the starting point of the sanctuary boundary (Satkosia Reserve Forest Boundary Pillar No. 82).

[No. 3413—8F-(W)-160/78-FFAH.]

By order of the Governor

A. R. RAO

Deputy Secretary to Government

LABOUR, EMPLOYMENT & HOUSING DEPARTMENT

NOTIFICATIONS

The 15th February 1980

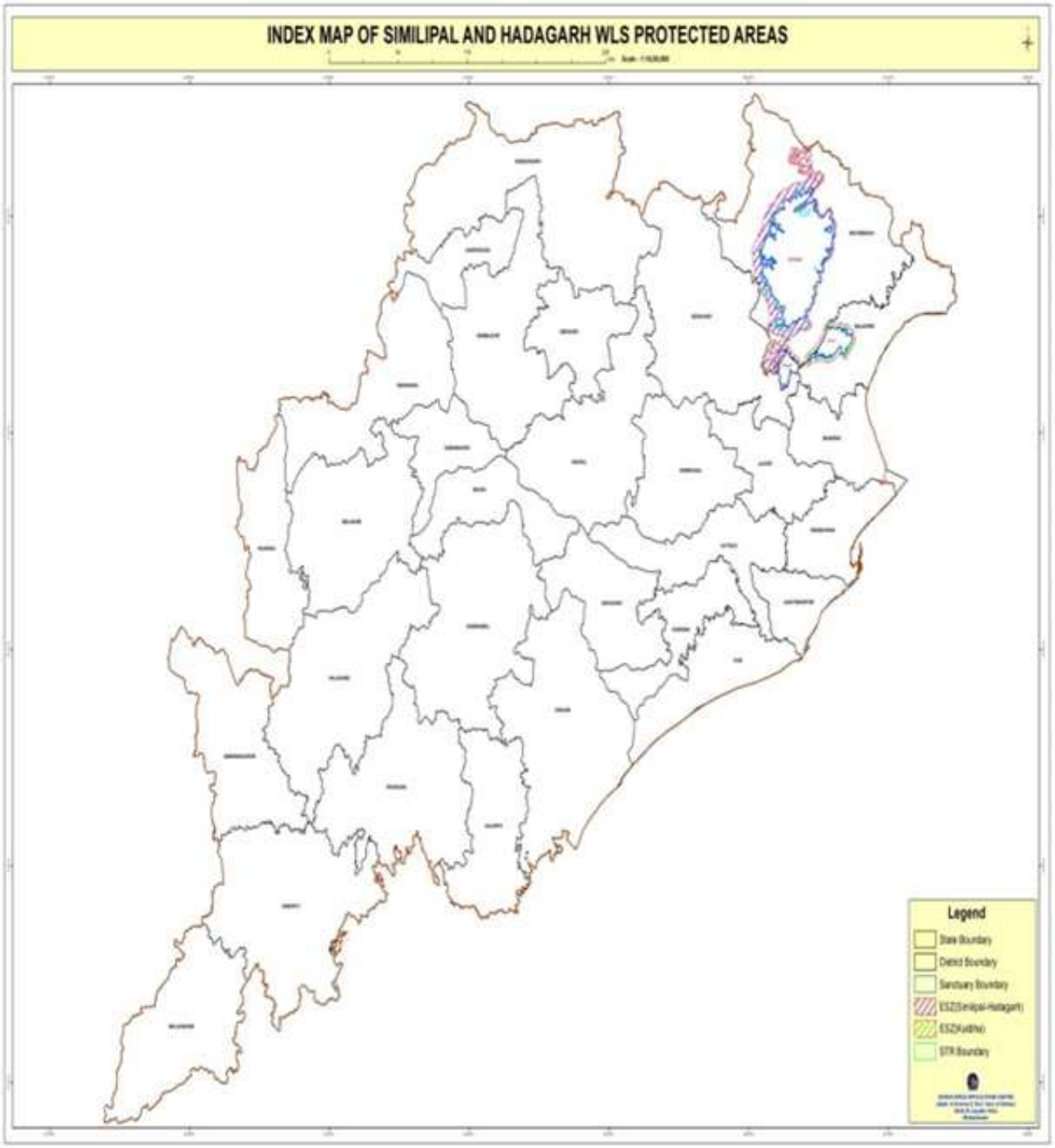
S. R. O. No. 222/80—In exercise of the powers conferred by clause (a) of sub-section (1) of section 5 read with section 9 of the Minimum Wages Act, 1948 (11 of 1948), the State Government do hereby appoint the committee consisting of members as specified in column (2) of the schedule annexed hereto to hold enquiries and advise the State Government in the matter of revision of the minimum rate of wages in respect of scheduled employment as specified in column (1) thereof.

SCHEDULE

Schedule employment (1)	Committee (2)
Salt Pan	(1) Assistant Labour Commissioner, Headquarters, Bhubaneswar, Chairman
	EMPLOYERS' REPRESENTATIVES
	(2) Managing Director, Bharat Salt and Chemical Industries, Oriya Bazar, Cuttack, Member
	(3) Secretary, Industrial Development Corporation of Orissa Limited, Bhubaneswar, Member
	EMPLOYEES' REPRESENTATIVES
	(4) Shri Narayan Sahu, President, Ganjam, district Salt Labourers Union, Berhampur, Member
	(5) Shri Ramanath Das, Advocate and President, Ganjam, district Salt Producers Union, Berhampur, Member

Annexure- IIA

LOCATION MAP SIMILIPAL-HADAGARH WILDLIFE SANCTUARY and ITS ECO-

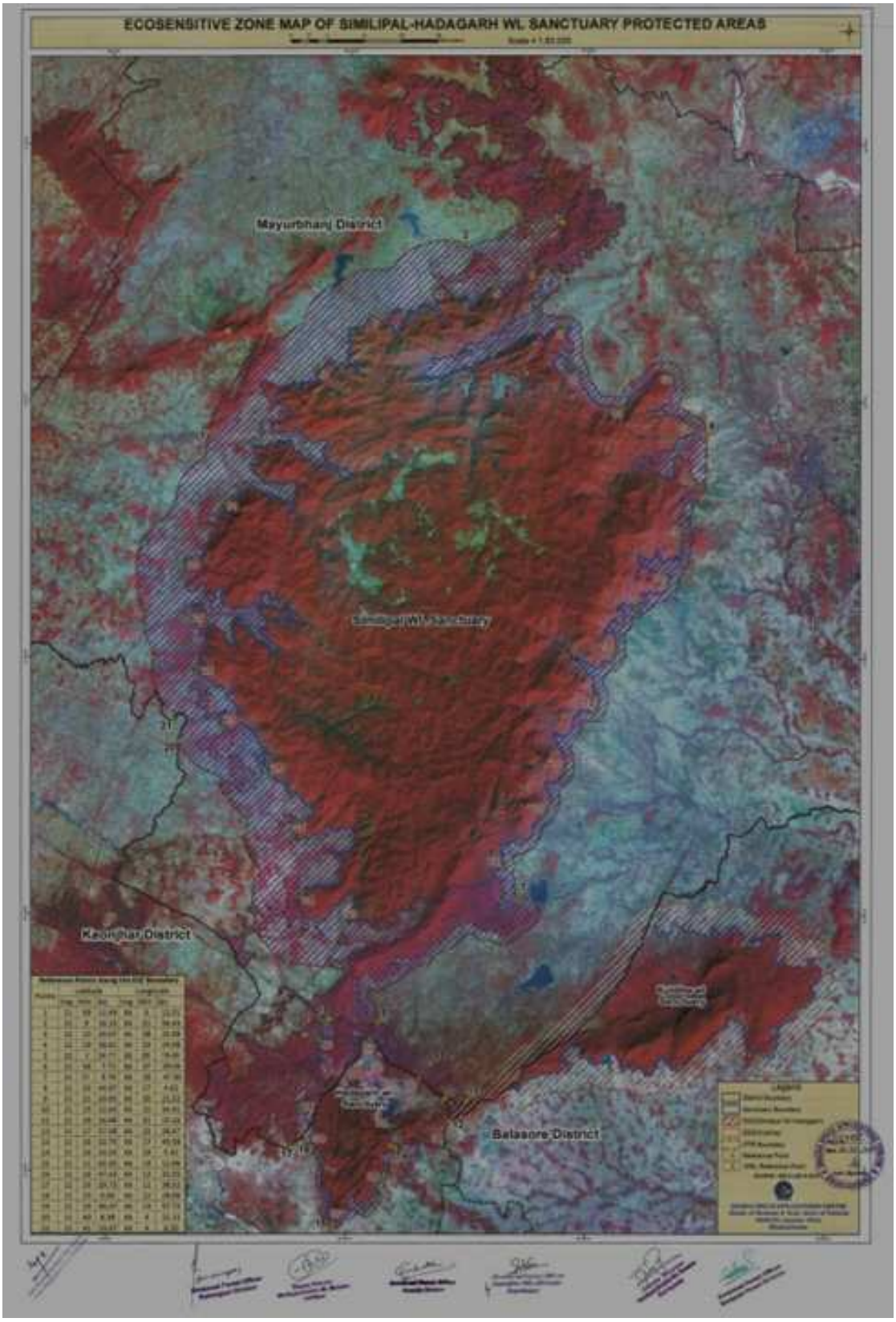


Annexure- IIB

SENSITIVE ZONE INTHE STATE OF ODISHA

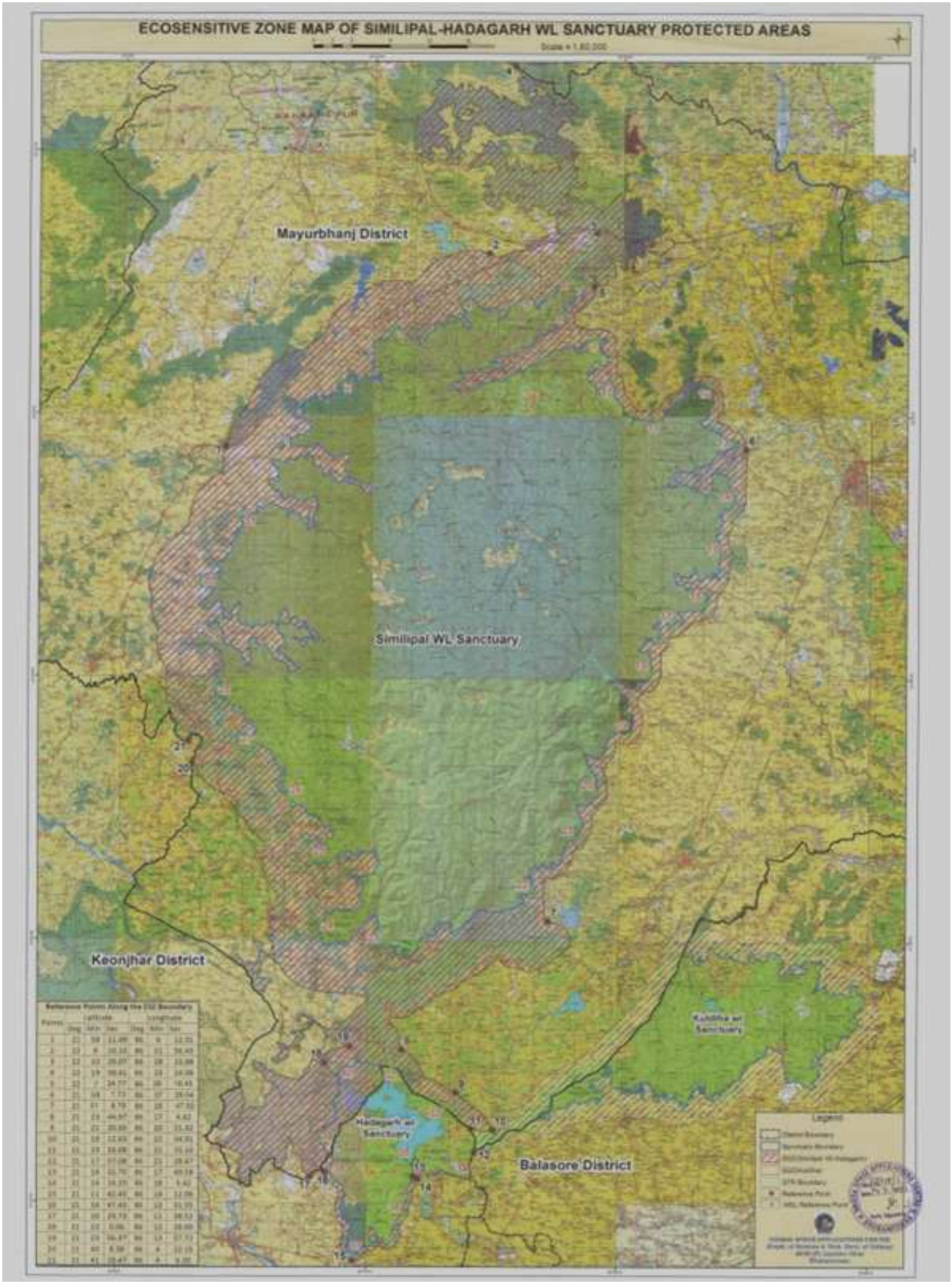
MAP OF ECO-SENSITIVE ZONE OF SIMILIPAL-HADAGARH WILDLIFE SANCTUARY ALONG WITH

LATITUDE AND LONGITUDE OF PROMINENT LOCATIONS ON SETTELITE IMAGE



Annexure- IIC

MAP OF ECO-SENSITIVE ZONE OF SIMILIPAL-HADAGARH WILDLIFE SANCTUARY ALONG WITH LATITUDE AND LONGITUDE OF PROMINENT LOCATIONS ON SURVEY OF INDIA (SOI) TOPOSHEET



Annexure-III

TABLE A: Geo-coordinates of prominent locations of Similipal-Hadagarh Wildlife Sanctuary

Id	Name of Wildlife Sanctuary	Latitude	Longitude
1	Similipal WLS	21.971200 N	86.154928 E
2	Similipal WLS	22.032951 N	86.217872 E
3	Similipal WLS	22.083638 N	86.272214 E
4	Similipal WLS	22.109239 N	86.338033 E
5	Similipal WLS	22.113148 N	86.403093 E
6	Similipal WLS	22.131549 N	86.444093 E
7	Similipal WLS	22.124180 N	86.461588 E
8	Similipal WLS	22.095925 N	86.442431 E
9	Similipal WLS	22.074737 N	86.474564 E
10	Similipal WLS	22.033179 N	86.490124 E
11	Similipal WLS	21.996407 N	86.535975 E
12	Similipal WLS	22.030161 N	86.587587 E
13	Similipal WLS	21.977337 N	86.612717 E
14	Similipal WLS	21.917579 N	86.614071 E
15	Similipal WLS	21.868316 N	86.602426 E
16	Similipal WLS	21.820638 N	86.586146 E
17	Similipal WLS	21.799509 N	86.552250 E
18	Similipal WLS	21.755206 N	86.531591 E
19	Similipal WLS	21.697540 N	86.510139 E
20	Similipal WLS	21.641067 N	86.478261 E
21	Similipal WLS	21.597486 N	86.457568 E
22	Similipal WLS	21.546466 N	86.416280 E
23	Similipal WLS	21.493549 N	86.247809 E
24	Similipal WLS	21.517270 N	86.200599 E
25	Similipal WLS	21.576537 N	86.192822 E
26	Similipal WLS	21.634666 N	86.168628 E
27	Similipal WLS	21.682350 N	86.119221 E
28	Similipal WLS	21.740090 N	86.093929 E
29	Similipal WLS	21.786208 N	86.084536 E
30	Similipal WLS	21.839350 N	86.076430 E
31	Similipal WLS	21.901740 N	86.117270 E
32	Hadagarh WLS	21.379716 N	86.275752 E
33	Hadagarh WLS	21.341625 N	86.327420 E
34	Hadagarh WLS	21.274558 N	86.355981 E

35	Hadagarh WLS	21.294415 N	86.298627 E
36	Hadagarh WLS	21.240461 N	86.288039 E
37	Hadagarh WLS	21.199806 N	86.236859 E
38	Hadagarh WLS	21.273892 N	86.215680 E
39	Hadagarh WLS	21.314178 N	86.202503 E
40	Hadagarh WLS	21.378589 N	86.222461 E

TABLE B: Geo-coordinates with prominent locations of Eco-Sensitive Zone

Points	Latitude	Longitude				
	Deg	Min	Sec	Deg	Min	Sec
1.	21	58	11.49	86	6	12.31
2.	22	9	16.10	86	21	56.43
3.	22	10	29.07	86	28	23.98
4.	22	19	58.61	86	23	24.08
5.	22	7	24.77	86	28	16.45
6.	21	58	7.73	86	37	29.04
7.	21	31	8.79	86	25	47.50
8.	21	23	44.97	86	17	4.62
9.	21	21	20.65	86	20	21.32
10.	21	19	12.63	86	22	34.91
11.	21	19	16.68	86	21	15.16
12.	21	17	57.08	86	21	28.47
13.	21	16	32.70	86	17	49.58
14.	21	16	24.20	86	18	5.42
15.	21	11	42.45	86	14	12.06
16.	21	16	47.43	86	12	31.55
17.	21	16	29.73	86	11	38.52
18.	21	23	0.06	86	12	28.00
19.	21	23	56.37	86	13	57.72
20.	21	40	8.38	86	4	22.15
21.	21	41	19.47	86	4	6.20

Annexure-IV

LIST OF REVENUE VILLAGE AREA FALLING UNDER ECO-SENSITIVE ZONE OF SIMILIPAL -HADAGARH WILDLIFE SANCTUARY ALONG WITH GEO-COORDINATES

Sl. No.	Name of District	Name of Panachayat Samiti/C.D. Block	Name of Village	GPS location of village	
				Longitude	Latitude
1	Mayurbhanj	Bangiriposi	Alapani	86°25'07.58" E	22°01'12.21" N
2	Mayurbhanj	Bangiriposi	Amdapani	86°24'38.39" E	22°01'09.33" N
3	Mayurbhanj	Bangiriposi	Asansikhar	86°28'13.41" E	22°04'55.37" N
4	Mayurbhanj	Bangiriposi	Astabera	86°26'35.86" E	22°04'47.61" N
5	Mayurbhanj	Bangiriposi	Badamtalia	86°29'23.34" E	22°03'39.88" N
6	Mayurbhanj	Bangiriposi	Bahutia	86°25'41.92" E	22°04'40.53" N
7	Mayurbhanj	Bangiriposi	Baliadhipa	86°20'45.78" E	22°02'11.01" N
8	Mayurbhanj	Bangiriposi	Baragan	86°30'23.45" E	22°00'34.96" N
9	Mayurbhanj	Bangiriposi	Baribeda	86°26'04.94" E	22°01'41.82" N
10	Mayurbhanj	Bangiriposi	Basilakacha	86°24'41.06" E	22°01'37.09" N
11	Mayurbhanj	Bangiriposi	Basukitala	86°27'32.14" E	22°06'26.98" N
12	Mayurbhanj	Bangiriposi	Baunspahari	86°24'03.36" E	22°02'45.73" N
13	Mayurbhanj	Bangiriposi	Beguniabandh	86°21'08.76" E	22°02'25.24" N
14	Mayurbhanj	Bangiriposi	Betjharan	86°25'18.65" E	22°03'42.76" N
15	Mayurbhanj	Bangiriposi	Bhaduakacha	86°25'26.08" E	22°00'51.04" N
16	Mayurbhanj	Bangiriposi	Bhagirathipur	86°26'49.55" E	22°06'19.63" N
17	Mayurbhanj	Bangiriposi	Bholagaria	86°27'52.77" E	22°06'59.39" N
18	Mayurbhanj	Bangiriposi	Brahmangon	86°22'34.44" E	22°02'30.41" N
19	Mayurbhanj	Bangiriposi	Chakidi	86°24'21.73" E	22°00'22.87" N
20	Mayurbhanj	Bangiriposi	Chandabil	86°26'47.35" E	22°05'45.44" N
21	Mayurbhanj	Bangiriposi	Charabandh	86°22'21.67" E	22°00'54.74" N
22	Mayurbhanj	Bangiriposi	Dantiakacha	86°22'35.04" E	22°00'58.23" N
23	Mayurbhanj	Bangiriposi	Dhadipani	86°22'48.03" E	22°01'31.59" N
24	Mayurbhanj	Bangiriposi	Domuhani	86°23'30.05" E	22°03'26.67" N
25	Mayurbhanj	Bangiriposi	Fuljhara	86°25'48.05" E	22°00'55.10" N
26	Mayurbhanj	Bangiriposi	Ghatakuari	86°22'47.43" E	22°03'08.95" N
27	Mayurbhanj	Bangiriposi	Ghatidubha	86°26'05.74" E	22°04'10.62" N
28	Mayurbhanj	Bangiriposi	Gohirapal	86°28'01.92" E	22°07'32.47" N
29	Mayurbhanj	Bangiriposi	Gopalpur	86°33'37.43" E	22°01'11.56" N
30	Mayurbhanj	Bangiriposi	Gothanida	86°29'24.71" E	22°03'13.88" N
31	Mayurbhanj	Bangiriposi	Hatibari	86°24'43.74" E	22°03'56.54" N

32	Mayurbhanj	Bangiriposi	Jaladiha	86°29'13.59" E	22°02'22.82" N
33	Mayurbhanj	Bangiriposi	Jamtalia	86°24'14.85" E	22°01'30.05" N
34	Mayurbhanj	Bangiriposi	Jerkani	86°25'33.23" E	22°01'16.94" N
35	Mayurbhanj	Bangiriposi	Joka	86°29'11.72" E	22°04'18.64" N
36	Mayurbhanj	Bangiriposi	Jua	86°31'23.51" E	22°00'03.28" N
37	Mayurbhanj	Bangiriposi	Kadambadiha	86°20'15.82" E	22°01'32.83" N
38	Mayurbhanj	Bangiriposi	Kamalpur	86°27'11.16" E	22°06'01.84" N
39	Mayurbhanj	Bangiriposi	Kanchhinda	86°27'05.27" E	22°05'02.63" N
40	Mayurbhanj	Bangiriposi	Kantasola	86°32'42.45" E	22°00'41.25" N
41	Mayurbhanj	Bangiriposi	Khadighati	86°24'14.32" E	22°01'01.87" N
42	Mayurbhanj	Bangiriposi	Kukurbhuka	86°24'41.05" E	22°00'52.58" N
43	Mayurbhanj	Bangiriposi	Kumbhirmundi	86°25'03.44" E	22°04'17.18" N
44	Mayurbhanj	Bangiriposi	Kundalabani	86°32'04.28" E	22°00'02.84" N
45	Mayurbhanj	Bangiriposi	Kurukutia	86°28'18.53" E	22°04'43.81" N
46	Mayurbhanj	Bangiriposi	Kusumtota	86°24'00.71" E	22°00'19.63" N
47	Mayurbhanj	Bangiriposi	Lakhmiposi	86°27'28.65" E	22°06'11.24" N
48	Mayurbhanj	Bangiriposi	Majhigan	86°23'36.28" E	22°02'51.92" N
49	Mayurbhanj	Bangiriposi	Majhigaon	86°29'29.61" E	22°02'50.00" N
50	Mayurbhanj	Bangiriposi	Masinabhila	86°28'21.77" E	22°02'27.51" N
51	Mayurbhanj	Bangiriposi	Mohanpur	86°21'18.18" E	22°02'05.14" N
52	Mayurbhanj	Bangiriposi	Nedam	86°27'32.38" E	22°04'15.85" N
53	Mayurbhanj	Bangiriposi	Palasabani	86°27'45.44" E	22°04'36.70" N
54	Mayurbhanj	Bangiriposi	Panasadiha	86°29'53.33" E	22°01'26.99" N
55	Mayurbhanj	Bangiriposi	Pindargaria	86°27'26.45" E	22°06'44.81" N
56	Mayurbhanj	Bangiriposi	Purunapani	86°24'35.41" E	22°00'30.43" N
57	Mayurbhanj	Bangiriposi	Purunapani	86°33'50.18" E	22°01'45.00" N
58	Mayurbhanj	Bangiriposi	Rajabasa	86°28'13.90" E	22°02'07.31" N
59	Mayurbhanj	Bangiriposi	Ramaharipur	86°33'15.95" E	22°01'05.26" N
60	Mayurbhanj	Bangiriposi	Rangamatia	86°27'32.40" E	22°04'55.32" N
61	Mayurbhanj	Bangiriposi	Rengalbera	86°21'11.96" E	22°01'47.73" N
62	Mayurbhanj	Bangiriposi	Saharbari	86°24'20.27" E	22°03'44.88" N
63	Mayurbhanj	Bangiriposi	Salghati	86°22'24.77" E	22°02'08.35" N
64	Mayurbhanj	Bangiriposi	Sorishpal	86°24'26.69" E	22°03'16.70" N
65	Mayurbhanj	Bangiriposi	Talbandh	86°20'22.17" E	22°01'50.84" N
66	Mayurbhanj	Badasahi	Chandanchaturi	86°34'13.52" E	21°50'30.72" N
67	Mayurbhanj	Badasahi	Jadunathpur	86°35'33.66" E	21°50'34.63" N
68	Mayurbhanj	Badasahi	Rautraipur	86°35'52.25" E	21°50'06.65" N
69	Mayurbhanj	Bijatala	Dhanatangar	86°25'19.01" E	22°17'47.40" N

70	Mayurbhanj	Bijatala	Jaladiha	86°18'44.45" E	22°07'52.01" N
71	Mayurbhanj	Bijatala	kundurikacha	86°22'34.92" E	22°13'17.35" N
72	Mayurbhanj	Bijatala	Palasbani	86°18'16.30" E	22°08'12.31" N
73	Mayurbhanj	Bijatala	Raihari	86°19'01.94" E	22°08'53.58" N
74	Mayurbhanj	Bijatala	Tiakati	86°24'58.74" E	22°17'26.48" N
75	Mayurbhanj	Bisoi	Alapani	86°14'42.49" E	22°02'51.40" N
76	Mayurbhanj	Bisoi	Andharjhari	86°13'56.98" E	22°03'03.37" N
77	Mayurbhanj	Bisoi	Arjunvila	86°16'00.82" E	22°05'30.10" N
78	Mayurbhanj	Bisoi	Asansikhar	86°22'49.39" E	22°07'01.34" N
79	Mayurbhanj	Bisoi	Ashana	86°17'33.98" E	22°06'33.51" N
80	Mayurbhanj	Bisoi	Ashanabani	86°20'24.60" E	22°07'02.69" N
81	Mayurbhanj	Bisoi	Baghiatangar	86°12'46.95" E	22°01'30.81" N
82	Mayurbhanj	Bisoi	Banaikala	86°12'08.45" E	22°04'10.81" N
83	Mayurbhanj	Bisoi	Banakati	86°11'00.46" E	22°01'18.22" N
84	Mayurbhanj	Bisoi	Bankidihi	86°18'01.72" E	22°05'46.40" N
85	Mayurbhanj	Bisoi	Barajambhila	86°15'53.42" E	22°06'28.89" N
86	Mayurbhanj	Bisoi	Barajori	86°13'17.29" E	22°06'19.81" N
87	Mayurbhanj	Bisoi	Baramanada	86°13'50.04" E	22°05'05.67" N
88	Mayurbhanj	Bisoi	Baranalua	86°11'56.75" E	22°02'32.42" N
89	Mayurbhanj	Bisoi	Barapurunapani	86°13'25.73" E	22°05'59.18" N
90	Mayurbhanj	Bisoi	Barhunia	86°25'16.51" E	22°09'03.57" N
91	Mayurbhanj	Bisoi	Bautibeda	86°20'54.96" E	22°08'39.90" N
92	Mayurbhanj	Bisoi	Bhatachhatra	86°18'42.91" E	22°06'46.47" N
93	Mayurbhanj	Bisoi	Bisoi	86°24'33.88" E	22°09'40.80" N
94	Mayurbhanj	Bisoi	Bobeijori	86°18'31.03" E	22°07'27.00" N
95	Mayurbhanj	Bisoi	Brahmanpasi	86°14'58.89" E	22°06'08.20" N
96	Mayurbhanj	Bisoi	Buramara	86°12'48.03" E	22°03'20.74" N
97	Mayurbhanj	Bisoi	Burikhamari	86°14'24.08" E	22°03'57.80" N
98	Mayurbhanj	Bisoi	Chadiripahari	86°14'25.97" E	22°02'24.86" N
99	Mayurbhanj	Bisoi	Charapani	86°16'23.65" E	22°07'40.65" N
100	Mayurbhanj	Bisoi	Chatani	86°20'54.14" E	22°07'41.20" N
101	Mayurbhanj	Bisoi	Chuakakar	86°26'16.36" E	22°08'27.58" N
102	Mayurbhanj	Bisoi	Dabank	86°14'15.12" E	22°06'22.45" N
103	Mayurbhanj	Bisoi	Dantuani	86°25'52.73" E	22°07'55.55" N
104	Mayurbhanj	Bisoi	Deodang	86°20'25.45" E	22°09'11.37" N
105	Mayurbhanj	Bisoi	Deopata	86°27'53.47" E	22°10'26.50" N
106	Mayurbhanj	Bisoi	Dhalabera	86°10'34.86" E	22°00'10.93" N
107	Mayurbhanj	Bisoi	Dhana	86°24'08.15" E	22°08'57.96" N

108	Mayurbhanj	Bisoi	Dhangirimota	86°09'12.97" E	22°00'52.24" N
109	Mayurbhanj	Bisoi	Duarsuni	86°26'27.28" E	22°12'41.78" N
110	Mayurbhanj	Bisoi	Dudhakundi	86°27'24.61" E	22°10'57.31" N
111	Mayurbhanj	Bisoi	Dumurdiha	86°10'05.36" E	22°01'17.68" N
112	Mayurbhanj	Bisoi	Ekatali	86°24'31.18" E	22°06'50.36" N
113	Mayurbhanj	Bisoi	Garagadi	86°22'23.19" E	22°12'40.02" N
114	Mayurbhanj	Bisoi	Ghorabindha	86°23'20.80" E	22°06'32.09" N
115	Mayurbhanj	Bisoi	Gunduria	86°12'27.64" E	22°04'45.26" N
116	Mayurbhanj	Bisoi	Hatisal	86°25'54.80" E	22°13'07.94" N
117	Mayurbhanj	Bisoi	Hingili	86°19'20.76" E	22°08'07.54" N
118	Mayurbhanj	Bisoi	Jambani	86°15'15.96" E	22°04'37.83" N
119	Mayurbhanj	Bisoi	Jamudihi	86°12'56.45" E	22°04'58.51" N
120	Mayurbhanj	Bisoi	Kadapani	86°25'18.43" E	22°10'05.37" N
121	Mayurbhanj	Bisoi	Kaduani	86°14'53.31" E	22°06'43.32" N
122	Mayurbhanj	Bisoi	Kaduani	86°22'11.46" E	22°08'45.65" N
123	Mayurbhanj	Bisoi	Kashipani	86°17'58.72" E	22°04'12.85" N
124	Mayurbhanj	Bisoi	Katas	86°23'22.96" E	22°09'01.09" N
125	Mayurbhanj	Bisoi	Kendumara	86°18'39.11" E	22°06'05.41" N
126	Mayurbhanj	Bisoi	Kesam	86°13'13.37" E	22°02'26.45" N
127	Mayurbhanj	Bisoi	kharambera	86°26'37.81" E	22°10'10.91" N
128	Mayurbhanj	Bisoi	Khariasul	86°17'00.52" E	22°05'49.53" N
129	Mayurbhanj	Bisoi	Khejurikatas	86°22'50.82" E	22°08'52.19" N
130	Mayurbhanj	Bisoi	Kitabera	86°26'18.85" E	22°09'18.42" N
131	Mayurbhanj	Bisoi	Kolipasi	86°11'46.95" E	22°03'47.68" N
132	Mayurbhanj	Bisoi	Kolisuta	86°16'49.11" E	22°07'25.29" N
133	Mayurbhanj	Bisoi	Kulgidihi	86°23'40.38" E	22°07'08.41" N
134	Mayurbhanj	Bisoi	Kurukutia	86°10'30.56" E	22°01'49.56" N
135	Mayurbhanj	Bisoi	Kurumuda	86°13'44.38" E	22°06'33.05" N
136	Mayurbhanj	Bisoi	Langalkatapokharia	86°24'48.42" E	22°08'08.73" N
137	Mayurbhanj	Bisoi	Mahisikudar	86°13'00.30" E	22°05'29.34" N
138	Mayurbhanj	Bisoi	Mahubhandar	86°21'49.22" E	22°07'59.29" N
139	Mayurbhanj	Bisoi	Majhigam	86°19'07.34" E	22°07'18.29" N
140	Mayurbhanj	Bisoi	Makhuna	86°25'28.78" E	22°07'24.03" N
141	Mayurbhanj	Bisoi	Manancha	86°21'52.21" E	22°09'16.49" N
142	Mayurbhanj	Bisoi	Manglapur	86°20'05.73" E	22°08'18.91" N
143	Mayurbhanj	Bisoi	Mayurbeka	86°11'48.39" E	22°01'07.79" N
144	Mayurbhanj	Bisoi	Nuadihi	86°19'45.80" E	22°08'57.18" N
145	Mayurbhanj	Bisoi	Nuagan	86°11'09.22" E	22°02'46.46" N

146	Mayurbhanj	Bisoi	Osadala	86°22'40.26" E	22°06'13.43" N
147	Mayurbhanj	Bisoi	Palagora	86°17'40.50" E	22°07'23.90" N
148	Mayurbhanj	Bisoi	Panikhi	86°24'35.22" E	22°07'22.98" N
149	Mayurbhanj	Bisoi	Parabhari	86°21'35.07" E	22°09'04.81" N
150	Mayurbhanj	Bisoi	Patharpara	86°18'07.41" E	22°06'23.53" N
151	Mayurbhanj	Bisoi	Pokharia	86°15'09.45" E	22°07'15.15" N
152	Mayurbhanj	Bisoi	Purunabalichua	86°21'41.14" E	22°06'43.10" N
153	Mayurbhanj	Bisoi	Radanagar	86°13'18.36" E	22°03'53.19" N
154	Mayurbhanj	Bisoi	Raikarkacha	86°17'03.99" E	22°05'06.69" N
155	Mayurbhanj	Bisoi	Raikarkachahil	86°17'46.95" E	22°04'54.25" N
156	Mayurbhanj	Bisoi	Rajabasa	86°28'19.03" E	22°11'00.90" N
157	Mayurbhanj	Bisoi	Raliabindha	86°14'25.02" E	22°05'32.42" N
158	Mayurbhanj	Bisoi	Rangamatia	86°15'37.16" E	22°07'29.04" N
159	Mayurbhanj	Bisoi	Rengalbera	86°14'44.39" E	22°04'38.79" N
160	Mayurbhanj	Bisoi	Rugudidihi	86°19'51.23" E	22°06'29.34" N
161	Mayurbhanj	Bisoi	Sanajamdhila	86°11'04.72" E	22°03'30.31" N
162	Mayurbhanj	Bisoi	Sanamanada	86°13'32.73" E	22°04'29.60" N
163	Mayurbhanj	Bisoi	Sananalua	86°12'13.64" E	22°03'11.92" N
164	Mayurbhanj	Bisoi	Sanapurunapani	86°16'02.58" E	22°07'20.81" N
165	Mayurbhanj	Bisoi	Sanarangamatia	86°20'32.09" E	22°05'19.17" N
166	Mayurbhanj	Bisoi	Sanbalichua	86°27'47.03" E	22°09'32.28" N
167	Mayurbhanj	Bisoi	Saragada	86°12'32.22" E	22°05'26.89" N
168	Mayurbhanj	Bisoi	Sunapasi	86°19'58.23" E	22°07'24.23" N
169	Mayurbhanj	Bisoi	Talakbudi	86°19'15.84" E	22°05'41.96" N
170	Mayurbhanj	Bisoi	Talapati	86°16'41.01" E	22°06'45.77" N
171	Mayurbhanj	Bisoi	Tambajhari	86°15'29.32" E	22°05'01.09" N
172	Mayurbhanj	Bisoi	Tambalbandha	86°12'20.85" E	22°01'49.52" N
173	Mayurbhanj	Bisoi	Tarana	86°28'01.75" E	22°12'09.20" N
174	Mayurbhanj	Bisoi	Telaighutu	86°11'38.31" E	22°01'48.26" N
175	Mayurbhanj	Bisoi	Tentiduma	86°17'32.66" E	22°07'45.85" N
176	Mayurbhanj	Bisoi	Thulukchatan	86°21'09.90" E	22°09'12.45" N
177	Mayurbhanj	Jashipur	Asanabani	86°17'50.97" E	21°56'44.09" N
178	Mayurbhanj	Jashipur	Asanpani	86°06'40.11" E	21°54'41.45" N
179	Mayurbhanj	Jashipur	Astakuanr	86°22'32.29" E	21°51'37.54" N
180	Mayurbhanj	Jashipur	Bada Uski	86°18'11.98" E	21°54'37.03" N
181	Mayurbhanj	Jashipur	Badakasira	86°16'12.52" E	21°49'04.40" N
182	Mayurbhanj	Jashipur	Badsun	86°06'40.01" E	21°57'22.19" N
183	Mayurbhanj	Jashipur	Bakala	86°05'00.58" E	21°53'42.23" N

184	Mayurbhanj	Jashipur	Bakua	86°21'21.08" E	21°49'03.86" N
185	Mayurbhanj	Jashipur	Balarampur	86°23'09.55" E	21°52'16.60" N
186	Mayurbhanj	Jashipur	Balikhal	86°26'03.18" E	21°52'19.70" N
187	Mayurbhanj	Jashipur	Banapandugandi	86°08'04.38" E	22°01'21.35" N
188	Mayurbhanj	Jashipur	Bandirabasa	86°19'44.21" E	21°53'42.55" N
189	Mayurbhanj	Jashipur	Baragaria	86°05'35.82" E	21°51'12.85" N
190	Mayurbhanj	Jashipur	Barajhilla	86°11'22.92" E	21°58'03.26" N
191	Mayurbhanj	Jashipur	Baranga	86°08'22.44" E	21°55'27.67" N
192	Mayurbhanj	Jashipur	Barashialinai	86°09'49.36" E	21°59'42.41" N
193	Mayurbhanj	Jashipur	Bareipani	86°21'14.25" E	21°57'02.08" N
194	Mayurbhanj	Jashipur	Bargiput	86°07'42.61" E	21°59'46.79" N
195	Mayurbhanj	Jashipur	Barigan	86°15'21.70" E	21°49'15.07" N
196	Mayurbhanj	Jashipur	Barsia	86°20'31.51" E	21°56'44.42" N
197	Mayurbhanj	Jashipur	Basantatur	86°06'04.04" E	21°55'19.53" N
198	Mayurbhanj	Jashipur	Begunia	86°08'32.65" E	21°59'30.20" N
199	Mayurbhanj	Jashipur	Bhadushula	86°12'59.47" E	21°56'58.59" N
200	Mayurbhanj	Jashipur	Bhradachua	86°16'38.77" E	21°48'41.87" N
201	Mayurbhanj	Jashipur	Bilapaka	86°14'36.70" E	21°53'31.19" N
202	Mayurbhanj	Jashipur	Brundipasi	86°12'26.62" E	21°57'24.65" N
203	Mayurbhanj	Jashipur	Budhabalanga	86°23'55.29" E	21°50'01.69" N
204	Mayurbhanj	Jashipur	Chakswanpal	86°07'04.63" E	21°55'53.77" N
205	Mayurbhanj	Jashipur	Chakundakacha	86°19'47.36" E	21°57'19.26" N
206	Mayurbhanj	Jashipur	Chandikhaman	86°15'52.17" E	21°51'39.38" N
207	Mayurbhanj	Jashipur	Charipahari	86°08'43.66" E	21°57'18.17" N
208	Mayurbhanj	Jashipur	Chheligodhuali	86°09'10.10" E	22°00'15.19" N
209	Mayurbhanj	Jashipur	Dhalabali	86°08'42.21" E	21°56'14.14" N
210	Mayurbhanj	Jashipur	Dhubaku	86°04'57.77" E	21°54'27.46" N
211	Mayurbhanj	Jashipur	Durdura	86°08'46.17" E	21°58'48.31" N
212	Mayurbhanj	Jashipur	Ektali	86°05'50.55" E	21°54'29.75" N
213	Mayurbhanj	Jashipur	Fulabadia	86°19'42.60" E	21°53'20.10" N
214	Mayurbhanj	Jashipur	Ghamiapasi	86°07'17.99" E	21°54'52.58" N
215	Mayurbhanj	Jashipur	Goili	86°05'35.11" E	21°55'47.96" N
216	Mayurbhanj	Jashipur	Gopinathpur	86°26'54.06" E	21°51'41.15" N
217	Mayurbhanj	Jashipur	Gudgudia	86°14'56.53" E	21°51'55.19" N
218	Mayurbhanj	Jashipur	Haladia	86°19'39.58" E	21°56'39.93" N
219	Mayurbhanj	Jashipur	Handipuhan	86°07'40.28" E	21°58'42.19" N
220	Mayurbhanj	Jashipur	Hatimundi	86°13'27.64" E	21°57'32.02" N
221	Mayurbhanj	Jashipur	Jajadihi	86°20'06.59" E	21°52'19.96" N

222	Mayurbhanj	Jashipur	Jamuami	86°12'49.91" E	21°57'14.51" N
223	Mayurbhanj	Jashipur	Kadalibadihili	86°06'59.27" E	21°59'09.77" N
224	Mayurbhanj	Jashipur	Kaleitumba	86°05'51.30" E	21°52'04.12" N
225	Mayurbhanj	Jashipur	Kaliani	86°09'21.03" E	21°55'02.63" N
226	Mayurbhanj	Jashipur	Kalikaprasada	86°11'25.17" E	21°54'41.14" N
227	Mayurbhanj	Jashipur	Kanchikana	86°06'20.45" E	21°53'07.71" N
228	Mayurbhanj	Jashipur	Kankrani	86°06'11.91" E	21°57'02.46" N
229	Mayurbhanj	Jashipur	Kapanda	86°07'19.35" E	21°55'47.07" N
230	Mayurbhanj	Jashipur	Kappira	86°06'54.53" E	21°56'46.89" N
231	Mayurbhanj	Jashipur	Kashipan	86°07'28.64" E	21°57'51.25" N
232	Mayurbhanj	Jashipur	Khediadunguri	86°15'57.72" E	21°51'25.21" N
233	Mayurbhanj	Jashipur	Khejuria	86°18'16.10" E	21°48'22.75" N
234	Mayurbhanj	Jashipur	Kolajhari	86°19'12.31" E	21°57'08.94" N
235	Mayurbhanj	Jashipur	Kolha	86°16'30.18" E	21°53'59.58" N
236	Mayurbhanj	Jashipur	Kuanribil	86°17'52.39" E	21°51'23.96" N
237	Mayurbhanj	Jashipur	Kukurbhuka	86°25'05.79" E	21°53'06.98" N
238	Mayurbhanj	Jashipur	Kumari	86°15'13.03" E	21°51'18.37" N
239	Mayurbhanj	Jashipur	Kumudabadi	86°06'55.04" E	21°53'59.38" N
240	Mayurbhanj	Jashipur	Kundabil	86°16'18.56" E	21°49'37.66" N
241	Mayurbhanj	Jashipur	Kundagara	86°13'07.09" E	21°56'35.88" N
242	Mayurbhanj	Jashipur	Kusumi	86°15'19.28" E	21°50'10.86" N
243	Mayurbhanj	Jashipur	Lembujharan	86°20'47.72" E	21°50'44.87" N
244	Mayurbhanj	Jashipur	Madanmohanpur	86°11'44.57" E	21°57'31.97" N
245	Mayurbhanj	Jashipur	Masinavilla	86°02'44.57" E	21°52'40.80" N
246	Mayurbhanj	Jashipur	Matiagarh	86°06'16.69" E	21°56'13.02" N
247	Mayurbhanj	Jashipur	Naana	86°23'13.23" E	21°53'34.22" N
248	Mayurbhanj	Jashipur	Nangalsia	86°04'46.29" E	21°52'45.07" N
249	Mayurbhanj	Jashipur	Netraghosra	86°14'27.37" E	21°52'31.70" N
250	Mayurbhanj	Jashipur	Nikhirda	86°26'02.05" E	21°53'19.04" N
251	Mayurbhanj	Jashipur	Nuhamalia	86°07'46.97" E	22°00'43.48" N
252	Mayurbhanj	Jashipur	Nuniagoda	86°18'47.02" E	21°56'05.18" N
253	Mayurbhanj	Jashipur	Olkudar	86°10'05.28" E	21°54'43.45" N
254	Mayurbhanj	Jashipur	Padamapur	86°06'21.20" E	21°57'52.38" N
255	Mayurbhanj	Jashipur	Palagura	86°12'51.02" E	21°56'30.85" N
256	Mayurbhanj	Jashipur	Pandugandi	86°04'31.97" E	21°55'19.12" N
257	Mayurbhanj	Jashipur	Paragarh	86°08'31.78" E	21°54'57.27" N
258	Mayurbhanj	Jashipur	Poragara	86°10'01.67" E	21°57'49.45" N
259	Mayurbhanj	Jashipur	Rajaala	86°14'33.66" E	21°55'52.10" N

260	Mayurbhanj	Jashipur	Ramchandrapur	86°07'55.94" E	22°01'12.03" N
261	Mayurbhanj	Jashipur	Rautala	86°17'48.53" E	21°54'37.57" N
262	Mayurbhanj	Jashipur	Saharpat	86°15'18.92" E	21°50'48.53" N
263	Mayurbhanj	Jashipur	Sanajhilla	86°13'07.74" E	21°57'35.30" N
264	Mayurbhanj	Jashipur	Sanashialinai	86°10'17.58" E	21°59'07.17" N
265	Mayurbhanj	Jashipur	Sanasoki	86°18'17.64" E	21°55'32.40" N
266	Mayurbhanj	Jashipur	Sankasira	86°15'30.56" E	21°49'50.90" N
267	Mayurbhanj	Jashipur	Sapachira	86°09'19.02" E	21°55'24.04" N
268	Mayurbhanj	Jashipur	Saruda	86°24'19.19" E	21°51'20.84" N
269	Mayurbhanj	Jashipur	Similipal	86°23'24.01" E	21°51'40.33" N
270	Mayurbhanj	Jashipur	Singarpur	86°05'02.90" E	21°55'39.85" N
271	Mayurbhanj	Jashipur	Suanpala	86°07'53.24" E	21°56'46.41" N
272	Mayurbhanj	Jashipur	Tamakashila	86°11'18.75" E	21°53'42.55" N
273	Mayurbhanj	Jashipur	Thakuragora	86°10'34.24" E	21°54'56.69" N
274	Mayurbhanj	Jashipur	Tilabari	86°07'54.83" E	21°54'57.07" N
275	Mayurbhanj	Jashipur	Tingirani	86°12'12.75" E	21°56'55.81" N
276	Mayurbhanj	Jashipur	Tulasibani	86°09'06.51" E	21°58'04.20" N
277	Mayurbhanj	Jashipur	Uttarans	86°10'50.46" E	21°54'29.01" N
278	Mayurbhanj	Kaptipada	Badajunapal	86°26'04.44" E	21°33'56.19" N
279	Mayurbhanj	Kaptipada	Chakaradharpur	86°27'55.66" E	21°36'12.86" N
280	Mayurbhanj	Kaptipada	Dugudha	86°22'12.18" E	21°19'49.71" N
281	Mayurbhanj	Kaptipada	Gaipanikhiahill	86°25'05.22" E	21°28'42.92" N
282	Mayurbhanj	Kaptipada	Gandidara	86°25'11.51" E	21°31'37.99" N
283	Mayurbhanj	Kaptipada	Gourchandrapur	86°20'38.75" E	21°27'58.21" N
284	Mayurbhanj	Kaptipada	Jayantipatasamiljamu-diha	86°27'38.22" E	21°35'35.19" N
285	Mayurbhanj	Kaptipada	Kadabahali	86°19'10.40" E	21°27'10.96" N
286	Mayurbhanj	Kaptipada	Kadambasul	86°24'30.54" E	21°32'25.94" N
287	Mayurbhanj	Kaptipada	Kantiali	86°25'26.31" E	21°34'03.50" N
288	Mayurbhanj	Kaptipada	Katuria	86°22'12.22" E	21°28'56.44" N
289	Mayurbhanj	Kaptipada	Kumurabari	86°16'52.79" E	21°24'33.37" N
290	Mayurbhanj	Kaptipada	Nachhipur	86°25'09.36" E	21°33'35.70" N
291	Mayurbhanj	Kaptipada	Noto	86°16'57.47" E	21°25'52.77" N
292	Mayurbhanj	Kaptipada	Nuasahi	86°25'25.06" E	21°33'15.46" N
293	Mayurbhanj	Kaptipada	Podadiha	86°26'04.40" E	21°33'37.92" N
294	Mayurbhanj	Kaptipada	Pungichua	86°18'43.20" E	21°21'20.90" N
295	Mayurbhanj	Kaptipada	Sadanandapur	86°28'17.95" E	21°36'23.27" N
296	Mayurbhanj	Kaptipada	Sanadei	86°24'28.77" E	21°28'38.01" N

297	Mayurbhanj	Kaptipada	Sanjumapal	86°27'12.45" E	21°35'29.31" N
298	Mayurbhanj	Kaptipada	Sharata	86°20'02.80" E	21°27'29.51" N
299	Mayurbhanj	Kaptipada	Sripadamanjaripur	86°19'44.76" E	21°21'29.24" N
300	Mayurbhanj	Kaptipada	Sukhuapata	86°18'02.30" E	21°22'45.92" N
301	Mayurbhanj	Kaptipada	Sukhuapatahill	86°16'04.21" E	21°23'09.61" N
302	Mayurbhanj	Karanjia	Anantasahi	86°04'26.85" E	21°50'42.67" N
303	Mayurbhanj	Karanjia	Aunlakata	86°09'38.19" E	21°46'58.45" N
304	Mayurbhanj	Karanjia	Baghalata	86°05'09.95" E	21°44'00.76" N
305	Mayurbhanj	Karanjia	Bajeni	86°03'22.25" E	21°43'51.09" N
306	Mayurbhanj	Karanjia	Balibhol	86°04'08.86" E	21°43'45.45" N
307	Mayurbhanj	Karanjia	Baliposi	86°05'28.06" E	21°42'48.42" N
308	Mayurbhanj	Karanjia	Barabarakamuda	86°06'58.54" E	21°48'02.89" N
309	Mayurbhanj	Karanjia	Bararamachandrapur	86°07'44.67" E	21°47'19.25" N
310	Mayurbhanj	Karanjia	Bargaon	86°03'36.58" E	21°51'09.51" N
311	Mayurbhanj	Karanjia	Batagouragan	86°03'31.63" E	21°52'15.63" N
312	Mayurbhanj	Karanjia	Batapalsa	86°03'28.54" E	21°49'08.73" N
313	Mayurbhanj	Karanjia	Batatainsira	86°04'05.00" E	21°52'48.54" N
314	Mayurbhanj	Karanjia	Bhalughar	86°03'07.74" E	21°44'14.15" N
315	Mayurbhanj	Karanjia	Bishipur	86°06'52.25" E	21°42'34.98" N
316	Mayurbhanj	Karanjia	Budhigan	86°10'13.88" E	21°45'38.94" N
317	Mayurbhanj	Karanjia	Burudihi	86°10'53.62" E	21°47'00.67" N
318	Mayurbhanj	Karanjia	Chheliaposi	86°03'13.96" E	21°46'37.43" N
319	Mayurbhanj	Karanjia	Dhatikibera	86°04'42.47" E	21°40'09.78" N
320	Mayurbhanj	Karanjia	Divigarh	86°06'05.64" E	21°48'11.80" N
321	Mayurbhanj	Karanjia	Dudhiani	86°09'20.69" E	21°47'29.25" N
322	Mayurbhanj	Karanjia	Gopalpur	86°02'49.05" E	21°44'23.32" N
323	Mayurbhanj	Karanjia	Goridiha	86°02'23.14" E	21°47'55.58" N
324	Mayurbhanj	Karanjia	Gourgaon	86°04'25.04" E	21°46'28.44" N
325	Mayurbhanj	Karanjia	Hatibari	86°05'01.20" E	21°48'31.41" N
326	Mayurbhanj	Karanjia	Hatisalbera	86°03'59.45" E	21°44'44.14" N
327	Mayurbhanj	Karanjia	Jalada	86°09'50.33" E	21°48'25.89" N
328	Mayurbhanj	Karanjia	Jamudaluia	86°04'48.47" E	21°43'10.35" N
329	Mayurbhanj	Karanjia	Jarasahi	86°04'27.96" E	21°45'18.09" N
330	Mayurbhanj	Karanjia	Jhumukakudar	86°02'29.80" E	21°46'54.64" N
331	Mayurbhanj	Karanjia	Kadalibari	86°07'57.59" E	21°47'40.44" N
332	Mayurbhanj	Karanjia	Kadamorak	86°03'30.39" E	21°49'56.29" N
333	Mayurbhanj	Karanjia	Kalakada	86°03'44.45" E	21°42'40.65" N
334	Mayurbhanj	Karanjia	Kapandara	86°03'30.73" E	21°45'28.82" N

335	Mayurbhanj	Karanjia	Kararia	86°03'06.16" E	21°52'46.03" N
336	Mayurbhanj	Karanjia	Kendumundi	86°06'24.68" E	21°40'49.99" N
337	Mayurbhanj	Karanjia	Kenjhara	86°04'04.13" E	21°42'08.38" N
338	Mayurbhanj	Karanjia	Khadikudar	86°02'56.05" E	21°47'19.12" N
339	Mayurbhanj	Karanjia	Khalpada	86°09'17.84" E	21°46'25.84" N
340	Mayurbhanj	Karanjia	Khandiadar	86°05'02.32" E	21°51'07.03" N
341	Mayurbhanj	Karanjia	Koliposi	86°03'02.50" E	21°44'43.52" N
342	Mayurbhanj	Karanjia	Kunjia	86°02'02.62" E	21°49'59.49" N
343	Mayurbhanj	Karanjia	Kushapada	86°04'23.60" E	21°45'55.72" N
344	Mayurbhanj	Karanjia	Lakshmiposi	86°10'24.29" E	21°48'05.67" N
345	Mayurbhanj	Karanjia	Malharpada	86°02'52.20" E	21°51'56.06" N
346	Mayurbhanj	Karanjia	Miludihi	86°05'14.13" E	21°45'56.17" N
347	Mayurbhanj	Karanjia	Miriginandi	86°03'54.72" E	21°47'48.31" N
348	Mayurbhanj	Karanjia	Nankura	86°02'23.20" E	21°50'48.65" N
349	Mayurbhanj	Karanjia	Nodhagaraia	86°02'25.17" E	21°51'39.18" N
350	Mayurbhanj	Karanjia	Nuagan	86°04'19.02" E	21°53'25.59" N
351	Mayurbhanj	Karanjia	Paharapur	86°10'43.46" E	21°48'03.66" N
352	Mayurbhanj	Karanjia	Paharmorak	86°04'28.96" E	21°49'51.27" N
353	Mayurbhanj	Karanjia	Panasapal	86°03'02.40" E	21°48'10.94" N
354	Mayurbhanj	Karanjia	Patbil	86°05'15.01" E	21°41'44.49" N
355	Mayurbhanj	Karanjia	Patulidiha	86°04'18.62" E	21°48'47.13" N
356	Mayurbhanj	Karanjia	Paudia	86°04'48.66" E	21°47'39.43" N
357	Mayurbhanj	Karanjia	Purunapani	86°02'14.65" E	21°47'36.06" N
358	Mayurbhanj	Karanjia	Purunapani	86°05'48.71" E	21°48'58.46" N
359	Mayurbhanj	Karanjia	Raitalia	86°03'35.70" E	21°53'02.18" N
360	Mayurbhanj	Karanjia	Ramajory	86°11'33.80" E	21°47'29.06" N
361	Mayurbhanj	Karanjia	Rangamatia	86°08'31.29" E	21°46'59.59" N
362	Mayurbhanj	Karanjia	Ranibholealiskuldar	86°08'44.38" E	21°47'47.44" N
363	Mayurbhanj	Karanjia	Ranipat	86°03'39.37" E	21°50'41.63" N
364	Mayurbhanj	Karanjia	Rengalbera	86°05'18.68" E	21°40'40.56" N
365	Mayurbhanj	Karanjia	Rorang	86°02'41.89" E	21°46'13.31" N
366	Mayurbhanj	Karanjia	Salarapada	86°02'29.26" E	21°48'58.58" N
367	Mayurbhanj	Karanjia	Sanagansasan	86°03'44.53" E	21°51'32.44" N
368	Mayurbhanj	Karanjia	Sanbarakamura	86°06'28.89" E	21°48'03.03" N
369	Mayurbhanj	Karanjia	Sanramchandrapur	86°07'34.31" E	21°46'17.64" N
370	Mayurbhanj	Karanjia	Shyamachandrapur	86°07'03.63" E	21°46'57.64" N
371	Mayurbhanj	Karanjia	Sialinai	86°02'44.75" E	21°50'03.72" N
372	Mayurbhanj	Karanjia	Sonaposi	86°05'22.33" E	21°44'51.56" N

373	Mayurbhanj	Karanjia	Sradha	86°04'34.37" E	21°51'57.11" N
374	Mayurbhanj	Karanjia	Sudiam	86°05'05.27" E	21°45'18.17" N
375	Mayurbhanj	Karanjia	Sundhikudar	86°03'24.16" E	21°47'05.87" N
376	Mayurbhanj	Karanjia	Thakuramapatana	86°06'21.40" E	21°47'24.49" N
377	Mayurbhanj	Karanjia	Thakurjharan	86°05'28.73" E	21°43'49.52" N
378	Mayurbhanj	Khunta	Agnikumari	86°35'21.69" E	21°49'21.82" N
379	Mayurbhanj	Khunta	Bahalda	86°32'30.60" E	21°47'24.75" N
380	Mayurbhanj	Khunta	Baniabasa	86°29'54.50" E	21°44'40.36" N
381	Mayurbhanj	Khunta	Dabak	86°32'08.62" E	21°45'57.65" N
382	Mayurbhanj	Khunta	Dengaamba	86°31'03.35" E	21°44'24.15" N
383	Mayurbhanj	Khunta	Dengam	86°32'22.48" E	21°45'07.14" N
384	Mayurbhanj	Khunta	Jaridiha	86°33'08.54" E	21°47'38.62" N
385	Mayurbhanj	Khunta	Kendugari	86°35'48.47" E	21°49'48.40" N
386	Mayurbhanj	Khunta	Mahalibasa	86°35'36.00" E	21°49'09.42" N
387	Mayurbhanj	Khunta	Mahuladihi	86°31'42.32" E	21°44'22.42" N
388	Mayurbhanj	Khunta	Nuagaon	86°32'06.36" E	21°45'18.61" N
389	Mayurbhanj	Khunta	Rangamatia	86°31'42.76" E	21°47'01.73" N
390	Mayurbhanj	Khunta	Sapanichua	86°34'04.28" E	21°48'21.25" N
391	Mayurbhanj	Khunta	Sreerampur	86°31'56.13" E	21°44'47.43" N
392	Mayurbhanj	Khunta	Subarnamanjari	86°33'33.46" E	21°48'05.99" N
393	Mayurbhanj	Khunta	Sunpokhari	86°34'30.11" E	21°48'32.36" N
394	Mayurbhanj	Koliane	Gendapokhari	86°35'01.92" E	22°02'02.78" N
395	Mayurbhanj	Koliane	Jagannathpur	86°34'29.99" E	22°02'10.00" N
396	Mayurbhanj	Koliane	Patharghera	86°35'28.33" E	22°02'13.96" N
397	Mayurbhanj	Samakhunta	Alubani	86°35'39.15" E	22°00'23.46" N
398	Mayurbhanj	Samakhunta	Ambadali	86°37'17.95" E	21°58'39.39" N
399	Mayurbhanj	Samakhunta	Asanabani	86°36'47.13" E	21°58'53.84" N
400	Mayurbhanj	Samakhunta	Balidiha	86°37'06.58" E	21°57'41.22" N
401	Mayurbhanj	Samakhunta	Besarapani	86°36'11.37" E	21°52'23.30" N
402	Mayurbhanj	Samakhunta	Bhundapal	86°36'20.52" E	21°57'35.62" N
403	Mayurbhanj	Samakhunta	Duladaradhanagar	86°36'24.35" E	21°54'05.22" N
404	Mayurbhanj	Samakhunta	Enayetpur	86°36'18.25" E	21°54'34.03" N
405	Mayurbhanj	Samakhunta	Gobindchandrapur	86°34'55.08" E	21°55'59.02" N
406	Mayurbhanj	Samakhunta	Godipokhari	86°36'57.41" E	21°56'04.97" N
407	Mayurbhanj	Samakhunta	Hinjalgadia	86°35'52.20" E	21°59'18.68" N
408	Mayurbhanj	Samakhunta	Janglablock	86°36'47.73" E	21°54'42.08" N
409	Mayurbhanj	Samakhunta	Jhinei	86°36'20.39" E	21°57'54.48" N
410	Mayurbhanj	Samakhunta	Jogendradasjot	86°33'36.28" E	21°56'40.13" N

411	Mayurbhanj	Samakhunta	Jungleblock	86°37'02.82" E	21°58'26.59" N
412	Mayurbhanj	Samakhunta	Kakarpani	86°36'57.75" E	21°55'30.83" N
413	Mayurbhanj	Samakhunta	Kenjhar	86°36'10.41" E	21°53'14.06" N
414	Mayurbhanj	Samakhunta	Khasadiha	86°37'03.02" E	21°56'32.90" N
415	Mayurbhanj	Samakhunta	Kitadihi	86°35'14.27" E	21°59'44.57" N
416	Mayurbhanj	Samakhunta	Kochilaghati	86°35'19.41" E	21°56'44.51" N
417	Mayurbhanj	Samakhunta	Krushnachandrapur	86°33'56.40" E	21°56'19.80" N
418	Mayurbhanj	Samakhunta	Laxmipashi	86°36'17.48" E	21°56'50.16" N
419	Mayurbhanj	Samakhunta	Lulung	86°33'18.89" E	21°56'29.40" N
420	Mayurbhanj	Samakhunta	Mudrajori	86°35'45.49" E	22°01'20.34" N
421	Mayurbhanj	Samakhunta	Nuagaon	86°37'12.12" E	21°56'54.61" N
422	Mayurbhanj	Samakhunta	Pithabata	86°34'47.47" E	21°56'24.00" N
423	Mayurbhanj	Samakhunta	Purunapani	86°34'35.62" E	21°56'47.96" N
424	Mayurbhanj	Samakhunta	Sansula	86°37'13.75" E	21°55'01.89" N
425	Mayurbhanj	Samakhunta	Sapanichua	86°37'22.14" E	21°56'13.46" N
426	Mayurbhanj	Samakhunta	Saratchandrapur	86°36'30.00" E	21°52'52.03" N
427	Mayurbhanj	Samakhunta	Tarajori	86°35'43.07" E	21°57'29.84" N
428	Mayurbhanj	Saraskana	Sankhabhanga	86°26'51.43" E	22°13'18.07" N
429	Mayurbhanj	Thakurmunda	Duarasuni(part)	86°10'11.44" E	21°20'10.77" N
430	Mayurbhanj	ThakurMunda	Akhapalan	86°09'10.96" E	21°34'50.22" N
431	Mayurbhanj	ThakurMunda	Asanabani	86°05'59.19" E	21°39'07.30" N
432	Mayurbhanj	ThakurMunda	Asanbani	86°14'27.10" E	21°30'15.98" N
433	Mayurbhanj	ThakurMunda	Asankudar	86°11'55.98" E	21°36'28.24" N
434	Mayurbhanj	Thakurmunda	Asurkhal	86°14'57.21" E	21°22'54.27" N
435	Mayurbhanj	ThakurMunda	Badabaliposi	86°12'58.02" E	21°34'10.00" N
436	Mayurbhanj	ThakurMunda	Baghamara	86°11'46.92" E	21°18'49.94" N
437	Mayurbhanj	Thakurmunda	Baghamara	86°12'30.32" E	21°17'32.41" N
438	Mayurbhanj	ThakurMunda	Baghanunda	86°09'57.46" E	21°28'49.81" N
439	Mayurbhanj	ThakurMunda	Baliabera	86°12'00.59" E	21°29'30.45" N
440	Mayurbhanj	ThakurMunda	Balidiha	86°12'05.50" E	21°19'23.93" N
441	Mayurbhanj	ThakurMunda	Banamunda	86°14'31.99" E	21°27'02.06" N
442	Mayurbhanj	ThakurMunda	Barabil	86°11'06.92" E	21°30'45.00" N
443	Mayurbhanj	ThakurMunda	Baramahuldiha	86°09'51.61" E	21°37'47.04" N
444	Mayurbhanj	ThakurMunda	Basantapur	86°09'38.79" E	21°33'01.91" N
445	Mayurbhanj	Thakurmunda	Baula	86°12'20.37" E	21°22'04.18" N
446	Mayurbhanj	ThakurMunda	Baunshapani	86°12'11.21" E	21°18'47.45" N
447	Mayurbhanj	Thakurmunda	Bausapani	86°12'23.94" E	21°18'02.35" N
448	Mayurbhanj	ThakurMunda	Bentakarpara	86°09'55.75" E	21°30'52.72" N

449	Mayurbhanj	ThakurMunda	Bhadubera	86°12'13.44" E	21°28'26.82" N
450	Mayurbhanj	ThakurMunda	Bahaliadal	86°12'56.00" E	21°22'55.60" N
451	Mayurbhanj	ThakurMunda	Bhejidiha	86°16'47.81" E	21°28'47.44" N
452	Mayurbhanj	ThakurMunda	Chainbainsi	86°08'52.63" E	21°34'28.22" N
453	Mayurbhanj	ThakurMunda	Chamakpur	86°09'21.98" E	21°31'54.95" N
454	Mayurbhanj	ThakurMunda	Champajhar	86°14'19.86" E	21°29'22.35" N
455	Mayurbhanj	Thakurmunda	Chaulajhari	86°08'26.88" E	21°17'25.70" N
456	Mayurbhanj	ThakurMunda	Chheratanga	86°07'25.43" E	21°38'25.25" N
457	Mayurbhanj	ThakurMunda	Chirupada	86°14'23.57" E	21°34'36.05" N
458	Mayurbhanj	ThakurMunda	Dakeipal	86°11'04.75" E	21°27'55.45" N
459	Mayurbhanj	ThakurMunda	Dangadiha	86°19'11.58" E	21°30'03.13" N
460	Mayurbhanj	ThakurMunda	Dangapani	86°09'45.34" E	21°37'05.15" N
461	Mayurbhanj	ThakurMunda	Dhirole	86°11'08.55" E	21°36'03.19" N
462	Mayurbhanj	ThakurMunda	Digdhar	86°10'41.48" E	21°31'16.24" N
463	Mayurbhanj	ThakurMunda	Diliganj	86°15'49.11" E	21°29'02.29" N
464	Mayurbhanj	ThakurMunda	Dubapal	86°13'31.23" E	21°27'21.92" N
465	Mayurbhanj	ThakurMunda	Dumurdiha	86°06'37.64" E	21°38'52.34" N
466	Mayurbhanj	ThakurMunda	Dwarasuni	86°10'04.57" E	21°19'46.51" N
467	Mayurbhanj	ThakurMunda	Edalbeda	86°09'01.77" E	21°39'59.46" N
468	Mayurbhanj	ThakurMunda	Ghodabindha	86°11'12.98" E	21°34'40.86" N
469	Mayurbhanj	ThakurMunda	Giribera	86°13'21.10" E	21°28'10.85" N
470	Mayurbhanj	ThakurMunda	Gobarjora	86°11'00.96" E	21°29'21.92" N
471	Mayurbhanj	ThakurMunda	Guhaldiha	86°10'24.34" E	21°32'44.02" N
472	Mayurbhanj	ThakurMunda	Guriajori	86°11'35.81" E	21°28'56.63" N
473	Mayurbhanj	ThakurMunda	Handiphuta	86°10'29.88" E	21°29'07.96" N
474	Mayurbhanj	ThakurMunda	Hatigara	86°10'08.73" E	21°35'06.46" N
475	Mayurbhanj	ThakurMunda	Jadidar	86°10'05.33" E	21°30'07.32" N
476	Mayurbhanj	Thakurmunda	Jambani	86°14'59.49" E	21°21'36.13" N
477	Mayurbhanj	ThakurMunda	Jamudiha	86°10'20.15" E	21°36'05.16" N
478	Mayurbhanj	ThakurMunda	Jamukhanjari	86°12'54.80" E	21°29'07.36" N
479	Mayurbhanj	ThakurMunda	Jamunalia	86°10'10.63" E	21°33'34.26" N
480	Mayurbhanj	ThakurMunda	Jamuposi	86°08'54.95" E	21°36'42.93" N
481	Mayurbhanj	ThakurMunda	Jaripada	86°15'43.35" E	21°28'13.61" N
482	Mayurbhanj	ThakurMunda	Jungleblock samil su-darshanpur	86°13'43.35" E	21°29'31.17" N
483	Mayurbhanj	ThakurMunda	Kadapani	86°09'18.56" E	21°35'45.64" N
484	Mayurbhanj	ThakurMunda	Kaliajiani	86°08'31.51" E	21°35'56.94" N
485	Mayurbhanj	ThakurMunda	Kaparkhai	86°11'01.07" E	21°37'04.72" N

486	Mayurbhanj	ThakurMunda	Kasibera	86°08'26.69" E	21°39'20.92" N
487	Mayurbhanj	ThakurMunda	Kathuanuagaon	86°13'03.83" E	21°27'11.08" N
488	Mayurbhanj	ThakurMunda	Kendujiani	86°07'04.59" E	21°38'10.97" N
489	Mayurbhanj	ThakurMunda	Keshadiha	86°13'35.53" E	21°32'38.07" N
490	Mayurbhanj	ThakurMunda	Khamadiha	86°09'18.22" E	21°29'58.49" N
491	Mayurbhanj	ThakurMunda	Khandapal	86°13'48.22" E	21°27'45.27" N
492	Mayurbhanj	ThakurMunda	Kharidamak	86°07'13.85" E	21°39'17.95" N
493	Mayurbhanj	ThakurMunda	Khuntaposi	86°09'40.77" E	21°30'30.29" N
494	Mayurbhanj	ThakurMunda	Kirkichipal	86°15'10.60" E	21°30'28.94" N
495	Mayurbhanj	ThakurMunda	Kokanda	86°18'14.00" E	21°28'55.08" N
496	Mayurbhanj	ThakurMunda	Kucheidiha	86°12'22.62" E	21°27'46.24" N
497	Mayurbhanj	Thakurmunda	Kundei	86°12'17.27" E	21°20'29.50" N
498	Mayurbhanj	ThakurMunda	Mandaljhari	86°14'47.77" E	21°34'02.54" N
499	Mayurbhanj	ThakurMunda	Mankadbeda	86°15'07.77" E	21°29'09.24" N
500	Mayurbhanj	ThakurMunda	Mituani	86°11'32.37" E	21°32'55.13" N
501	Mayurbhanj	ThakurMunda	Mulapal	86°14'44.58" E	21°27'51.37" N
502	Mayurbhanj	ThakurMunda	Nada	86°11'19.42" E	21°17'44.59" N
503	Mayurbhanj	ThakurMunda	Nihaiigandi	86°10'10.21" E	21°31'37.16" N
504	Mayurbhanj	ThakurMunda	Nipania	86°09'21.23" E	21°33'46.95" N
505	Mayurbhanj	ThakurMunda	Nuagaon	86°14'11.33" E	21°28'38.76" N
506	Mayurbhanj	ThakurMunda	Nuapada	86°12'58.87" E	21°27'43.26" N
507	Mayurbhanj	ThakurMunda	Pariasahi	86°08'11.01" E	21°36'52.62" N
508	Mayurbhanj	ThakurMunda	Patarpara	86°18'07.43" E	21°29'12.21" N
509	Mayurbhanj	ThakurMunda	Purunapani	86°12'20.10" E	21°31'49.02" N
510	Mayurbhanj	ThakurMunda	Ranibhol	86°08'24.91" E	21°40'39.66" N
511	Mayurbhanj	ThakurMunda	Ranibhola	86°11'59.45" E	21°35'52.19" N
512	Mayurbhanj	ThakurMunda	Ruguribera	86°09'10.56" E	21°31'25.72" N
513	Mayurbhanj	ThakurMunda	Rugurisahi	86°07'55.49" E	21°39'47.74" N
514	Mayurbhanj	ThakurMunda	Salachua	86°11'08.64" E	21°18'04.05" N
515	Mayurbhanj	ThakurMunda	Saleibera	86°09'09.62" E	21°38'40.83" N
516	Mayurbhanj	ThakurMunda	Sanahuldiha	86°10'45.35" E	21°36'25.74" N
517	Mayurbhanj	ThakurMunda	Sanbaliposi	86°13'55.33" E	21°28'09.99" N
518	Mayurbhanj	ThakurMunda	Sarubil	86°05'18.10" E	21°39'00.40" N
519	Mayurbhanj	ThakurMunda	Satakosiaamalanama-hillblock	86°12'50.63" E	21°19'49.48" N
520	Mayurbhanj	ThakurMunda	Satberhi	86°13'45.35" E	21°20'47.02" N
521	Mayurbhanj	Thakurmunda	Satkosia Forest cluster	86°07'12.69" E	21°20'21.15" N

522	Mayurbhanj	Thakurmunda	Satkosiaamal Nama Hill Block	86°11'05.84" E	21°21'25.81" N
523	Mayurbhanj	ThakurMunda	Sunariposi	86°07'41.63" E	21°36'58.60" N
524	Mayurbhanj	ThakurMunda	Suninda	86°10'36.62" E	21°32'14.61" N
525	Mayurbhanj	ThakurMunda	Taramara	86°10'07.99" E	21°28'18.52" N
526	Mayurbhanj	ThakurMunda	Thakurmunda	86°09'36.24" E	21°31'11.18" N
527	Mayurbhanj	Udala	Ambikadeipur	86°30'50.81" E	21°43'25.54" N
528	Mayurbhanj	Udala	Anantapur	86°28'06.48" E	21°37'22.22" N
529	Mayurbhanj	Udala	Jamudiha	86°29'32.31" E	21°41'10.12" N
530	Mayurbhanj	Udala	Khalari	86°31'01.35" E	21°42'16.53" N
531	Mayurbhanj	Udala	Manikpur	86°28'59.57" E	21°38'39.94" N
532	Mayurbhanj	Udala	Tentala	86°30'38.52" E	21°41'32.87" N
533	Mayurbhanj	Udala	Upartaldiha	86°28'40.16" E	21°40'04.25" N
534	Keonjhar	Anandapaur	Kantipala	86°13'12.12" E	21°18'51.62" N
535	Keonjhar	Anandapaur	Paitapani	86°12'29.79" E	21°16'57.72" N
536	Keonjhar	Anandapaur	Kathakata	86°13'37.46" E	21°15'22.75" N
537	Keonjhar	Hatadihi	Thunigaon	86°15'21.16" E	21°12'35.05" N
538	Keonjhar	Hatadihi	Baidakhia	86°15'40.60" E	21°12'32.49" N
539	Keonjhar	Hatadihi	Karanjabati	86°15'25.59" E	21°12'21.77" N
540	Keonjhar	Hatadihi	Saralapasi	86°15'47.70" E	21°12'48.39" N
541	Keonjhar	Hatadihi	Sundarapal	86°16'15.31" E	21°12'30.47" N
542	Keonjhar	Hatadihi	Purunapani	86°16'56.50" E	21°13'30.63" N
543	Keonjhar	Hatadihi	Madhubana	86°17'53.59" E	21°18'12.00" N
544	Keonjhar	Saharapada	Sankatapalia	86°17'19.02" E	21°15'40.46" N

ANNEXURE-LXII

Joint Forest Management Resolution, 2011

The Orissa Gazette

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 2176, CUTTACK, THURSDAY, SEPTEMBER 22, 2011/ BHADRA 31, 1933

[No. 16524-IF-Affn.17/2011/F.& E.]

FOREST & ENVIRONMENT DEPARTMENT

RESOLUTION

The 9th September, 2011

Sub: Joint Forest Management Resolution, 2011

1. Introduction:

Forests are one of the complex eco-systems of our planet. The role of forests in conservation of environment and economic prosperity of mankind is well established. Economic growth and environment protection are inextricably linked. For surviving on the earth human beings will have to live in harmony with nature. The need for conservation of environment and protection of forests and wildlife has been enshrined in our Constitution. Orissa has 61018 Sq. kms of forest area which is 39.18% of the geographical area of the State. The existing forest cover of 31.38 % of its geographical area plays a very significant role in the socio-economic and cultural life of the people of the State. However, over the past few decades, the forests of Orissa are under heavy biotic pressure. The rich bio-diversity of the State faces the risk of depletion. Man-animal conflict is on the rise. Hence, conservation and development of the forest eco-systems of Orissa is a priority of the State Government.

The National Forest Policy, 1988 envisaged co-operation of the people in conservation and development of forests. In keeping with this policy Government of Orissa adopted the Joint Forest Management (JFM) approach and sought community participation for protection, regeneration and management of the forest wealth. JFM has not only been a tool for forest regeneration, but also a means of employment generation and social empowerment of the forest-fringe dwellers.

The State Government enacted the Orissa Village Forest Rules, 1985 which envisaged preparation of a Management Plan for every village forest and sought co-operation of the community in protection of these forests. In 1988, the

State Government passed a resolution to formally introduce a Scheme of Protection of peripheral Reserve Forest areas with participation of the adjoining villagers by forming a Village Level Forest Protection Committee. The scope of this resolution was enlarged in 1990 to include the Protected Forests. To make the forest-people interface more effective, the Government of Orissa in Forest & Environment Department issued a Resolution dated 3.7.1993. This resolution dealt, in a fairly exhaustive manner, the involvement of all local communities in protection of adjoining forests, formation of Van Samrakshyana Samiti (V.S.S.), duties and responsibilities of the V.S.S. and their Executive Committees and the role of Forest Department and Gram Panchayats, preparation of Joint Forest Management plans, usufruct benefits for the V.S.S. and provisions of MoU etc. Since these Resolutions in the past did not cover the Mangrove Wetlands and the Protected Areas (PA) of the State, i.e. National parks and Sanctuaries, and participatory modes of management are needed there too, the 2008 Resolution was issued to extend the participatory approach to all types of forests. Eco-development was adopted as a strategy in order to improve the livelihood of local people and thereby secure their support for conservation.

Participatory Forest Management in JFM mode is an evolving concept encompassing ecological socio-cultural and economic dimensions. People have played an important role in protection and regeneration of forests all over the state of Orissa. Villagers have either formed V.S.Ss as per JFM Resolution or Community Forest Management Groups outside the existing JFM framework. It is desirable that associations of people, whether formed under Government resolutions, or by peoples' own initiative, with the forest conservation as the principal and core objective, are allowed to function smoothly.

Panchayat Extension to Scheduled Area (PESA) Act, 1996, which is applicable to scheduled areas, lays down as follows: "Every Gram Sabha shall be competent to safeguard and preserve the traditions and customs of the people, their cultural identity, community resources and the customary mode of dispute resolution; Every Gram Sabha shall approve the plans, programmes and projects for social and economic development before such plans, programmes and projects are taken up for implementation by the Panchayat at the village level and be responsible for the identification or selection of persons as beneficiaries under the poverty alleviation and other programmes." This Act vests the ownership of Minor Forest Produce (MFP) on Gram Panchayats in Scheduled areas. The decision of Government of Orissa to do away with the monopolies in collection and trading in 69 items of MFP is in consonance with the spirit of PESA Act.

The community forest resource has been defined under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (popularly known as Forest Rights Act). As per the said Act, community forest resource means customary common forest land within the traditional and customary boundary of the village and seasonal use of the landscape in case of pastoral communities etc. The Minor forest produce has been defined under the Forest Rights Act which includes all non-timber forest produce of plant origin such as bamboo, brushwood, stumps, cane, tassar, cocoons, honey, wax, lac, tendu or kenduleaf, medicinal plants and herbs, roots, tubers and the like. It may be mentioned here that in case of Kendu Leaf, the current policy of Government is to discharge certain responsibilities with a view to protecting the livelihood of forest-dependent communities while providing management inputs to facilitate a scale of operation required for adequate value realization and sustainable management process.

Under the Forest Rights Act, the Gram Sabha is to initiate the process of determining the individual and community forest right. Therefore the enactment of FRA provides an opportunity not only to strengthen the existing Participatory Forest conservation and management initiatives but to promote such initiatives in the areas which are devoid of such institutional arrangements. With the changing scenario of Forest Management, increasing awareness among people and experiences gained from the past management practices; it is now felt necessary that the resolution on Joint Forest Management, 2008 is revised.

2. Selection of Area:

(i) The forests of the State to be covered under this Resolution shall be grouped into the following two categories:

(a) Reserved Forests, Protected forests, Village forests, Revenue forests etc. not covered under Protected Areas.

(b) Protected Areas (National Park and Sanctuaries) excluding Core Areas, and Mangrove Wetlands.

The Committee constituted for the first category of forests will be known as Vana Surakshya Samiti (VSS) while the Committee constituted for the second category will be known as Eco-development Committee (EDC).

(ii) While deciding the extent of area to be assigned, the Palli Sabha shall consult the Forest Range Officer concerned and take into account the area customarily being protected and used by the community, the number of adjacent villages, their claims, if any, and users' regime. In case a group of villages decide to constitute one VSS jointly, they

may do so. The local Forester will provide the technical input and facilitate the process of identification of the forest area to be managed by the committee.

(iii) In case any change is required in the extent of forest area assigned to the existing VSS formed under the JFM Resolution, 2008, the same can be done in consultation with the village community and the local forest department officials not below the rank of a Forest Range Officer.

3. Constitution of VSS/EDC:

(i) Ordinarily there will be one VSS/EDC for a single village. One VSS may also cover more than one village or there may be more than one committee in a village especially large in size. Other Forest Protection groups, if any would also be covered under this Resolution.

(ii) All adults of the village will be the members of the VSS/EDC. They may pay an enrolment fee determined by the General Body (GB) of VSS/EDC.

(iii) The Palli Sabha shall send its Resolution to the Range Officer concerned regarding constitution of VSS / EDC for his record and communication to the DFO concerned for registration at the Division level.

4. Constitution of the Executive Committee (EC):

(i) The Palli Sabha shall elect the Chairperson, the Vice-Chairperson, the Secretary and the Treasurer and a minimum of other 11 (eleven) members to constitute the Executive Committee. At least 50% of the members of the EC shall be women. The number of SC & ST members in the Executive Body shall be in proportion to their membership in VSS / EDC. There should also be representation from the group of community, who do not have any livelihood support other than depending on the forests.

(ii) Either the Chairperson or Vice-Chairperson shall be a woman.

(iii) The composition of the EC shall be as follows:

1. Chairperson	1	Elected Member
2. Vice-Chairperson	1	Elected Member
3. Secretary	1	Elected Member
4. Treasurer	1	Elected Member
5. Ward Member (s) concerned		*Ex officio* Member (s)
6. Members	11	Elected Members
7. Local Forest Guard	1	*Ex officio* Member

(iv) The Range Officer concerned will act as the Returning Officer for conducting the election of the EC. It shall be the responsibility of the Returning Officer to ensure that the representation in the EC is in accordance with reservation specified in Para-i above.

(v) The EC will have tenure of 3 years at a time.

5. Meeting:

(i) General Body (GB)

(a) The GB meeting of the VSS / EDC shall be held at least once in every six months. It can also be called as and when required.

(b) The Secretary with the approval of the Chairperson will convene the meeting of the GB. Ordinarily a 15 days' notice would be necessary for convening the meeting. A copy of the notice will be sent to the Gram Panchayat.

(c) The Chairperson and in his absence the Vice-Chairperson shall preside over the meetings.

(d) 50% of the members of the VSS / EDC will constitute the quorum for the GB. At least one third of the members present should be women.

(e) Under special circumstances, a special meeting of the VSS/EDC can be convened provided at least one third of the members agree to convene such a meeting and make such a request to the Chairperson in writing. Where the Chairperson does not convene the meeting, the Secretary shall convene the GB meeting with the approval of the Vice-Chairperson. In all such cases, a 3 days' notice would be necessary indicating the purpose of the said meeting. The decision in such meeting shall be taken by a minimum of 2/3rd members of VSS / EDC.

(f) The Secretary shall record the proceedings and get them approved by Chairperson. A copy of the proceedings would be either pasted in a register or preserved in a guard file. A copy of the Resolution will be forwarded to the Forest Range Office and the Gram Panchayat under the signature of the Secretary.

(g) The Executive Committee shall be elected by GB at least one month before expiry of its tenure.

(ii) Executive Committee (EC)

(a) EC would meet as often as possible and necessary, but not less than once in two months.

(b) The meeting will be presided over by the Chairperson and in his absence by the Vice- Chairperson.

(c) The quorum for any meeting of the EC shall be 50% of its membership, out of which at least one-third shall be women.

6. Duties and responsibilities of VSS / EDC:

(i) The members of the VSS / EDC shall individually and collectively protect the forest, wildlife and biodiversity.

(ii) The VSS / EDC shall put in necessary efforts so that adjoining catchments area, water resources and other ecologically sensitive areas are protected.

(iii) The VSS/ EDC shall place adequate emphasis on plantation of indigenous medicinal and NTFP species in the forests as well as outside the forest area adjoining the village.

(iv) The VSS / EDC shall ensure that the decisions taken in the Palli Sabha to regulate access to community forest resources and stop any activity which adversely affects the wildlife, forests and the biodiversity, are complied with.

(v) The General Body of the VSS /EDC shall have the powers to remove and/or substitute any elected member of the EC by a two third majority of the members if the concerned member does not discharge his/her duties satisfactorily.

7. Duties and responsibilities of the Executive Committee (EC):

(i) The EC shall carry out the day-to-day business of the VSS / EDC as per provisions of the Resolution. The EC shall prepare the Micro Plan and Annual Work Plan for the assigned forest area and integrate other developmental activities outside the forest area associated with the forest based livelihood system and get it approved by the VSS / EDC after technical scrutiny by the Forest Range Officer concerned. The EC shall be responsible for managing and implementing the Micro Plan and Annual Plan and other decisions of the General Body of VSS / EDC.

(ii) The EC shall be responsible for protection of the forests assigned to the VSS / EDC and extend their assistance to the Forest Department for apprehending the offenders who commit forest offences. If the members of the VSS / EDC play a significant role in detection of forest offence and seizure of the forest produce within their village limits, they will be entitled for a fixed percentage of the value of the forest produce (except in case of WL Trophies) so seized as per procedure laid down in Para. - 11(iii).

(iii) The EC in consultation with the GB shall evolve methodology on all issues relating to membership, conflict resolution, prevention of encroachment, exercise of customary rights and use of the permissible forest resources such as NTFP including Bamboo.

(iv) The EC shall be responsible to account for and manage the funds and other resources received from the Government, other agencies and funds internally generated, if any. For this purpose a joint account called VSS account/EDC account shall be opened in any commercial, rural or Co-operative Bank recognised by the RBI or in any post office, which shall be operated, jointly by the Secretary and the Treasurer of the VSS / EDC. Utilisation Certificate relating to the expenditure incurred shall be jointly signed by the Chairperson and the Secretary and submitted to the authorities concerned.

(v) The EC shall be responsible for managing funds received by VSS / EDC by maintaining and operating VSS / EDC account as per the procedure detailed in Annexure A.

(vi) The EC shall try to establish marketing linkage for various NTFP items and other micro-enterprise products for securing better returns for the members. The Forest Department will provide necessary support in this regard.

(vii) Annual account of VSS / EDC shall be placed before the GB for its approval.

8. Role of Palli Sabha:

As per the 73rd Amendment of the Constitution, certain powers and responsibilities have been vested on the PRIs. Therefore it is necessary to define the relationship between village level institution like VSS / EDC and the PRI and establish a linkage with the Palli Sabha.

(i) Regarding protection and conservation of forest, wildlife and environment, the EC shall work as a Sub-Committee of Palli Sabha.

(ii) If the work of the EC of any VSS / EDC is found to be detrimental to forest conservation and against the larger and long term interests of the people, the VSS / EDC may recommend for dissolving and reconstituting the EC. The Palli Sabha, on receipt of such recommendation may enquire into the matter and forward its findings to the Divisional Forest Officer for necessary action. The Divisional Forest Officer, after examining the merit will dissolve the EC and advise the GB of VSS / EDC for its reconstitution. Such dissolution will be formally placed by the DFO before the District Level Steering Committee in its next meeting for information.

9. Role of the Forest Department:

(i) To register the VSS / EDCs and maintain close liaison with them.

(ii) To support the VSS / EDCs in identifying and apprehending the forest offender(s).

(iii) To take action as per law in cases where VSS / EDC members have handed over the offender(s) and forest produce involved in the offence.

(iv) To assist in capacity building of VSS / EDC members on different aspects of forest management, planning, silviculture, nursery technology, forest laws, accounting, book keeping, micro-enterprise development, value addition and processing of NTFPs etc.

(v) To provide technical help to the VSS / EDCs in preparation and implementation of the Micro plan/ annual work programme.

(vi) To invite suggestion from the VSS / EDCs while preparing the Working Plan / Management Plan of the concerned Forest Area / Protected Area.

(vii) To sign Memorandum of Understanding with the VSS / EDCs and ensure sharing of benefit as per norms in vogue.

(viii) To establish co-ordination with other departments/agencies for successful implementation of the micro plans and related area development programmes.

(ix) To facilitate the process of discharging the duties and resolving the conflicts by the ECs.

10. Micro Plan:

(i) After constitution of the EC, as soon as possible, a Micro Plan shall be prepared by the members of the Committee through a participatory process involving VSS Members and with the technical input provided by the field officers of the Forest Department.

(ii) The Micro Plan shall be prepared for conservation and sustainable management of the assigned forests while integrating other developmental activities outside the forest area associated with the forest based livelihood system, with participation and involvement of line departments, wherever necessary.

(iii) The Micro Plan will primarily prescribe afforestation with priority for plantation of indigenous medicinal and NTFP species, soil and moisture conservation measures and activities to be undertaken for livelihood support of the forest dependent communities. It may also incorporate formation of SHGs and micro-enterprises that could be undertaken based on locally available resources and may include activities such as:– eco-tourism, farm forestry, Agro forestry, Silvi-pasture development, promotion of fuel-efficient devices, animal husbandry, pisciculture, bee keeping, mushroom cultivation, tassar/lac cultivation etc.

(iv) The Micro Plan shall indicate the choice of species in different plantation schemes and models. It shall contain a detailed silvicultural operations plan, which shall be consistent with the prescriptions of the overall working plan covering the area or the Wildlife Management Plan of the Protected Area.

(v) The Micro Plan so prepared shall be in consonance with the existing laws of the land.

(vi) The Micro Plan shall also detail out the various NTFP items that can be collected. This shall be done with due regard to the carrying capacity, productivity and biodiversity of the local eco-system.

(vii) The draft Micro Plan prepared by the EC, will be scrutinized by the Forest Range Officer from the technical, financial and legal point of view. After that the same shall be placed before the GB for deliberation and approval.

11. Usufruct sharing:

(i) The VSS / EDC shall be entitled to the usufructuary benefits from the assigned forests as under:—

(a) Usufructs like fallen leaves, fodder grasses, thatch grass, broom grass, fencing materials, brushwood, fallen lops, tops and twigs to be used as fuel shall be available to the members free of cost.

(b) All intermediate yields in the shape of small wood, poles, firewood etc as may be obtained as a result of silvicultural operations and bamboo harvested in VSS / EDC assigned area shall be made available to the VSS / EDC members in a manner as may be decided by EC. If sold at a price, the funds so obtained shall be deposited in the VSS / EDC account.

(c) In case of Kendu leaves and specified forest produce other than bamboo, if any, the VSS will have the right to collect the same from the assigned forest but these items will be disposed of as per the prevailing provisions of Government and practices.

(d) While maintaining the forest cover in perpetuity, if any major harvest or final felling occurs in the assigned forest, the same shall be taken up by the forest department as per the prescription of the working plan/ duly approved micro plan. In case of natural calamities, harvesting of wind-fallen trees shall be treated as final harvest. Priority will be given to the members of the VSS /EDC for salvaging and harvesting work. Valuation of the produce so obtained shall be done and information shared with the VSS /EDC and the produce will be sold / disposed of by the forest department or by agents of the forest department. The VSS / EDC will receive 50% share of the sale price after deduction of proportionate harvesting cost and this will be deposited in the "VSS account". The VSS may also opt for 50% of the forest produce so

harvested if it is for their *bonafide* domestic use and they agree to pay the proportionate cost of harvesting.

(e) In case of village woodlots created and maintained by the VSS / EDC on non forest land, all usufructs including interim and rotational harvests shall go to the VSS / EDC.

(f) In the event of a natural calamity occurring in the village there may be a demand for house building materials and other forest produce from the assigned forest. In such cases, the VSS / EDC may go for harvesting the required quantity of timber or other forest produce as a deviation to the Micro Plan, with due approval of the Divisional Forest Officer concerned.

(ii) The EC shall be responsible for the distribution of the usufructuary benefits equitably among the members of the VSS. Need of the group or community, who do not have any livelihood support other than depending on the forests, should be specially considered.

(iii) In cases where member/ a group of members of the VSS /EDC play a major role in the collection of intelligence, detection and seizure of illegal forest produce in transit the concerned VSS/EDC shall be entitled to the prescribed percentage of the sale price of the forest produce as per Rule 4 (3) of the Orissa Rewards for Detection of Forest Offences Rules, 2004. Such amount shall be deposited by the DFO in the "VSS account/EDC account" after disposal of the seized produce following due procedure of law.

12. Transit of harvested forest product:

All forest produce requiring permits for transit as per provisions of Orissa Timber and Other Produce Transit Rules, 1980 shall be removed from the assigned forest area in accordance with a permit to be issued jointly by the President and the Secretary in the prescribed format (Form-4). The permit shall be valid only within the limits of the area to which the VSS members belong. A record will be maintained to this effect by the VSS / EDC and the Secretary will keep the local Forest Range Officer informed of the same on a quarterly basis. In case of transportation outside the above limit, the permit will be issued by the competent forest officer on receipt of application from VSS / EDC.

13. Conflict Resolution:

(i) In case of intra village conflict in matters of implementation of Joint Forest Management, the Executive Committee of the VSS/ EDC shall endeavour to amicably resolve the conflict. If it fails to resolve the conflict, it shall bring the same to the notice of the Palli Sabha and try to sort out the issue. If the conflict still remains, the same would be

referred to the Sub Divisional Level Steering Committee formed in the line of the SDLC under FRA, 2006 and their decisions would be final.

(ii) In case of inter village conflict; the same would be referred to the Sub Divisional Level Steering Committee and their decisions would be final.

14. Memorandum of Understanding (MoU):

(i) To ensure smooth working relationship between the Forest Department and the VSS /EDC and also to bring in a sense of ownership, empowerment and accountability a MoU shall be signed between the FD and VSS / EDC delineating the duties and responsibilities of the parties concerned.

(ii) The Chairperson of the VSS will sign the MoU on behalf of the VSS while the Range Officer concerned will sign the same on behalf of Forest Department. Other members at the EC will also be signatory to the MoU as witness while the concerned local forest officials such as:— the Forester and Forest Guard will sign the MoU as witness.

(iii) The MoU shall be in the prescribed form (Form-5).

15. Steering Committee:

(i) There shall be Steering Committees at the Sub Division Level, District Level and at the State Level.

(ii) Sub Division Level Steering Committee (SDLC): This committee shall comprise of the following members:—

(a) Sub Collector	:	Chairperson
(b) Assistant Conservator of Forests	:	Member Convener
(c) An Officer of the Tribal Welfare Department *in-charge* of the Sub-Division	:	Member
(d) Sub Divisional Police Officer (SDPO)	:	Member
(e) Forest Ranger concerned	:	Member
(f) Tahashildar concerned	:	Member
(g) Chairperson of the Panchayat Samiti concerned	:	Member
(h) Zilla Parishad member	:	Member
(i) Two Chairpersons/Vice-Chairpersons of VSS/EDC (to be nominated by the DFO)	:	Member

(iii) The SDLC will be responsible to resolve all cases of intra village and inter village conflicts as referred to them in regards to smooth functioning of VSS / EDC.

(iv) The SDLC will meet at least once in every quarter and shall facilitate functioning of the VSS / EDC and provide necessary support and guidance to them.

(v) The SDLC will facilitate the VSS / EDC for protection and sustainable management of forests, forest based livelihood and holistic development of the villages.

(vi) The SDLC may invite the representatives of the committees concerned and other such peoples' representatives, reputed persons / organizations working in the field of forest management to their meetings as per requirement.

(vii) District Level Steering Committee (DLSC): This committee shall comprise of the following members:—

(a) District Collector	:	Chairperson
(b) Divisional Forest Officers (Territorial and Wildlife)	:	Member
(c) ADM dealing with land matters	:	Member
(d) Deputy Director (Agriculture)	:	Member
(e) Chief District Veterinary Officer	:	Member
(f) PD, DRDA	:	Member
(g) PA, ITDA	:	Member
(h) District Welfare Officer	:	Member
(i) Deputy Director Horticulture	:	Member
(j) Soil Conservation Officer	:	Member
(k) 5 VSS (Chairperson/ Vice-Chairperson (at least 2 women) (to be nominated by the DFO)	:	Member

(viii) The DFO concerned having the jurisdiction over the district headquarters will be the Member Convener of the meetings of DLSC.

(ix) The tenure of the non-official members will be three years.

(x) The DLSC may co-opt NGOs or other experts as members with credibility and experience of working on forest related issues.

(xi) The DLSC will meet at least once in six months and shall facilitate functioning of the VSS / EDC and provide necessary support and guidance to them.

(xii) The DLSC will oversee protection and sustainable management of forests, forest based livelihood and holistic development of the villages.

(xiii) State Level Steering Committee (SLSC): The constitution of the State Level Steering Committee shall be as under:—

1. Minister (Forest)	: Chairperson
2. Chief Secretary	: Vice-Chairperson
3. Principal Secretary, F & E Department	: Member
4. Principal CCF (O)	: Member
5. PCCF (WL)	: Member
6. 2 D.F.Os./One RCCF from field to be nominated by PCCF (O) on rotation basis	: Member
7. Secretary, Revenue Department	: Member
8. Secretary, Rural Development Department	: Member
9. Secretary, Home Department	: Member
10. Secretary, PR Department	: Member
11. Secretary, SC & ST Department	: Member
12. Chief Conservator of Forests (Central)	: Member
13. Director, Orissa Watershed Development Mission	: Member
14. Two representatives of Civil Society Organisations / Experts to be nominated by F&E Department	: Member
15. Special Secretary, F& E Department	: Member
16. Chairpersons of two VSS / EDC to be nominated by the PCCF (O)	: Member
17. CCF (Plan, Programme & Afforestation), Office of PCCF, Orissa	: Member-Convener

(xiv) The non-official members of the State Level Steering Committee will have tenure of three years.

(xv) The Committee shall meet at least once in a year to guide the process of participatory forest management.

(xvi) Changes in the Resolution, if any shall be placed before the SLSC for approval and recommendation to Government.

16. Repeal and Savings:

This supersedes Forest & Environment Department Resolution No.17454-1F-Affn.17/2008/F&E., dated the 22nd October, 2008. However, all VSSs already formed under provisions of Forest & Environment Department Resolutions made earlier will be treated as VSS formed under this Resolution.

ORDER

Ordered that the Resolution be published in the Extraordinary issue of the *Orissa Gazette*.

By order of the Governor

AUROBINDO BEHERA
Principal Secretary to Government

ANNEXURE-A

VSS / EDC Account and Procedure of Accounting

(i) The Executive Committee (EC) of the VSS / EDC shall be responsible to account for and manage the funds and other resources received from the Government, other agencies and funds internally generated, if any. For this purpose a joint account called VSS account/EDC account shall be opened in any commercial, rural or Co-operative Bank recognised by the RBI or in any post office, which shall be operated, jointly by the Secretary and the Treasurer of the VSS / EDC. The account will be opened in the style of "(village name/any other prefix) VSS / EDC Account". All money received by the VSS / EDC either in cash or instrument shall be deposited into the account before it is used for any purpose.

(ii) Any withdrawal from the VSS / EDC account can be done only after a specific resolution of the EC in this regard.

(iii) The funds deposited into the VSS / EDC account shall be utilised towards the conservation, development and management of forest, development of the village or for any other purpose ancillary to the implementation of the Micro Plan.

(iv) In case the EC decides to spend the money from the "VSS Account/EDC account" for any other purpose it shall seek the approval of the General Body of the VSS / EDC.

(v) In case of detection of any financial irregularity the General Body may pass a resolution and freeze the VSS / EDC account for a specific period and refer the matter to the Palli Sabha. The Palli Sabha may conduct necessary enquiry and may take required action.

(vi) The Secretary shall be fully responsible for up keeping the Monthly account and maintenance of the Cash Book of the VSS / EDC. The local Forest Officials will provide guidance to the EC, whenever necessary to maintain the account in proper form.

(vii) A quarterly work programme may be drawn up by the EC and implemented subject to availability of funds for the purpose. Funds will be withdrawn accordingly from the VSS / EDC Account.

(viii) All vouchers will be passed by the EC and jointly signed by the Secretary and the Treasurer and shall be retained at the VSS / EDC level. The Secretary will prepare the monthly cash account along with an abstract of receipt and expenditure by the 10th of the following month to be approved by the EC.

(ix) Annual receipt and expenditure of the VSS / EDC shall be audited by an auditor to be appointed by the General Body of the VSS / EDC. The annual statement of receipt and expenditure of the VSS / EDC account shall be placed before the GB for its approval. Whenever funds provided by Govt. are utilized, the audited and approved abstract of annual receipt and expenditure shall be communicated by the EC to the concerned RO and DFO for record.

(x) Utilisation Certificate relating to the expenditure incurred out of funds received from Government or any other external agency shall be prepared by the Treasurer and jointly signed by the Chairperson and the Secretary and submitted to the authorities concerned.

ANNEXURE -B

Form –1

RESOLUTION

We the following villagers of _____ villages (s), hereby resolve to have formed / reconstituted a Vana Surakshya Samiti (VSS) / Eco Development Committee (EDC) for the protection and management of the part/whole of _____ forest in accordance with the provisions of Para 3 i of the Orissa Joint Forest Management Resolution, 2011. The details of the area are as follows:—

1. Name of Committee:
2. Village:
3. Gram Panchayat:
4. C.D. Block:
5. Police Station:
6. Forest Beat:
7. Forest Section:
8. Forest Range:
9. Total Members (list of members enclosed):
   (i) No. of S.T. member _____
   (ii) No. of S.C. member _____
   (iii) No. of Women members _____
10. Forest areas protected and managed _____ha.
11. Name of the Forest Block _____
12. Comp. No. _____

NAME OF VILLAGERS **SINGATURE**

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Form – 2

OFFICE OF THE FOREST RANGE OFFICER _____ RANGE

Memo No. _____ Date _____

FORMATION OF VSS / EDC

The villagers of _____ village (s) have formed / reconstituted the Vana Surakshya Samiti / Eco Development Committee (EDC) as per the provision of Para 3 i of the Orissa Joint Forest Management Resolution, 2011 for the protection and management of the part/whole of _____ forest. The details of the area are as follows:—

1. Name of Committee:
2. Village:
3. Gram Panchayat:
4. C.D. Block:
5. Police Station:
6. Forest Beat:
7. Forest Section:
8. Forest Range:
9. Total Members (list of members enclosed):
   (i) No. of S.T. member _____
   (ii) No. of S.C. member _____
   (iii) No. of Women members _____
10. Forest areas proposed to be protected and managed _____ha.
11. Name of the Forest Block _____
12. Comp. No. _____

The Resolution of the Palli Sabha of the village of _____village(s) is forwarded herewith for registration of the VSS / EDC in accordance with the provision of Para 9 i of the Orissa Joint Forest Management Resolution, 2011.

Signature of Forest Range Officer

Form – 3

OFFICE OF THE DIVISIONAL FOREST OFFICER _____DIVISION

OFFICE ORDER NO. _____ Date _____

In accordance with the provision of Para 9 i of the Orissa Joint Forest Management Resolution, 2011, the _____ Vana Surakshya Samiti / Eco Development Committee is here by registered in this office vide Registration No. _____

Forest Area Schedule:

Extent of Forest Area: ha

Description of Location:

DIVISIONAL FOREST OFFICER _____
FOREST DIVISION

OFFICE OF THE DIVISIONAL FOREST OFFICER _____ DIVISION

Memo No. _____ Date _____

Copy forwarded to Forest Range Officer _____Range for information and necessary action. He is instructed to demarcate the forest area as per above schedule and depict the area in the topo sheet (1:50000 scale). A copy of the map should be available with the VSS / EDC, and in the Range Office. Another copy of the map should be submitted to this office for record.

Copy forward to Sarpanch, _____ Gram Panchayat for information and necessary action.

DIVISIONAL FOREST OFFICER _____
FOREST DIVISION

Form – 4

PERMIT UNDER THE ORISSA JOINT FOREST MANAGEMENT RESOLUTION – 2011

- Name of the assigned Forests _____
- Description of Forest produce Quantity
- Source of Procurement of the forest produce _____
- Name of the VSS / EDC Member _____

Date of issue: Destination:

Valid up to:

Signature of the President Signature of the Secretary

_____ VSS / EDC _____ VSS / EDC

Form –5

MEMORANDUM OF UNDERSTANDING

1. We the members of the Executive Committee of the Vana Surakshya Samiti /Eco Development Committee of _____ village and the Officials of _____ Forest Range under _____ Forest Division have come together to collaborate and perform the duties and shoulder the responsibilities as detailed in the Orissa Joint Forest Management Resolution, 2011, for protection, and sustainable management of the forest areas as per the schedule given hereunder.
   i. Name of the VSS / EDC
   ii. Registration N.
   iii. District _____
   iv. Forest Division _____
   v. Forest Range:
   vi. Section :
   vii. Beat:
   viii. Police Station :
   ix. Village:
   x. Name of the assigned Forest Block:
   xi. Legal status of the Forest area:
   xii. Area (Ha) of the assigned forest:
   xiii. Boundaries of the area:

   North East
   South West

2. It is hereby agreed by and between us to abide by the provisions of JFM Resolution, 2011.

3. We undertake to function in consonance with the existing laws of the land.

4. A copy of the aforesaid Resolution is annexed herewith duly signed by us on every page in proof/evidence of our having read/understood the same in letter and spirit. It is hereby agreed that this MoU will come into effect from _____.

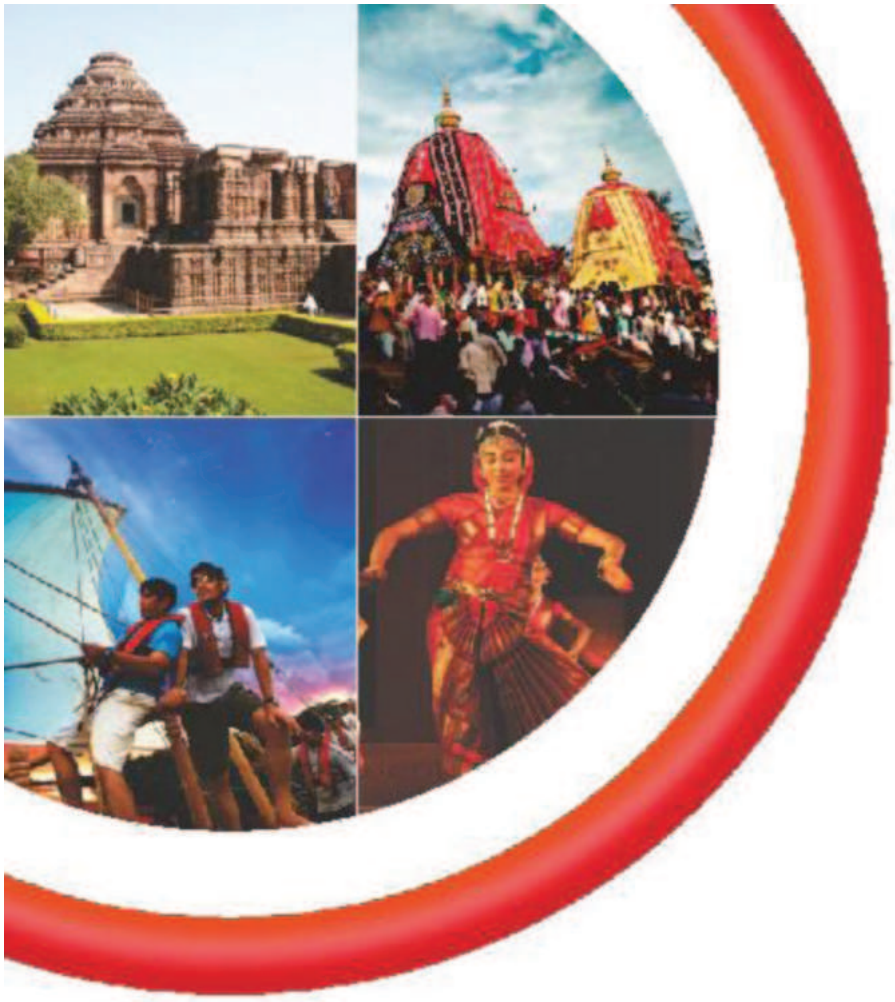
Signature of the Chairperson
_____ VSS / EDC

Witnesses:
1.
2.
3.

Signature of R.O.
Range:
Division:
Witnesses:
1.
2.
3.

Printed and published by the Director, Printing, Stationery and Publication, Orissa, Cuttack-10
Ex. Gaz. 1440-193+100

ANNEXURE LXIII
ODISHA TOURISM POLICY 2016



TOURISM POLICY 2016

ODISHA
NEW OPPORTUNITIES

Government of Odisha

Department of Tourism

1. Introduction:

The Tourism Industry is a major propeller for economic growth throughout the world. Over past decades, tourism has continuously expanded and diversified, to become one of the dominant and fastest growing economic sectors. Tourism makes culture, art and history accessible to World at large. While generating direct income employment, it has tremendous potential to create indirect employment and income due to higher multiplier effect. Economies of many countries in the World are propelled by the tourism sector alone.

The Travel and Tourism (T&T) industry is the largest contributor to employment and economy which is 9.8% of the global GDP (US $ 7.2 trillion) in 2015 including direct, indirect and induced impact (World Travel & Tourism Council). Tourism added 7.2 million jobs to the global economy, about 1 in 11 jobs globally (United Nations World Tourism Organisation – Tourism Highlights 2015).

Tourism is a growing industry in India. India has moved up 13th position to 52nd rank from 65th in Tourism & Travel Competitive Index. As per the Ministry of Tourism, Government of India (GoI), the number of foreign tourist arrival in India during 2015 is 8 million and that of domestic tourist visits to all States / UTs is 1432 million. The foreign exchange earnings from tourism sector was INR 1,35,193 crore during the same period. It is expected that the number of arrivals in India will increase further into the future with the World Travel and Tourism Council making the country the eleventh fastest emerging tourism destination in the world.

Odisha, the soul of Incredible India has tremendous potential in tourism sector, because of its golden history, strategic geographical location, diverse demography and profound bounties of nature. Puri, the shrine of Lord Jagannath, one of the oldest pilgrimage centres, famous for the Car festival, attracts lakhs of pilgrims round the year. The world famous Sun Temple, a UNESCO heritage site at Konark (12th century), the temple city of Bhubaneswar (9th century) & Puri (11th century) are widely popular as the golden triangle which draws tourists, both domestic & international in hordes.

Odisha has a long tradition of Buddhism starting from 1st century BC. The Golden Casket containing the Buddhist relics, excavated Buddhist Stupas, Monasteries & Viharas discovered at Lalitagiri, Ratnagiri & Udayagiri are famous, all over the world. The Ashokan rock inscriptions of 3rd Century BC at Dhauli where the historic war of Kalinga was fought is the testimony to the existence of strong Buddhist tradition in Odisha. In addition, as many as 200 Buddhist heritage sites have also been identified in different parts of the State.

The State is bestowed with profound bounties of nature. Odisha is India's bridge to her own golden past and a resurgent present. The grand scenic beauty of nature, historic monuments, exotic sea beaches, luxuriant forest, majestic mountains, captivating wildlife, mystic waterfalls, beautiful handicrafts, vast water bodies, famous classical and folk dances, enchanting music, home to largest salt - water crocodile i.e. the largest nesting places for olive - ridley turtles, home to world famous Irrawaddy dolphin and most importantly, its hospitable people are the wonders that make the State as the supreme tourism destination of the world.

The State has made great strides in various sectors of its economy in tune with the progressive globalization and the changing demands of the tourists to make tourism a sustainable industry in the State. Tourism in Odisha is one of the main contributors to the economy of Odisha (13% of GDP of Odisha). The State of Odisha secured 3rd rank in terms of intensity of overnight domestic tourism, with an average of 541 trips per 100 households, as compared to the all-India average 418 trips per 100 households. Therefore, the tourism intensity in Odisha is 29 percent higher than the national-level tourism intensity (National Council of Applied Economic Research, 2015). The Government of Odisha has undertaken many historic reforms in all sectors of its

economy for Ease of Doing Business in the State. It has implemented the momentous Right to Act 2012 and the progressive Industrial Policy Resolution (IPR) 2015. These important steps have boosted the economy of the State and placed tourism in the forefront as a major factor in accelerating the progress of the State.

The tourist arrival to the State has increased manifolds in last decades. In last six years the tourist arrival to the State has shown an increasing trend which is a result of aggressive campaign undertaken by the State Tourism Department.

Tourist Visit in Odisha During Last 6 Years

Year	Domestic	Foreign	Grand Total
2010-11	77,70,741	53,212	78,23,953
2011-12	84,72,208	62,816	85,35,024
2012-13	92,91,734	65,522	93,57,256
2013-14	100,64,072	67,400	101,31,472
2014-15	110,51,351	72,215	111,23,566
2015-16	120,67,695	67,364	121,35,059

The present policy envisages an aggressive, dynamic and long term approach to achieve the growth potential in tourism by initiating identified policy measures, framing the required statutory framework, ensuring largescale investment support through professional management and private participation establishing the required synergies among various sectors through appropriate institutional arrangements and focused intervention for improvement of value and quality in tourism sector.

2. Vision

To develop Odisha as the supreme tourist destination and to place it prominently on the domestic and global tourism map.

3. The Mission

a) To promote tourism in a mission mode for economic development, inclusive growth, employment generation, social equity, integration, resulting in eradication of poverty and raising the income levels of the people of the State.

b) To promote the brand image of Odisha nationally and internationally.

c) To give high priority to development and promotion of prime tourism products, conservation of heritage, natural environment, etc.

d) Ensuring beneficial outcome to all the stakeholders.

4. The Objectives:

a. To promote Sustainable & Green Tourism with a view to create employment opportunities and to bring about socio-economic benefits to the community.

b. To preserve, enrich and promote Odisha's unique cultural heritage, natural resources and environment with a view to achieve inclusive development; addressing the regulatory & tourism promotion/ development functions in Private Public Partnership (PPP) mode at all levels in an effective & well coordinated manner.

c. To promote Odisha as one stop destination to experience its great history, culture, society and natural beauty so as to boost foreign & domestic tourist arrival in the State.

d. To promote circuit tourism in association with the States of the Eastern Zone of the country to facilitate easy arrival and movement of the tourist.

e. To upgrade skill & professionalism and promote employment opportunities in tourism sector.

f. To promote digital tourism

g. To promote responsible tourism and develop tourism products in an environment friendly manner.

h. To promote barrier free tourism.

i. To promote (1) Beach Tourism, (2) Eco Tourism, (3) Buddhist Tourism, (4) Heritage Tourism, (5) Religious Tourism, (6) Knowledge Tourism, (7) Medical Tourism, (8) Travel Tourism, (9) Caravan Tourism, (10) Wellness Tourism, (11) Cruise Tourism, (12) Sand Art Tourism, (13) Adventure Tourism, in a mission mode.

5. Strategy:

a. Inter-Departmental Support:

Tourism requires a strong multi modal approach. With this objective in view, the State Government will synergize all the activities of different departments and stakeholders to achieve the overall objective.

b. Statutory Regulatory Framework:

Apart from the necessary statutory framework for policy coordination, there is utmost necessity to ensure synergy at the field level. To achieve the objectives, similar statutory framework is required at the implementation level, in the form of local tourism councils/ bodies. The policy aims at enhancing the value of tourist destination in the form of improving local sanitation, making the destination beautiful by enforcing uniform facade, removing cable clutters and checking encroachments etc. The policy aims at bringing synergy among the local bodies, police and public representatives to work in tandem, within a statutory regulatory frame work. The Tourism Advisory Committee (TAC) shall recommend to enforce these regulations from time to time.

c. Development of Infrastructure:

Development of infrastructure in tourism sector is one of the critical components for developing tourism in the State. Government would strongly aim to provide an atmosphere & framework for private sector participation in infrastructure development to reinforce the efforts made by the Government in this regard. Both domestic & foreign private investment shall be encouraged to participate in joint venture or in Public Private Partnership (PPP) mode for development of long term infrastructure in the tourism sector.

d. Land:

Department of Tourism shall indentify & earmark suitable land parcels in important tourist locations for development of tourism projects. The detailed land schedule reserved for the tourism projects shall be available in Departmental website which will be allotted to private sector investors through a transparent mechanism after studying techno-economic feasibility & employment generating potential of the concerned projects.

e. Road Transport:

Department of Tourism shall identify important state highways, roads connecting important tourist destination and recommend the appropriate department for widening, beautification & high-quality maintenance of these roads. The Government shall encourage private sector for providing tourist amenities centre like public convenience, parking, cafeteria, souvenir shop, medical facilities etc. alongside important roads. The State will encourage private sector investment for boosting the transport service for various categories of tourists.

f. Air Connectivity:

The State Government shall endeavour to have direct air connectivity to important cities and major tourist destinations of the country. State Government shall encourage developing small air strips inside the state on PPP mode. Thrust shall be on providing more International air linkage, to Bhubaneswar by alluring Airlines through underwriting of tickets/ incentives or any other mode as may be necessary to increase foreign tourist arrival in the State.

g. Rail Connectivity:

The State Government shall pursue with the Indian Railway for expansion of railway network inside the State especially to the important tourist destinations. Efforts shall also be made to pursue Ministry of Railway for providing more superfast / luxury / special train to different important tourist destination of the State. The State shall encourage luxury train on the lines of Palace-on-Wheels model in association with Indian Railway, Indian Railway Catering and Tourism Corporation (IRCTC) and other neighboring States.

h. Quality Power Supply:

Department of Tourism shall endeavour to ensure 24 X 365 power supply in important tourist destinations. The grid & Ulo line shall be strengthed to ensure quality power supply in important tourist destinations.

i. Civic Amenities:

Highest priority to be accorded to ensure healthy & sanitary conditions in all important pilgrim centres & tourist locations beaches through direct intervention by the Tourism Department, Urban Development Department, Public Health Department, Local Bodies, Non-Government Organisations & Corporate Bodies. Beach cleaning authority will be created to oversee the cleanliness of major beaches.

j. Accommodation:

Efforts shall be made to encourage private sector investors to create Star category hotels, convention centres, heritage hotels, eco camps by granting different fiscal incentives, single window clearances facilities, marketing supports, media campaign etc.

k. Eco-tourism:

The State Government has created a eco-tourism cell under the Forest & Environment Department of the State Government. A separate eco-tourism policy has been launched for promotion of eco-tourism in the State. Eco-tourism shall be made more robust and popularized as an important means to promote tourism in the State considering its vast potential.

l. Rural Tourism:

The State Government shall identify model villages which are rich from the point of view of handicraft and handloom, rural life, social habits & culture. These villages shall be developed to model villages to provide unique experience to the tourist.

m. Utilization of inspection bungalows, circuit houses & Government accommodations

Department of Tourism shall prepare an inventory of inspection bungalows available under water resources, works, revenue etc. and shall explore the possibility of developing them under PPP mode / any other mode for use of the tourist.

n. Home Stay Facilities:

Private house owners shall be encouraged to provide home stay facilities for the use of the tourist under bed and breakfast scheme.

o. Ease of Doing Business:

For speedy clearance of Tourism Projects a Single Window Clearance Authority has been created which will issue deemed approvals as provided in Odisha Industries (Facilitation Act), 2004 (OIFA) 2015. The Single Window Clearance Authority shall be made more effective, robust and more investor friendly. Right to service has been implemented in the state and the Department of Tourism shall rigorously implement the Right to Service Act for quick clearance of the projects.

p. Marketing & Promotion:

Department of Tourism shall organize various tourism promotion events to attract tourists to the state.

- The Department of Tourism shall participate in different leading national & International tourism fair and shall provide incentives to the tourism stakeholders to participate in International tourism events to increase tourists arrival in state.
- Organize familiarization tours for leading tour operators, travel writers of the country and abroad to attract more foreign & domestic tourists.
- Extensive outdoor marketing within the country & abroad which include signages in airports, branding of trains, hoardings in strategic locations etc.
- Media campaign both in print & electronics within the country & abroad shall be done by the Government to attract more tourists to the State.
- Brand ambassador will be appointed for strengthening the brand name of Odisha Tourism.

q. Capacity Building:

Capacity building in hospitality sector shall be the top most priority to build rigorous professionalism to create a strong ambience of comfort, confidence and communication among the tourists. Department of Tourism shall encourage private sector investment in Tourism & Hospitality Sector Institutes for capacity building to ensure availability of more skilled manpower required in tourism sector. Efforts shall be made to synergize all government schemes and private sector initiatives to develop skill in Tourism and Hospitality sector.

r. Public Awareness:

The most important aspect of tourism development is to bring in the necessary behavioral and attitudinal change in the society to make it tourist friendly and create a strong receptive atmosphere. People's participation through Panchayati Raj Institutions, Urban Local Bodies, Co-Ops and NGOs shall be encouraged for development of tourism and to create public awareness to achieve a broader goal of high quality tourist services.

s. Wayside Amenities:

The Government has taken a policy decision to establish modern wayside amenities to provide quality services to the highway and roadside tourists. More number wayside amenities shall be developed by synchronizing the activities of various Government Department such as Works, Transport, Forest and other concerned Departments.

t. Right to Service:

The State Government have implemented the Right to Service Act 2012. The Department of Tourism have been brought under the Right to Service Act, which shall be rigorously implemented for timely clearances of all tourism projects.

u. Buddhist & Heritage Tourism:

State Government shall promote Buddhist tourism in view of the historical significance of Buddhism in the State. Special Buddhist Circuit will be developed by linking all the Buddhist sites.

v. Cruise Tourism:

Considering the vast coastline, Chilika lake, long stretch of water bodies, lakes, there is vast scope for cruise tourism in the State. The State Government shall promote cruise tourism by bringing in modern cruises and technology.

w. Religious Tourism:

Religious tourism has vast potential in the State in view of the presence of historic temples and monuments which shall be developed in a big way in the State.

x. MICE Tourism:

The State houses major IT and ITES companies. The State shall promote meeting incentive conferences & events tourism to cater the needs of multinational companies & NGOs

y. Knowledge Tourism:

The State has become the knowledge hub of Eastern India. Many centres of learning university, institutions of national and international repute have come up in the State. Large number of students, intellectuals visit the State for acquiring knowledge. The State shall promote knowledge tourism and facilitate activities of all stakeholders.

z. Barrier-free Tourism:

The State Government shall assiduously promote barrier-free tourism especially for differently-abled tourist. Incentives shall be provided to entrepreneurs / people for making innovation and setting innovative projects for barrier free tourism in the tourism sector.

6. Definitions

6.1 Tourism Unit:

Tourism Unit means a legal entity under the relevant law, engaged or to be engaged in providing any service related to travel and tourism. Following units will be considered as Tourism Units:

a) Star Category Hotels
b) Heritage Hotels
c) Apartment Hotels
d) Motels
e) Convention Centres
f) Resorts
g) Tented Accommodation
h) Tourism & Hospitality Training Institutes
i) Amusement parks / Water Parks / Theme Parks
j) Adventure Sports
k) Wayside Amenities

6.2 Effective date:

Effective date means the date that starts after the gazette notification of Odisha Tourism Policy 2016. The operative period of the policy starts after the effective date.

6.3 New Tourism Unit:

A 'New Tourism Unit' means a Tourism Unit which is set up and which commences commercial operation during the operative period of this Policy.

6.4 Existing Tourism Unit Undergoing Expansion:

Existing Tourism Unit taking up expansion of more than fifty percent of its existing capacities (e.g. Rooms / Riders / Tents, etc.) after the effective date. Only one expansion project of an existing tourism unit will be eligible for incentive during the operative period of the Policy.

6.5 Commercial Operations:

Date of Commercial Operations of a Tourism Unit is the date on which the Tourism Unit opens to tourists on a commercial basis, after due testing, trial running and commissioning under relevant Government rules. A committee consisting of District Tourist Officer, an officer from Department of Tourism to be nominated by the Government and representative of principal financing Bank of the project shall certify the date of start of commercial operation.

6.6 Eligible Tourism Unit:

New Tourism Unit and Existing Tourism Unit Undergoing Expansion during the operative period of the Policy would be considered as Eligible Tourism Units as defined in Para 6.3 and 6.4.

6.7 Apartment Hotel:

Apartment Hotel unit should have facilities as per the prevailing Guidelines for Apartment Hotels laid down by the Ministry of Tourism, Government of India. Such Apartment Hotels should obtain necessary category certification from the competent authority.

6.8 Tented Accommodation:

Tented Accommodation unit should have facilities as per the prevailing guidelines for Tented Accommodation as laid down by the Ministry of Tourism, Government of India. Such Tented Accommodation should obtain necessary category certification from the competent authority.

6.9 Tourism & Hospitality Training Institute / University:

The Institute / university must be offering tourism / hospitality courses that are recognized / certified by regulatory authorities.

6.10 Mega Tourism Unit:

New projects capable of creating new employment of more than 150 persons with investment of Rs.75 crores and above (excluding the cost of land) will be construed as Mega Tourism Units. Units which are set up and which commence commercial operations during the operative period of this Policy will only be eligible under this category. The proposals of Mega Tourism Units would require due approval of the Tourism Advisory Committee (TAC).

Hotels and Resorts, Multiplexes and Malls shall be excluded from the definition of Mega Tourism Unit.

6.11 Theme Park:

Theme Park should be based on a single or series of themes having a plot measuring atleast 10,000 sq.m. (about 2.5 acres). It may have amusement rides, water slides, accommodation (at least ten lettable rooms), restaurant, theatre, shopping area, activity area and theme areas. It is, however, not mandatory to have all these features.

6.12 Hotel:

Hotel projects should have facilities of 1 to 5 star categories hotel as per the prevailing guidelines of the Ministry of Tourism, Govt. of India. Such hotels should obtain category certificate from the competent authorities. These units should have a minimum of 20 lettable rooms with attached bathrooms. The hotels should have adequate provision of toilets for visitors. Size of the rooms and bathrooms, AC facilities should be as per the norms prescribed by the Department of Tourism, Govt. of India for such hotels.

6.13 Resort:

A Resort project should have a minimum of 20 lettable rooms with attached bathrooms. Unless it is a hill station or a beach or a location, which, in the opinion of the Department of Tourism, does not require air conditioning, at least 35% of the rooms should be air conditioned. The bathroom carpet area should measure at least 3.5 sqmt. It should have restaurant / dining hall with a seating area of minimum 40 sqmt. (excluding kitchen and storage). It should have a telephone with STD facility. The plot on which resort is located should admeasure at least 10,000 sqmt. It should have, on its plot, a minimum open space (unbuilt area) of 6,000 sqmt. It should have at least 4 of the following facilities:

- Indoor games (e.g. Table – Tennis, Squash, Billiards, Bowling Alley, etc.), with a minimum built up area of 25 sqmt.
- Conference room (Minimum Carpet area of 30 sqmt.)
- Swimming pool
- Tennis or badminton court or golf or other outdoor games area.
- A health club (minimum built-up area of 20 sqmt.)
- A lounge (admeasuring at least 35 sqmt.)

6.14 Health Farm:

The Health Farm should be located in an area, which is free from pollution and noise, and have a generally salubrious and health-promoting environment. There should be at least 20 lettable rooms with attached bathrooms. It should have at least six of the following facilities.

- Health Club
- Gymnasium
- Yoga/Meditation Area
- Outdoor Exercise Areas
- Indoor Games
- Outdoor Games
- Swimming Pool
- Classroom
- Jogging Tracks
- Horse Riding facility

It should include a farm to grow fruits, vegetables, herbs, and grains (admeasuring at least 500 sqmt.). It should be located on a plot admeasuring at least 5,000 sqmt. It should have medical, paramedical personnel, alternative system of medicine specialist, diet specialist, and such other full time staff of at least two persons.

6.14 Motels and Wayside Amenities:

The Motel Project should be located on a National Highway, State Highway or Main District Road (MDR). It should have at least 4 lettable rooms and all the lettable rooms should have attached bathrooms. The plot on which the motel is located should admeasure a minimum of 1,500 sqmt. It should have restaurant/dining hall with sitting area of minimum 30 sqmt. (excluding kitchen & storage). The double rooms and single rooms should have minimum

carpet areas of 12 sqmt and 10 sqmt respectively. The bathroom carpet area should admeasure at least 3 sqmt. It should have public toilet and first aid centre. It should have car parking area @ 5 sqmt per room. The rooms should have adequate furniture, fixtures and linen. The ownership/lease of land and land use should be in order.

Wayside amenities will be a common facility centre on the National Highways, State Highways, and Major District Roads. They should ideally have (a) Food Plaza; (b) Public Convenience; (c) ATM/Banking; (d) Emergency/Medical Facilities; (e) Communication Centre; (f) Petrol Filling Station and Auto Services. For wayside amenities to be eligible for these incentives, they must have (a), (b), (d) and (e) among the facilities mentioned above.

6.16 Water Sports:

Water sports projects should be set up at a beach or lakeside or riverside along with a pontoon/jetty. It should offer at least two water sports. Parasailing, water-scooters, hovercraft and water-skiing are examples of such facilities. In addition to investment in boats and outboard motors, it should make an investment of at least Rs.20 lakh in water sports equipments. It should have adequate changing rooms, showers, lockers and separate toilet blocks for ladies and gents. It should have a restaurant. It should have trained staff for implementation of safety norms prescribed by the Government.

6.17 Houseboat:

House boat should be set up at backwater, lakeside, reservoir, riverside location identified by Department of Tourism. It should offer at least one room facility, with on board restaurant in motorized boat, satisfying the safety norm prescribed by appropriate authorities. Houseboat project includes provision of jetty/ pontoon, parking, and off-shore infrastructure. It should have trained staff for implementation of safety norms prescribed by the Government of Odisha.

6.18 Art & Craft Village:

The Art and Craft village project must be on a minimum one acre compact land with facilities like space to work for at least 10 artisans, an exhibition area of not less than 1000 sqft. to display different crafts, a multipurpose hall for folk shows, performing arts and film screening etc. A restaurant and toilet blocks should also be provided.

6.19 Golf Course:

A Golf Course Project should have a minimum of 9 holes. The land area should not be less than 10 Hectares. The design and drainage should be so worked out that there is no water logging. There should be a reliable system for adequate water supply. It should have a satisfactory club house. It should allow easy access to tourists, who are not its members; to play golf and use other facilities and the charges in this regard should be transparent and consistent. Adequate parking for at least 50 vehicles and clean public toilet facility must be available.

6.20 Camping and Tent Facilities:

Camping and tent facilities should have clear ground admeasuring at least 1,000sqmt. It should have tented accommodation capacity for at least 20 persons. There should be a minimum of 10 tents. The gross carpet area of tents should admeasure at least 200 sqmt. All the tents should have attached toilets. The tents should be put on a platform raised to a minimum of 2.5 feet above the ground. The tent site should have adequate security. The site should have eco-friendly structures admeasuring at least 200 sqmt. for such purposes as food, recreation, relaxation and lockers. It should have adequate electricity, water supply, sewerage disposal drainage and toilet facility. Space for own tents of tourists should also be available.

6.21 Amusement / Theme Park:

An Amusement Park should have at least 8 amusement rides. There should be a minimum investment of Rs.50 lakh in amusement rides/aids. This pertains to the cost of equipment alone. It should have a minimum area of 20,000 sqmt.

6.22 Aquarium:

An aquarium should have minimum 1,000 cubic meter water holding capacity and should have at least 10 exhibits. It should be open to public. It should have trained supervisors for operation and maintenance of the livestock. It should have restaurants, adequate parking, and separate toilet blocks for ladies and gents etc.

6.23 Water Park:

A Water Park project should have minimum 5 acre compact land and minimum of five water sites. It should have the capacity to handle at least 100 slides simultaneously. It should have trained supervisors for implementation of safety norms. It should have restaurants and adequate changing rooms, lockers, showers and separate toilet blocks for ladies and gents among other.

6.24 Ropeway:

The Ropeway should be mechanized and motor driven. The horizontal length may be 500 meters or more (but can be slightly less if the location demands so). It should be comfortable for the passengers and noise should be within permissible limits. It should have capacity to carry minimum 200 passengers per hour. The cabins should leave at brief intervals so that transportation is continuous and waiting time is minimum. It should have thyristor control of main drive motor or comparable device to ensure smooth acceleration and deceleration. It should have an emergency brake in addition to the normal brakes. The cabins should be sturdy and aesthetic. It should have full capacity generator set to drive the ropeway in case of power failure. The facilities should be created in compliance with the applicable security norms.

6.25 Heritage Hotel:

A Heritage hotel should be a palace, a haveli, a darbar-garh of any building, built in a traditional style, prior to 1950. The façade, architectural features and general construction should have the distinctive qualities, ambience, and décor consistent with a traditional lifestyle. It should have minimum 10 lettable rooms. The facilities and the features along with the services should be as per the guidelines of the Department of Tourism, Government of India as applicable from time to time.

6.26 Convention Centre:

A Convention Centre should be located on a plot admeasuring at least 5,000 sqmt. It should have capacity to seat at least 750 persons in the central column less hall. The capacity should be so organized (partition-able) that it is possible for at least 5 separate conference events to run simultaneously.. At least 75% of the convention centre's capacity should be air conditioned. The Convention Centre should have sufficient parking facility (minimum 2 sqmt per person). All conference/convention areas should be equipped with state-of-the-art convention facilities including modern public address system, slide projection, video screening and such other facilities. It should possess its own equipments. It should have adequate arrangement for secretariat support with Fax, e-mail and photocopying facilities and first aid centre. It should have a restaurant, cafeteria with adequately covered ,comfortable area to cater to at least 500 persons simultaneously. The area excluding kitchen, should admeasure at least 500 sqmt. The quantum of such facilities should be consistent with the size of the complex.

6.27 Caravan Tourism:

Caravan Tourism may be motorized/vehicle-based. It should have capacity to handle simultaneously at least 30 participants, if it is operated with the aid of motorized vehicles. It should operate for at least three months in a year. It should have operated for at least three months before seeking the approval of the DoT.

6.28 Adventure Tourism Projects:

Adventure tourism projects should have required equipments and trained staff to maintain and run the activity. All required permissions from various authorities must be obtained. Minimum facilities like restaurant (wherever required), drinking water supply, staying arrangements (whereverrequired), toilet etc. should be provided.

6.29 Medical Tourism :

Medical Tourism is a form of Tourism wherein medical institutions/ hospitals shall be allowed incentives under this policy to attract foreign tourists who may visit for treatment and avail post treatment tour to different tourist places.

6.30 Other Projects

Other projects not falling into any of the above categories will be considered as tourism project subject to their approval by the Tourism Advisory committee.

7. Interventions:

7.1 New investment:

The Tourism Policy envisages the development of tourism infrastructure through collaboration between the government and the private sector. The Tourism Policy 2016 encourages private investment and provides attractive incentives for new investment in tourism sector.The implementation of various provisions covering incentives, concessions etc. will be based on the detailed operational guidelines / statutory notifications by the Department of Tourism (DoT).

7.2 Land Bank:

The State Government with the objective of establishment and promotion of tourism has developed a robust land bank at key tourist locations throughout the State. Various parcels of land suitable for development of tourism projects and currently being held by General Administration (G.A.), Revenue, Odisha Industrial Infrastructure Development Corporation (IDCO) & various other government agencies has been earmarked & reserved for tourism purpose. The land so reserved will be allotted for tourism project as per IPR 2015 rate as applicable. The Land Bank is meant to:

- optimize the latent potential of land available all across the state and use it for development of tourism infrastructure.
- and facilitate investors to get land for tourism projects.

Though the DoT has developed a Land Bank, the efforts to identify more land shall be a continuous process. DoT / District Tourism Promotion Council (DTPC) shall primafacie identify lands / sites appropriate for tourism development through site visits, site studies and assessment of tourism development potential in the area.

The identified land parcels shall be reserved in the form of a Land Bank for development of appropriate categories of tourism projects as identified by DoT. The details of the Land Bank for tourism projects would be made available on the websites of DoT and the concerned district administration.

The role of DoT shall be of a facilitator and would be the first point for receiving applications for development of Tourism Projects on the land identified through the Land Bank. On receipt of applications from private entrepreneurs, DoT shall facilitate the grounding of the tourism project. The disposal of the land / property shall be in accordance with the decision of the appropriate Committee to be formulated by the Department of Tourism.

7.2.1 Land Recommendation Committee:

A Committee (Land Recommendation Committee) shall be formed for allotment of land parcels from the Land Bank. The Land Recommendation Committee shall meet at least once in every three months and shall comprise–

Chief Secretary, Odisha	Chairman
Secretary, Department of Tourism	Member Convenor
Principal Secretary, Department of Revenue & Disaster Management	Member
Special Secretary, G.A. Department	Member
Concerned RDC	Member
CMD/MD,IDCO	Member
Collector of the concerned district	Member
Director, Department of Tourism	Member

DoT shall act as the secretariat for the Land Recommendation Committee.

7.3 Human Resource Development / Capacity Building:

This policy aims to streamline and strengthen the human resource development activities which include: capacity building programs, sensitization of stake holders in tourism industry and making available trained manpower for hospitality sector. This will involve –

- Setting up of new Hotel Hospitality and Hotel Management Institutes/Universities through private participation.
- Industrial Training Institutes/Polytechnics would be encouraged to introduce tourism related courses for subordinate staff of hotels / resorts / motels / lodges, caterers, guides, cab and tourist coach drivers to enhance skills.
- Institutions running management courses in the state will be encouraged to offer Hospitality and Travel Management related courses. Institutions / NGOs carrying out sensitization programs related to tourism would be encouraged.
- Short term courses relating to capacity building for hospitality industries in rural area with support of State Institute of Rural Development.

7.4 Safety & Security:

The DoT has established seven special Tourist Police Stations in the State in major tourist destination. Department of Tourism (DoT) envisages ensuring safe tourism through setting up of more Police Stations, provision of dedicated police personnel at major tourist destinations, life-guards at beaches in coordination with local NGOs and SHGs. It shall be the endeavor of the Government to pre-empt and prevent abuse/ exploitation of women and children in and around tourist destinations. For ensuring the safety and security of tourists visiting the tourism destinations across Odisha, the Tourism Policy, 2016 provides for the following measures.

DoT shall take steps to employ personnel, preferably ex-servicemen, for provision of security to tourists in specific tourism destinations. DoT shall also provide appropriate training to the selected personnel for providing better services to tourists.

DoT shall organize training and sensitization programs for policemen posted at key tourism destinations in association with the Department of Home for ensuring that policemen empathize with genuine complaints and grievances of tourists. In order to prevent exploitation of women and minors in any form, DoT, in conjunction with the local police administration, shall take proactive steps to prevent such abuses.

7.5 Clean Tourism Sites Campaign:

As a part of Clean India Campaign, the Tourism Department shall endeavor to launch special drive for making the tourist destination clean. The Tourism Department shall set up a beach cleaning authority comprising prominent persons having experience in the field. The Tourism Department shall involve different tourism stakeholder to take forward this initiatives. Special sensitization programme including awareness programme through electronic media shall be launched for this purpose. The Department of Tourism has started mechanized cleaning in Puri Sea Beach. Similar cleaning operations shall be made in all the Sea Beaches like Gopalpur, Talsari, Chandrabhaga, Ramachandi, Chandipur & other important tourism sites. The beaches in the state of Odisha are famous for their beauty and efforts shall be made to keep them clean and beautiful for the tourist.

7.6 Odisha Tourism Development Corporation (OTDC):

- The Odisha Tourism Development Corporation shall be modernised and strengthened to make it a more effective tool for promotion of tourism.
- To develop and promote Odisha as one of the premier destination of the country and to adopt such methods and devices necessary to attract tourists in large numbers.
- To provide / operate quality tourism infrastructure on its own or through appropriate PPP structures.
- To act as facilitator for development of tourism in the State.
- Continue with the existing properties with improved facilities, services and value addition.
- Promoting star category hotels and other facility as green field project through private participation.
- Marketing of lesser known tourist destination to bring it to the lime light through package tours and providing basic amenities.
- Providing a total travel solution to the tourists visiting the State.
- Selective privatization of the existing Units for profit optimization.
- Promoting Odisha as a favoured destination in general and OTDC hotels as favoured host amongst the tourist through extensive marketing, value addition, quality infrastructure and improved services.

7.7 Tourism Units to avail incentives / subsidy:

A new Tourism Unit should be opened to all and shall not be confined to exclusive use of members of any group or club or any such other restrictions.

A new tourism unit or an expansion of an existing tourism unit will be eligible for incentives provided they satisfy the following conditions:

- The new unit should obtain registration with the concerned registering authority to be detailed by the DoT.
- The new project should have separately identifiable capital investment and should not be an extension of the existing project. The new project will not lose its eligibility, if the utilities of existing units for water, electricity, steam, pollution control, central facilities etc. are extended to the new projects. Expansion of existing project will be eligible for incentives, provided the existing tourism unit increases its investments in fixed capital or capacity by at least 50% as elaborated in para 6.4.

The existing tourism properties to be developed on PPP mode will be eligible for fiscal incentives provided, the private partner fulfil the minimum development plan prescribed in the Lease-cum-Development Agreement and the property is further augmented through investment in fixed capital or capacity by at least 50% of the existing capacity + prescribed minimum development plan.

7.8 Tourism Undertaking:

'Tourism Undertaking' means a legal entity in the form of a registered company under the Companies Act, 1956, a Partnership firm, a Registered Trust, a legally registered Co-operative society or an individual proprietary firm engaged or to be engaged in one or more tourism projects. The proposed tourism facility should be open to all and shall not be confined to the exclusive use of members of any group or club or any such other restrictions.

7.9 Eligible Capital Investment for incentives:

The following investment shall be considered eligible for incentives.

- Payment made towards registration charges of land.
- Building constructed for providing specific tourism facilities/services. The actual expenditure incurred and paid for construction of building as per the norms will only be considered.
- Other construction such as boundary wall, landscaping and any other project specific construction.
- Plant and machinery
- Electrical Installation/ renewable energy installation
- Interior furnishing
- Furniture and fixtures
- Kitchen equipments
- Sewage Treatment Plant (STP)
- Generator and Air Condition plant / AC unit

7.10 Ineligible Capital Investment:

The following investment shall not be eligible for incentive.

- Cost of land
- Working capital
- Goodwill
- Commissioning fees
- Royalty
- Pre-operative expenses
- Second hand plant and machinery, furniture fixtures, electrical installation etc.
- Interest capitalized
- Trucks, cars, vans, trailers and other transport vehicles
- Consumables, crockery and utensils, bad linen
- Technical/Consultant fees
- Any construction which is of the nature of real estate development i.e. shops, flats, office etc. meant for sale / lease / rent.

7.11 Eligible Units (Tourism Projects) for availing incentives:

- Hotels of star categories
- Apartment hotels
- Heritage hotels, resorts, health farms and health & wellness spa.
- Motels, wayside amenities and public amenities at tourist sites.
- Theme based entertainment centre, Amusement park, Aquarium, Aqua Park, Sand Art Park Multiplexes (Cinema halls) of at least three (3) screens
- Adventure sports, beach sports and water sports,
- Art and craft Villages, Craft and souvenir shops at tourist sites excluding manufacturing, development of souvenirs and artisan hubs
- Golf courses
- Camping, Caravan, Tents and other temporary accommodation facilities developed for tourism purposes
- Aerial Ropeways
- Convention centers,
- Cruise boats, Houseboats
- Eco-Tourism projects / Cruise Tourism projects / Wellness Tourism projects
- Adventure Tourism projects / Knowledge Tourism projects / Buddhist Tourism projects / Heritage Tourism projects / Beach Tourism Projects
- Wildlife safari
- Film city
- Medical tourism (only the Joint Commission International (JCI) accredited Hospital)
- Exclusive Tourism & Hospitality related Institute / universities
- Other Projects approved by the Department of Tourism, Government of Odisha or Ministry of Tourism, Government of India.

8. Framework for Incentives and Other Support Measures for Tourism Projects:

To attract private sector investment, it is envisaged to offer both financial & non-financial incentives to different tourism projects.

8.1 Financial Incentives

8.1.1 Allotment of land:

Land is the most important ingredient in setting up of a tourism unit. The land for tourism units will be allotted at concessional rates as per the provision of IPR 2015 or as per the guidelines to be fixed by the Government from time to time.

8.1.2 Capital Investment Subsidy:

To encourage investment in tourism infrastructure and tourism projects, investment subsidy is envisaged for new Tourism Projects. All eligible tourism projects as per Para 7.11 with investment not below Rs.20 lakh shall be eligible to get capital investment subsidy. The capital investment subsidy is envisaged as follows:

a) **Quantum of Capital Investment subsidy**

Eligible Capital Investment (excluding the land cost)	Admissible Subsidy	Maximum Limit
Investment upto Rs.50 crore	20%	Rs.10.00 Crore
Investment above Rs.50 crore	20%	Rs.15.00 Crore
Tented accommodation (with minimum investment of Rs.0.20 crore)	30%	Rs.0.15 Crore
Equipment worth Rs.1 crore and above for Adventure & Water Sports	20%	Rs.0.50 Crore

- As percentage of Eligible Capital Investment

b) **Additional Subsidy of 5% will be provided to following projects:-**

(I) New Tourism Projects around Chilika lake, KBK, Kandhamala and Gajapati District and any new places or districts as may be necessary to be notified by the Government from time to time on the recommendation of Tourism Advisory Committee. Considering the influence zone of Chilika, the exact location / distance from higher

water level of the Chilika lake within which tourism projects would be considered for incentives will be decided by the TAC.

(ii) New Tourism Projects owned and managed by women entrepreneurs (with minimum equity participation of 51% in the entity) and those belonging to SC/ST categories as also the differently-abled will be entitled to an additional 5% subsidy over and above the 'Admissible Subsidy'.

(iii) In all the above mentioned cases, the total subsidy available shall be subject to the ceiling prescribed under 'Maximum Limit' mentioned in Para 8.1.2(a).

(iv) The eligible units after one year of commencement of commercial operations of the project will be eligible for availing capital investment subsidy.

8.1.3 Interest subsidy:

All new eligible tourism units as per Clause 7.10, 7.12 shall be eligible to get interest subsidy as per the following rates for a period not more than 5 years provided the concerned promoter(s) shall not have defaulted to Odisha State Financial Corporation (OSFC)/ Industrial Investment Promotion Corporation of Orissa Limited (IPICOL) / SIDBI / banks / public financial institutions / other Government Agencies in payment of interest & installment in connection with any other commercial venture with which the concerned promoter is directly or indirectly associated.

Interest subsidy @ 5% per annum subject to maximum of Rs.1 crore for the entire period of 5 years. This subsidy will be available to eligible tourism units after one year from date of commencement of commercial operations of the tourism unit maximum up to five years.

8.1.4 Stamp Duty exemption:

All new Tourism Units shall be eligible to get 100% exemption in Stamp Duty on purchase of land for the project. Such reimbursement shall be made after commercial operation of the project.

8.1.5 Reimbursement of land conversion charges:

All tourism new projects shall be eligible to get 100% reimbursement of the land conversion charges. Such reimbursement shall be made after commercial operation of the project.

8.1.6 Reimbursement of VAT:

New tourism projects shall be eligible for reimbursement of 100% of VAT paid for a period of 7 years from the date of commercial operation limited to 200% of cost of plant & machinery / 100% of the project cost whichever is low in a tapered manner provided that the VAT reimbursement shall be applicable only to the net tax paid after adjustment of Input Tax credit. This provision will be suitably replaced / modified after Goods & Service Tax is introduced.

8.1.7 Reimbursement of Entertainment Tax:

New Multiplex Cinema halls of at least three (3) screens with a minimum capital investment of Rs. 3 crore, with modern projection system, sound system, air conditioning etc., will be reimbursed 100% Entertainment Tax for a period of five (5) years. Similar benefits shall be extended to other eligible tourism projects like Public Aquarium, Aqua Park, Amusement Park etc.

8.1.8 Energy:

New Tourism Units will be exempted from payment of electricity duty up to a contract demand of 5 MVA for a period of 5 years from the date of availing power supply for production. To encourage energy efficiency, a onetime reimbursement of cost of energy audit of the new unit shall be provided up to a maximum of Rs.1.00 lakh subject to achieving energy efficiency to be certified by credible third party agency.

8.1.9 Reimbursement of Entry Tax:

New Tourism Units shall be eligible for 100% reimbursement of entry tax on acquisition of plant & machinery till the date of commercial operation. New tourism units shall also be eligible for 100% reimbursement of entry tax on purchase of raw material for a period of 5 years from the date of commercial operation subject to a maximum ceiling of 100% of cost of plant & machinery. This provision will be suitably replaced / modified after GST is introduced and implemented.

8.1.10 Employment cost subsidy:

75% reimbursement (in case of male worker) & 100% reimbursement (in case of female workers) of expenditure on account of employer contribution towards ESI & EPF scheme for a period of 5 years shall be made in respect of skilled & semi-skilled workers engaged as regular employees who are domicile of the State.

8.1.11 Environmental protection infrastructure subsidy:

New tourism units shall be eligible for reimbursement of 20% of the capital cost of setting up effluent treatment plant / sewerage treatment plant subject to a maximum of Rs.20 lakh. Such reimbursement shall be made only after commercial operation of the project.

8.1.12 Training Subsidy:

For every person trained & newly recruited in tourism project, the training cost shall be reimbursed @ Rs.2000/- per employee provided such training is imparted within 3 years of the commercial operation.

8.1.13 Tourist Transport :

The State will facilitate the provision of adequate quality transport services for tourists. As such 75% exemption from registration charges and 50% concession from payment of permit charges shall be allowed for new air-conditioned coaches having minimum

seating capacity of 25 seats, registered as contract carriage and operating in notified tourist circuits. The Department of Tourism shall notify the tourist circuits for the purpose from time to time.

8.1.14 Participation in overseas Tourism Events:

DoT shall provide incentives to the tourism service provider of State for participating in overseas tourism events. The incentive shall be limited to 50% of the space rent actually paid and travel expenses incurred by the tourism service provider of the State subject to maximum of Rs.75,000/- for each event. Such concession shall be limited to two events in one financial year for any agency. The tourism service provider approved by Govt.of India, Ministry of Tourism fulfilling the eligibility criteria prescribed by Ministry shall be eligible to get additional reimbursement of travel expenses of 4 more additional events. The admissibility of travel expenses shall be as per the guideline of Ministry of Tourism, Government of India and the maximum ceiling shall be Rs.2.5 lakh per annum.

8.1.15 Film shooting subsidy:

To encourage shooting of feature films in important tourist locations and thereby highlighting different tourist destinations of the states, incentive will be allowed for shooting of feature film in the State of Odisha. As such 75% of the actual expenditure incurred on accommodation in hotels of Odisha during such shooting shall be reimbursed subject to a ceiling of 10 lakh. This incentive shall only be allowed to film which is approved by Central Board of Film Certification (CBFC).

8.1.16 Kiosk in important tourist centers:

Tourism Department will create Kiosk in important tourist centers for sale of souvenir, handicraft items, tea stall & other utility shops and allot them to unemployed youth of the locality including the existing unorganized vendors at concessional rent / fee. Tourism department will bring out detail allotment procedure & guideline of such Kiosk by way of Notification.

8.1.17 Subsidy is envisaged in the policy as a means of incentives to encourage private investment in tourism sector. While extending incentives, subsidies & concessions, the total financial incentives for any tourism unit shall not exceed the eligible capital investment in the project. (as defined in Para-7.10 of the Tourism Policy).

8.2 Special Tourism Zone:

Many regions of the state have huge tourism potential. To have more focused intervention, it is proposed that the state tourism promotion council will identify and notify such regions as Special Tourism Zones. The state government shall develop quality infrastructure like roads, sanitation, power supply and water supply through convergence of resources in the special tourism zone. The state tourism promotion council may allow separate incentives in the identified zone for specific time period.

8.3 Non-financial Incentive:

In addition to fiscal incentives, new tourism units will benefit from a number of other support mechanisms of the Government.

- Tourism department will provide facilitation in obtaining various permissions and clearances required from statutory bodies like CRZ, Municipal/local bodies, Airports, Pollution Control Board, etc. on best effort basis.
- The Department will make use of the provisions of Single Window, Escort Officer, etc. to fast-track the clearance of tourism projects.
- The Government will assist in promotion of private tourism projects at the national and international level. For this purpose opportunities to participate in Road shows and Trade Fairs, link from government websites, partnership for hosting events and activities etc. by designing suitable modalities would be provided.
- Facilitating online reservation of hotels / vehicles/ tour packages of the state tourism stakeholders.
- Non-financial performance oriented incentives to tour operators, guides, taxi and auto drivers by way of familiarization tour, training etc.

9. Administration of Incentives:

9.1 Procedure for applying for incentives:

Department of Tourism, Government of Odisha shall be the Implementing Agency for administration of Incentives under this Tourism Policy. Detailed operational guidelines shall be issued by the Tourism Department.

All undertakings desirous of availing any incentive under this policy must be registered with the Department of Tourism. The projects will be scrutinized by Tourism Department and after scrutiny; provisional registration shall be issued adopting the following procedure.

- Tourism Department shall give Provisional Registration Certificate in the first instance up to 3 years to the Eligible Units.
- If such a unit is not in a position to complete the project and start commercial operations during the initial validity period, it may apply for time extension along with its progress report. The administrative department may, after examining the difficulties experienced by the individual unit in implementing the project and also recording the reasons, grant extension for a period up to 2 years.
- The units which are unable to go operational after the time extension will have to explain to the Government the reasons for the delay. This explanation will have to be forwarded by the District Tourist Officer to the Commissioner / Director of Tourism, who will carry out physical inspection of the projects and report to the tourism advisory committee. The committee will then take a decision on further time extension based on this report and recommend its views to the government for taking necessary steps.

9.2 Illustrative procedure for claiming Incentives:

The Eligible units along with the provisional certificate shall apply to DoT, within 180 days after the commencement of commercial operation of the project, for permissible benefits along with necessary documents. Department of Tourism on receiving the information and documents will scrutinize it and issue Eligibility Certificate and the Certificate of Entitlement and put proper date of effect so as to enable the unit to avail the incentives.

Step-I
Eligible Units will apply for the Incentive to Department of Tourism

Step-II
DoT will scrutinize the applications and issue a Provisional Registration Certificate (PRC)

Step-III
PRC shall be valid for up to 3 years in the first instance

Step-IV
If a unit is not in a position to complete the project during 3 years, it may apply for extension.

Step-V
If agreed, Tourism department may grant an extension, (maximum upto 2 years). Further time extension by Tourism Advisory Committee.

Step-VI
The Eligible Units shall inform Tourism Department within 180 days of the

Step-VII
Tourism Department shall scrutinize the documents and after field visit issue Eligibility Certificate, if eligible.

Step-VIII
Based on the Eligibility Certificate, the Department of Tourism shall in turn issue Certificate of Entitlement and put proper date of effect for availing benefits.

COMMENCEMENT OF COMMERCIAL OPERATION OF THE PROJECT

The unit shall remain in commercial operation continuously for a minimum of 5 years from the date on which benefits have been availed. In cases, where the operation has been discontinued due to any reason within the period of 5 years mentioned above, the unit shall be required to refund the incentives along with interest @ of 2% per month or any other penal interest prescribed by the DoT.

The unit, after getting the eligibility certificate, must submit quarterly progress details to the DoT of the incentives availed during the eligibility period. Any excess claim of incentives will be recovered with interest of 2% per month or any other penal interest prescribed by the DoT.

10. Institutional Mechanism for Tourism Development:

10.1 State Tourism Promotion Council:

The State Tourism Promotion Council (STPC) will be constituted, as follows to act as the Apex Body to guide and monitor the development of Tourism in the State.

Chief Minister	Chairman
Minister of Tourism	Member
Minister of Forest & Environment	Member
Minister of Transport	Member
Chief Secretary of Odisha	Member
Development Commissioner	Member
Secretary, Home	Member
Secretary, Finance	Member
Secretary (Tourism)	Member Convenor
Secretary (Forest & Environment)	Member
Secretary (Transport)	Member
Secretary, Handloom & Handicrafts	Member
General Managers of Railway Divisions covering Odisha	Member
Senior representative from FICCI	Member
Senior representative from CII	Member
Representative from Airport Authority of India	Member
Representative from 2 major airlines operating in the state (nominated by the Secretary, Tourism)	Member
Representative from IATA / HRAO	Member
Representative from IATO/ TAAI	Member
Two leading hoteliers (nominated by the Secretary, Tourism)	Member
Representative of ASI	Member
Director, Department of Tourism	Member

The nominated members shall have a maximum tenure of 3 years unless renewed by the Secretary, Tourism. The STPC shall meet at least once in 12 months. The State Tourism Promotion Council will review & monitor, the implementation of the Policy and suggest changes in the policy frame work.

10.2 Tourism Advisory Committee:

A Tourism Advisory Committee (TAC) shall be formed for facilitating development of tourism in the state. The Tourism Advisory Committee would be headed by the Chief Secretary, Government of Odisha and will have the role of advising the State Tourism Promotion Council on policy matters, strategy for development of tourism in the state, Inter-departmental coordination, recommendations etc.

The Tourism Advisory Committee will have following members.

1. Chief Secretary	Chairman
2. Development Commissioner	Member
3. Secretary (Home)	Member
4. Secretary (Tourism)	Member Convenor
5. Secretary (Revenue)	Member
6. Secretary (Finance)	Member
7. Secretary (Forest & Environment)	Member
8. PCCF (Wildlife)	Member
9. Director (Tourism)	Member
10. Managing Director (OTDC)	Member
11. Representatives of other departments, agencies and organisations to be nominated by the Government from time to time.	

10.3 Single Window Clearance Authority:

There shall be a 3-tier Single Window Clearance Authority (SWCA) for clearance of private sector tourism projects as enumerated below -

- Investment up-to Rs. 50 crore - Special Single Window Clearance Committee (SSWCC) shall be constituted under the chairmanship of Secretary, Tourism; Govt of Odisha,
- Investments above Rs.50 crore and up to Rs.1000 crore – State Level Single Window Clearance Authority (SLSWCA) members as constituted under the Odisha Industries Facilitation Act (OIFA) 2004.
- Investment above Rs 1,000 crore - High Level Clearance Authority (HLCA) headed by the Chief Minister with members as constituted under the Odisha Industries Facilitation Act (OIFA) 2004.

DoT will provide secretarial assistance to the SLSWCA. The SLSWCA shall have the power to direct concerned departments or authorities to issue required clearances within the specified time limit, subject to compliance of the provisions of the applicable Acts and rules or orders and instructions in force.

The SLSWCA shall carry out the following functions:

- Issue approvals of projects as required under the appropriate rules as and when necessary.
- Issue deemed approvals as provided in OIFA 2004 as and when necessary.
- Review and monitor the processing of applications cleared earlier and sent to competent authorities.

A Nodal Officer would be appointed / designated from DoT, to support the SLSWCA and liaise with the District Level Nodal Agencies (DLNA) under the OIFA Act. The Nodal Officer would receive all applications forwarded from IPICOL / the DICs (if the DICs have been approached). These would be put up by the Nodal Officer before SLSWCA for approval.

10.4 District Tourism Promotion Council:

Every district will have a District Tourism Promotion Councils (DTPC). It shall act in close coordination with Department of Tourism. Its main functions shall be–

- Identify land parcels for tourism development in the district.
- To act as the nodal agency and clearing house for ideas and information related to tourism at the district & sub-district level.
- Facilitate convergence of resources of various agencies for the development of tourism infrastructure.
- Development and updation of tourism information for districts which may also be uploaded in the district websites.
- Promote the development of tourism master plans for each district in coordination with other government agencies.
- Skill profiling of local population to create lists for guides, freelancers, photographers, home-stay addresses and develop a tourism service provider database and clear awareness among the general public on tourism related matters.
- Contribute to the publicity and promotional material of DoT and encourage/facilitate travel writers, media for publicizing places of tourist interest of the district.
- Prepare the event list at the district level for tourism purposes.
- Organize and facilitate training programs for the benefit of stakeholders in the tourism industry on chargeable basis
- Facilitate the formation of local tourism destination development bodies with local community participation for development of tourism assets.
- Identify, develop and lease out land for parking and other tourist services where user charges can be a source of revenue.

- Facilitate and support the development of eco-tourism societies.
- Develop economically viable Tourism Projects.
- Licensing, regulation and accreditation of tourism ventures as per DoT guidelines
- Mobilize and enlist the local community stakeholders for specific areas / tourism destinations as per requirement.

The Revenue Divisional Commissioner shall be the Patron and the District Collector shall be the Chairman of DTPC .The DTPC shall have an Executive Body which shall be responsible for the daily business & affairs of the Council. The terms and conditions shall be notified separately by the Government.

10.5 Executive Body of DTPC:

The Executive Body shall carry out the business and affairs of the DTPC. The Executive Body will meet at least once in a month. It shall have a tenure of 3 years or as decided by the Government. The Tourist Officer for the District shall be the Secretary to DTPC and shall carry out the functions including convening of meetings, documentation, and other duties as determined by the Executive Body.

District Collector	Chairman
Divisional Forest Officer (DFO)	Member
Project Director, DRDA	Member
Representative of the concerned Municipal Corporation (where applicable)	Member
Superintendent of Police	Member
Representative from Commissionerate of Police (Bhubaneswar-Cuttack)	Member
Representative of Handicrafts & Handloom	Member
Chairman of Zilla Parishad / Municipalities /N.A.C. in district	Member
Local MPs/ MLAs	Member
Executive Engineer PWD (R&B)	Member
Executive Engineer from Rural Development Department (Local works)	Member
District Planning Officer	Member
Executive Engineer (RWS&S)	Member
President, District Hotel Association	Member
President, District Travel Agent Association	Member
Any other member or members nominated by the Chairman who would be helpful in realizing the objectives of the body	Member
OTDC nominee	Member
Tourist Officer for the District	Member Secretary

10.6 Local Tourism Promotion Council:

This Policy proposes the formation of Local Tourism Promotion Councils (LTPC in few important tourist centres for carrying out functions such as –

- Identify land parcels for tourism development in the locality
- Skill profiling of local population to create lists of guides, freelancers, photographers, home-stay addresses and develop a tourism service provider database
- Contribute to the publicity and promotional material of DTPC
- Administering operation & management of tourist facilities created by the Government.
- Implementation of tourism events if any
- Facilitate the formation of local tourism destination development bodies with local community participation for development of tourism assets.
- Identify, develop and lease out land for parking and other tourist services where user charges can be a source of revenue.
- Facilitate and support the development of eco-tourism societies
- Mobilize and enlist the local community stakeholders for specific areas / tourism destinations as per requirement
- Sensitize the local community about the importance of the tourism and to become more tourist friendly

The LTPC shall consist of an Executive Body, the District Collector shall be the Patron and the Block Development Officer shall be the Chairman. The Executive Body shall be the body responsible for the daily business & affairs of the LTPC. The terms and conditions shall be notified separately by the Government. The details of the constitution of the LTPC are as given below:

Block Development Officer	Chairman
Jr. Engineer (Block)	Member
Sarapanch of concerned G.P. / Representative of the concerned Municipal Corporation (where applicable)	Member
O.I.C. of concerned P.S.	Member
President, Local Hotel Association	Member
President, Local Travel Agent Association	Member
Any other member or members nominated by the Chairman who would be helpful in realizing the objectives of the body	Member
OTDC nominee	Member
Tourist Officer for the District	Member Secretary

10.7 Miscellaneous:

A. The Tourism Policy-2016 shall be co-terminus with IPR-2015. The State Government may at any time amend any provision of the policy.

B. Doubts relating to interpretation of any term and / or dispute relating to operation of any provision under this policy shall have to be referred to the Tourism Department for clarification / resolution and the decision of the Government in this regard shall be final & binding on all concerned.

C. Implementation of various provision covering the subsidy, incentives, concessions etc. will be subject to issue of detail guidelines / statutory notifications by the DoT within one month from the date of issue of this policy.

ANNEXURE LXIV

TOURIST FEED BACK FORM (NATURE CAMP) EDC.

SIMILIPAL NATURE CAMPS

Dense Diverse Divine

Making sure everything is perfect for you is a key component of what we do, and we sincerely appreciate any comments you may have regarding your visit

Tourist Feedback form

	Excellent	Good	Fair	Poor
Staff/ETG members Attitude				
Nature Camp - Ambiance				
Nature Camp - Food				
House Keeping				
Cleanliness of the Room				
Activities				
Overall Experience rating				

Any other comments?.....

.....

How did you come to know about Similipal Nature camps?

☐ Referred by friends/relatives

☐ Through Print Media

☐ Through Electronic media

☐ Through Internet/Social media

☐ Already knew about Nature Camps

Have you visited Nature camps earlier?

☐ No, this is my first visit to Nature camp

☐ Yes, this is my second visit

☐ I have already visited Similipal Nature camps a number of times

Room	Courtesy: Deputy Director Similipal North Wildlife Division Jashipur, Mayurbhanj-Odisha Control room: 76828 06146 www.similipal.org/www.ecotourodisha.org ddsimilipalnorth@gmail.com
Location of Stay	
Date	
Name	
Ph	
Mail.....	

ANNEXURE LXV

FEED BACK FOR DAY TOURISM

SIMILIPAL NATURE CAMPS

Dense Diverse Divine

Making sure everything is perfect for you is a key component of what we do, and we sincerely appreciate any comments you may have regarding your visit

Tourist Feedback form

	Excellent	Good	Fair	Poor
Staff/ETG members Attitude				
Nature Camp - Ambiance				
Nature Camp - Food				
House Keeping				
Cleanliness of the Room				
Activities				
Overall Experience rating				

Any other comments?.....

.....

How did you come to know about Similipal Nature camps?

☐ Referred by friends/relatives

☐ Through Print Media

☐ Through Electronic media

☐ Through Internet/Social media

☐ Already knew about Nature Camps

Have you visited Nature camps earlier?

☐ No, this is my first visit to Nature camp

☐ Yes, this is my second visit

☐ I have already visited Similipal Nature camps a number of times

Room	Courtesy: Deputy Director Similipal North Wildlife Division Jashipur, Mayurbhanj-Odisha Control room: 76828 06146 www.similipal.org/www.ecotourodisha.org ddsimilipalnorth@gmail.com
Location of Stay	
Date	
Name	
Ph	
Mail.....	

ANNEXURE LXVI

IDENTIFICATION AND ADAPTION OF DEGRADED FOREST PATTERNS AROUND TIGER RESERVE

OFFICE OF THE FIELD DIRECTOR, SIMILIPAL TIGER RESERVE
-CUM- REGIONAL CHIEF CONSERVATOR OF FORESTS, BARIPADA
Phone No-06792-259126, FAX- 06792 – 256705 E-mail : rccf.baripada@odisha.gov.in

By E-Mail

Memo No 613 /3F-38/2022
Dated, Baripada the 02 ~~February~~ March, 2022.

To

Dr. Amit Mallick,
Inspector General of Forests (NTCA),
Govt. of India, MoEF & CC,
National Tiger Conservation Authority, New Delhi.

Sub:- Identification and adoption of degraded forest areas patch around Tiger Reserve.

Ref:- Your Letter F. No.7-3/2014-NTCA, dt.09.02.2022.

Sir,

In inviting a kind reference to your above cited letter on the captioned subject, the suitable degraded forests of substantive area in the vicinity of Similipal Tiger Reserve identified by the Divisional Forest Officers of Baripada Circle is furnished hereunder for favour of your information and necessary action.

Name of the Circle	Name of the Division	Name of the Reserve Forests in the vicinity of Similipal Tiger Reserve	Area (in Ha.)
Baripada	Karanjia	Mituani -III RF	98.08Ha.
		Ektali –II PRF	215.30Ha
		Mituani-I RF	106.80Ha
		Mituani-II RF	184.40Ha.
		Kadapani RF	145.20Ha.
	Keonjhar(WL)	Santoshpur RF	9393.49Ha.
		Boula RF (Hadagarh Sanctuary)	10421.98Ha.
	Balasore(WL)	Tenda RF (Kuldiha WL Sanctuary)	1985.40Ha.
		Kuldiha RF (Kuldiha WL Sanctuary)	11468.00Ha.
		Devgiri RF (Kuldiha WL Sanctuary)	857.20Ha.

for Field Director, Similipal Tiger Reserve
-Cum-Regional C.C.F, Baripada.

Memo No. 614 /Date. 02.03.2022

Copy forwarded to the Principal Chief Conservator of Forests (WL) & CWLW, Odisha, Bhubaneswar for favour of information with reference to Letter F. No.7-3/2014-NTCA, dt.09.02.2022 of IGF(NTCA), New Delhi.

Field Director, Similipal Tiger Reserve
-Cum-Regional C.C.F, Baripada.

ANNEXURE LXVII

CFR AND IFR DETAILS IN SIMILIPAL TIGER RESERVE

By E-Mail

OFFICE OF THE FIELD DIRECTOR, SIMILIPAL TIGER RESERVE
-CUM- REGIONAL CHIEF CONSERVATOR OF FORESTS, BARIPADA
Phone No-06792-259126, FAX- 06792 – 256705 E-mail : rccfbaripada@gmail.com

Memo No 884 / 3F-01/2020.
Dated, Baripada the 06th August, 2020.

To

The Field Director, Similipal Tiger Reserve
-Cum-Regional Chief Conservator of Forests, Baripada.

Sub:- Information related to settlement of rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 within tiger reserves.

Ref:- Your Memo No.2029, dt.07.07.2020.

With reference to your above cited memo on the captioned subject, the information related to settlement of rights under FRA-2006 within Tiger Reserve in respect of Similipal South Wildlife Division, Baripada is furnished below for favour of your information and necessary action.

State	Tiger Reserve	Core				Buffer				Remarks/ Details of progress are to be provided in this column if the settlement has not yet taken place.
		Individual Rights		Community Rights		Individual Rights		Community Rights		
		No. of individuals	Area (in Ac.)	No. of Rights	Area (in Ac.)	No. of individuals	Area (in Ac.)	No. of Rights	Area (in Ac.)	
2	3	4	5	6	7	8	9	10	11	12
Odisha	Similipal Tiger Reserve	1	1.19	-	-	27	479.16	33	22990.78	1-ROR already Provided to IFR claimants, 2- Management Plans for Community Rights have not been approved by DLC till date.

Deputy Director,
Similipal South WL Division, Baripada.

ANNEXURE-LXVIII

GOVERNMENT OF ODISHA
FOREST, ENVIRONMENT AND CLIMATE CHANGE DEPARTMENT
****

NOTIFICATION

Bhubaneswar, Dated the 1st Aug 2023

No.FE-WL-WLF-0022-2023 / 16064 / FE & CC, In pursuance of the decision taken in the meeting held on 22nd June, 2023 under the Chairmanship of the Chief Secretary, Odisha on strengthening of protection measures in Similipal Tiger Reserve, it is decided to set up Joint Task Force (JTF) under the Chairmanship of the Field Director, Similipal Tiger Reserve (STR) by comprising of both Forest & Police personnel with 1 (one) company of Armed police Constabulary .

Accordingly , after careful consideration of the proposal of the PCCF (Wildlife) and Chief Wildlife Warden, Odisha, conceptualized in consultation with the IGP, East Zone, Balasore; S.P, Mayurbhanj; DFO, Baripada and the Deputy Directors of Similipal North & South Wildlife Divisions, the Government have been pleased to set up the Joint Task Force (JTF) under the Chairmanship of the Field Director, Similipal Tiger Reserve (STR) with the following composition and Terms of Reference (ToR).

(A) Composition of Joint Task Force (JTF)

Field Director, Similipal Tiger Reserve cum RCCF, Baripada	Chairman
DFO, Baripada Forest Division	Member
DFO, Karanjia Forest Division	Member
DFO, Rairangpur Forest Division	Member
Deputy Director, Similipal North WL Division	Member
Additional SP/ DSP (Operations) Mayurbhanj	Member
ACF, Similipal South WL Division (Intelligence)	Member
Deputy Director, Similipal South WL Division	Member Convener

It may co-opt any further experts/ Civil Society groups/ scientific community/ any individuals for discharge of duties and responsibilities.

(B) Police personnel to be attached to Joint Task Force (JTF):

Designation	Number of personnel	Remarks
One Company of armed constabulary	100	One Company (3 platoons) to be deployed by DGP and to have personnel of different ranks as per standard norms
Total	**100** [one company (3 platoons)]	

FE-WL-WLF-0022-2023/1/2023

NB: Disciplinary and administrative control will rest with SP, Mayurbhanj whereas operational control will be vested with the Company Head who in consultation with the Field Director/ JTF shall deploy the force.

(C) Forest personnel to be attached to Joint Task Force (JTF)

Designation	Number of personnel	Remarks
Range Officer / Dy RO	3	To be deployed by the Field Director from STR / Baripada
Forester	6	
Forest Guards	81	FGs of existing Similipal Tiger Protection Force will work under JTF
Total	**90**	

NB: Disciplinary, administrative and operational control will be vested with the Field Director and/or officers authorized by him. Further, the Field Director shall deploy the personnel duly keeping the JTF informed.

(D) Terms of Reference of the Joint Task Force (JTF):

- To collect intelligence and identify people holding illegal arms and ammunitions in fringe/ buffer villages of Similipal Tiger Reserve and prepare a database.
- To take comprehensive action involving forest and police personnel in de-weaponing all the illegally acquired weapons in the fringe and buffer villages of Similipal Tiger Reserve.
- To effectively deploy the force to counter any armed poachers inside Similipal Tiger Reserve.
- To deploy Forest and Police personnel at susceptible anti-poaching camps/ sensitive areas for regular patrolling.
- To provide capacity building to forest personnel in the form of training on the use of fire arms as well as in dealing with armed poachers inside the forest area.
- To take any further measures as may be necessary for protection of Similipal Tiger Reserve and its wild life.

By order of the Governor,

21/7/23

Additional Chief Secretary to Govt.

Memo No. 16072 /FE & CC, Dated. 01.08.23

Copy forwarded to Director General of Police (DGP), Odisha for information and necessary action.

He is requested to provide required number of police officers of different ranks to act as members of the Task Force.

1.8.2023

Additional Secretary to Government.

Memo No. 16073 /FE & CC, Dated. 01.08.23

Copy forwarded to All Departments / all RCCFs/ All Collectors / all Superintendent of Police / all DFOs for information and necessary action.

1.8.2023

Additional Secretary to Government.

Memo No. 16074 /FE & CC, Dated. 01.08.23

Copy forwarded to all members of Joint Task Force for information action and necessary action.

1.8.2023

Additional Secretary to Government.

Memo No. 16075 /FE & CC, Dated. 01.08.23

Copy forwarded to the Head State Portal, IT Department / NIC, Bhubaneswar for information and necessary action/ 20 spare copies to Guard file.

1.8.2023

Additional Secretary to Government.