MANAGEMENT EFFECTIVENESS EVALUATION of TIGER RESERVES IN INDIA

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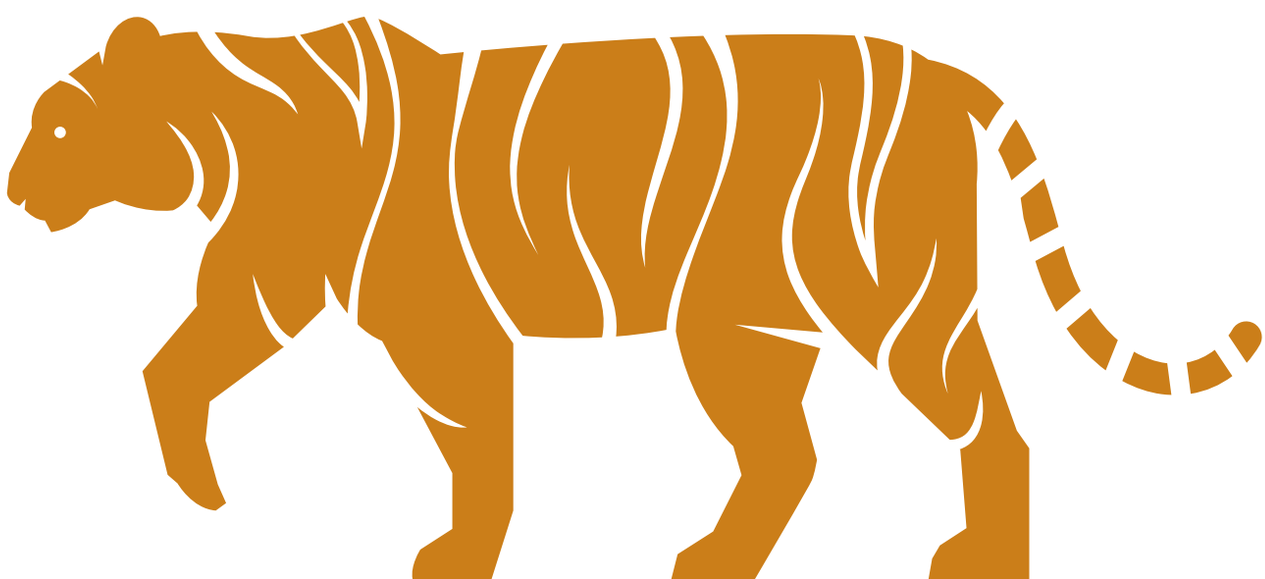

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Cover Photo
Manoj Dholakia

मंत्री
पर्यावरण, वन एवं जलवायु परिवर्तन
और
श्रम एवं रोजगार
भारत सरकार

स्वच्छ भारत
एक कदम स्वच्छता की ओर

सत्यमेव जयते

MINISTER
ENVIRONMENT, FOREST AND CLIMATE CHANGE
AND
LABOUR AND EMPLOYMENT
GOVERNMENT OF INDIA

Azadi Ka Amrit Mahotsav

भूपेन्द्र यादव
BHUPENDER YADAV

Message

I am delighted to inform that India has been conducting the Management Effectiveness Evaluation (MEE) of its tiger reserves using the globally accepted framework developed by IUCN's World Commission on Protected Areas since 2006. This evaluation exercise has been conducted for many years now and has provided valuable insights into the effectiveness of our conservation efforts in tiger reserves across the country. The criteria and indicators adopted for this evaluation have been specifically tailored to Indian conditions, taking into account the unique context and geographical location of each tiger reserve. The MEE score is based on a range of factors, including the performance and management of each reserve over time.

I would like to acknowledge the immense efforts put in by the Wildlife Institute of India and the National Tiger Conservation Authority, for their instrumental role in the success of this exercise. Their dedication and commitment towards safeguarding our natural resources and protecting our precious tiger population is truly commendable.

The Management Effectiveness Evaluation has played a critical role in enhancing the management of our tiger reserves. It has helped in identifying the gaps in our conservation efforts and enabled us to adopt more effective strategies for ensuring the long-term survival of these magnificent creatures. I am proud to say that our tiger reserves have shown a steady improvement in their MEE scores, indicating that our conservation efforts are bearing fruit. This is a testimony to our commitment towards protecting our natural heritage and conserving our biodiversity.

I congratulate all the team members for this endeavour.

(Bhupender Yadav)

Date: 31.03.2023

सत्यमेव जयते

आहारशुद्धौ सत्वशुद्धिः

एक कदम स्वच्छता की ओर

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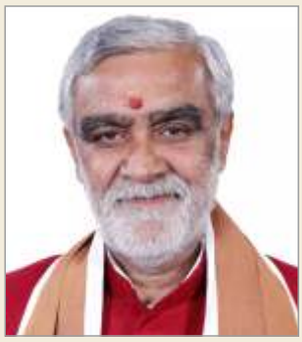
अश्विनी कुमार चौबे
Ashwini Kumar Choubey



Message

India is one of the select countries in the world that has successfully not only assessed its tiger conservation efforts through the globally accepted management effectiveness framework, but has also replicated the assessment for five consecutive times (2006-2022). This assessment exercise has provided valuable insights to policy makers, conservationists and academia as to what strategies work best for ensuring long term conservation of tigers in the country.

The criteria/ indicators adopted for conducting the Management Effectiveness Evaluation (MEE) using IUCN's World Commission on Protected Areas Framework for assessing the management effectiveness of Tiger Reserves have been suitably adapted to Indian conditions. The MEE score of a tiger reserve, in addition to management, is dependent on the context and geographical location of that tiger reserve, reflecting upon the trends in its performance and management over a period of time.

India has been able to manage its Tiger Reserves effectively as is reflected by the fact that none of them fall in the poor management category and there has been a substantial improvement in the fifth cycle of assessment. This is indeed a moment of immense pride for our field formations in Tiger Reserves, the Chief Wildlife Wardens of the States, Wildlife Institute of India and the National Tiger Conservation Authority. I would like to compliment all the stakeholders for their magnificent effort and would urge them to continue striving for safeguarding our wilderness resources in general and tiger populations in particular.

(Ashwini Kumar Choubey)

Acknowledgements

We would like to thank a large number of officers and managers for providing support for the evaluation of 51 Tiger Reserves across the country.

We are grateful to the officials and staff of the National Tiger Conservation Authority (NTCA), Ministry of Environment, Forest and Climate Change

(MoEF&CC) for providing technical guidance and financial assistance to accomplish this exercise.

Especially, we would like to thank the Chief Wildlife Wardens of all 18 Tiger States and Field Directors and frontline staff of 51 Tiger Reserves for their valuable contribution in carrying forward the Management Effectiveness Evaluation (MEE) exercise.

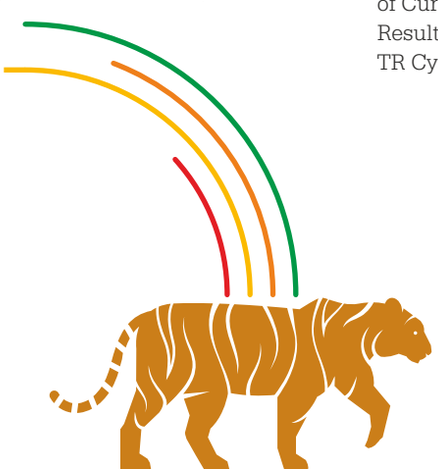
We express our sincere appreciation for the professional support and untiring efforts of the 10 independent teams (Chairmen and members) constituted by the NTCA for the five clusters for the evaluation of 51 Tiger Reserves in the country.

We are especially indebted to the faculty member and staff of the Wildlife Institute of India for their valuable support in accomplishing the task.

We would like to especially thank Dr. V.B. Mathur former director, Wildlife Institute of India for providing his valuable thoughts in finalizing the analysis and the report.

The Team
Wildlife Institute of India
Dehradun
July, 2023

CONTENTS



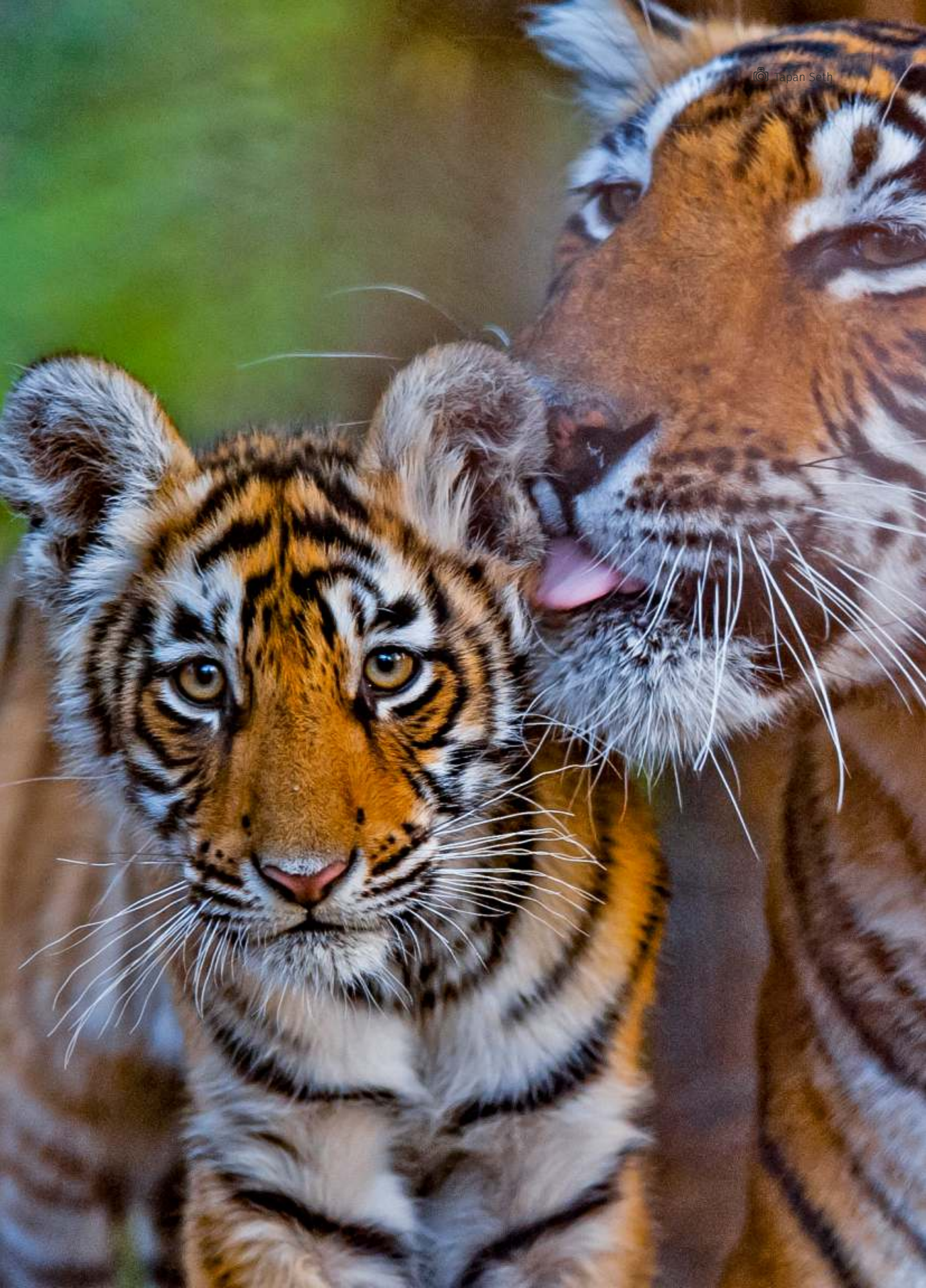
ABBREVIATIONS

WORD	ABBREVIATIONS
ACF	Assistant Conservator of Forests
AJEEVIKA-NRLM	Ajeevika-National Rural Livelihood Mission
APCCF	Additional Principal Chief Conservator of Forests
APCS	Anti-Poaching Camps
APO	Annual Plan of Operation
BCRLIP	Biodiversity Conservation Rural Livelihood Improvement Project
BO	Beat Officer
BR	Biosphere Reserve
BSF	Border Security Force
BSI	Botanical Survey of India
C2C	Category 2 Centre
CAMPA	Compensatory Afforestation and Management Planning Authority
CBD	Convention on Biological Diversity
CBET	Community-based Ecotourism
CCF	Chief Conservator of Forest
CF	Conservator of Forest
CRPF	Central Reserve Police Force
CTH	Core/ Critical Tiger Habitat
CWLW	Chief Wildlife Warden
DCF	Deputy Conservator of Forest
DFO	Divisional Forest Officer
DGF	Director General of Forest
EDC	Eco-Development Committee
E-EYE	Electronic Eye
EPT	Elephant Proof Trench
ESZ	Eco-Sensitive zone
FD	Field Director/ Fixed Deposit
FDC	Forest Development Corporation
FG	Forest Guard
FRA	Forest Rights Acts
FW	Forest Watcher
GIS	Geographical Information System
GO	Government Order
GOI	Government of India
GPS	Global Positioning System
GPSPDA	Global Positioning System Personal Digital Assistant

HOFF	Head of Forest Force
HRD	Human Resource Development
HWC	Human-Wildlife Conflict
IEDP	India Eco-development Project
IIFM	Indian Institute of Forest Management
ITDA	Integrated Tribal Development Agency
IUCN	International Union for Conservation of Nature and Natural Resources
JFMC	Joint Forest Management Committee
KV	Kilo Volt
LAC	Local Advisory Committee
LOC	Letter of Credit
LPG	Liquid Petroleum Gas
LTM	Lion Tailed Macaque
LWE	Left Wing Extremism
MEE	Management Effectiveness Evaluation
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Scheme
MOEFCC	Ministry of Environment, Forest and Climate Change
MOU	Memorandum of Understanding
MS	Member Secretary
M-STRIPES	Monitoring System for Tigers, Intensive Protection and Ecological Status
MV	Motor Vehicle
NABARD	National Bank for Agriculture and Rural Development
NGI	Non-Governmental Institute
NGO	Non-Governmental Organisation
NGS	National Geographic Society
NGSDP	National Green Skill Development Programme
NH	National Highway
NIC	Nature Interpretation Centre
NP	National Park
NTCA	National Tiger Conservation Authority
NTFP	Non-Timber Forest Produce
NWFP	Non-Wood Forest Produce
PA	Protected Area/ Protection Assistant
PAO	Pay and Account Office
PCCF	Principal Chief Conservator of Forests
PCCF(WL)	Principal Chief Conservator of Forests (Wildlife)
PDF	Park Development Fund


Dhritiman Mukherjee

PRT	Primary Response Team
PT	Project Tiger
PWD	Public Works Department
REC	Regional Expert Committee
RET	Rare, Endangered and Threatened Species
RKVY	Rashtriya Krishi Vikas Yojana
RO	Range Office
RWD	Rural Works Department
SBM	Swachh Bharat Mission
SFRI	State Forest Research Institute
SIDCUL	State Industrial Development Corporation of Uttarakhand Limited
SOG	Special Operation Group
SOP	Standard Operating Procedure
SSB	Sashastra Seema Bal
STPF	Special Tiger Protection Force
SWOT	Strength Weakness Opportunity Threats
TCF	Tiger Conservation Foundation
TCP	Tiger Conservation Plan
TR	Tiger Reserve
UAV	Unmanned Aerial Vehicle
VES	Vertical Electrical Sounding
VFC	Village Forest Committee
VHF	Very High Frequency
VSS	Van Sanrakshan Samitis
WB	World Bank
WCCB	Wildlife Crime Control Bureau
WCPA	World Commission of Protected Area
WCT	Wildlife Conservation Trust
WHS	World Heritage Site
WII	Wildlife Institute of India
WLPA	Wildlife (Protection) Act, 1972
WLS	Wildlife Sanctuary
WT	Wireless Tower/ Watch Tower
WTI	Wildlife Trust of India
WWF	World Wide Fund for Nature
ZSI	Zoological Survey of India


Tapan Seth

INTRODUCTION

MANAGEMENT EFFECTIVENESS EVALUATION OF TIGER RESERVES IN INDIA

Rathika Ramasamy

1.1 Conservation Challenges

Tigers (*Panthera tigris*) are one of the largest apex predators serving as a umbrella species for conservation and most endangered big cats in the wild. Tigers were once found in abundance in the Asian continent, with a distributional range that spanned 30 present-day countries (Karanth and Nichols, 2017). Gradual expansion of human settlements and rapid urbanization has exerted tremendous pressure on tigers. In the intensifying conflict between humans and tigers over land and livestock, tigers were systematically exterminated from most of their range. With the introduction of steel traps and snares, followed by firearms, explosives, and chemical poisons, hunters nearly eradicated tigers from the majority of their range (Karanth, 2001) causing approximate 93% contraction of their historical global range (Sanderson et al. 2006). Poaching, fuelled by an illegal international demand for tiger parts and products, depletion of tiger prey due to illegal consumption of wild meat, and habitat loss due to an ever-increasing demand for forested lands are major threats to tigers. Late in the 1960s, wildlife experts observed that poaching of tigers and their prey, as well as habitat degradation, had sharply reduced the number of tigers in the wild. Tiger numbers have plummeted from as many as 100,000 individuals to around 4,000 over the past century (Dinerstein et al. 2007), despite decades of conservation efforts and investments.

1.2 Protected Areas

Protected areas (PAs) are the cornerstone of most conservation strategies around the world. In India, under the Wildlife (Protection) Act, 1972, four legal categories of PAs have been recognised viz. National Parks, Wildlife Sanctuaries, Conservation Reserves and Community Reserves. Currently, there are 998 Protected Areas (106 National Parks, 567 Wildlife Sanctuaries, 105 Conservation Reserves and 220 Community Reserves) covering 1,73,629 km^2 or 5.28% of the country's geographical area (Source: WII ENVIS, 2023). Fifty-three Tiger Reserves have been notified which include National Parks and Wildlife Sanctuaries of the country. The Tiger Reserve notifications are an additional layer of protection around PAs.

With increasing urban sprawl, most of the Protected Areas in India are becoming isolated islands amidst pool of hostile land-use matrices. Protected Areas face many challenges to their integrity and connectivity 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. Assessing the effectiveness of management and using the results for adaptive management is at the core of good PA management and governance. Assessments enable managers and stakeholders to reflect on their experience, allocate resources efficiently and plan for effective management in relation to potential threats and opportunities (Hockings et. al. 2007).

Management Effectiveness Evaluation of these sites is one important way of ensuring that the investment of time and effort in establishing and managing PAs in delivering the benefits that society seeks.

INTRODUCTION 01

1.3 Project Tiger

India has been recognised as one of the world's mega-biodiverse nations, comprising approximately 8% of the world's biodiversity on only 2.4% of its landmass. Managing this diversity is a tremendous challenge and responsibility, made increasingly difficult by a number of prevalent threats. As a result, the Indian Wildlife (Protection) Act of 1972 came into effect in order to protect India's biological diversity. This act is the overarching wildlife enforcement statute in India.

After a year of the enactment of the Wildlife (Protection) Act of 1972, the Indian government launched Project Tiger in 1973 to protect the tiger and preserve its habitat. The initial conception of the project spanned six years, from April 1973 to March 1979. "Project Tiger" is a pioneering conservation initiative that seeks to use the tiger's role and charisma to garner resources and public support for conserving specific ecosystems. Securing natural systems and their functions would ensure that future generations of Indians have access to their inherent values, commodities, and services. The Tiger Task Force recommended three phases for Project Tiger: Phase One from 1972 to 1980, Phase Two from 1980 to 1990, and Phase Three from 1990 to 2000.

Manas, Palamau, Similipal, Corbett, Ranthambore, Kanha, Melghat, Bandipur, and Sundarban Tiger Reserves were the first nine Tiger Reserves established in the country after the conception of Project Tiger. The current number of Tiger Reserves in the country has increased from nine to fifty-three.

Project Tiger has been one of the largest species conservation initiatives of its kind in the world. Project Tiger Directorate of the Ministry of Environment and Forests was mandated with the task of providing technical guidance and funding support to tiger bearing states. The initial success of Project Tiger evaluated by the pugmark census technique put the figure to around 3,500 tigers by 1990s.

Figure 1.1: Tiger Reserve Network in India

Table 1.1: List of 53 Tiger Reserves in India

S. No.	Tiger Reserve (TR)	State	TR Notification Year	Total Area (sq. km)
1	Bandipur	Karnataka	2007	1456.3
2	Corbett	Uttarakhand	2010	1288.31
3	Kanha	Madhya Pradesh	2007	2,051.79
4	Manas	Assam	2008	2,837.10
5	Melghat	Maharashtra	2007	2,768.52
6	Palamau	Jharkhand	2012	1,129.93
7	Ranthambore	Rajasthan	2007	1,411.29
8	Similipal	Orissa	2007	2,750.00
9	Sundarban	West Bengal	2007	2,584.89
10	Periyar	Kerala	2007	925.00
11	Sariska	Rajasthan	2007	1,213.34
12	Buxa	West Bengal	2009	757.90
13	Indravati	Chhattisgarh	2009	2,799.07
14	Namdapha	Arunachal Pradesh	1987	2,052.82
15	Nagarjunasagar	Andhra Pradesh	2007	3,296.31
16	Dudhwa	Uttar Pradesh	2010	2,201.77
17	Kalakad Mundanthurai	Tamil Nadu	2007	1,601.54
18	Valmiki	Bihar	2012	899.38
19	Pench	Madhya Pradesh	2007	1,179.63
20	Tadoba Andhari	Maharashtra	2007	1,727.59
21	Bandhavgarh	Madhya Pradesh	2007	1,536.93
22	Panna	Madhya Pradesh	2007	1,598.10
23	Dampa	Mizoram	2007	988.00
24	Bhadra	Karnataka	2007	1,064.29
25	Pench - MH	Maharashtra	2007	741.22
26	Pakke	Arunachal Pradesh	2012	1,198.45
27	Nameri	Assam	2000	464.00
28	Satpura	Madhya Pradesh	2007	2,133.31
29	Annamalai	Tamil Nadu	2007	1,479.87
30	Udanti Sitanadi	Chhattisgarh	2009	1,842.54
31	Satkosia	Odisha	2007	963.87
32	Kaziranga	Assam	2007	1,173.58
33	Achanakmar	Chhattisgarh	2009	914.02
34	Kali (Dandeli-Anshi)	Karnataka	2007	1,097.51
35	Sanjay Dubri	Madhya Pradesh	2011	1,674.50
36	Mudumalai	Tamil Nadu	2007	688.59
37	Nagarhole	Karnataka	2007	1,205.76
38	Parambikulam	Kerala	2009	643.66
39	Sahyadri	Maharashtra	2012	1,165.57
40	Biligiri Ranganathaswamy Temple	Karnataka	2007	574.82
41	Kawal	Telangana	2012	2,015.44
42	Sathyamangalam	Tamil Nadu	2013	1,408.40
43	Mukundara Hills	Rajasthan	2013	759.99
44	Nawegaon Nagzira	Maharashtra	2013	1,894.94
45	Amrabad	Telangana	2015	2,611.39
46	Pilibhit	Uttar Pradesh	2014	730.25
47	Bor	Maharashtra	2012	816.27
48	Rajaji	Uttarakhand	2015	1075.17
49	Orang	Assam	2016	492.46
50	Kamlang	Arunachal Pradesh	2017	783.00
51	Srivilliputhur Megamalai	Tamil Nadu	2021	1016.57
52*	Ramgarh Vishdhari	Rajasthan	2022	1501.8921
53*	Ranipur	Uttar Pradesh	2022	529.3612

*Two recently declared Tiger Reserves viz., Ramgarh Vishdhari and Ranipur Tiger Reserves were not included in the current cycle of MEE.

1.4 Tiger Reserves

Tiger Reserves in India are the best conservation model in the world, providing preeminent habitat for biodiversity conservation and human wellbeing. They are also the prime destinations for nature-based tourism due to their unique biological, cultural and aesthetic features.

The Government of India undertook an important conservation initiative by launching the 'Project Tiger' in 1973 and so far, India has declared a network of 53 Tiger Reserves spread across 18 States (Figure 1.1 & Table 1.1). Of which, a total of 51 Tiger Reserves are evaluated through MEE process encompassing a total of 73,765.57 square kilometres area; 40,787.15 square kilometres serve as the core and 32,978.42 square kilometres serve as the buffer (https://ntca.gov.in/) in fifth cycle of MEE of TR 2022.

Tiger reserves are effective tools of conservation of natural forest and wilderness areas. Besides conserving tigers and harbouring a rich biodiversity, they are vital to ensure perpetuity of natural evolutionary processes and a range of ecosystem services . They also support ecological processes responsible for providing a range of various associated economic, social, cultural and spiritual benefits.

1.5 Why Management Effectiveness Evaluation (MEE) of Tiger Reserves?

To gauge the efficacy of conservation efforts and to steer management inputs, it is essential to evaluate the efficiency of Tiger Reserve management. After the extinction of tigers in Sariska Tiger Reserve, Rajasthan, the Prime Minister's Office (PMO) issued a directive to the Office of the Comptroller and Auditor General (C&AG) of India and the Ministry of Environment, Forest, and Climate Change (MoEFCC) to conduct an independent audit and submit the report to the Parliament. The Wildlife Institute of India, Dehradun, hosted a meeting with a high-level committee from the C&AG Office on behalf of the MoEFCC. During that meeting, it was decided to devise a procedure for 'independent evaluation' of the country's Tiger Reserves. Then, using the under the global IUCN World Commission on Protected Area (WCPA) framework, a management effectiveness evaluation (MEE) module was developed with the technical help of MEE experts, notably Dr Marc Hockings and Dr Jamison Ervin..

1.6 What is Management Effectiveness Evaluation (MEE)?

In the past one and a half decades, assessment of management effectiveness has emerged as an essential tool for PA managers and is increasingly being required by Governments and international bodies. In both developed and developing nations, it has been seen that establishment of PAs has not always resulted in adequate protection (Hockings and Phillips 1999, Hockings et al. 2000, Ervin 2003). Evaluation is required because PAs face many threats. Issues within and/or beyond the control of individual managers should be weighed in an evaluation of management effectiveness. This approach enables a variety of responses to threats and management deficiencies, from site-specific actions to broad political and policy evaluations (Hockings et al., 2000).

Management effectiveness evaluation (MEE) is defined as the assessment of how well PAs are being managed-primarily, whether they are protecting their values and achieving the goals and objectives agreed upon. The term 'management effectiveness' reflects three main themes of PA management:

- Design issues relating to both individual sites and PA systems.
- The adequacy and appropriateness of management systems and processes.
- Delivery of the objectives of PAs, including conservation of values.

Broadly speaking, MEE can:

- Enable and support an adaptive approach to management.
- Assist in effective resource allocation.
- Promote accountability and transparency.
- Help involve the community and build constituencies.
- Promote the values of PAs.

1.7 Indian Experience on MEE

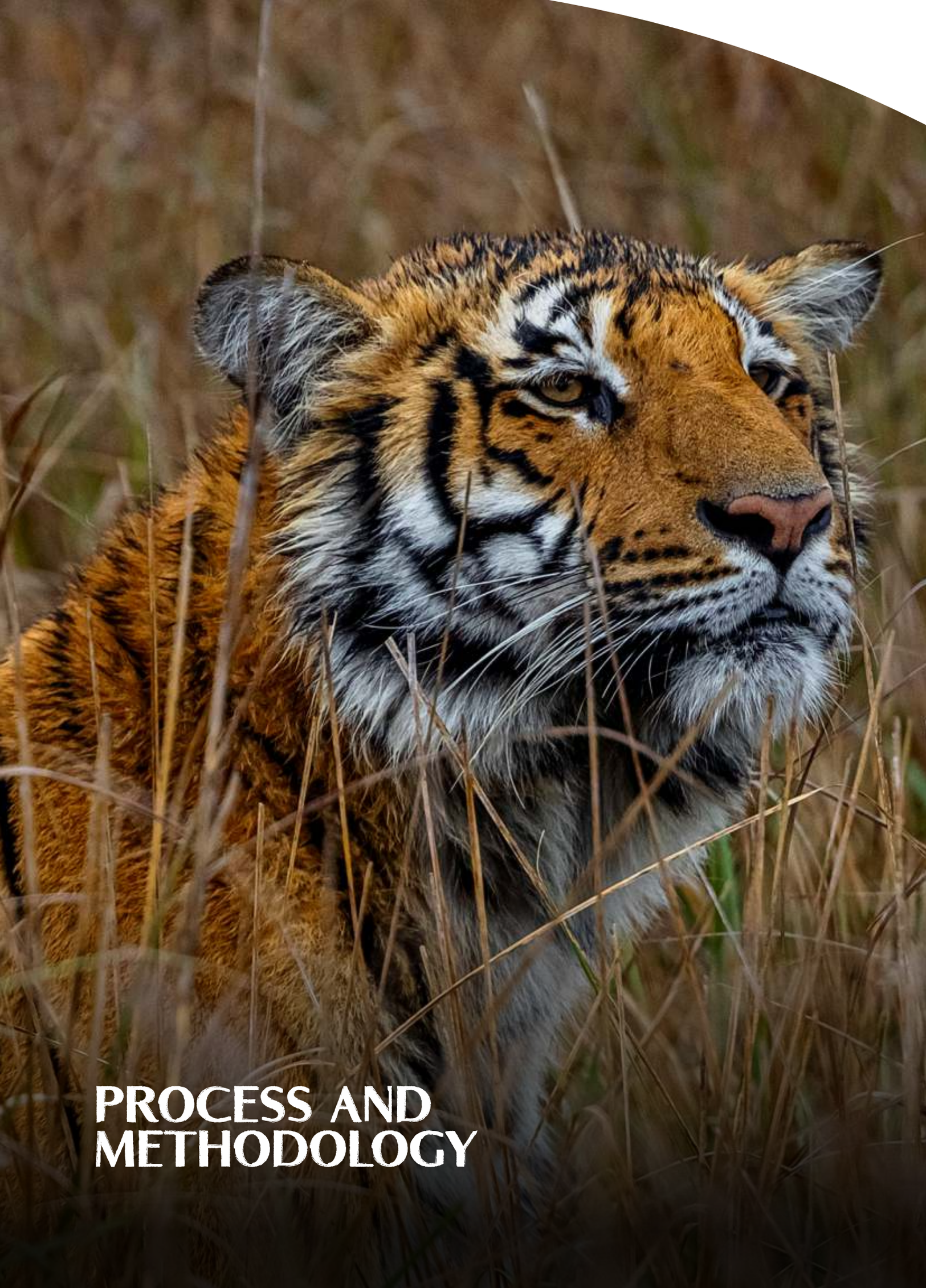
India is one of the few nations to have institutionalised the MEE Process. In 2006, India initiated an evaluation of the efficacy of the management of its natural world heritage sites (Mathur, 2008). As part of the IUCN-UNESCO 'Enhancing Our Heritage' initiative, three South Asian Natural World Heritage sites, namely Keoladeo National Park in Rajasthan, Kaziranga National Park in Assam, and Chitwan National Park in Nepal, were

evaluated between 2002 and 2007. The MEE of national parks and wildlife sanctuaries began in 2006. India has conducted five cycles of evaluation of the Tiger Reserves at an interval of every four years from 2006 to 2022. The first cycle contained 28 TRs in 2006, the second cycle 39 TRs in 2010, the third cycle 43 TRs in 2014, the fourth cycle 50 TRs in 2018 and the fifth cycle 51 TRs in 2022. Table 1.2 provides a summary of MEE exercises conducted in India.

Dhritiman Mukherjee

Table 1.2: MEE exercises conducted in India.

S. No.	Type of Approach	Application in India
1	In-depth, Evidence-based assessment WORLD HERITAGE SITES	03 World Heritage Sites (WHS) (2003-2008) Keoladeo WHS, Rajasthan, India Kaziranga WHS, Assam, India Chitwan WHS, Nepal
2	Rapid Expert-based scorecard NATIONAL PARKS AND WILDLIFE SANCTUARIES	MEE of 125 PAs from 2006-2014: report published in 2015 MEE of 80 PAs in 2015-2017: report published in 2017 MEE of 125 PAs in 2017-18: report published in 2018 MEE of 146 PAs in 2018-19: report published in Jan 2021 MEE of 156 PAs in 2020-21: completed MEE of 150 PAs in 2022-23: completed
3	Comprehensive system-wide, Peer-based assessment TIGER RESERVES NETWORK	MEE of 28 Tiger Reserves in 2006 MEE of 39 Tiger Reserves in 2010 MEE of 43 Tiger Reserves in 2014 MEE of 50 Tiger Reserves in 2018 MEE of 51 Tiger Reserves in 2022



PROCESS AND METHODOLOGY

MANAGEMENT EFFECTIVENESS EVALUATION OF TIGER RESERVES IN INDIA

Manoj Dholakia

2.1
IUCN's Framework for Assessing Management Effectiveness

IUCN has developed a framework for assessing the management effectiveness of protected areas through six elements i.e., context, planning, input, process, output and outcomes (Figure 2.1). It begins with establishing the *context* of existing values and threats, progresses through *planning* and allocation of resources (*inputs*) as a result of management actions (*process*) and eventually produces goods and services (*outputs*) that result in impacts or *outcomes*. The elements are grouped within design/planning, adequacy and appropriateness of management systems and processes and delivery of protected area objectives including conservation of values.

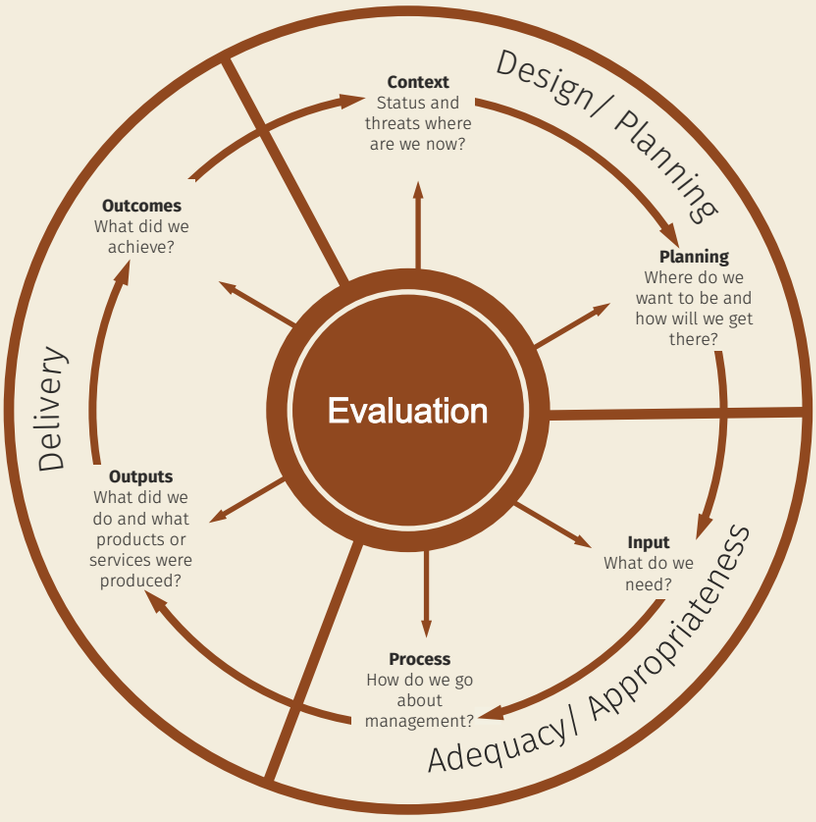


Figure 2.1
MEE Framework

Source
Hockings et al. 2008)

PROCESS AND METHODOLOGY

02

2.2 Assessment Process for MEE of Tiger Reserves in India, 2022

In order to bring about parity in the analysis of diverse Tiger Reserves of the country and to guide the evaluators with respect to the assessments to be made, the criteria have been slightly refined since past cycles in the technical manual. For assessment of each of the six elements of the MEE Framework, 33 criteria (Table 2.1) have been developed for MEE of Tiger Reserves in India. Explanatory notes on 'Criteria', wherever needed, were provided to guide the assessment process. A detailed matrix was developed and included as a part of assessment to make the scoring more objective after assigning differential weightages to different criteria/indicators. Against each 'Criteria' the evaluation team indicated appropriate 'Reference document(s)' and also provided 'Remarks'. The scores by themselves will not help in providing the complete picture unless supported by observations/ remarks that qualify such scores.

The scoring was done based on the parameters indicated in the matrix for each headline indicator. The evaluators were only allowed to choose one response and each response was assigned a score from 2.5 to 10, a score of 2.5 represented the lowest management effectiveness and rated as 'poor'; a score of 5 represented average management effectiveness and rated as 'fair'; a score of 7.5 represented the below optimal management effectiveness and rated as 'good', whereas a score of 10 represented the optimal management effectiveness and rated as 'very good'. The scores of all 33 'criteria/indicators' were pooled together for each of the 51 Tiger Reserves and a percentage rating was calculated for each Tiger Reserve. This interpretation classifies the results into four categories based on the percentage of maximum possible score: 50-59% rated as 'Fair'; 60-74% rated as 'Good'; 75-89% rated as 'Very Good' and >= 90% rated as "Excellent". Slight modification of these categories and the introduction of the category "Excellent" was done in order to accommodate substantial improvement (higher scores viz. >= 90%) made by the Tiger Reserves during 5th cycle of MEE. Care was taken to ensure that these categories are comparable with previous cycles of MEE, i.e., very good category of the previous cycles was split into two categories, viz., very good and excellent categories in this cycle.

Table 2.1: List of 33 criteria/indicators adopted by MEE of Tiger Reserves

Element	Ind. #	Indicator Name
Context	1.1	Are the values of the Tiger Reserves (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?
Planning	2.1	Status of Tiger Conservation Plan (TCP)?
	2.2	Does the TR safeguard the threatened biodiversity values?
	2.3	Are stakeholders given an opportunity to participate in planning process?
	2.4	Are habitat management programmes systematically planned, relevant and monitored, and contribute effectively to tiger and other endangered species conservation?
	2.5	Does the TR have 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-wildlife 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?
Input	3.1	Are personnel adequate, well organized and deployed with access to adequate resources in the Tiger Reserve (TR)*?
	3.2	Are resources (vehicle, equipment, building etc.) adequate, well organized and managed with desired access?

Element	Ind. #	Indicator Name
	3.3	Are financial resources other than those of the state linked to priority actions and are funds adequate, released timely and utilized?
	3.4	Are financial resources from the state linked to priority action and funds adequate, timely released and utilized for the management of Tiger Reserve?
	3.5	What level of resources are provided by donors other than government sources?
Process	4.1	Does the TR have manpower resources trained in wildlife conservation for effective TR management?
	4.2	Is TR staff management performance linked to achievement of management objectives?
	4.3	Is there effective public participation in TR management+ and does it show in making a difference?
	4.4	Is there a responsive system for handling complaints and comments+ about TR management?
	4.5	Does TR management address the livelihood issues+ of resource dependent communities, especially of women?
	4.6	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)?
Output	5.1	Is adequate information on TR management publicly available?
	5.2	Are visitor services and facilities appropriate and adequate?
	5.3	Are research/ monitoring related trends systematically evaluated and routinely reported and used to improve management?
	5.4	Is there a systematic maintenance schedule and funds in place for management of infrastructure/assets?
Outcome	6.1	Are populations of threatened species declining, stable or increasing?
	6.2	Is the population of tigers showing a declining, stable or increasing trend?
	6.3	Have the threats+ to the TR being reduced/ minimized? Or is there an increase?
	6.4	Are the expectations of visitors+ generally met or exceeded?
	6.5	Are local communities supportive of TR management?

2.3 Timeline and Activities

Ten Independent Regional Expert Committees (REC) were constituted, deputed in 5 different clusters of five tiger landscapes to evaluate the 51 Tiger Reserves of the country (Table 2.2). Each team comprised a chairman and 2-3 members (retired IFS officers having experience of wildlife management, especially in the field of Tiger Reserve/ Protected Area Management). In addition, a faculty member from the Wildlife Institute of India (WII) was a part of the team and provided technical support in carrying out the exercise.

Prior to commencement of the exercise, an expert committee constituted by the NTCA deliberated upon the past MEE exercises in the Tiger Reserves and a Technical Manual (Version 2022) (Yadav et al. 2022) was developed. A briefing session (inception workshop) for the evaluators was conducted at New Delhi in June 2022.

As a part of the exercise, the Field Directors submitted a self-assessment form with all relevant supporting documents by July 2022. The Independent Expert MEE teams visited all 51 Tiger Reserves for conducting MEE as per the prescribed assessment criteria and completed the MEE Score Card after cross checking the supportive documents submitted by the Field Directors between July 2022-February 2023. All efforts were made to ensure that the 3-member Independent Expert MEE teams visit the Tiger Reserves together and spend at least three days per site. The Chairman of the respective committees compiled and submitted the reports to the Wildlife Institute of India and NTCA after completion of field visit of assigned TRs. In addition to the site reports the Chairman also submitted a 2-3 pages

report on each site covering Introduction of the TR, (a) Management Strengths; (b) Management Weaknesses; and (c) Immediate Actionable Points. The reports submitted by the MEE team were also reviewed internally by in- house experts on Tiger Reserve Management in the country. An interaction meeting was organized by NTCA on March 15, 2023, to finalise the report in which the Field Directors of Tiger Reserves and MEE teams participated along with the NTCA officers. Following this meeting, on April 9, 2023, in Mysuru, Bengaluru, the Honourable Prime Minister Shri Narendra Modi released a 40-page summary report of the fifth cycle of MEE for Tiger Reserves. The WII team then worked on compiling the management strengths, management weaknesses, and immediate actionable points of all Tiger Reserves from the chairmen's reports, scoring, data analysis, and report writing in order to produce the full report.

Table 2.2: Ten Independent Regional Expert Committees in five Clusters

Team/ Cluster	Tiger Reserve	Chairperson	Member	WII Faculty
1a	Corbett TR Rajaji TR Melghat TR Dudhwa TR Pilibhit TR	Sh. Brij Kishor Singh	Dr. Anup Kumar Nayak Sh. Surendra Kumar Sh. Sanjay Srivastava	Dr. Salvador Lyngdoh
1b	Pench (MH) TR Tadoba-Andheri TR Nawegaon-Nagzira TR Bor TR Sahyadri TR	Sh. B.S. Bonal	Sh. Pawan Kumar Sharma Dr. Sandeep Tripathi Sh. Shailesh Prasad Dr. Gautam Talukdar	
2a	Bandhavgarh TR Kanha TR Mukundara-Hills TR Satpura TR	Sh. Azam Zaidi	Dr. Pradeep Vyas Sh. Shailendra K. Singh	Sh. Qamar Qureshi, Dr. Kausik Banerjee
2b	Pench(MP) TR Panna TR Sariska TR Ranthambore TR Sanjay-Dubri(MP) TR	Sh. A.V. Joseph	Dr. Bipin Behari Sh. Pradeep Kumar Dr. Rajeev K. Srivastava	Dr. Parag Nigam
3a	Valmiki TR Indravati TR Achanakmar TR Udanti-Sitanadi NSTR	Sh. R.N. Mehrotra	Sh. N.K. Vasu Dr. H.S. Upadhyaya Sh. Rupak De	Dr. Gopi G.V.
3b	Similipal TR Satkosia TR Kawal TR Amrabad TR Palamau TR	Sh. DNS Suman	Dr. Nitin Kakodkar Dr. R.K.Singh	Dr. Bilal Habib
4a	Bandipur TR BRT TR Periyar TR Nagarhole TR Bhadra TR Kali (Dandeli-Anshi) TR	Sh. U.M. Sahai	Sh. Pawan Kumar Sh. Ak Misra Sh. Yogesh	Dr. K. Ramesh
4b	KMTR Srivilluputhur-Megalamai TR Parambikulam TR Anamalai TR Mudumalai TR Sathyamanglam TR	Sh. S.S. Srivastava	Sh. M.S. Negi Sh. Alok Kumar	Dr. Vishnupriya Kolipakam
5a	Namdapha TR Kamlang TR Kaziranga TR Pakke TR Manas TR	Dr. Anil Kumar Bhardwaj	Dr. Subrat Mukherjee Sh. Prashant Kumar	Dr. R. Suresh Kumar
5b	Buxa TR Sundarban TR Nameri TR Orang TR Dampa TR	Sh. Ajai Misra Sh. B.K Patnaik Sh. G. Harikumar	Dr. Abhijit Das	

Table 2.3 Landscape complexes of Tiger Reserves

Complex Number	Landscape	Name of Tiger Reserves	Number of Tiger Reserves
I	Shivalik Gangetic Plain Landscape	Corbett, Rajaji, Dudhwa, Pilibhit, Valmiki	5
II	Central Indian and Eastern Ghats Landscape	Satpura, Kanha, Pench (MH), Similipal, Pench (MP), Tadoba-Andhari, Melghat, Navegaon-Nagzira, Bandhavgarh, Panna, NSTR, Amrabad, Sahyadri, Bor, Satkosia, Kawal, Ranthambore, Sanjay -Dubri, Achanakmar, Palamau, Sariska, Mukundara Hills, Udanti-Sitanadi, Indravati	24
II	Western Ghats	Kali, Parambikulam, Periyar, Anamalai, KMTR, Bhadra, Nagarhole, Bandipur, Mudumalai, Sathyamangalam, SMTR, BRT Hills	12
IV	Northeastern Hills and Brahmaputra Landscape	Sundarbans, Manas, Buxa, Orang, Dampa, Kaziranga, Nameri, Pakke, Namdapha, Kamlang	9
V	Sundarbans Landscape	Sundarban	1
			51 TRs

2.4 Assessment Criteria and Matrix for MEE of Tiger Reserves in India, 2022

For the assessment of each of the six elements of the MEE framework, 33 criteria (headline indicators) were identified. Matrix with all explanatory notes, wherever needed, was provided to guide the assessment process. The scores, along with observations (remarks), provided a better understanding of the situation in the field. It is pertinent to mention that the matrix developed for the first time for 2022 assessment provided with much required objectivity to the exercise.

CONTEXT

1.1

Are the values* of the TR well documented, assessed and monitored?

Assessment criteria+

Condition	Category*	(Tick √)	Reference document(s)	Remarks
Values not systematically documented, assessed and monitored.	Poor			
Values generally identified but not systematically assessed and monitored	Fair			
Most values systematically identified, assessed and monitored.	Good			
All values systematically identified, assessed and monitored.	Very good			

+Values would also include geo-morphological historico-cultural, faunal and floral species.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

Features	Details of Attributes and Features Along with Reference Documents	Attributes				Points (yes =1; No =0)
		Identified	Documented	Assessed	Monitored	
Ecological Value		Yes/ No	Yes/ No	Yes/ No	Yes/ No	
Biological Value		Yes/ No	Yes/ No	Yes/ No	Yes/ No	
Social, Cultural & Spiritual Value		Yes/ No	Yes/ No	Yes/ No	Yes/ No	
Economical Value		Yes/ No	Yes/ No	Yes/ No	Yes/ No	
Total Points						

The Total/ Maximum points = 16. On the basis of obtained points, the category will be as below:
Poor= 0-4; Fair= 5-8; Good= 9-12; Very Good= 13-16

Matrix in tabular form for assessing compliance point scores on the basis of explanatory note and criteria:

1.2

Are the threats to TR values well documented and assessed*?

Assessment criteria+

Condition	Category*	(Tick √)	Reference document(s	Remarks
Threats not systematically documented, assessed and monitored.	Poor			
Threats generally identified but not systematically assessed.	Fair			
Most threats systematically identified, assessed.	Good			
All threats systematically identified, assessed.	Very good			

+This assessment should be based on the number, nature and extent of all threats as per standard protocols (similar to Security Audit Protocols followed by GTF in assessment of Tiger Reserves) and their documentation. Threats will include:- current threats (immediate threat to the valuable asset of the TR ,e.g., poaching, habitat destruction, fire, grazing, illicit felling, mining, encroachment, etc.), Near future threats (possible threats in the next 2-3 years, e.g. ,a road coming up in the park) and Future threats (possible threats in next 4-5 years, e.g., industrial growth, and human resources of the TR, etc.).

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

CRITERIA	COMLIANCE DETAILS ALONGWITH REFERENCE DOCUMENTS	COMPLIANCE YES=1/ NO=0	POINTS
(1) Following of Standard Protocol for Threat assessment			
(2) All stake holders (field staff) participated through some consultative workshop for identification and assessment			
(3) Identification of nature of all threats (current or immediate and future) with their listing			
(4) Listing and prioritisation of Key Biological resources			

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

	CRITERIA	COMLIANCE DETAILS ALONG WITH REFERENCE DOCUMENTS	COMPLIANCE YES=1/ NO=0	POINTS
(5)	Assessment of each threat in terms of extent, distribution & trend			
(5)	Threat wise assessment of source /offenders, area of occurence, reasons or motivation for offence			
(6)	Preparation of threat score cards and their prioritisation			
(7)	Preparation of map with distribution of threats			
(8)	Proper documentation of all data/ information related to threats, offences and their management			
	TOTAL POINTS			

NOTE; #Points for each attribute is "1" for "Yes" and "0" for "No". Thus, the Total/ Maximum points = 8. CATEGORY: Poor= 0-2; Fair= 3-4; Good= 5-6; Very Good= 7-8

1.3

Is the 'Core Area' of TR free from human and biotic interference and the "Buffer Area" under unified Control?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
The 'Core Area' has extensive human and biotic interference.	Poor			
The 'Core Area' has some human and biotic interference.	Fair			
The 'Core Area' has little human and biotic interference.	Good			
The 'Core Area' has no human and biotic interference.	Very good			

+This assessment should be based on existence and the efforts made by TR management to address issues related to human settlements/ villages inside the core area; livestock grazing, cultivation, encroachments etc., resource extraction/ livelihood dependence of local communities and should reflect the overall interference due to all the above factors. The issue of 'Unified Control' of the 'Core' and 'Buffer' zone under the Field Director would also be taken into account.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

(A). DETAILS OF INTERFERENCES# AND EFFORTS TO ADDRESS ALONG WITH REFERENCE DOCUMENTS	DEGREE OF INTERFERENCE / EFFORTS TO ADDRESSand Points	POINT SCORE* (1 - 4)
1. Human settlements/ villages inside the core area		
INTERFERENCE:	Extensive=1/ Some=2/ Little=3 / Nil=4	
EFFORTS TO ADDRESS:	No efforts=1/ Partially addressed=2/ Mostly addressed=3/Fully addressed=4	
2. Llivestock grazing		
INTERFERENCE:	Extensive=1/ Some=2/ Little=3 / Nil=4	
EFFORTS TO ADDRESS:	No efforts=1/ Partially addressed=2/ Mostly addressed=3/ Fully addressed=4	
3. Encroachment and Cultivation		
INTERFERENCE:	Extensive=1/ Some=2/ Little=3 / Nil=4	
EFFORTS TO ADDRESS:	No efforts=1/ Partially addressed=2/ Mostly addressed=3/ Fully addressed=4	
4. Resource extraction/ Livelihood dependence of local communities		
INTERFERENCE:	Extensive=1/ Some=2/ Little=3 / Nil=4	

(A). DETAILS OF INTERFERENCES# AND EFFORTS TO ADDRESS ALONG WITH REFERENCE DOCUMENTS	DEGREE OF INTERFERENCE / EFFORTS TO ADDRESSand Points	POINT SCORE* (1 - 4)
	Extensive=1/ Some=2/ Little=3 / Nil=4	
EFFORTS TO ADDRESS:	No efforts=1/ Partially addressed=2/ Mostly addressed=3/ Fully addressed=4	
5. Rail/ Road Network and Public Passage		
INTERFERENCE:	Extensive=1/ Some=2/ Little=3 / Nil=4	
EFFORTS TO ADDRESS:	No efforts=1/ Partially addressed=2/ Mostly addressed=3/ Fully addressed=4	
6. Other Interferences, if any relevant in the TR		
INTERFERENCE:	Extensive=1/ Some=2/ Little=3 / Nil=4	
EFFORTS TO ADDRESS:	No efforts=1/ Partially addressed=2/ Mostly addressed=3/ Fully addressed=4	
(B).DETAILED STATUS OF UNIFIED CONTROL OF CORE AND BUFFER ZONE WITH REFERENCE DOCUMENTS	DEGREE OF CONTROL & POINTS	POINT SCORE* (1 - 4)
	Not done=1/ Done in small portion=2/ Done in major portion=3/ Full control=4	
	s =TOTAL POINTS SCORED FOR ALL ITEMS IN (A) & (B):	
	m = MAXIMUM AWARDABLE POINTS: (Calculation: Total Number of criteria, evaluated in A & B X 4 (maximum value of a criterion)	
	POINT SCORE PERCENT = s/m X 100 (rounded to whole number):	

NOTE: (#) : All the Items may not be applicable for a TR. The items not relevant may be marked as "NOT APPLICABLE" in score column. Similarly, any interferences not included in item 1 to 5, but relevant to TR should be added as "6. Other Interferences" and be evaluated. Only relevant items to be evaluated and percent point score to be calculated on the basis of relevant items.

CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%

1.4

Has the TR complied with the four Statutory+ Requirements (SR) along with Tripartite MoU and three Standard Operation Procedures (SOP)?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
None of the four SR, no compliance of Tripartite MoU and three SOPs met	Poor			
Two of the four SR, 50% conditions of the Tripartite MoU and SOPs complied	Fair			
Three of the four SR, 75% conditions of the Tri-partite MoU and SOPs complied	Good			
All four SR, 100% conditions of the Tripartite MoU and SOPs complied	Very good			

+Statutory requirements are (1) Legal delineation and notification of Core and Buffer Areas; (2) Establishment of Tiger Conservation Foundation; (3) Development of a Tiger Conservation Plan; and

(4) Constitution of a State-level Steering Committee under the Chairmanship of the Chief Minister. TA refers agreement between Field Director, State Government and NTCA. The 3 SOPs are on (i) Straying of Tiger in human dominated landscape, (ii) Tiger Mortality and (iii) Disposal of Carcasses

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

DETAILS OF COMPLIANCE OF 4 SRs ALONGWITH TRIPARTITEMOU AND 3 SOPs (Give Documentary References)	NO. OF 4 SRs COMP-LIED	PERCENAGE OF COMPLIANCE OF TRIPATITE MOU & 3 SOPs			
		0 to 49%	50 to 74%	75 to 99%	100%
	Nil /One SR	Poor	Poor	Poor	Poor
	Two SRs	Poor	Fair	Fair	Fair
	Three SRs	Fair	Fair	Good	Good
	Four SRs	Good	Good	Good	Very Good

Tick (?) the cell to which the compliance details fit into.

MATRIX IN TABULAR FORM FOR ASSESSING CATEGORY ON THE BASIS OF EXPLANATORY NOTE AND SPECIFIC COMBINATION IN CONDITION:

1.5

Has the Action Points of Previous MEE been Addressed Substantially?

Assessment criteria+

Condition	Category*	(Tick √)	Reference document(s)	Remarks
None of the action points of previous MEE addressed substantially	Poor			
Few of the action points of previous MEE addressed substantially	Fair			
Many action points of previous MEE addressed substantially	Good			
All action points of previous MEE addressed substantially	Very good			

+In case of new tiger reserves or wherein earlier MEE recommendations are absent any other report/document may be taken into account which is suggestive in nature, such as recommendation of a committee or any assessment in the area.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

SL No.	Action Points recommended in 2018 MEE/ in any other report or committee or assessment in absence of MEE report	Action Taken to address (Provide supportive documents)	Status of Action (none/ partial/ substantial)
1			
2			
3			

Manoj Dholakia

PLANNING

2.1

Status of Tiger Conservation Plan (TCP) +?

Assessment criteria				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
No TCP in place.	Poor			
TCP is under preparation	Fair			
TR has a relevant TCP	Good			
TR has a comprehensive and relevant TCP, duly approved by the NTCA	Very good			

+The scientific content and the participatory processes used in preparation of the TCP will be taken into account in assessing the quality of TCP.

*Score: 2.5; Fair: 5; Good: 7.5; Very Good: 10

PREPARATION OF TCP:

1. Details on preparation and approval of TCP:

ADHERENCE TO GUIDELINES OF NTCA ISSUED IN TECHNICAL DOCUMENT: NTCA /01/07:

2. Incorporation of Protection Strategy as per guidelines (brief description):
3. Incorporation of strategy for buffer on mainstreaming wildlife concerns in various production landscapes (summary of provisions):
4. Core Area Plan- Following of templates in the guideline as well as covering of all chapters and sections along with details as to their comprehensiveness:
5. Buffer Area Plan- Following of templates in the guideline as well as covering of all chapters and sections along with details as to their comprehensiveness:
6. Indicative Plan for adjoining corridors providing connectivity/ Corridors- Following of templates in the guideline as well as covering of all chapters and sections along with details as to their comprehensiveness:
7. Details on preparation of year wise Budget/ Financial forecast along with schedule of activities for the plan period and their comprehensiveness:

2.2

Does the TR safeguards the threatened biodiversity values?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
TR does not safeguard the threatened biodiversity values.	Poor			
TR safeguards a few threatened biodiversity values.	Fair			
TR safeguards a large number of threatened biodiversity values.	Good			
TR safeguards all threatened biodiversity values.	Very good			

+Remarks need to elaborate on the kind of safeguards and how they work or are intended to work; efforts taken to identify and protect unique biodiversity

Score : 2.5; Fair: 5; Good: 7.5; Very Good: 10

Manoj Dholakia

Items of Biodiversity Values Evaluated (give Details of Findings Elaborating Safeguard Measures, Working or Intended to Work With Supportive Documents)	Tick (√) Appropriate Category	Point Score
A. GENETIC DIVERSITY:	**Categories and Point Score**	
1) Name of all identified key species and species wise details of scientific population estimation:	a) None/ad hoc way =1 b) A few scientifically=2 c) Mostly estimated scientifically =3 d) All estimated scientifically =4	
2) Species wise details about assessment of habitat, food chains/ prey base of key species:	a None/ad hoc way =1 b) A few scientifically=2 c) Most assessment scientific =3 d) All assessment scientific =4	
3) Habitat Conservation and Development measures in respect of key species:	a) None/ad hoc way =1 b) Effective for a few =2 c) Effective for most =3 d) Effective for all =4	
4) Details of Poaching/ Illicit removal control measures:	a) Poor =1 b) Somewhat effective=2 c) Largely effective =3 d) Very effective =4	
B. LANDSCAPE THREATS:	**Categories and Point Score**	
5) Details of land degradation threats in the TR and measures to address:	a) Not identified or fully assessed =1 b) Assessed but ad hoc measures to address =2 c) Mostly addressed =3 d) Fully addressed =4	
6) Details of major landscape fragmentation threats (like territorial isolation, linear projects, settlements and encroachments etc.) and measures to mitigate:	a) Not identified or fully assessed =1 b) Assessed but ad hoc mitigation measures =2 c) Mostly addressed =3 d) Fully addressed =4	
C. EFFORTS TO PROTECT UNIQUE BIODIVERSITY:	**Categories and Point Score**	
7) ` Details of identification of unique biodiversity (like wetlands, mangroves, unique vegetations) in TR and efforts to protect them:	a) Not identified or fully assessed / explored =1 b) Identified/ inadequate protection efforts=2 c) Largely adequate protection efforts =3 d) Adequate efforts for fully protection =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS IN A, B & C:		
m = AWARDABLE MAXIMUM POINTS = Total Number of criteria, evaluated on point scale (1 to 4) in A, B & C X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		

CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

2.3

Are stakeholders given an opportunity to participate in planning process?

Assessment criteria+				
Condition	**Category***	**(Tick √**	**Reference document(s)**	**Remarks**
Little, if any opportunity for stakeholder participation in planning.	Poor			
Stakeholders participate in some planning.	Fair			
Stakeholders participate in most planning processes.	Good			
Stakeholders routinely and systematically participate in all planning processes.	Very good			

+The assessment should be based on identification of stakeholders to be associated with different planning processes and the opportunity offered to them. The result of participation must show in the field and not merely reported as a routine exercise (Functioning of LAC, micro planning of villages, working of EDC, etc. to be taken into account).
Score : 2.5; Fair: 5; Good: 7.5; Very Good: 10

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

ITEMS OF EVALUATION FOR STAKE HOLDERS OPPORTUNITY TO PARTICIPATE IN PLANNING PROCESS (WITH SUPPORTIVE DOCUMENTS)		TICK (√) APPROPRIATE CATEGORY	POINT SCORE
A.	**IDENTIFICATION OF STAKE HOLDERS:**	**Categories and Point Score**	
1)	Planning process wise details of stake holders identified for participation: **Supportive Documents:**	a) Not identified/ad hoc =1 b) Identified for a few processes =2 c) Identified for most processes =3 d) Identified for all required processes = 4	
B.	**OPPORTUNITIES AND PARTICIPATION:**	**Categories and Point Score**	
2)	Details of provisions for identified stake holders to participate in different consultative processes of preparation of TCP and actual participation: **Supportive Documents:**	a) No participation =1 b) Very limited =2 c) Participation in major processes =3 d) Participation in all required processes =4	
3)	Status of constitution and working of LAC: **Supportive Documents:**	a) None =1 b) Formed, not effective =2 c) Formed and functional in most aspects =3 d) Formed and functional in all aspects =4	
4)	Status of constitution and working of EDC: **Supportive Documents:**	a) None/ negligible =1 b) Some committees but not effective =2 c) Formed and functional in most areas =3 d) Formed and functional in all areas =4	
5)	Details of participation and functioning of village micro planning: in many villages =3 **Supportive Documents:**	a) None/ negligible =1 b) Some efforts but not systemic =2 c) Systemic micro planning working d) Systemic micro planning working in all villages =4	
s =TOTAL POINTS SCORED FOR A .L ITEMS IN 1 to 5:			
m = AWARDABLE MAXIMUM POINTS =Total number of criteria (5) X 4 (maximum value of a criterion):			20
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):			
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Gooc			76-100%

2.4

Are habitat management programmes systematically planned, relevant and monitored, and contribute effectively to Tiger and other endangered species conservation?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Habitat management programmes are entirely adhoc.	Poor			
Limited planning and monitoring programmes are in place for habitat management.	Fair			
Habitat management programmes are generally planned and monitored.	Good			
Habitat management programmes are thoroughly planned and monitored.	Very good			

+This assessment should be primarily based on habitat management programmes in relation to habitats for species that are threatened (IUCN categories), are habitat specialists, subjected to seasonal movements, wide ranging with emphasis on the breeding and rearing habitat and may include factors such as food, water, shelter (all connotations).Habitat structure, composition, unique patches of vegetation and sensitive sites, sources of water and their distribution are integral. Corridors within buffer zone are critically important. For example, all riparian habitats, management of Avian faunal diversity, grass lands identified/mapped and being managed scientifically etc. Have these been addressed? Is there a planning process in place? The management practices dealing with invasive species such as Lantana, Michania etc. would be examined. Are the wetlands identified/mapped, management prescription in place, aquatic flora and fauna inventorised, distribution of waterholes planned/mapped, refilling system in place? Water conservation measures (viz, check dams/ anicuts) adopted.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

# ITEMS OF EVALUATION (WITH SUPPORTIVE DOCUMENTS)	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
A. SENSITIVE SPECIES:		
(Details on habitat management programmes on aspects of their thoroughness of planning and monitoring measures; including species-based needs for breeding, rearing, shelter, food and water etc. have to be provided on respective species)	**Categories and Point Score**	
1) Tiger (Details of Habitat Management Plan on aforesaid aspects) **Supportive Documents:**	a) None / ad-hoc plan =1 b) Limited Planning and monitoring=2 c) Plans for most aspects with monitoring =3 d)All aspects thoroughly planned and monitored =4	
2) Threatened Species (IUCN categories, other than Tiger) **Supportive Documents:**	a) None / ad-hoc plan =1 b) Limited Planning and monitoring=2 c) Plans for most aspects with monitoring =3 d)All aspects thoroughly planned and monitored =4	
3) Seasonal Migratory Species: **Supportive Documents:**	a) None / ad-hoc plan =1 b) Limited Planning and monitoring=2 c) Plans for most aspects with monitoring =3 d)All aspects thoroughly planned and monitored =4	
4) Wide Ranging Species: **Supportive Documents:**	a) None / ad-hoc plan =1 b) Limited Planning and monitoring=2 c) Plans for most aspects with monitoring =3 d)All aspects thoroughly planned and monitored =4	

# ITEMS OF EVALUATION (WITH SUPPORTIVE DOCUMENTS)	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
5) Management of avian faunal diversity: **Supportive Documents:**	a) None / ad-hoc plan =1 b) Limited Planning and monitoring=2 c) Plans for most aspects with monitoring =3 d)All aspects thoroughly planned and monitored =4	
B. SPECIAL AND ECO-SENSITIVE SITE MANAGEMENT:	**Categories and Point Score**	
(Details on identification and mapping of such sites; habitat management programmes on aspects of scientific planning and monitoring measures related to the protection and conservation of unique habitat structure and composition as well as mitigation measures have to be provided) 6) Unique patches of vegetation: **Supportive Documents:**	a) Not identified/mapped =1 b) Identified, Limited Planning/monitoring=2 c) Mapped, plans on most aspects and monitored =3 d) Comprehensive plans on all aspects and monitored =4	
7) Eco sensitive site Conservation: **Supportive Documents:**	a) Not identified/mapped =1 b) Identified, Limited Planning/monitoring=2 c) Mapped, plans on most aspects and monitored =3 d) Comprehensive plans on all aspects and monitored =4	
8) Wet lands (In addition to afore said aspects status on inventorisation of aquatic flora and fauna to be provided to evaluate comprehensive planning) **Supportive Documents:**	a) Not identified/mapped =1 b) Identified, Limited Planning/monitoring=2 c) Mapped, plans on most aspects and monitored =3 d) Comprehensive plans on all aspects and monitored =4	
9) Addressing needs of conservation of corridors and sensitive habitats in Buffer Zone: **Supportive Documents:**	a) Not identified/mapped =1 b) Identified, Limited Planning/monitoring=2 c) Mapped, plans on most aspects and monitored =3 d) Comprehensive plans on all aspects and monitored =4	
10) Grass lands: **Supportive Documents:**	a) Not identified/mapped =1 b) Identified, Limited Planning/monitoring=2 c) Mapped, plans on most aspects and monitored =3 d) Comprehensive plans on all aspects and monitored =4	
C. OTHER HABITAT MANAGEMENT PROGRAMMES:	**Categories and Point Score**	
11) Management of invasive species (*Lantana*, *Michania* etc.): **Supportive Documents:**	a) Survey is general nature, not mapped/monitored =1 b) Partly survey-mapped, ad-hoc plan and monitoring=2 c)Largely mapped, satisfactory plan and monitoring =3 d) Comprehensively mapped, planned and monitored =4	
12) Water resources conservation and development: (Details on plans encompassing mapping of sources of water, and planning for water conservation	a) Survey is general nature, not mapped/monitored =1 b) Partly survey-mapped, ad-hoc plan and monitoring=2 c) Largely mapped, satisfactory plan and monitoring =3 d) Comprehensively mapped, planned and monitored =4	

# ITEMS OF EVALUATION (WITH SUPPORTIVE DOCUMENTS)	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
structures as check dams /anicuts etc. and waterholes management to be outlined)		
Supportive Documents:		
s =TOTAL POINTS SCORED FOR ALL ITEMS IN A, B & C:		
m = MAXIMUM AWARDABLE POINTS:		
(Calculation: Total Number of criteria, evaluated in A, B & C X 4 (maximum value of a criterion)		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		

2.5

Does the TR has an effective Protection Strategy (PS)* and Security Plan and Security Audit (SA) in place?

Assessment criteria+

Condition	Category*	(Tick √)	Reference document(s)	Remarks
TR has little or no PS and SA.	Poor			
TR has an adhoc PS and SA.	Fair			
TR has a generally relevant PS and SA but is not very effective.	Good			
TR has a comprehensive and very effective PS and SA.	Very good			

+This assessment takes inter-alia into account the nature of threats, the number and location of patrolling camps and foot and mobile patrolling, needs that relate to available manpower, terrain difficulties, practicability of area coverage, readiness to contain specific threats with necessary support and facilities. The constitution and functioning of Special Tiger Protection Force (STPF), Number of offences reported, arrests made, prosecution initiated and conviction achieved will be taken into account.

*Score: 2.5; Fair: 5; Good: 7.5; Very Good: 10

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

ITEMS OF EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
A. SECURITY PLAN (SP):	Categories and Point Score	
1) Security plan (SP): (Details to be given on the extent of comprehensiveness in the SP in dealing with the 5 cornerstones (Evaluation of area, Preparation-Resource mapping, Prevention, Detection and Response) provided in NTCA Generic guidelines) Supportive Documents:	a) No specific SP =1 b) SP incorporates a few features of guidelines =2 c) SP broadly conforms to NTCA guidelines =3 d) SP conforms to all NTCA guidelines =4	

ITEMS OF EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
B. EFFECTIVE PROTECTION STRATEGY (PS):	**Categories and Point Score**	
2) Planning Protection strategy: (Details on its comprehensiveness on the basis of guidelines issued by NTCA for preparing TCP) **Supportive Documents:**	a) Poorly planned =1 b) Ad-hoc plan/strategy =2 c) Broadly in light of the SP &guidelines =3 d) Comprehensive plan/ strategy based on SP and TCP guidelines =4	
3) Patrolling camps and check posts: (Details of beat/ range wise numbers and their effectiveness in area coverage, especially in vulnerable sites to mitigate different nature of threats) **Supportive Documents:**	a) Negligible coverage =1 b) Covers small amount of strategic area =2 c) Covers most of strategic area and effective =3 d) Covers all area and very effective =4	
4) Effective foot and mobile patrolling: (Details on strategy of coverage of accessible area and patrol hours, rules of patrol planning and deployment in different levels along with protocols for reporting, monitoring, mapping and feedbacks) **Supportive Documents:**	a) No /ad-hoc strategy =1 b) General strategy; a few aspects properly dealt =2 c) Systematic strategy in major aspects =3 d) Comprehensive, systematic & effective =4	
5) Amenities and equipment for patrolling: (Details on existence of proper yardsticks for basic amenities camps, personal kits and patrol equipment, sniffer dogs and metal detectors etc. and their provisioning and supervision) **Supportive Documents:**	a) No norm and poor provisioning =1 b) Norms for a few items & limited provisioning =2 c) Norms for most items & most staff equipped =3 d) Well laid out norms & all staff well equipped =4	
6) Communication and information network for patrolling: (Details on efficiency of strategy on information-communication system and operationalisation of intelligence-based enforcement patrolling) **Supportive Documents:**	a) Nil /ad-hoc operations without any protocol =1 b) Some guidelines and partially effective =2 c) Largely efficient strat- egy serving to needs =3 d) Efficient, well-equipped strategy and protocols =4	

ITEMS OF EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
7) Rapid Response Team (RRT): (Details of organisation, constitution, training and deployment of RRT to deal with special needs of hot spots and other illegal activities, not covered by regular patrols, along with operational procedures, protocols and control; and their effectiveness) **Supportive Documents:**	a)Nil / ad-hoc operation b)A few teams not well organised or equipped =2 c)Many teams, relevant protocols & equipped =3 d)Teams for all area and operate effectively under due control & protocol =4	
8) Effectiveness of Law Enforcement LE) Strategy: (Details on number of offences reported, arrests made, prosecution initiated and conviction achieved in last 4 years and reasoning in support of categorisation) **Supportive Documents:**	a) No / poor Law Enforcement =1 b) Partially effective Law Enforcement =2 c) Largely effective Law Enforcement =3 d) Very effective Law Enforcement =4	
9) Constitution and functioning of Special Tiger Protection Force (STPF)#: (Details of the constitution, organisational features, operational protocols, deployment, achievement in last 4 years and effectiveness of its functioning. For TRS with no STPF "Not applicable" should be ticked and excluded from items of evaluation) **Supportive Documents:**	a) Sanctioned but not formed =1 b) Sanctioned & Form- ation in advance stage =2 c) Constituted, not in full strength, somewhat effective =3 d) In almost full strength, proper operational proto- cols & very effective =4 **OR NOT APPLICABLE**	
C. SECURITY AUDIT (SA):	**Categories and Point Score**	
10) Security Audit: (Details on Security Audit protocol, auditing agency-external or self, intervals of audit, findings or scores awarded, if any and extent of remedial measures) **Supportive Documents:**	a) No SA =1 b) SA done but without established protocol =2 c) SA as per established protocol, not repeated =3 d) Regular SA as per prot- ocol by external team and remedial measures =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS IN A, B & C:		
m = AWARDABLE MAXIMUM POINTS =Total Number of criteria, evaluated on point scale (1		
to 4) in A, B & C X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		

NOTE: (#): Items no. 9 may not be applicable for a TR. In such case it should be excluded and other items (which are 9 in number) will be evaluated. Total points score (s) and Maximum points (m) should be calculated on the 9 items only.

CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%

2.6

Has the TR been effective in the mitigation of human-wildlife conflicts?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Human-wildlife conflicts are significant but poorly addressed.	Poor			
TR has been able to mitigate few human- wildlife conflicts.	Fair			
TR has been able to mitigate many human- wildlife conflicts.	Good			
TR has been effective in mitigating all human-wildlife conflicts.	Very good			

+The assessment will take into account the number of incidences reported and payment of compensation made and its timelines. Hotspots identified, readiness/ preparedness to effectively manage Human Wildlife interaction (availability of rescue vehicles, cages as per standards, rescue and rehabilitation center etc.). Other aspects to factor in are; is the staff adequately trained and well equipped to handle emergency responses. What is the adherence to SOPs/ Protocol, flying squads, Rapid response Team, response time to a crisis? (Is the rescue team enough in number to cover the areas of the park)

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

ITEMS OF EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
A. HWC INCIDENCES AND EX-GATIA PATMENTS: (Year wise details should be given separately for each type of cases, viz., human loss, human injury, cattle kill and crop/ property loss)	**Categories and Point Score**	
1) Number of different types of HWC cases and trend: (Year-wise details on number (no.) of different types HWC incidences in last 4 years along with amount of loss/ damage) **Supportive Documents:**	a) Significant no. of cases and increasing =1 b) Cases Significant no. but decreasing / Many cases =2 c) Small no. of cases =3 d) Nil / Negligible no. of cases =4	
2) Ex-gratia payments: (Year-wise details on ex-gratia payment for different types of cases depicting- no. of cases, amount due, cases disposed, amounts paid, average time for disposal. In addition, information on the amount of ex-gratia for different	a) Very delayed payment/ cumbersome procedure =1 b) Delayed payment / no immediate relief on death or injury =2 c) Reasonable delay and immediate relief on death or injury =3 d) Speedy disposal, good protocol & immediate relief on death or injury =4	

ITEMS OF EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
cases and time line fixed for payments should be given) **Supportive Documents:**		
B. PREVENTIVE / PROACTIVE MEASURES TO ADDRESS STRAYING:	**Categories and Point Score**	
3) Identification of hotspots and adherence to protocols: (Details on follow up of relevant instructions for identification of hotspots, analysing reasons of straying, their monitoring and adherence to SOPs/ protocols) **Supportive Documents:**	a) Not identified / SOPs not followed =1 b) Some identified / no analysis / SOPs followed partially =2 c) Mostly identified, analys- ed and SOPs followed =3 d) All spots mapped, analysed and strict adherence to SOPs =4	
4) Preparedness in managing HWC: (Details on operation of Rapid Response Teams (RRT), availability of rescue vehicles, camera traps, wireless, cages, tranquilising kits and other essential equipment asper standards in guidelines) **Supportive Documents:**	a) No / ad-hoc team poorly equipped =1 b) RRT formed but low preparedness =2 c) RRT formed, mostly equi-pped, better prepared=3 d) RRT formed and all teams fully equipped =4	
5) RRT for entire TR, proper training and response time: (Details on no. of teams, appropriate staffing, hands-on-training, adequacy to cover the TR and response time to incidents) **Supportive Documents:**	a) No Team =1 b) A few teams, not trained or staffed properly or poor response time =2 c) Properly staffed, trained teams; covers all hotspot & good response time =3 d)Fully staffed, well trained teams for whole TR and fast response time =4	
6) Rescue and Rehabilitation Centre: (Details on the establishment and operation of rescue and rehabilitation centre in TR) **Supportive Documents:**	a) Nil =1 b) Ad-hoc arrangements =2 c) Centre established, some trained staff, essential facilities and operational =3 d) Well established centre, trained staff equipped with facilities asper guidelines =4	
C. CROP RAIDING:	**Categories and Point Score**	

ITEMS OF EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
7) Prevention and control of crop raiding by wild animals: (Details of crop reading and measures like flying squads, monitoring teams, early warnings and crop protection measures etc. and their effectiveness)	a) No / insignificant measures =1 b) Some measures, a few squads not effective =2 c) Flying squads, monitoring team, crop protection helps etc., largely effective =3 d) All desired measures, good surveillance, monitor- ing; very effective =4	
Supportive Documents:		
s =TOTAL POINTS SCORED FOR ALL ITEMS IN A, B & C:		
m = AWARDABLE MAXIMUM POINTS = Total Number of criteria, evaluated on point scale (1 to 4) in A, B & C X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%		

2.7

Is the TR integrated into a wider ecological network/ landscape following the principles of the ecosystem approach?

Assessment criteria+

Condition	Category*	(Tick)	Reference document(s)	Remarks
TR not integrated into a wider network/ landscape.	Poor			
Some limited attempts to integrate the TR into a network/ landscape.	Fair			
TR is generally quite well integrated into a network/ landscape.	Good			
TR is fully integrated into a wider network/ landscape.	Very good			

+Assessment needs to consider the scope of opportunities on the landscape scale that exist. Consider whether any attempts have been made and what are these? Have all the important corridors been identified? What actions are planned/implemented for their security? Have the Forest Working Plans and Forest Development Corporation Plans within the identified landscapes taken cognizance of such new requirement? These should have been reflected in TCPs. Is there is any effort to rationalize landuse around TR? Is any effort being made to plan and use 'Smart Green Infrastructure'

* Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

ITEMS OF EVALUATION	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
ITEMS OF EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS	**Categories and Point Score**	
1. Efforts on Tiger Conservation (TC) in landscape scale: (Details on recognition of the scope of opportunities that exists in landscape scale and efforts made to realise it- like adding or securing other PAs/areas where opportunity exists for integration of TC) **Supportive Documents:**	a)No effort =1 b)Broadly recognised landscape, no effort to add or secure areas for TC =2 c) Entire potent land-scape identified, efforts are to add or secure more area/ PA =3 d) Entire potent land-scape mapped & more area or PA added & secured =3	
2. Delineation of Corridors and connectivity: (Details on status of scientific identification, mapping, demarcation and notification of corridors) **Supportive Documents:**	a) Not done / indistinct =1 b) Broadly identified, not mapped/ =2 c) All corridors/ connectivity identified & mapped=3 d) All corridors mapped, notified and demarcated on ground =4	
3. Planning for Connectivity/ Corridor Security: (Details on comprehensiveness of plan prepared for adjoining connectivity/ corridor areas adhering to the guidelines of NTCA for TCP preparation) **Supportive Documents:**	a) No plan =1 b) Under preparation =2 c) Plan part of TCP, mostly as per the guidelines =3 d) Comprehensive corridor plan as per guidelines =4	
4. Incorporation of Tiger conservation in Working Plans (WP) of adjacent Forest Division / Corporation: (Details on inclusion of prescriptions of Corridor/ connectivity plans in respective working plans) **Supportive Documents:**	a) Not included in WP / no executive order =1 b) Not included in WP but some ad-hoc measures =2 c) Included in some WP/ others are in process =3 d) Completely incorporated in WPs of divisions =4	
5. Attempts for rationalisation of land use around the TR: (Details on formulation and co-ordination for development of integrated land use approach for tiger conservation and co-existence agenda) **Supportive Documents:**	a) No attempts =1 b) Some restrictions in ad hoc manner =2 c) Ecosensitive zone under process, efforts on for integrated land use =3 d) Ecosensitive zone noti- fied and works on for land use rationalisation =4	

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

ITEMS OF EVALUATION	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
6. Smart Green Infrastructure: (Details on efforts being made to plan and use smart green infra structure in the land scape; especially road, railway, mining, transmission, hydel & construction projects) **Supportive Documents:**	a) Not used =1 b) Used partly in a few projects =2 c) Used in many projects for tiger conservation friendly infrastructure =3 d) Standard practice to use it widely in planning and implementation process =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS IN A, B & C:		
m = AWARDABLE MAXIMUM POINTS = Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%		

2.8

Is the TR being consciously managed to prevent carbon loss and to encourage further carbon capture/ climate change mitigation?

Assessment criteria+

Condition	Category*	(Tick √)	Reference document(s)	Remarks
There have been no efforts to consider carbon storage, carbon capture and adaptation to climate change in management of the TR	Poor			
Some initial thought has taken place about carbon storage, carbon capture and likely impacts of climate change, but this has yet to be translated into management plans	Fair			
Detailed plans have been drawn up to reduce carbon loss from TR, to increase carbon dioxide capture and about how to adapt management to predicted climate change, but these have yet to be translated into active management.	Good			
Detailed plans have been drawn up to reduce carbon loss from TR, to increase carbon dioxide capture and about how to adapt management to predicted climate change, and these are already being implemented	Very good			

+To ensure climate change mitigation, parameters that act as carbon sinks viz. wetlands identified/ mapped, management prescriptions in place, aquatic flora and fauna inventorised, distribution of waterholes planned/mapped, refilling system in place to be considered. Are water conservation measures (viz. check dams/anicuts) adopted/ Any other methods attributed to climate change adaptation/mitigation/ carbon sequestration, (eg. Prevention of forest fires etc.) adopted?

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

ITEMS OF EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
A. CARBON CAPTURE, LOSS AND STORAGE:	**Categories and Point Score**	
1. Carbon storage, capture and loss assessment: (Details on initiatives to consider assessment of carbon storage, carbon capture and carbon loss for management actions in TR) **Supportive Documents:**	a) No effort =1 b) Some thoughts but no action plan =2 c) Detailed plans drawn up but not yet implemented =3 d) Action plans are being implemented =4	
2. Reduction in carbon loss and increase of carbon capture: (Details of initiatives to reduce carbon loss and increase carbon capture in the TR including prevention of forest fires in terms of saving carbon loss) **Supportive Documents:**	a) No effort =1 b) Some thoughts but no action plan =2 c) Detailed plans drawn up but not yet implemented =3 d) Plans well implemented, work on to estimate carbon gains by fire control =4	
B. IMPACT OF CLIMATE CHANGE AND ADAPTATION/ MITIGATION:	**Categories and Point Score**	
3. Impacts of Climate change and adaptation (Details on initiatives in planning for predicting impacts of climate change in TR and how to adapt management to it) **Supportive Documents:**	a) No effort =1 b) Some thoughts but no action plan =2 c) Detailed plans drawn up but not yet implemented =3 d) Plans are already being implemented =4	
4. Wetland as carbon sink: (Details on status of wetlands, which act as carbon sink, in respect of identification, mapping, inventorisation of aquatic flora and fauna and comprehensiveness of management prescriptions as well as on adoption of water conservation measures, viz. check dams /anicuts etc.) **Supportive Documents:**	a) No mapping/ no inventorisation =1 b) Mapped, inventorised, some unplanned works =2 c) Mapped, inventorised, comprehensive plans & some structures =3 d) Comprehensive plans well implemented commen- surate with objectives =4	
5. Other adaptation/ mitigation measures: (Details on efforts of taking other adaptive/ mitigative measures on Climate change) **Supportive Documents:**	a) No other measures =1 b) Ad hoc measures =2 c) Planned measures =3 d) Well planned innovative works =4	

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

ITEMS OF EVALUATION SCORE AND FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT
s =TOTAL POINTS SCORED FOR ALL ITEMS IN A & B:		
m = AWARDABLE MAXIMUM POINTS = Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%		

INPUTS

3.1

Are personnel adequate, well organized and deployed with access to adequate resources in the Tiger Reserve (TR)*?

Assessment criteria+				
Condition	Category*	(Tick √)	Reference document(s)	Remarks
Few, personnel explicitly allocated but poorly supported for TR management.	Poor			
Some personnel explicitly allocated for TR management but not adequately supported and systematically linked to management objectives.	Fair			
Some personnel with fair support explicitly allocated towards achievement of specific TR management objectives.	Good			
Adequate personnel appropriately supported and explicitly allocated towards achievement of specific TR management objectives.	Very good			

+This assessment should inter-alia be based on number of personnel allocated for attainment of TR objectives at the Range , Round, Beat and Patrolling camps levels or as relevant to the needs (sanctioned posts vis- a- vis existing personnel and needs beyond the sanctioned strengths. It is possible that posts have last been sanctioned several years back that do not now account for the current needs). Are staff welfare schemes in place such as insurance policies, distribution of ration, uniforms (Winter and Summer sets), providing with gadgets/equipment, camp conditions etc.? Area per beat guard to be considered to assess deployment of staff rationally; registration e-shram portal and Ayushman Yojna extended to all casual workers?

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

ITEMS OF EVALUATION	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
ITEMS WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	**Categories and Point Score**	
1. Field personnel in position: (Details of cadre wise total occupancy against the sanctioned strength; vacancy% in field units:- patrolling camp, beat, section/round & range; % of field staff > 50 years **Supportive Documents:**	a) >50% vacancy in front line & field units, aged staff =1 b) 15- 50 % vacancy in front line & field units, aged staff =2 c) Total vacancy <15% in both; many young staff =3 d) All posts (almost) filled; field staff mostly young =4	
2. Personnel requirement: (Details on current size of beats; actual need of regular field staff at different levels beyond sanction strength asper norms; and efforts on making objective based revision plans, obtaining sanctions and filling up of posts) **Supportive Documents:**	a) Large beats, old sanction, no revision proposal =1 b) Large beats, old proposal not relevant nor pursued =2 c) Moderately large beats; need based cadre revision pursued =3 d) Adequate staff asper needs or recruitment on to fill need based new revised strength =4	
3. Managing shortfall of frontline staff: (Details on number of casual/ hired staff deployed in field level and their percentage to total field staff and degree to which essential unctions are managed through them; percent and no. of foot patrol teams with <4 members) **Supportive Documents:**	a) Inadequate, essential field functions are badly affected =1 b) Some hiring, but many small patrol teams & field units =2 c) Hiring casuals effective; size of patrol team mostly normal =3 d) Required numbers are hired to effectively manage patrols & other vacancies in field staff =4	
4. Staff welfare: (Details on staff welfare schemes such as, summer and winter uniforms, project allowance-PA, kits for regulars and casuals, free ration and other amenities in camp and insurance coverage) **Supportive Documents:**	a) Nil/some to only a few=1 b) Some uniform, PA, insurance, kits for regulars only; no camp amenities/rations =2 c) Uniforms, PA, kits, insurance for regulars & most of casuals; no/ partial rations in camp =3 d) PA to regulars, all field staff insured; proper uniforms, kits, rations & camp amenities=4	
5. Patrolling equipment and gadgets: (Details on supply of equipment, such as wireless device, back pack, tent, mosquito-net, water bottle, knife, matchets, torch, binoculars, night visions,	a) A small no. of staff supplied with a few gadgets only =1 b) Many field staff supplied some gadgets =2 c) Staff/ patrols equipped with most of equipment =3 d) All patrolling and field staff are fully equipped =4	

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

ITEMS OF EVALUATION	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
GPS/compass, map etc.) **Supportive Documents:**		
6. Camp condition: (Details on physical condition and cleanliness, electricity/lighting, toilets and potable water in all field offices/ camps from range to patrolling camp/ check-post) **Supportive Documents:**	a) Poor condition and little facilities in large no. camps =1 b) Limited facilities, many camps without light/ toilet =2 c) Most camps have essential facilities; in good condition =3 d) All units/camps in good co- ndition & have all facilities =4	
7. e-shram and Ayushman yojana for casual workers: (Details on inclusion of all casual workers of TR in e-shram and Ayushman yojana) **Supportive Documents:**	a) No workers included =1 b) Some workers included =2 c) Many workers included =3 d) Registration extended to all casual workers =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS:		
m = AWARDABLE MAXIMUM POINTS = Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%		

3.2

Are resources (vehicle, equipment, building etc.) adequate, well organized and managed with desired access?

Assessment criteria+

Condition	Category*	(Tick √)	Reference document(s)	Remarks
Few, if any, resources explicitly allocated for TR management.	Poor			
Some resources explicitly allocated . for TR management but not systematically linked to management objectives	Fair			
Some resources explicitly allocated towards achievement of specific TR management objectives.	Good			
Adequate resources explicitly allocated towards achievement of specific TR management objectives.	Very good			

+ These form a variety of resources. These may be segregated into immovable (structures) and movable categories and each further may be considered under the essential and desirable categories. It is best to start with what are the minimum needs to attain each objective, what is available and manner of use/deployment. The proportions of the 'essentials' and 'desirables' along the importance gradient of objectives would serve as pointers for score categories. Specific remarks would be vitally important. Veterinary facilities and related infrastructure such as rescue cages, specialized vans, medical equipment etc. to be taken into account.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

ITEMS OF EVALUATION ITEMS WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
1. Buildings: (Details on total requirement of buildings indicating essential ones that includes need for field units- range to patrolling camps/check-posts; existing numbers for both categories; number of field staff without staff quarters) **Supportive Documents:**	a) Large shortage of buildings including essential ones =1 b) Many essential buildings are yet to be constructed =2 c) Good no. of essential buil- dings; efforts on for more =3 d) Adequate buildings; beats, camps, posts in good state =4	
2. Vehicles: (Details on number of different types of vehicles of TR in running condition and hired; number of frontline staff, mobile patrol, RRT, flying squads without dedicated vehicle) **Supportive Documents:**	a) Inadequate vehicles, not properly deployed =1 b) Vehicle shortage for many essential functions/duties =2 c) Vehicles deployed properly for all essential functions =3 d) Adequate good vehicles properly deployed to manage effectively all TR needs =4	
3. Equipment other than personal patrol amenities: (Details on need of number of essential equipment, such as night vision device, Smart patrols devices, laptops, GPS, camera traps, metal detectors etc., required to effectively manage the TR and the number actually available) **Supportive Documents:**	a) Nil / insignificant =1 b) Some equipment; small to meet essential needs =2 c) Essential equipment; serves essential requirements =3 d) All required equipment available to meet the need =4	
4. Arms and ammunitions: (Details on different types of fire arms and ammunitions available in working condition and their status of supply to different field staff) Supportive Documents:	a) Nil / insignificant =1 b) Some arms but not enough to meet all essential needs =2 c) Good no. of arms; carter to essential protection needs =3 d) Adequate arms, properly distributed to staff in the field for effective protection =4	
5. Veterinary facilities: (Details on availability of veterinary facilities and related infrastructure, such as rescue cages, specialised vans, tranquilising guns and medical equipment etc.) **Supportive Documents:**	a) Nil/ insignificant =1 b) Small facilities =2 c) Essential facilities exist =3 d) All facilities in place =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS:		
m = AWARDABLE MAXIMUM POINTS =Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%		

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

3.3

Are financial resources other than those of the State linked to priority actions and are funds adequate, released timely and utilized?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Resource allocation is adhoc, funds are inadequate and seldom released in time and not utilized.	Poor			
Some specific allocation for management of priority action. Funds are inadequate and there is some delay in release, partially utilized.	Fair			
Comprehensive planning and allocation that meets the most important objectives. Generally funds released with not much delay and mostly utilized.	Good			
Comprehensive planning and allocation of resources for attainment of most objectives. Funds generally released on-time and are fully utilized.	Very good			

+Obtain details of funds released by NTCA and their utilization by TR in the last 3 years and indicate them under 'Remarks'. Also comment on the problems associated with fund allocations and their utilization.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Year wise and scheme wise total allotment and utilisation of funds for last 3 years from different central assistances including Project Tiger and other non-state Govt. resources (if any) in tabular form (enclose copies of scheme wise allotment documents):
2. Scheme wise information showing- the amount and date of submission of APO; date of sanction and release of instalments (initial and final) by central government; dates and amount of release of instalments by state government; and then by HOD/ CWLW to FD; amount of each instalment utilised and the date of submission of UC (utilisation Certificate) should be provided in tabular form for every year (last 3 years). Reasons of delay in release and utilisation as well as for non-utilisation should also be provided in a remark column (enclose copy of UC):
3. Details on comprehensive planning for identification of priority actions (activities), estimation of funds to meet them and get the desired allotments. In addition, provide adequacy of allotments in respect of the estimate (enclose item wise statement showing requirements and allocations on different items of priority activities for each year):
4. Problems associated with fund allocations and their utilization:

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3.4

Are financial resources from the State linked to priority action and funds adequate, timely released and utilized for the management of Tiger Reserve?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Resource allocation is adhoc, funds are inadequate and seldom released in time and not utilized.	Poor			
Some specific allocation for management of priority action. Funds are inadequate and there is some delay in release, partially utilized.	Fair			
Comprehensive planning and allocation that meets the most important objectives. Generally funds released with not much delay and mostly utilized.	Good			
Comprehensive planning and allocation of resources for attainment of most objectives. Funds generally released on- time and are fully utilized.	Very good			

+Obtain details of funds released by State and their utilization by TR in the last 3 years and indicate them under 'Remarks'. Also comment on the problems associated with fund allocation and their utilization.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Year wise and scheme wise total allotment and utilisation of funds for last 3 years from different state government financial sources (state plan, nonplan, local bodied, authorities and districts, as well as state shares of central sponsored schemes) in tabular form (enclose copies of scheme wise allotment documents):
2. Scheme wise information showing- the amount and date of sanction and release of instalments (initial and final) by state government; by HOD/ CWLW to FD; amount utilised in tabular form for every year (last 3 years). Reasons of delay in release and utilisation as well as for non-utilisation should also be provided in a remark column:
3. Details on comprehensive planning for identification of priority actions (activities), estimation of funds to meet them and get the desired allotments. In addition, provide information on adequacy of allotments vis-à-vis requirements with item wise statement showing requirements and allocations received from state and central sources separately on different items of priority activities for each year (enclose supportive documents):
4. Problems associated with fund allocations and their utilization:

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3.5

What level of resources are provided by Donors other than government sources?

Assessment criteria+				
Condition	Category*	(Tick √)	Reference document(s)	Remarks
Donors contribute nothing for the management of the TR.	Poor			
Donors make some contribution to management of the TR but opportunities for collaboration are not systematically explored.	Fair			
Donors contributions are systematically sought and negotiated for the management of some TR level activities.	Good			
Donors contributions are systematically sought and negotiated for the management of many TR level activities.	Very good			

+Quantify and compare with last 3 years status; Status of earnings by TCF last 3 years.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

Donor Name	Items	Year-1		Year-2		Year-3		No. of years for which commitment is made
		Quantity	Amount	Quantity	Amount	Quantity	Amount	
3.Details of earnings by TCF in last 3 years:								

Process

4.1

Does the TR have manpower resources trained in wildlife conservation for effective TR management?

Assessment criteria+				
Condition	Category*	(Tick √)	Reference document(s)	Remarks
No trained officers and frontline staff in the TR.	Poor			
Some trained officers and few trained frontline staff, posted in the TR.	Fair			
All trained officers and fair number of trained frontline staff posted in the TR.	Good			
All trained officers and most of the trained frontline staff is posted in the TR.	Very good			

+Indicate % of trained staff in various categories. The number and thematic areas of the 'Internal Training' programmes organized in the TR in the last 3 years may be taken into account. Has the TR prepared a 'Staff Development Plan'? Is it being implemented?

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
1. Status of training in wildlife conservation : (Details on total number and percentage of officers and frontline staff trained in forest & wildlife as part of induction courses after recruitment) **Supportive Documents:**	a) None except managers =1 b) Some officers & few frontline staff trained =2 c) All officers & fair number of frontline staff trained =3 d) All officers & most of frontline staff trained =4	
2. Specialised courses or trainings: (Details on total number & percentage of officers and frontline staff have undergone special wildlife conservation courses or trainings) **Supportive Documents:**	a) None except managers =1 b) Some officers & few frontline staff trained =2 c) All officers & fair number of frontline staff trained =3 d) All officers & most of frontline staff trained =4	
3. Special thematic training modules for internal training inTR: (Details on developing training modules for protection and enforcement; number and percentage of anti-poaching staff trained in each of the modules in last 3 years) **Supportive Documents:**	a) No module developed; few trainings in ad-hoc manner =1 b) A few modules; some staff trained =2 c) Many training modules; fair no. & % of staff trained =3 d) Large no. of modules; most staff trained in the modules =4	
4. Record of training: (Details on status of maintaining training records for each employee as well as module/ training-wise personnel trained; status on issue of certificates) **Supportive Documents:**	a) Nil / only in-service part =1 b) No proper record of internal trainings except recent ones =2 c) Proper records of most of the staff and trainings =3 d) Updated training records of all staff and trainings held=4	
5. Staff Development plan: (Details of preparation of a staff development plan for individual skill and career development of staff and achievement of TR goals; status of implementation) **Supportive Documents:**	a) No plan =1 b) In process to make plan =2 c) Plan exists /in final stage=3 d) Plan being implemented =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS:		
m = AWARDABLE MAXIMUM POINTS =Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%		

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

4.2

Is TR staff management performance linked to achievement of management objectives?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
No linkage between staff management performance and management objectives.	Poor			
Some linkage between staff management performance and management objectives, but not consistently or systematically assessed.	Fair			
Management performance for most staff is directly linked to achievement of relevant management objectives.	Good			
Management performance of all staff is directly linked to achievement of relevant management objectives.	Very good			

+Quantify and compare with last 3 years status; Status of earnings by TCF last 3 years.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Methods of performance appraisal of staff followed in the TR- In Staff management performance Appraisal staff are assessed on the basis of goal setting, communicating and monitoring by seniors and time to time feed backs. In annual appraisal process judging of past performance is made at year end and not measured on the basis of clear and agreed objectives. Mostly in Government systems the annual appraisal system, called ACR (Annual Character Roll) is followed. The system followed in different ranks need to be mentioned (copies of CR forms being used for different ranks should be enclosed):
2. Details on the basis of mode of promotions adopted for different ranks (name ranks in which merit promotion is adopted and the ranks in which promotion is on the basis of seniority subjected to fitness, judged on the basis of CR, vigilance clearance, disciplinary actions etc.):
3. Details of rewards/ awards given to staff including the NTCA scheme of awarding Rs. 1.0 lakh to frontline staff for extra ordinary performance in field as per NTCA guide lines issued vide OM no. F. No. 15-24/2019-NTCA New Delhi, the August 16, 2019:

4.3

Is there effective public participation in TR management+ and does it show in making a difference?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Little or no public participation in TR management.	Poor			
Opportunistic public participation in some of the relevant aspects of TR management.	Fair			
Systematic public participation in most of the relevant aspects of TR management.	Good			
Comprehensive and systematic public participation in all important and relevant aspects of TR management.	Very good			

+The involvement of NGOs/ NGIs in population estimation may be taken into account. Are public awareness and education programme being taken up?

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
1. Management activities identified for public participation: (Details on identification of relevant management activities for seeking public participation to effectively manage TR) **Supportive Documents:**	a) None =1 b) A few activities, ad-hoc & no systematic identification =2 c) Many activities, area & target groups identified =3 d) All relevant activities, area with target groups identified=4	
2. Implementation of participatory programs : (Details on status of public participation in different relevant programs; such as eco-tourism eco development, anti-poaching, fire protection, pilgrim management, plastic waste disposal etc.; the positive achievements for attaining TR objectives) **Supportive Documents:**	a) Little / negligible =1 b) Opportunistic public participation in some programs =2 c) Systematic public participation in most of programs =3 d) Systematic involvement of all targeted people in relevant programs with good impact =4	
3. Participation in public awareness programs: (Details of public awareness and education programs run by groups/ institutions/ villages in last 3 years; public participation and program effectiveness) **Supportive Documents:**	a) Nil =1 b) A few programs without much impact =2 c) Many effective programs for fair no. of people =3 d) Large no. of programmes creating mass awareness =4	
4. Involvement of NGOs/ NGIs in Tiger estimation: (Details on involvement of NGOs/ NGIs/ individuals in All India Tiger Estimation & phase-IV monitoring; the degree of involvement and help rendered) **Supportive Documents:**	a) Nil =1 b) Some participation; not asper objectives =2 c) Good participation; helpful to the process =3 d) Meaningful & intense participation achieves objective =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS:		
m = AWARDABLE MAXIMUM POINTS =Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		

CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

4.4

Is there a responsive system for handling complaints and comments+ about TR management?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Ad-hoc approach to handling complaints.	Poor			
Complaints handling system operational but not responsive to individual issues and with limited follow up.	Fair			
Coordinated system logs and responds effectively to most complaints.	Good			
All complaints systematically logged in coordinated system and timely response provided with minimal repeat complaints.	Very good			

+Does the TR maintains 'Suggestions Register' /Box / Web Portal? What actions are taken to deal with suggestions?

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Mode of registration of public complaints and keeping of logs: systems adopted for keeping logs of on-line modes like web portals and e-mails etc. as well as offline modes- complaint box (installed places, mode and interval of opening), complaint by post and in person etc. (enclose the relevant documents issued for accessing, opening, registering and submission to responsible authorities)
2. Details on complaint handling and disposal system (enclose the relevant orders and copy of records/ documents):
3. Details of system in place to monitor complaint/ grievance redressal. Provide year wise number of complaints received in different modes, numbers disposed and numbers pending in last 3 years. Provide details of pendency showing the period and the level; also provide mechanism for periodical status reporting and reviewing adopted (furnish documents in support):
4. Details of system in place to inform the complainant or aggrieved person. Provide the number of complaints disposed vis-a-vis number of complainants informed in last 3 years (furnish documents in support):
5. Details of Suggestion Registers in public places and system in place to act on them. Provide details of places where such registers have been kept, the persons entrusted to scrutinise suggestions and report to the higher level; the number of suggestions accepted and implemented in last 3 years (furnish documents in support).

4.5

Does TR management addresses the livelihood issues+ of resource dependent communities, especially of women?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
No livelihood issues are addressed by TR management.	Poor			
Few livelihood issues are addressed by TR management.	Fair			
Substantial livelihood issues are addressed by TR management.	Good			
Livelihood issues of resource dependent communities especially of women are addressed effectively by TR managers.	Very good			

+The number of man days generated in the last 3 years may be taken into account. Are funds received from District Agencies and other sources? Provide details of funds received in last 3 years. Livelihood options provided through EDCs to local people.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
A. LIVELIHOOD OPTIONS THROUGH EDC (INCLUDING VFCs etc.) : 1. Constitution of EDC: (Details on number of EDCs constituted, number of villages covered and yet to be covered; statutory provisions; numbers with more than one meeting annually) **Supportive Documents:**	**Categories and Point Score** a) None/ negligible =1 b) Large numbers left out =2 c) Many statutory EDCs actively working =3 d) Almost all villages have statutory EDC and active=4	
2. Procedural support extended by TR in functioning of EDCs: (Details on earmarking of designated staff to attend and help in functioning of EDCs and the status of actual participation in meetings and EDC related works) **Supportive Documents:**	a) Little/ negligible support =1 b) Limited presence/support=2 c) Present in most of meetings and render good support =3 d) Staff support is very good; guide them in all activities =4	
3. Functioning of EDCs for IGA: (Details of functioning of EDCs in implementing various IGA programs; amount of works & quantum of income generation; spectacular achievements, if any) **Supportive Documents:**	a) Nil /negligible =1 b) A few programs without much impact =2 c) Many effective IGAs support many beneficiaries =3 d) Good no. of successful IGA benefit large no. of people =4	
4. Functioning of Self Help Groups (SHGs): (Details on creation and functioning of SHGs, especially by women and performance in supporting alternate livelihood options)	a) Nil / Negligible =1 b) A few groups=2 c) Fair no. of women SHGs, support many beneficiaries =3 d) Large no. of SHGs function well; mostly benefit women=4	
B. ECO TOURISM:	**Categories and Point Score**	
5. Livelihood options from Eco-tourism: (Details on eco-tourism activities directly supporting local beneficiaries- food, lodgings, park visits, guides and other works by individuals / SHGs/ EDCs) **Supportive Documents:**	a) Nil /negligible =1 b) Small no. of benefit =2 c) Many activities benefit well many beneficiaries =3 d) Large no. of TR initiatives & beneficiaries; impressive =4	
6. Funds from district agencies and other sources : (Details on funds received in last 3 years from district agencies & other sources for addressing livelihood issues -source and purpose; how integrated to RD programs)	a) Nil /negligible =1 b) Small amount- adhoc; no integration to RD programs =2 c) Some amounts received, no integration to RD programs =3 d) Amounts received regularly & integrated to RD program=4	

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA:

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
7. Labor employment by TR: (Details on labor employments by the TR for various protection, management and developmental activities in form of mandays for last 3 years)	a) Insignificant =1 b) Some employment =2 c) Many employments =3 d) Good no. of employment=4	
s =TOTAL POINTS SCORED FOR ALL ITEMS:		
m = AWARDABLE MAXIMUM POINTS =Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		

CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%

4.6

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)?

Assessment criteria+

Condition	Category*	(Tick √)	Reference document(s)	Remarks
No planning and no implementation	Poor			
Plans have been made but no implementation	Fair			
Plans have been made and some implementation is in progress	Good			
Plans have been made and are being actively implemented/ no human habitation in the CTH	Very good			

+Assessment will look into the village relocation planning process including availability of manpower, financial resources and NGO support, if any. Is there a mechanism to address the complaints received in respect of relocation process? Effort must be made to assess post-relocation success or otherwise. If the core zone is inviolate, rating will be highest.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

Matrix in tabular form for assessing compliance point scores on the basis of explanatory note and criteria:

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
1. Settlements inside CTH: (Details on number of settlements, families, persons inside Core- on date of creation and at present; numbers relocated to outside TR) **Supportive Documents:**	a) None/ negligible =1 b) Small number relocated =2 c) Many villages relocated =3 d) All villages are relocated =4	
2. Preparation of village relocation plan for remaining villages: (Details on status of preparation of relocation plan- numbers submitted, completed, under preparation and not started- as per NTCA guidelines) **Supportive Documents:**	a) Nil =1 b) Preparation of a few plans recently started =2 c) Many plans prepared, some sanctioned, rest in process =3 d) All plans implemented or under implementation =4	

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
3. Implementation Process: (Details of following of guidelines, especially related to eligibility, voluntary consent, package determination, money transfer, beneficiary's say , monitoring committees, deploying special staff , complaint redressal & post relocation success) **Supportive Documents:**	a) No relocation =1 b) Loosely followed =2 c) Mostly followed =3 d) Strictly adhered; successful implementation =4	
4. Phasing out of tourism from Core/ CTH: (Details on efforts made to phase out tourism facilities like night stay and eateries etc. from core as per recent guidelines reiterated on 11/10/19) **Supportive Documents:**	a) Nil =1 b) LAC meeting held, no action in ground =2 c) Phase-out schedule decided, low impact, eateries closed/ managed by TCF =3 d) Phaseout as per schedule, low impact adherence, eateries closed/ run by TCF =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS:		
m = AWARDABLE MAXIMUM POINTS =Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%		

OUTPUT

5.1

Is adequate information on TR management publicly available?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Little or no information on TR management publicly available.	Poor			
Publicly available information is general and has limited relevance to management accountability and the condition of public assets.	Fair			
Publicly available information provides detailed insight into major management issues and condition of public assets.	Good			
Comprehensive reports are routinely available in public domain on management and condition of public assets.	Very good			

+Information like TCP, SOPs in vernacular language, MOU, fund flow, estimation, crime, tourism and booking, etc. data can be included.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

ITEMS OF EVALUATION	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS 1. Management related information in public domain: (Details on status of availability of management related documents, such as TCP and SOPs etc. in public domain along with the documents in vernacular language; public domain includes designated website, newsletters and press) **Supportive Documents:**	**Categories and Point Score** a) Not in public domain =1 b) Few SOPs / some sketchy information in website =2 c) TCP & SOP in public domain & partly or not in vernacular =3 d) TCP & SOPs etc. in public domain & also in vernacular =4	
2. Financial information in public domain: (Details on availability of financial information in public domain, such as fund flows & MOU etc.; compliance of displaying cost and work details on worksite) **Supportive Documents:**	a) Nil/ Negligible =1 b) No information except a few display of cost & work detail =2 c) Display in all worksites; some financial details made public =3 d) Display in all worksite; fund flow, MOU in public domain =4	
3. Population estimation information in public domain: (Details on availability of periodic population estimates of key threaten endangered species, including All India Tiger Estimation-AITE and status of prey and predators related to TR in public domain) **Supportive Documents:**	a) No TR related information =1 b) None other than AITE data in NTCA website/document =2 c) AITE data & information on census data of many species =3 d) Periodic census data of major species & relevant phase-IV information available =4	
4. Wildlife crime information in public domain: (Details on availability of information related to wildlife crime in public domain) **Supportive Documents:**	a) Nil =1 b) Few information of general nature =2 c) Some information made available in public domain =3 d) Comprehensive information made available =4	
5. Tourism information in public domain: (Details on availability of information to public related to tourism, such as tourist inflow, places to visit, facilities, guided tours, tariffs and on line bookings, etc.) **Supportive Documents:**	a) Sketchy information not in website; no online booking =1 b) Some general information in website; no online booking=2 c) Relevant information in website & online booking =3 d) Comprehensive information in website & online booking =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS:		
m = AWARDABLE MAXIMUM POINTS =Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%		

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA :

5.2

Are visitor services and facilities appropriate and adequate?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Visitor services and facilities do not exist.	Poor			
Visitor services and facilities are very basic.	Fair			
Visitor services and facilities are monitored from time to time and are fairly effective.	Good			
Visitor services and facilities are conscientiously maintained, regularly upgraded and monitored for visitor satisfaction	Very good			

+Include the existence and quality of visitor and interpretation centers, including skills and capabilities of personnel manning these, TR related publications, films, videos; arrangements of stay (including places serving refreshments and food owned and managed by TR), watch towers and hides including safety factors, vehicles assigned for visitors including riding elephants, if any and their deployment, drinking water, rest rooms, garbage disposal, attended and self guided services in the field, visitor feedback on the quality of wilderness experience.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA :

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
EVALUATION AND FINDINGS WITH SUPPORTIVE DOCUMENTS 1. Presence and quality of visitor services: (Details on various visitor services, such as reception & interpretation; common public amenities, like drinking water, toilets, rest rooms, parking, canteen, souvenir shops etc.; eco-tourism including stays, tours, treks and nature trails etc. present in the TR; number of visitors and the quality of services)) **Supportive Documents:**	**Categories and Point Score** a) Nil/ negligible =1 b) Limited / basic services for small no. of visitors =2 c) Services good for moderate no. of visitors; monitored =3 d) Appropriate & adequate good quality services for large no. of visitors; monitored; upgraded =4	
2. Interpretation centers: (Details of interpretation centers, their quality, upkeep, physical conditions and effectiveness in achieving objectives on environmental education & awareness) **Supportive Documents:**	a) Nil =1 b) Center not effective =2 c) Centers properly & purposef- ully organised; very effective =3 d) Adequate no. of centers, good displays & themes; good-upkeep well managed & impressive =4	
3. Skills and capabilities of staff managing services: (Details on skills and capabilities of staff managing various visitor services including interpretation; no. of special staff or staff undergone special trainings) **Supportive Documents:**	a) No special skill =1 b) A few skilled staff =2 c) Some skilled staff =3 d) Adequate skilled, capable staff in place for the services=4	

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
4. TR related publications, films and videos: (Details on availability of TR related publications, including brochures for visitors' information, films and videos; their quality and availability to visitors) **Supportive Documents:**	a) Nil / insignificant =1 b) Some general brochures =2 c) Many good publications, film & videos; easily available =3 d) Adequate good quality films, publications & videos; easily available to public=4	
5. Arrangements of stay: (Details on arrangements of stay including places serving refreshments and food owned and managed by TR) **Supportive Documents:**	a) Nil / negligible =1 b) Some stay facilities in TR; eateries privately managed =2 c) Many stay facilities, low imp- act adherence, eateries by TR =3 d) Good no. of stay facilities mostly outside core and eateries, managed by TR =4	
6. Park visit services: (Details on assignment of vehicles and other means like elephants and boats etc., where available & their proper deployment; number & safety factor of watch towers and hides) **Supportive Documents:**	a) Nil / negligible =1 b) Small number; inadequate =2 c) Fair no. of facilities with safety measure, monitored =3 d) Good no. of facilities proper- ly deployed; safety measure with monitoring =4	
7. Attended and self-guided services in the field: (Details on attended and self-guided services in the field; public information on:- hiring of guides, cost details; types of self-guided tours/ visits and contact person) **Supportive Documents:**	a) Nil / meagre services =1 b) Some guided tours not well organised; scanty information =2 c) Organised guided tours; rele- vant useful details online =3 d) Organised guided tours; boo- king online; useful information on guided /self-guided visits =4	
8. Garbage disposal: (Details on Garbage disposal including efforts to make TR plastic free) **Supportive Documents:**	a) Poor / plastic =1 b) Garbage disposal not efficient often plastics littered =2 c) Good garbage disposal; efforts to make it plastic free =3 d) Excellent garbage disposal involving locals; plastic free =4	
9. Visitors feedback: (Details on number and nature of visitors feedback on the quality of wildlife experience; system adopted by the TR to act on those feedbacks) **Supportive Documents:**	a) No / poor feedback =1 b) Average type; no action =2 c) Good experience; system to act on & improve =3 d) Feedback mostly very good; system to scrutinize & rectify =4	
s =TOTAL POINTS SCORED FOR ALL ITEMS:		
m = AWARDABLE MAXIMUM POINTS =Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):		
POINT SCORE PERCENT = s/m X 100 (rounded to whole number):		
CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%		

5.3

Are research/ monitoring related trends systematically evaluated and routinely reported and used to improve management?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Little or no systematic evaluation or routine reporting of trends.	Poor			
Some evaluation and reporting undertaken but neither systematic nor routine.	Fair			
Systematic evaluation and routine reporting of trends undertaken.	Good			
Systematic evaluation and comprehensive reporting of trends undertaken and attempts made at course corrections as relevant.	Very good			

+Not all TRs attract projects and researchers and with exceptions, little research takes place on the TRs own steam because of systemic limitations. However, monitoring of some critical issues is expected e.g. population of tiger, co-predators and prey with insights into their demography and distribution (some opportunistic sampling by sightings, signs and spatial distribution during assessment would be extremely useful in terms of expert impression and as a pulse), monitoring incidence of livestock grazing, fires, weeds, sources of water, a variety of illegal activities typically associated with the reserve, wildlife health (e.g. epidemics, immunization of livestock) regeneration and change in vegetation, visitors and their activities, offence cases, ex-gratia payments etc. Efforts must be made to assess the planning and implementation of Phase-IV monitoring protocols and the success of implementation of M-Stripes (wherever applicable). Are the 'Sykes and Horill' monitoring plots maintained and data analyzed? Engagement of interns, collaborations with colleges, Universities, or other Institutes for research.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

MATRIX IN TABULAR FORM FOR ASSESSING COMPLIANCE POINT SCORES ON THE BASIS OF EXPLANATORY NOTE AND CRITERIA :

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
A. RESEARCH IN TR: 1. Research in TR by different organisation: (Details on research activities by external agencies; observance of protocols; timely communication of findings & publications to TR; use in improving management) **Supportive Documents:**	**Categories and Point Score** a) Nil =1 b) Some works; no follow-up =2 c) Moderate no. of projects with protocol; in-time reports =3 d) Many projects; protocol in place; timely reports & used to improve management =4	
2. Research in TR by own stream: (Details of research activities by own stream including laying out & maintaining of Syke & Horill monitoring plots; analysis and reporting of findings; course correction mechanism) **Supportive Documents:**	a) Nil =1 b) Some sample plots; no/ partial data collection/not analysed =2 c) A few research/ sampling works; timely reporting =3 d) Some works, findings report- ed & acted; Syke & Horill plots maintained, and analysed =4	
3. Research collaboration with institutions: (Details on engagement of interns, collaborations with colleges, Universities, or other Institutes for research; reporting & analysis of finding and course correction) **Supportive Documents:**	a) Nil =1 b) Under negotiation/ some interns engaged =2 c) A few collaborative research & interns; timely report =3 d) Some collaborations; interns working; timely reporting; system to act on findings =4	

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
B. MONITORING AND EVALUATION OF TRENDS IN THE TR ON CRITICAL ISSUES:	**Categories and Point Score**	
4. Population of tiger, co-predator, and prey: (Details on monitoring of population with insights into their demography and distribution- by some opportunistic sampling, by sightings, signs and spatial distribution during assessment to collect extremely useful information for expert impression and as a pulse) **Supportive Documents:**	a) Not done/ proper record =1 b) Some unsystematic data, not reliable =2 c) Data collected systematically; no proper analysis for trend =3 d) Data collected systematically; used to know their demography, distribution, emerging trends =4	
5. Monitoring of biotic threats to habitat: (Details on monitoring/ evaluation of threats to habitat, such as grazing, fire, weeds, poaching, encroachments, visitors action etc.; manner of reporting/ recording; analysis of trends and use for improving management) **Supportive Documents:**	a) Little/ no systematic evaluation / routine reporting =1 b) Some are evaluated, reported but not routine/systematic =2 c) Systematic evaluation & trend reporting routinely done =3 d) Systematic evaluation; comprehensive reporting of trends & course correction, if needed =4	
6. Monitoring of vegetation and habitat : (Details on monitoring/ evaluation of regeneration, change of vegetation, weeds. and water sources ; manner of reporting/ recording; analysis of trends and use for improving management) **Supportive Documents:**	a) Little/ no systematic evaluation / routine reporting =1 b) Some are evaluated, reported but not routine/systematic =2 c) Systematic evaluation & trend reporting routinely done =3 d) Systematic evaluation; comprehensive reporting of trends & course correction, if needed =4	
7. Monitoring of wildlife health : (Details on monitoring/ evaluation of wildlife health inclusive of epidemics, immunization of livestock; manner of reporting/ recording; analysis of trends and preventive measures) **Supportive Documents:**	a) Not monitored; ad-hoc immunization program =1 b) Monitoring, reporting for few diseases; immunization partly=2 c) Major diseases are monitored, reported; and immunization around as per need =3 d) Comprehensive monitoring & reporting of diseases/epidemics; for prevention/ immunization =4	
8. Monitoring of offence cases: (Details on monitoring of offence cases and ex-gratia payment; manner of reporting & recording- routine or comprehensive; analysis/ evaluation of trends; use for improving management) **Supportive Documents:**	a) Little/ no systematic evaluation / routine reporting =1 b) Some evaluation & reporting but not routine/systematic =2 c) Systematic evaluation & trend reporting routinely done =3 d) Systematic evaluation; comprehensive reporting of trends & course correction, if needed =4	

ITEMS OF EVALUATION ITEM WISE FINDINGS WITH SUPPORTIVE DOCUMENTS	TICK (√) APPROPRIATE CATEGORY	POINT SCORE
9. Implementation of phase IV monitoring protocol: (Details on planning and implementation of phase IV monitoring protocol; manner of reporting/ recording; analysis of trends and use in improving protection &management) **Supportive Documents:**	a) Little/ no systematic adherence to protocol =1 b) Protocol adhered to some extent, but no trend evaluation=2 c) Protocol mostly followed; trends evaluated =3 d) Protocol fully adhered; used in protection & management =4	
10. Use of M-Stripes: (Details on implementation / use of M-Stipes; success in collection of data related to 3 modules- patrol, ecology and conflict; its use in improving management) **Supportive Documents:**	a) Not implemented =1 b) In preparatory stage to switch over from another system =2 c) M-Stipes implemented largely to collect useful information =3 d) M-Stipes is successfully implemented; data is used for improving management =4	

s =TOTAL POINTS SCORED FOR ALL ITEMS:

m = AWARDABLE MAXIMUM POINTS =Total Number of criteria, evaluated on point scale X 4 (maximum value of a criteria):

POINT SCORE PERCENT = s/m X 100 (rounded to whole number):

CATEGORY ON POINT SCORE PERCENT BASIS: Poor:0-25%, Fair:26-50%, Good:51-75%, Very Good:76-100%

5.4

Is there a systematic maintenance schedule and funds in place for management of infrastructure/assets?

Assessment criteria+

Condition	Category*	(Tick √)	Reference document(s)	Remarks
No systematic inventory or maintenance schedule.	Poor			
Inventory maintenance is adhoc and so is the maintenance schedule.	Fair			
Systematic inventory provides the basis for maintenance schedule but funds are inadequate.	Good			
Systematic inventory provides the basis for maintenance schedule and adequate funds are made available.	Very good			

+ Assets register (buildings and roads) maintained?
*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Asset registers maintained in the TR. Provide type of asset registers such as, buildings, roads, vehicles, wireless towers, check dams, percolation ponds, watch towers, fire lines and other infra structure/assets; also provide their quantum (furnish/name supported documents):
2. Details of maintenance schedule and orders/ instructions, if any for each type of assets. Asset wise details for every year on the quantity of asset, estimated amount required, fund allocated and source of funds for last 3 years (furnish supported documents):

Name of Asset	Maintenance schedule	Quantum of Asset	Year	Fund Required (Rs.Lakhs	Funds allotted (Rs. Lakhs) Project Tiger	Non plan	TCF	Others	Total	Remarks
1. Building			Year- 1, Year-2, Year-3							
2.Roads			Year- 1, Year-2, Year-3							
3. Vehicle			Year- 1, Year-2, Year-3							

OUTCOMES

6.1

Are populations of threatened species declining, stable or increasing?

Assessment criteria+ Condition	Category*	(Tick √)	Reference document(s)	Remarks
Populations of key threatened/ endangered species are declining.	Poor			
Some threatened/ endangered species populations declining, some are increasing, most others are stable.	Fair			
Several threatened/ endangered species populations increasing, most others are stable.	Good			
All threatened/ endangered species populations either increasing or stable.	Very good			

+This needs to practically relate to the natural ecosystem potential rather than being driven merely by numbers and visibility. The assessment score may be elaborated under remarks.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Details of population estimation of key threatened/ endangered species. Provide name of all key threatened / endangered species in the TR; the name of species and the year for last 3 population estimations; methods deployed in their estimation.

2. Status of population of key threatened / endangered species:

Key threatened/ endangered species	Population in earlier estimation	Population in latest estimate	Increase/ decrease in number	Status on ecosystem potential basis (increase/stable/ decline)	Explanation for justifying the status on ecosystem basis
1.					
2.					
3.					
4.					
5.					

6.2

Is the population of tigers showing a declining, stable or increasing trend?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Population of tiger is showing a declining trend	Poor			
Population of tiger is showing a declining trend and the reason is identified and options to reverse are in place	Fair			
Population of tiger is showing a stable trend but below carrying capacity	Good			
Population of tiger is stable at carrying capacity or showing an increasing trend and surrounding landscape, core area addresses tiger dispersal appropriately	Very good			

*This assessment should be based in the context of available population estimate (2010-11) as baseline and the outcomes of the currently ongoing Phase-IV analyses.

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Details on determination of Carrying Capacity for population of tiger in the TR (enclose supportive documents):
2. Details of population estimation and trend (enclose supportive documents):

					Phase-IV status w.r.t. 2010-11 estimate				
2010-11 Estimate	**2018 AI Estimate**	**Year of current Phase- IV**	**Phase- IV Estimate**	**Carrying Capacity (CC)**	**Declined**	**Stable below CC**	**Stable at CC**	**Increase below CC**	**Increase at CC**

3. In case of declining trend, whether the reasons have been identified and options/ actions taken to reverse the trend. Provide details with supportive documents:
4. The status of surrounding landscape and core area addressing tiger dispersal appropriately. Provide details on the pattern of dispersal in surrounding landscape and core and its appropriateness (enclose supportive documents):

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6.3

Have the threats+ to the TR being reduced/ minimized? Or is there an increase?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Threats to the TR have not abated but have enhanced.	Poor			
Some threats to the TR have abated, others continue their presence	Fair			
Most threats to the TR have abated. The few remaining are vigorously being addressed	Good			
All threats to the TR have been effectively contained and an efficient system is in place to deal with any emerging situation.	Very good			

+Does the TR has a Disaster Risk Management Plan to deal with existing as well as emerging threats? Fire management plan?

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Status of Threats (enclose supportive

List of Threats	Extent of Threats earlier	Measures being taken for abatement	Extent of Threats at present	Status of change (Abated/ Being pursued/Enhanced)
1.				
2.				
3.				

2. Status of TR having a Fire Management Plan (enclose supportive documents):

3. Status on the TR having a Disaster Risk Management Plan to deal with existing as well as emerging threats (enclose supportive documents):

6.4

Are the expectations of visitors+ generally met or exceeded?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Expectations of visitors generally not met.	Poor			
Expectations of many visitors are met.	Fair			
Expectations of most visitors are met.	Good			
Expectations of all most all visitors are met.	Very good			

+What is the compliance status on Supreme Court/ NTCA Guidelines on Ecotourism in TRs?

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Status (number) of Visitors/ Tourist visiting the TR annually in last 3 years (with supportive documents):
2. Details of various eco-tourism programmes run by the TR and annual participation of visitors for last 3 years (enclose supportive documents):
3. Details on mechanism in place for recording feedbacks from tourists visiting the park and to act upon good suggestions in incorporating them to practices/management activities. Provide details on such actions. Also provide details on scrutinization of feed backs as to satisfaction of visitors' expectations and mention the outcome (enclose supportive documents):
4. Details on compliance status of Supreme Court/ NTCA guidelines on eco-tourism in TR (enclose supportive documents):


Nilanjan Chatterjee

6.5

Are local communities supportive of TR management?

Assessment criteria+				
Condition	**Category***	**(Tick √)**	**Reference document(s)**	**Remarks**
Local communities are hostile.	Poor			
Some are supportive.	Fair			
Most locals are supportive of TR management.	Good			
All local communities supportive of TR management.	Very good			

+There could be many reasons for disenchantment. It could be real because of managerial neglect or the managerial efforts could be appropriate but there could be local elements/organizations who would like to keep the disaffection simmering for their own ulterior motives. Likewise success could be entirely because of the efforts of managers or they might be fortunate in striking partnerships with credible NGOs. Assessment may take the prevailing causes into account. Social surveys can be looked into to validate the point. What are we doing to engage?

*Score: Poor: 2.5; Fair: 5; Good: 7.5; Very Good: 10

1. Details of support of local communities (with supportive documents):
2. Details of reasons of disenchantment of local communities, if any, and the local elements/organizations who would like to keep the disaffection simmering for their own ulterior motives-what are the motives). Provide details of actions TR is taking to engage them. Also mention help, if any from credible NGOs (enclose supportive documents):
3. Details on any social Survey conducted to assess the support and underlying issues and outcome from such survey (enclose supportive documents):

RESULTS AND OUTCOMES

MANAGEMENT EFFECTIVENESS EVALUATION OF TIGER RESERVES IN INDIA

Shibu Nair

3.1 Overall results of MEE of Fifth Cycle of Tiger Reserves in India, 2022

The Management Effectiveness Evaluation (MEE) exercise has successfully completed the five cycles of evaluation of Tiger Reserves in the country. First cycle of evaluation conducted for 28 Tiger Reserves in 2006; second cycle of evaluation conducted for 39 Tiger Reserves in 2010, including repetitions of 28 TRs of 2006; third cycle of evaluation conducted for 43 Tiger Reserves in 2014 including repetitions of 39 TRs of 2010; fourth cycle of evaluation conducted for 50 Tiger Reserves in 2018 and fifth cycle of evaluation conducted for 51 Tiger Reserves in 2022 including repetitions of 50 TRs of 2018.

The MEE ratings of Tiger Reserves described in 4 categories as, 50-59% rated as 'Fair'; 60-74% rated as 'Good'; 75-89% rated as 'Very Good'; 90% and above rated as 'Excellent'.

BOX: MEE Ratings/ Criteria

The MEE ratings of Tiger Reserves described in 4 categories as:

- 50-59% rated as 'Fair';
- 60-74% rated as 'Good';
- 75-89% rated as 'Very Good';
- 90% and above rated as 'Excellent'.

Fig. 3.1 MEE ratings

There has been continuous improvement with subsequent cycles of evaluation in MEE score of Tiger Reserves. The overall mean MEE score in second cycle in 2010 was 65%, and 69% in third cycle in 2014, 70% in fourth cycle in 2018 and 78% in the current cycle of evaluation in 2022.

RESULTS AND OUTCOMES

03

S.No.	State	Tiger Reserve	MEE Score (%)	MEE Rating
1	Kerala	Periyar	94.53	Excellent
2	Madhya Pradesh	Satpura	93.18	Excellent
3	Karnataka	Bandipur	93.18	Excellent
4	Karnataka	Nagarhole	92.42	Excellent
5	Madhya Pradesh	Kanha	91.67	Excellent
6	Karnataka	Biligiri Ranganatha Swamy Temple	91.67	Excellent
7	Tamil Nadu	Anamalai	91.67	Excellent
8	Maharashtra	Pench	90.91	Excellent
9	Karnataka	Bhadra	90.91	Excellent
10	Karnataka	Kali (Dandeli-Anshi)	90.15	Excellent
11	Odisha	Similipal	90.15	Excellent
12	Tamil Nadu	Mudumalai	90.15	Excellent
13	Madhya Pradesh	Pench (MP)	89.39	Very Good
14	Maharashtra	Tadoba-Andhari	87.88	Very Good
15	Assam	Manas	85.61	Very Good
16	Maharashtra	Melghat	84.85	Very Good
17	Tamil Nadu	Sathyamanglam	84.85	Very Good
18	Kerala	Parambikulam	84.09	Very Good
19	Assam	Kaziranga	84.09	Very Good
20	Maharashtra	Nawegaon-Nagzira	83.33	Very Good
21	Madhya Pradesh	Bandhavgarh	83.33	Very Good
22	Madhya Pradesh	Panna	83.33	Very Good
23	Tamil Nadu	Kalakad-Mundanthurai	83.33	Very Good
24	Andhra Pradesh	Nagarjunasagar-Srisailam	82.58	Very Good
25	Uttar Pradesh	Dudhwa	81.82	Very Good
26	Uttarakhand	Corbett	78.79	Very Good
27	Maharashtra	Sahyadri	78.79	Very Good
28	Telangana	Amrabad	78.79	Very Good
29	Maharashtra	Bor	77.27	Very Good
30	Arunachal Pradesh	Pakke	77.27	Very Good
31	Bihar	Valmiki	75.76	Very Good
32	West Bengal	Sundarbans	75.76	Very Good
33	Odisha	Satkosia	75.00	Very Good
34	Telangana	Kawal	74.24	Good
35	Rajashthan	Ranthambore	73.48	Good
36	Arunachal Pradesh	Kamlang	72.73	Good
37	Madhya Pradesh	Sanjay -Dubri	71.97	Good
38	Uttar Pradesh	Pilibhit	71.97	Good
39	Chhattisgarh	Achanakmar	69.70	Good
40	Uttarakhand	Rajaji	68.94	Good
41	Assam	Orang	68.18	Good
42	Jharkhand	Palamau	65.91	Good
43	Rajashthan	Sariska	64.89	Good
44	West Bengal	Buxa	63.64	Good
45	Tamil Nadu	Srivilliputhur Megalamai	60.94	Good
46	Rajashthan	Mukundara Hills	60.16	Good
47	Arunachal Pradesh	Namdapha	57.58	Fair
48	Chhattisgarh	Udanti-Sitanadi	56.82	Fair
49	Assam	Nameri	56.82	Fair
50	Chhattisgarh	Indravati	53.79	Fair
51	Mizoram	Dampa	50.00	Fair

Table 3.1 Overall results of MEE of Fifth Cycle of Tiger Reserves in India, 2022

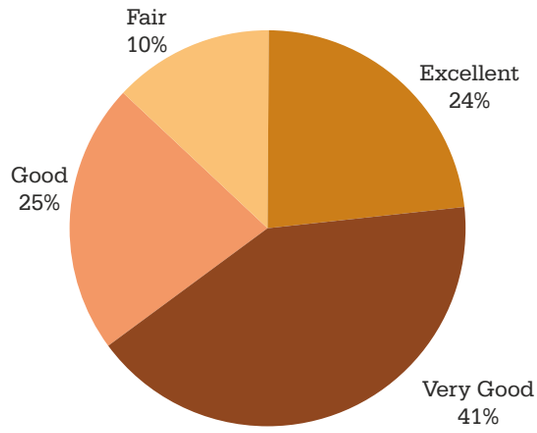


Figure 3.2
MEE ratings of Tiger Reserves, 2022

3.2 Cluster-wise performance of MEE of Tiger Reserves in India, 2022

The 51 Tiger Reserves have been classified into 5 landscape complexes based on the specific landscape characteristics and as on All India Tiger Estimation Exercise viz., (1) Shivalik-Gangetic Plain Landscape Complex; (2) Central Indian Landscape Complex and Eastern Ghats Landscape Complex; (3) Western Ghats Landscape Complex; (4) North-eastern Hills and Brahmaputra Landscape and (5) Sundarbans Landscape.

The landscape with the highest mean MEE score (87.32) is the Western Ghats landscape complex, followed by Central Indian landscape complex and Eastern Ghats landscape complex (77.60) and the landscape with the lowest mean MEE score (62.88) is the North-eastern Hills and Brahmaputra landscape complex.

In cluster-wise ratings, Cluster four represents maximum number of Tiger Reserves in 'Excellent' category (8 Trs), Cluster one represents maximum number of Tiger Reserves in 'Very Good' category (7 TRs) and Cluster two represents maximum number of Tiger Reserves in 'Good' category (4 TRs) (Figure 3.3).

Table 3.2. Landscape complexes and MEE scores (%)

Landscape	Name of Tiger Reserves	Number of Tiger Reserves	Mean MEE Score (%)
Shivalik Gangetic Plain Landscape	Corbet, Rajaji, Dudhwa, Pilibhit & Valmiki	5	75.46
Central Indian and Eastern Ghats Landscape	Satpura, Kanha, Pench (MH), Similipal, Pench (MP), Tadoba-Andhari, Melghat, Nawegaon-Nagzira, Bandhavgarh, Panna, NSTR, Amrabad, Sahyadri, Bor, Satkosia, Kawal, Ranthambore, Sanjay -Dubri, Achanakmar, Palamau, Sariska, Mukundara Hills, Udanti-Sitanadi, Indravati	24	77.6
Western Ghats	Kali, Parambikum, Periyar, Anamalai, KMTR, Bhadra, Nagarhole, Bandipur, Mudumalai, Sathyamangalam, SMTR, BRT	12	87.32
North-eastern Hills and Brahmaputra Landscape	Manas, Buxa, Orang, Dampa, Kaziranga, Nameri, Pakke, Namdapha, Kamlang	9	62.88
Sundarbans	Sundarbans	1	75.76
		51 Trs	

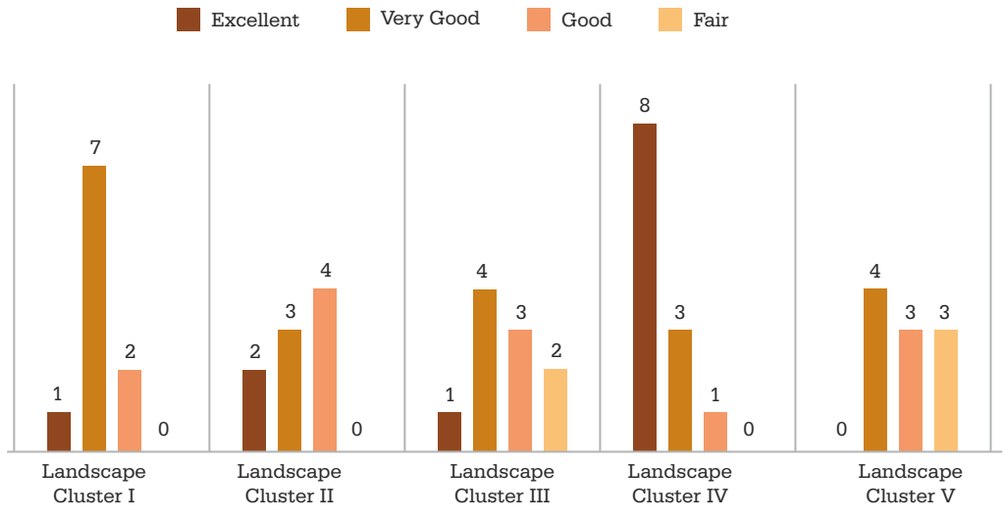


Figure 3.3 Cluster-wise MEE Ratings of Tiger Reserves, 2022

In Cluster one, Pench Tiger Reserve, Maharashtra reported the highest MEE score of 90.91% falling in 'Excellent' category, whereas Rajaji Tiger Reserve, Uttarakhand received the lowest MEE score of 68.94% falling in 'Good' category. In Cluster two, Satpura Tiger Reserve, Madhya Pradesh reported the maximum MEE score of 93.18% as 'Excellent'; whereas Mukundara Hills Tiger Reserve, Rajasthan represents lowest MEE score of 60.16% in 'Good' category. Cluster three represents maximum score for Similipal Tiger Reserve, Odisha of 90.15% in 'Excellent' category whereas Indravati Tiger Reserve, Chhattisgarh scored minimum of 53.79% in 'Fair' category. In cluster four, Periyar Tiger Reserve, Kerala scored highest that is 94.53% in 'Excellent' category, whereas Srivilliputhur Megalamai Tiger Reserve, Tamil Nadu rated as lowest that is 60.94% in 'Good' category. Cluster five represents highest score for Manas Tiger Reserve, Assam that is 85.61% in 'Very Good' category and lowest for Dampa Tiger Reserve, Mizoram as 50% in 'Fair' category (Table 3.2).

Table 3.2. Cluster-wise MEE scores (%)

Cluster	S.No.	State	Tiger Reserve	MEE Score (%)	Category
Cluster 1A	1	Uttar Pradesh	Dudhwa	81.82	Very Good
	2	Uttar Pradesh	Pilibhit	71.97	Good
	3	Uttarakhand	Corbett	78.79	Very Good
	4	Uttarakhand	Rajaji	68.94	Good
	5	Maharashtra	Melghat	84.85	Very Good
			Mean Score	**77.27**	
Cluster 1B	6	Maharashtra	Pench	90.91	Excellent
	7	Maharashtra	Tadoba-Andhari	88.64	Very Good
	8	Maharashtra	Sahyadri	78.79	Very Good
	9	Maharashtra	Bor	77.27	Very Good
	10	Maharashtra	Nawegaon-Nagzira	83.33	Very Good
			Mean Score	**83.79**	
Cluster 2A	11	Madhya pradesh	Bandhavgarh	83.33	Very Good
	12	Madhya pradesh	Satpura	93.18	Excellent
	13	Madhya pradesh	Kanha	91.67	Excellent
	14	Rajashthan	Mukundara Hills	60.16	Good
			Mean Score	**82.09**	
Cluster 2B	15	Madhya pradesh	Panna	83.33	Very Good
	16	Madhya pradesh	Pench (MP)	89.39	Very Good
	17	Madhya pradesh	Sanjay -Dubri	71.97	Good
	18	Rajashthan	Sariska	64.89	Good
	19	Rajashthan	Ranthambore	73.48	Good
			Mean Score	**76.61**	

Cluster	S.No.	State	Tiger Reserve	MEE Score (%)	Category
Cluster 3A	20	Bihar	Valmiki	75.76	Very Good
	21	Chhattisgarh	Indravati	53.79	Fair
	22	Chhattisgarh	Achanakmar	69.70	Good
	23	Chhattisgarh	Udanti-Sitanadi	56.82	Fair
	24	Andhra Pradesh	NSTR	82.58	Very Good
			Mean Score	**67.73**	
Cluster 3B	25	Odisha	Similipal	90.15	Excellent
	26	Odisha	Satkosia	75.00	Very Good
	27	Telangana	Kawal	74.24	Good
	28	Telangana	Amrabad	78.79	Very Good
	29	Jharkhand	Palamau	65.91	Good
			Mean Score	**76.82**	
Cluster 4A	30	Karnataka	Bandipur	93.18	Excellent
	31	Karnataka	Nagarhole	92.42	Excellent
	32	Karnataka	Bhadra	90.91	Excellent
	33	Karnataka	Kali (Dandeli-Anshi)	90.15	Excellent
	34	Karnataka	Biligiri Ranganatha Swamy Temple	91.67	Excellent
	35	Kerala	Periyar	94.53	Excellent
			Mean Score	**92.14**	
Cluster 4B	36	Kerala	Parambikulam	84.09	Very Good
	37	Tamil Nadu	Kalakad-Mundanthura i	83.33	Very Good
	38	Tamil Nadu	Anamalai	91.67	Excellent
	39	Tamil Nadu	Mudumalai	90.15	Excellent
	40	Tamil Nadu	Sathyamanglam	84.85	Very Good
	41	Tamil Nadu	Srivilliputhur Megalar ai		60.94Good
			Mean Score	**82.51**	
Cluster 5A	42	Arunachal Pradesh	Namdapha	57.58	Fair
	43	Arunachal Pradesh	Pakke	77.27	Very Good
	44	Arunachal Pradesh	Kamlang	72.73	Good
	45	Assam	Kaziranga	84.09	Very Good
	46	Assam	Manas	85.61	Very Good
			Mean Score	**75.46**	
Cluster 5B	47	Assam	Nameri	56.82	Fair
	48	Assam	Orang	68.18	Good
	49	Mizoram	Dampa	50.00	Fair
	50	West Bengal	Buxa	63.64	Good
	51	West Bengal	Sundarbans	75.76	Very Good
			Mean Score	**62.88**	

3.3 State-wise performance of MEE of Tiger Reserves in India, 2022

Fifty-one Tiger Reserves belong to 18 states of the country. The state of Madhya Pradesh and Maharashtra have the maximum number of Tiger Reserves in India that is 6 Tiger Reserves respectively, followed by Karnataka having 5 Tiger Reserves, whereas Andhra Pradesh, Bihar, Jharkhand and Mizoram have only a single Tiger Reserve in each State (Table 3.3). The state of Karnataka reported the highest mean MEE score of 91.66%, followed by Kerala with 89.31%, whereas Mizoram (mean MEE score 50%) recorded the lowest MEE scores (Figure 3.4). Among 18 Tiger states of the country, 1 state reported in 'Excellent' category, 10 states reported in 'Very Good' category, 6 states reported in 'Good' category, whereas 1 state reported in 'Fair' category.

S.No.	State	No. of Trs	Name of TRs	Mean MEE Score (%)	Mean MEE Rating
1	Andhra Pradesh	1	Nagarjunasagar Srisailam	82.58	Very Good
2	Arunachal Pradesh	3	Namdapha, Pakke, Kamlang	69.19	Good
3	Assam	4	Manas, Nameri, Kaziranga, Orang	73.67	Good
4	Bihar	1	Valmiki	75.76	Very Good
5	Chhattisgarh	3	Indravati, Udanti-Sitanadi, Achanakmar	60.1	Good
6	Jharkhand	1	Palamau	65.91	Good
7	Karnataka	5	Bandipur, Bhadra, Kali, Nagarhole, Biligiri Ranganatha Swamy Temple	91.66	Excellent
8	Kerala	2	Periyar, Parambikulam	89.31	Very Good
9	Madhya Pradesh	6	Kanha, Pench, Bandhavgarh, Panna, Satpura, Sanjay-Dubri	85.47	Very Good
10	Maharashtra	6	Melghat, Tadoba-Andhari, Pench, Sahyadri, Nawegaon-Nagzira, Bor	83.96	Very Good
11	Mizoram	1	Dampa	50	Fair
12	Odisha	2	Similipal, Satkosia	82.57	Very Good
13	Rajasthan	3	Ranthambore, Sariska, Mukundara Hills	66.17	Good
14	Tamil Nadu	5	Kalakad Mundanthurai, Anamalai, Mudumalai, Sathyamangalam, Srivilliputhur Megamalai	82.18	Very Good
15	Telangana	2	Kawal, Amrabad	76.51	Very Good
16	Uttar Pradesh	2	Pilibhit, Dudhwa	76.92	Very Good
17	Uttarakhand	2	Corbett, Rajaji	73.86	Very Good
18	West Bengal	2	Sundarbans, Buxa	69.70	Good
		18 Tiger States	**51 Tiger Reserves**	**75.31***	**Very Good**

Table 3.3
State-wise mean MEE score and ratings of Tiger Reserves, 2022

* Since this score was calculated by averaging the mean state wise MEE scores, there is a little variation from the overall MEE score of 78.01%

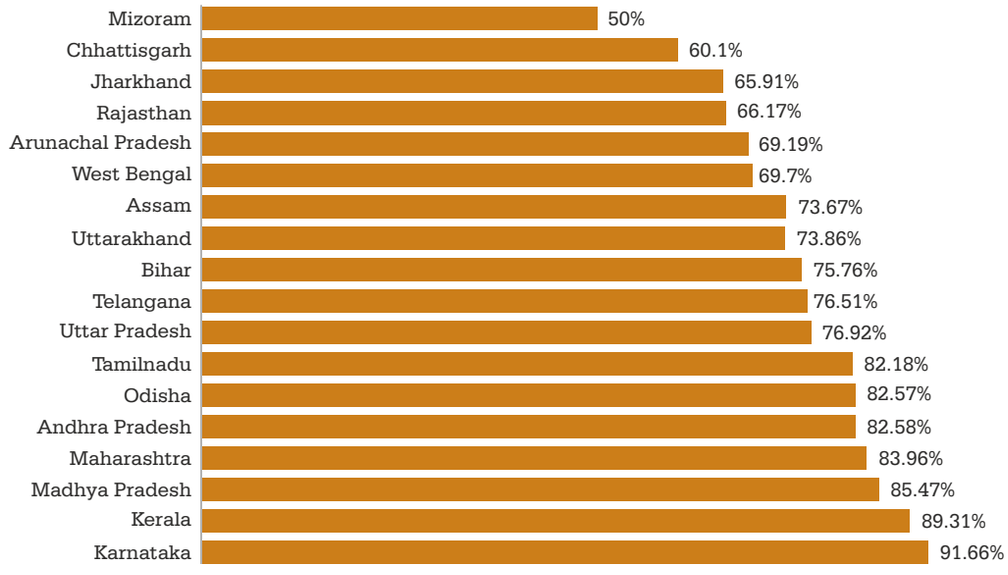


Figure 3.4
Ascending orders of Tiger states with mean MEE score

3.4 Element-wise performance of MEE of Tiger Reserves in India, 2022

Fifty-one Tiger Reserves of the country were evaluated through the MEE framework, which included 33 'Headline Indicators' in six elements of the framework. The results of the thirty-three 'Headline Indicators' were summarised for 51 Tiger Reserves. The result indicates that the 'Headline Indicators' under element 'Context' are best performing and scored maximum of 81.37% followed by 'Planning' that is 80.88%. Whereas the element 'Input' received least attention by Tiger Reserve Management and scored 72.75%. The 'Headline Indicators' under 'Process', 'Output' and 'Outcomes' are average performing indicators (Figure 3.5).

Individual Tiger Reserves have been analysed element wise over the 6 elements. The 2 Tiger Reserves viz., Satpura Tiger Reserve, Madhya Pradesh and Similipal Tiger Reserve, Odisha are top performing Tiger Reserves in terms of 'Context' and received 100% score, respectively. Whereas Pench Tiger Reserve, Maharashtra, BRT Tiger Reserve, Karnataka and Manas Tiger Reserve, Assam were the top performing Tiger Reserves in 'Planning', receiving 96.88% respectively. Bhadra Tiger Reserve, Karnataka received 100% score in 'Input'. In 'Process', Satpura Tiger Reserve, Maharashtra, Kanha Tiger Reserve, Maharashtra and Bandipur Tiger Reserve, Karnataka performed the best (with a score of 100% each). Kanha Tiger Reserve, Maharashtra, Nagarhole Tiger Reserve, Karnataka and Periyar Tiger Reserve, Kerala performed the best in the element 'Output' with a maximum score of 100% each. Lastly, in 'Outcomes', Mudumalai Tiger Reserve, Tamil Nadu was the top scorer with 100% (Figure 3.6).

The results of 33 'Headline Indicators' pooled together for 51 Tiger Reserves were evaluated during the fifth cycle of MEE in 2022. The "Compliance of Statutory requirements, integration of landscape and TCP compliance" are best performing indicators; "additional criteria on carbon capture/climate change mitigation, donors other than govt. supporters and adequacy of central govt funding" are weak performing indicators. The question 'TCP compliance' rated best at 88.24%, whereas the question on 'additional criteria on carbon capture/climate change mitigation received least score was of 63.24% (Figure 3.7).

Shivang Mehta

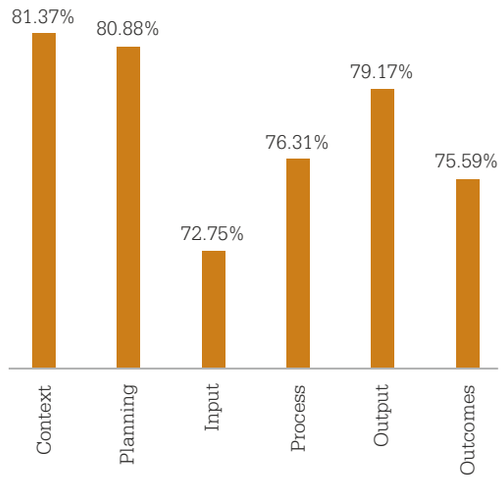


Figure 3.5
Element-wise overall performance of MEE of Tiger Reserve, 2022

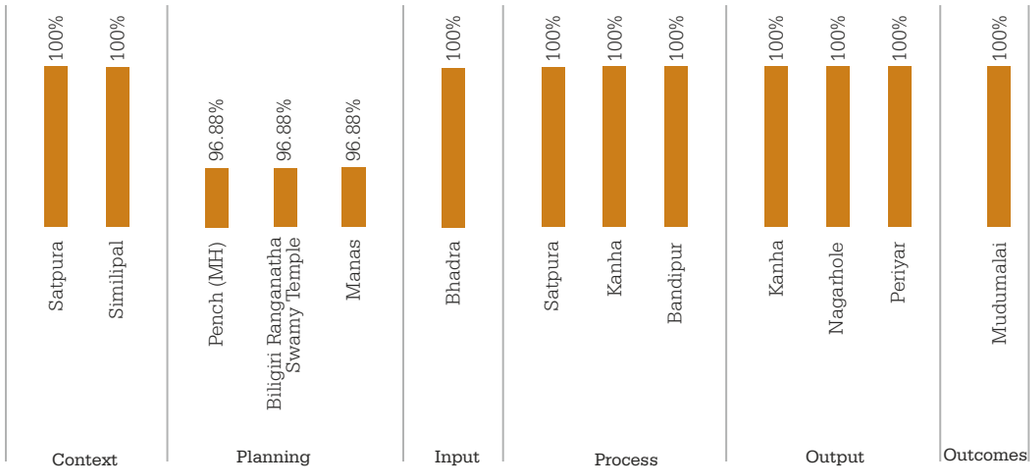


Figure 3.6
Element-wise best performing Tiger Reserves

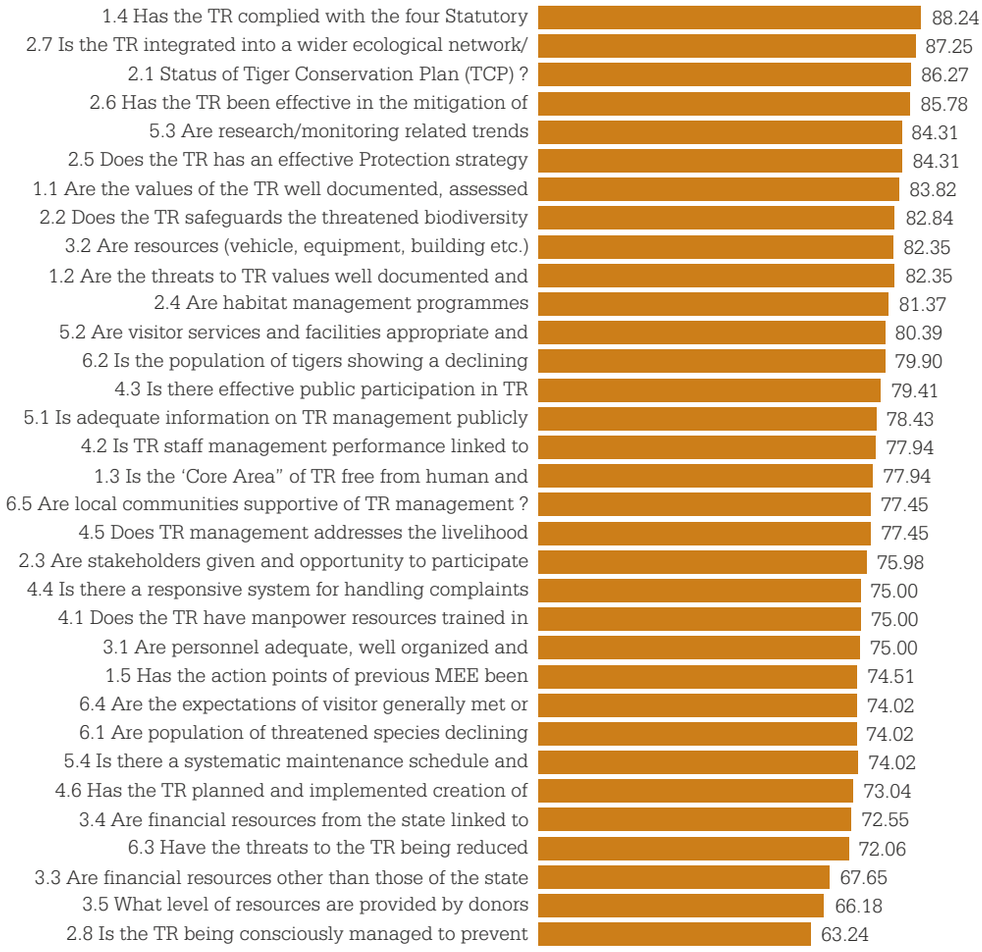


Figure 3.7 Performance of 33 'Headline Indicators' for 51 Tiger Reserves, evaluated in 2022.

3.5 Comparison of current MEE TR Results with previous MEE TR Cycles

3.5.1 Overall comparison of current MEE TR cycle results with previous MEE TR cycles

Under India's Project Tiger, Management Effectiveness Assessment (MEE) of Tiger Reserves (TRs) was conducted in five repeat cycles after every four years from 2006 to 2022 in India. First cycle included 28 TRs in 2006, second cycle included 39 TRs in 2010, third cycle included 43 TRs in 2014, fourth cycle included 50 TRs in 2018 and fifth cycle included 51 TRs in 2022.

There has been continuous improvement with subsequent cycles of evaluation in MEE score of Tiger Reserves in India. The overall mean MEE score in second cycle in 2010 was 65% and 69% in third cycle in 2014, 70% in fourth cycle of evaluation in 2018 and 78% in the current cycle of evaluation in 2022. Most of the Tiger Reserves were reported in 'Very Good' category in all rounds of evaluation, followed by 13 TRs in 'Good' category, 12 TRs in the newly formed 'Excellent" category and no Tiger Reserve fell in the 'Poor' category from the third cycle onwards (Figure 3.8).

Vijayrajan Muthu

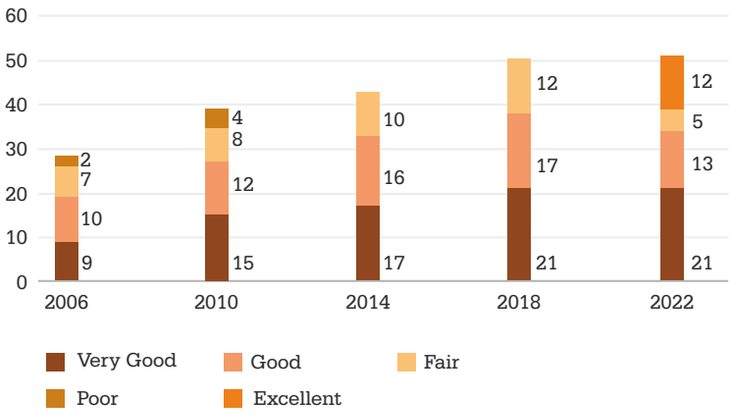


Figure 3.8 Comparative performance of 5 cycles of evaluation of Tiger Reserves

A comparison of MEE ratings of current cycle has been made with previous cycles of evaluation. If we compare the current cycle of MEE ratings with previous/third cycle of evaluation of 2014, it is seen that there are 9 Tiger Reserves, showing an improvement in one MEE ratings from 'Good' to 'Very Good' and 9 Tiger Reserves showing an improvement in one MEE ratings from 'Very Good' to 'Excellent'.

Whereas 2 Tiger Reserves showed decline in MEE ratings viz., Nameri and Udanti-Sitanadi Tiger Reserves. Twenty TRs remained consistent with their ratings. BRT and Similipal Tiger Reserves showed exceptional performances; jumping two MEE ratings .i.e, from 'Good' to 'Excellent'. Same goes for Bor Tiger Reserve; from 'Fair' to 'Very Good' (Table 3.6).

Table 3.6 Comparative MEE ratings of individual TRs in five MEE cycles from 2006 to 2022

Tiger Reserves	MEE Ratings					Change Status
	2006	2010	2014	2018	2022	
No. of notified TR	28	39	43	50	51	
Achanakmar	-	Fair	Fair	Good	Good	-
Amrabad	-	-	-	Good	Very Good	↑
Anamalai	-	Very Good	Very Good	Very Good	Excellent	↑
Bandhavgarh	Good	Very Good	Good	Good	Very Good	↑
Bandipur	Good	Very Good	Very Good	Very Good	Excellent	↑
Bhadra	Good	Very Good	Good	Very Good	Excellent	↑
Biligiri Ranganatha Swamy Temple	-	-	Good	Good	Excellent	↑↑
Bor	-	-	-	Fair	Very Good	↑↑
Buxa	Good	Good	Good	Good	Good	-
Corbett	Very Good	Good	Very Good	Very Good	Very Good	-
Dampa	Good	Good	Good	Fair	Fair	-
Dudhwa	Very Good	Good	Good	Good	Very Good	↑
Indravati	Poor	Poor	Fair	Fair	Fair	-
Kalakad-Mundanthurai	Fair	Very Good	Very Good	Very Good	Very Good	-
Kali (Dandeli-Anshi)	-	Very Good	Good	Very Good	Excellent	↑
Kamlang	-	-	-	Fair	Good	↑
Kanha	Very Good	Very Good	Very Good	Very Good	Excellent	↑
Kawal	-	-	Fair	Good	Good	-
Kaziranga	-	Very Good	Good	Very Good	Very Good	-
Manas	Fair	Good	Good	Good	Very Good	↑

Tiger Reserves	MEE Ratings					Change Status
	2006	2010	2014	2018	2022	
No. of notified TR	28	39	43	50	51	
Melghat	Very Good	Good	Very Good	Very Good	Very Good	-
Mudumalai	-	Very Good	Very Good	Very Good	Excellent	↑
Mukundara Hills	-	-	Fair	Fair	Good	↑
Nagarhole	Good	Good	Very Good	Very Good	Excellent	↑
Nagarjunsagar-Srisailam	Fair	Good	Good	Good	Very Good	↑
Namdapha	Fair	Fair	Fair	Fair	Fair	-
Nameri	Good	Fair	Fair	Good	Fair	↓
NawRegaon-Nagzira	-	-	-	Very Good	Very Good	-
Orang	-	-	-	Good	Good	-
Pakke	Fair	Good	Good	Good	Very Good	↑
Palamau	Very Good	Poor	Fair	Fair	Good	↑
Panna	Very Good	Very Good	Very Good	Very Good	Very Good	-
Parambikulam	-	Very Good	Very Good	Very Good	Very Good	-
Pench (MH)	Good	Good	Very Good	Very Good	Excellent	↑
Pench (MP)	Very Good	Very Good	Very Good	Very Good	Very Good	-
Periyar	Good	Very Good	Very Good	Very Good	Excellent	-
Pilibhit	-	-	-	Fair	Good	↑
Rajaji	-	-	-	Fair	Good	↑
Ranthambore	Fair	Good	Good	Fair	Good	↑
Sahyadri	-	Fair	Good	Good	Very Good	↑
Sanjay-Dubri	-	Fair	Good	Good	Good	-
Sariska	Poor	Fair	Good	Fair	Good	↑
Sathyamanglam	-	-	Good	Very Good	Very Good	-
Satkosia	-	Poor	Fair	Good	Very Good	↑
Satpura	-	Very Good	Very Good	Very Good	Excellent	↑
Similipal	Very Good	Fair	Fair	Good	Excellent	↑↑
Srivilliputhur-Megamalai	-	-	-	-	Good	-
Sundarbans	Very Good	Very Good	Very Good	Good	Very Good	↑
Tadoba-Andhari	Good	Good	Very Good	Very Good	Very Good	-
Udanti-Sitanadi	-	Poor	Fair	Good	Fair	↓
Valmiki	Fair	Fair	Very Good	Very Good	Very Good	-

The comparison of MEE score (in percentage) of current cycle 2022 has been made with previous cycles of evaluations in 2006, 2010, 2014 and 2018, given in state-wise, alphabetical order in Table 3.7. Further the mean of all five cycles have been calculated and based on mean score, mean MEE ratings are indicated. The overall mean of all cycles indicated that Indian Tiger Reserves have an MEE score of 66.83% or 67% falling in 'Good' category.

Manoj Dholakia

Table 3.7 Mean MEE score (%) of individual TRs of five MEE cycles from 2006 to 2022

State	Mean MEE Score (%) in 2006	Mean MEE Score (%) in 2010	Mean MEE Score (%) in 2014	Mean MEE Score (%) in 2018	Mean MEE Score (%) in 2022	Mean MEE Score (%) for 5 cycles
Andhra Pradesh	49.19	63.33	63.71	68.75	82.58	65.51
Arunachal Pradesh	54.32	64.09	54.43	58.59	69.19	60.13
Assam	57.84	67.31	57.79	67.77	73.67	64.88
Bihar	57.30	40.52	75.81	75.78	75.76	65.03
Chhattisgarh	37.84	35.28	50.00	59.38	60.10	48.52
Jharkhand	76.22	38.33	54.03	53.91	65.91	57.68
Karnataka	65.68	72.50	72.90	80.47	91.66	76.64
Kerala	68.65	80.00	88.71	90.23	89.31	83.38
Madhya Pradesh	75.68	84.00	79.44	81.90	85.47	81.30
Maharashtra	71.35	62.67	74.60	71.35	83.96	72.79
Mizoram	65.41	60.00	68.55	42.97	50.00	57.38
Odisha	75.68	42.50	55.65	70.31	82.57	65.34
Rajasthan	40.54	64.58	65.86	55.73	66.17	58.58
Tamil Nadu	56.22	75.00	75.40	82.03	82.18	74.17
Telangana	-	-	-	65.63	76.57	71.10
Uttar Pradesh	83.24	64.17	70.97	49.61	76.92	68.98
Uttarakhand	82.16	62.50	76.61	61.72	73.86	71.37
West Bengal	74.59	69.17	76.21	69.53	69.70	71.84
Total TRs and Mean MEE Score %	64.23	61.53	68.27	66.98	75.31	66.83

3.5.2 State-wise comparison of current MEE TR cycle results with previous MEE TR cycles

The fifty-one Tiger Reserves have been clubbed state-wise on the basis of the no. of Tiger Reserves in each state and mean MEE score percentage. The overall mean MEE score of five years has shown that Kerala State is the best performing State with 83.38% score, followed by Madhya Pradesh with 81.30% and Karnataka with 76.64% (Table 3.8 and Figure 3.9).

Table 3.8
State-wise no. of Tiger Reserves and mean MEE score (%) in descending order of five MEE cycles from 2006 to 2022

State	No. of TRs in 2006	No. of TRs in 2010	No. of TRs in 2014	No. of TRs in 2018	Mean MEE Score (%) in 2006	Mean MEE Score (%) in 2010	Mean MEE Score (%) in 2014	Mean MEE Score (%) in 2018	Mean MEE Score (%) in 2022	Mean MEE Score (%) for 5 cycles
Kerala	1	2	2	2	68.65	80.00	88.71	90.23	89.31	83.38
Madhya Pradesh	5	5	6	6	75.68	84.00	79.44	81.90	85.47	81.30
Karnataka	2	4	5	5	65.68	72.50	72.90	80.47	91.66	76.64
Tamil Nadu	1	3	4	4	56.22	75.00	75.40	82.03	82.18	74.17
Maharashtra	3	5	4	6	71.35	62.67	74.60	71.35	83.96	72.79
West Bengal	2	2	2	2	74.59	69.17	76.21	69.53	69.70	71.84
Uttarakhand	1	1	1	2	82.16	62.50	76.61	61.72	73.86	71.37

State	No. of TRs in 2006	No. of TRs in 2010	No. of TRs in 2014	No. of TRs in 2018	Mean MEE Score (%) in 2006	Mean MEE Score (%) in 2010	Mean MEE Score (%) in 2014	Mean MEE Score (%) in 2018	Mean MEE Score (%) in 2022	Mean MEE Score (%) for 5 cycles
Telangana	0	0	0	2	-	-	-	65.63	76.57	71.10
Uttar Pradesh	1	1	1	2	83.24	64.17	70.97	49.61	76.92	68.98
Andhra Pradesh	1	1	2	1	49.19	63.33	63.71	68.75	82.58	65.51
Odisha	1	2	2	2	75.68	42.50	55.65	70.31	82.57	65.34
Bihar	1	1	1	1	57.30	40.52	75.81	75.78	75.76	65.03
Assam	2	3	3	4	57.84	67.31	57.79	67.77	73.67	64.88
Arunachal Pradesh	2	2	2	3	54.32	64.09	54.43	58.59	69.19	60.13
Rajasthan	2	2	3	3	40.54	64.58	65.86	55.73	66.17	58.58
Jharkhand	1	1	1	1	76.22	38.33	54.03	53.91	65.91	57.68
Mizoram	1	1	1	1	65.41	60.00	68.55	42.97	50.00	57.38
Chhattisgarh	1	3	3	3	37.84	35.28	50.00	59.38	60.10	48.52
Total TRs and Mean MEE Score %	28	39	43	50	64.23	61.53	68.27	66.98	75.31	66.83

3.5.3 Element-wise comparison of current MEE TR cycle results with previous MEE TR cycles

The evaluation of Tiger Reserves based on the 6 elements of MEE framework was carried out. The results of 33 'Headline Indicators' were summarised in these 6 elements. The results of 4 MEE TR cycles were comparatively analysed and the overall mean MEE score calculated. The result indicated that the element 'Context' is best performing with an overall mean MEE score of 73.42% in 5 cycles and the element 'Process' scored lowest of 66.59%. This means the questions in 'Context' received highest attention while questions included in 'Process' received least attention by TR management. The 'Headline Indicators' under 'Planning', 'Output' and 'Outcomes' are average performing indicators (Figure 3.10 and Table 3.9).

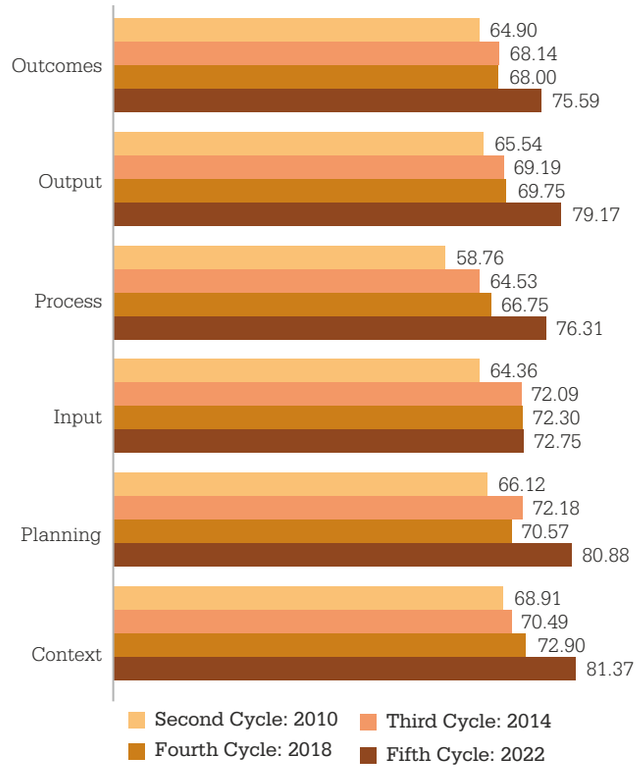
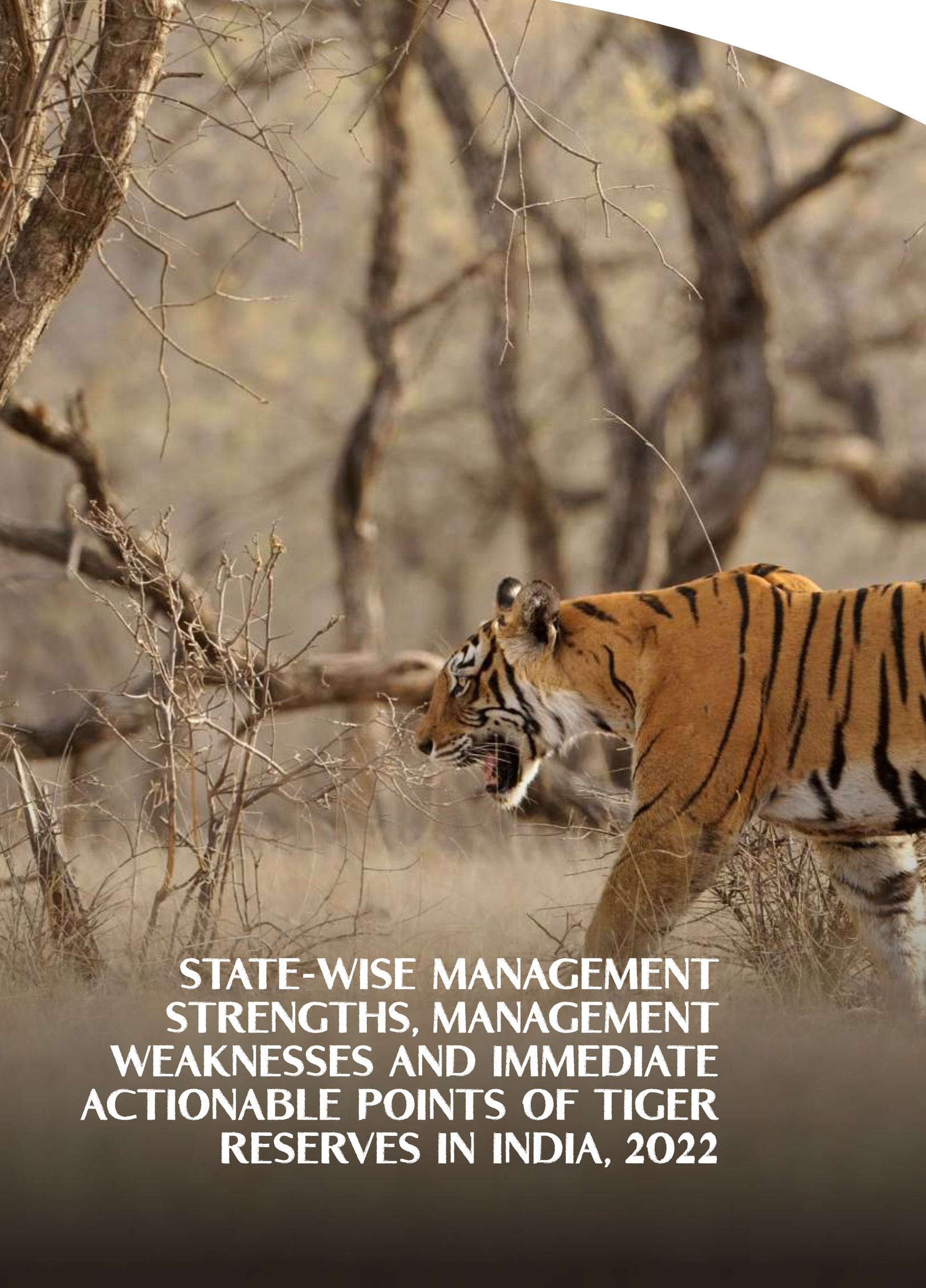


Figure 3.10 Element-wise MEE Score % in 4 MEE TR Cycles

Element	Fifth Cycle: 2022	Fourth Cycle: 2018	Third Cycle: 2014	Second Cycle: 2010	Overall Mean MEE Score % of 4 Cycles
Context	81.37	72.90	70.49	68.91	73.42
Planning	80.88	70.57	72.18	66.12	72.44
Input	72.75	72.30	72.09	64.36	70.37
Process	76.31	66.75	64.53	58.76	66.59
Output	79.17	69.75	69.19	65.54	70.91
Outcomes	75.59	68.00	68.14	64.90	69.16

Table 3.9 Element-wise MEE score percentage in 4 MEE TR cycles



STATE-WISE MANAGEMENT STRENGTHS, MANAGEMENT WEAKNESSES AND IMMEDIATE ACTIONABLE POINTS OF TIGER RESERVES IN INDIA, 2022

MANAGEMENT EFFECTIVENESS EVALUATION OF TIGER RESERVES IN INDIA

Rathika Ramasamy

ANDHRA PRADESH

NAGARJUNASAGAR SRISAILAM TIGER RESERVE

1

MEE SCORE **82.58%**

Date of Evaluation
5-10 January 2023

Evaluators' Names
Sh. R.N. Mehrotra
Sh. N.K. Vasu
Dr. H.S. Upadhyaya
Dr. G.V. Gopi

INTRODUCTION

Nagarjunasagar–Srisailam Tiger Reserve (NSTR) is the largest tiger reserve in our country in terms of size. This reserve is located in the Nallamala Hills, which is an offshoot of the Eastern Ghats. Spread over an area of 3728 km^2 in five revenue districts, this tiger reserve is an abode of rich biodiversity with many endangered plants and animals. The geo-morphology of the habitat is interesting, with plateaus, ridges, gorges and deep valleys, supporting a tropical dry deciduous forest having an undergrowth of bamboo and grass. The Core/Critical Tiger Habitat is 2444.14 km^2, and the buffer/peripheral area is 1283.36 km^2. NSTR, Andhra Pradesh (3728 km^2) and the adjoining Amrabad TR, Telangana (2611 km^2) make a larger landscape having tiger-centric management interventions. NSTR is connected to Seshachalam Biosphere Reserve through forested patches and three protected areas, making it an important tiger-movement landscape. The WII report "Connecting Tiger Population for Long-Term Conservation" has also identified Nagarjunasagar–Sri Venkateswara NP as an important corridor for tiger conservation. The TR management has been able to comply with the important recommendations of the earlier MEE (2018), such as unified control, provision of veterinary facilities, controlling illegal fishing and involving local tribes/communities in protection and other management activities.

Management Strengths

1. An offshoot of the southern Eastern Ghats in the state of Andhra Pradesh, NSTR is located in an extremely beautiful, pristine cultural and natural landscape. Nagarjunasagar–Srisailam Tiger Reserve (NSTR) is the largest tiger reserve in India (area 3728 km^2).
2. NSTR (Rajiv Gandhi Wildlife Sanctuary and Gundla Brahmeswaram (GBM) Wildlife Sanctuary) provides an approach to landscape conservation as it is contiguous with Amrabad Tiger Reserve (Telangana) in the north (Nallamalla Forest) and Lankamaleswara Sanctuary and Sri Venkateswara National Park, extending southwards up to Tirupati.
3. NSTR is connected to Seshachalam Biosphere Reserve through forested patches and three protected areas, Sri Lankamalleswaram Wildlife Sanctuary, Sri Venkestwara National Park and Sri Penusila Naiasimha Wildlife Sanctuary. This corridor is important for tiger movements in the landscape and hence must be prioritized for effective conservation (AITE-2018).
4. NSTR has documented all individual tigers using unique IDs. Pictures of tigers and other species are compiled and presented in the form of an album. This was unveiled by the Chief Minister and other highly placed individuals in the legislature and executives. Copies of the album have been distributed and help in establishing a constituency of supporters for the TR apart from assisting monitoring and management requirements.
5. The vast collection of museum specimens, ranging from plankton and invertebrates to mammals, in Srisailam Research Lab is the result of commendable work done by the NSTR team. The biodiversity of NSTR has been documented and preserved comprehensively in this lab, which is visited by students from all across India. The bio-lab is being maintained properly and updated by the TR management.
6. The ecotourism management at NSTR is good, and ecotourism centres have been developed at Bairluty and Thummalabailu. NSTR has a remarkable bio-park at Srisailam. The evolutionary history of the animal kingdom is depicted here, and it is an excellent ecotourism site.
7. The tiger conservation foundation has adequate corpus funds, which are managed well. The funds are utilised well by the management for the betterment of the TR. However, there is a serious burden on the TCF resources in the event of non-disbursal of central and state funds for identified planned activities as per the TCP, including the wages of protection watchers.
8. There is no scarcity of water in the tiger reserve. The River Krishna is the perennial water source, and apart from it, a large network of bavis (wells) and kuntas (ponds) is distributed across NSTR. There are numerous streams, small and big, that cover the entire tiger reserve. Most of them join the River Krishna ultimately. All the animals are dependent on the natural water sources and on artificial water sources developed by the department, which are to be maintained. New water resources are being developed.
9. The core and buffer are under the unified command of the Field Director. Such unified control is a major positive of the management as the reserve is large and spread across five districts of the state. Team work and coordination are now visible, which are needed for effective management of the TR.
10. The TR has established a wildlife dispensary for in-house management of rescued and stressed animals.
11. The reserve has a good wireless network across the TR.
12. The threat of invasive species is minimal.
13. The solid waste accumulating due to public roads passing through the TR and movements of pilgrims has been effectively managed.

Management Weaknesses

1. In NSTR, 16 villages comprising around 3285 people are located in the core area, and they are dependent on the forests for fuel and fodder and for grazing animals. There are 69 villages in the buffer zone. There is a high dependence of the villagers on NSTR for fodder, fuelwood, NTFP and bamboo. However, this is mainly a problem in the buffer zone, as in the core zone the villages are mostly small Chenchu hamlets, called gudems.
2. Thousands of cattle belonging to the scheduled tribes residing in the core and buffer areas wander in the forests for fodder. This results in a shortage of fodder for wild animals. In all base camps a register for cattle movement is maintained, and regular immunization programmes are planned.
3. Illegal fishing activities in the backwaters of the multipurpose dams that have been constructed across the River Krishna at Srisailam and Nagarjunasagar, forming large reservoirs within the boundaries of the core of the tiger reserve, are a major concern. Though joint operations by Amrabad Tiger Reserve (Telangana) and NSTR on the common boundary along the River Krishna have effective control, around 1000 families are dependent on the fishing in the River Krishna within NSTR for their livelihood.
4. Because there are various stakeholder departments in NSTR, notably the hydro-electric department, Integrated Tribal Development Agency (ITDA), the migrant fishing community and other resource users, there is every possibility of conflict between the conservation interests and individual interests/incompatible developments.
5. Famous temples such as Srisaila Mallikarjuna Swamy Temple, Akkamahadevi Temple, Nagaluty Veerabhadra Swamy Temple, Rudrakoteswara Swamy Temple and Ishtakameshwari Temple are located in the core area of NSTR. A large number of pilgrims (2–3 lakhs) from Karnataka and Maharashtra visit these temples during Mahasivarathri and Ugadi, disturbing the habitat and wild animals, increasing the vehicle pressure, creating litter, intensifying the man–animal conflict and generating forest fires. Controlling the pilgrimage is a challenge to NSTR.
6. The Dornala–Srisailam highway passes through the core of NSTR, posing a threat to the wildlife and habitat management.
7. There are large stretches of *Bambusa arundinacea* clumps in the central part of the reserve. These stretches are a unique ecosystem of the Nallamalla Hills. Clump improvement works are not being taken up, and as a result a large number of clumps are dying and getting degraded due to congestion. This makes the area vulnerable to fire, and there is a severe threat to the habitat.
8. The funds under the centrally sponsored Project Tiger are released late to the tiger reserve due to the LOC/PAO system of the state government.

Immediate Actionable Points

1. The Tiger Conservation Plan for the period from 2013–14 to 2022–23 for the core area, the buffer area and corridor areas has been approved by the NTCA (vide GOI, F. No.1-19/2009-NTCA, dated 13 October 2014) under Section (3) of Section 38 v of the Wild Life (Protection) Act, and the same is being followed. This is expiring soon and the new TCP has to be prepared and approved by the competent authorities in a timely manner.
2. During the next TCP preparation, all the stakeholders of the TR have to be involved and consulted during the drafting phase. The process of identification of their willingness to participate, their role and the impact on the TR management and the consultations may be initiated immediately. In the absence of an identified process and protocol, the IUCN framework and workbooks for MEE may be helpful.
3. Constitution of a state-level steering committee under the chairmanship of the Hon'ble Chief minister is to be done expeditiously.
4. Since NSTR has communities that are dependent on the forest resources in the core and buffer, there is a need to assess their willingness to be relocated. After the study, the relocation process needs to be taken up on a priority basis to make the core free of human pressure.
5. The average present beat size (30 km^2) is fairly large. Such a large beat size hinders effective management. Efforts should be initiated to rationalise the beat size to 10–20 km^2.

6. Many sanctioned posts at different levels are vacant. Efforts are to be expedited to fill in the vacant positions.
7. Land use land cover classification of the entire reserve has to be carried out to understand the availability of suitable habitats and to infer if there is expansion of bamboos and Phoenix patches in the reserve.
8. Management of over-matured and dying bamboo patches creating a barrier effect in the habitat as well as encroaching on the grasslands needs to be studied, and suitable interventions are to be implemented to support the herbivore population.
9. There is a need for upgrading of equipment, especially the mobiles/Android devices that are used for M-STRiPES, which are outdated.
10. The APC watchers, who are largely from the Chenchu tribes, use their own two-wheeler vehicles for moving within the forests. Two-wheelers may be procured and provided to them along with fuel/oil. .
11. The NSTR–Sri Venkateswara corridor is a potential tiger corridor, and it needs to be secured through financial and technical inputs from the NTCA.
12. There is a delay or at times non-disbursal of central funds of Project Tiger to the TR. Timely release of the state share as well as central assistance should be the priority for the state. This issue needs to be handled immediately for effective management of NSTR.
13. Since NSTR is facing heavy pressure from pilgrimage tourism, this needs to be managed properly to prevent any inappropriate activities posing threats to the reserve. Through various awareness activities and capacity building programmes, the pilgrim-tourists can be motivated to practise responsible, sustainable and green tourism. They also provide opportunities for spreading mass awareness about conservation.
14. The payment of compensation to local communities needs to be institutionalised so that money is released quickly to tackle the human–wildlife conflict issues.
15. The state government may explore the possibility of scaling up the technical capacity at Srisailam to create a full-fledged "Wildlife Capacity Building Centre", running regular in-house programmes for Andhra Pradesh as well as Telengana.

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ARUNACHAL PRADESH

KAMLANG TIGER RESERVE

2

MEE SCORE 72.73%

Date of Evaluation
9-11 December 2022

Evaluators' Names
Sh. Anil Kumar Bhardwaj
Dr. Subrat Mukherjee
Sh. Prashant Kumar
Dr. R. Suresh Kumar

INTRODUCTION

Kamlang Tiger Reserve (KTR) is the 50th tiger reserve of the country, notified on 6 March 2017 with a 696 km^2 area as the core, an 87 km^2 area as the buffer and a total area 783 km^2. KTR has a locational advantage of being surrounded by forest areas-Namdapha Tiger Reserve in the south, Kamlang Reserve Forest in the west and north and an un-classed state forest to its east, with this larger landscape being connected to Hukawng Wildlife Sanctuary in Myanmar.

The uniqueness of KTR lies in its astonishing biodiversity and endemism. It is a part of the larger Eastern Himalayan Biodiversity Hot Spot, some parts of which are explored and many more are yet to be explored. It is home to critically endangered animal species like the Malayan sun bear, hoolock gibbon, white-bellied heron and capped langur. The top predators here are many-the tiger, clouded leopard, wild dog and leopard cat-and so are the diverse prey species-Himalayan serow, sambar, red goral, wild boar, barking deer, etc.. The primates found in the tiger reserve include the stump-tailed macaque, Assamese macaque, Bengal slow loris and hoolock gibbon. KTR is home to many species of charismatic and endangered bird like the white-bellied heron and the blood pheasant.

KTR has six vegetation types-Tropical Wet Evergreen Forests, Tropical Semi Evergreen Forests, Sub-tropical Semi Evergreen Forests, Moist Bamboo Forests, Himalayan Moist Temperate Forests, and Moist Alpine Scrub Forests and they consist of woodlands, grasslands and wetlands. A total of 150 tree species have been reported from the tiger reserve, and they include *Canarium resiniferum, Terminalia chebula, Gmelina arborea* and *Amoora wallichii*. Approx 6 species of orchid have also been identified. Endemic plant species like *Sapria himalayana, Mishmi tita* and *Coptis teeta* have also been identified from the tiger reserve. The grasslands are mostly confined to riverine areas and higher altitude meadows.

Rain is received from both the south-west and north-east monsoons, and the area is also criss-crossed by four major rivers-the Lohit, Lang, Kamlang and Lati-that drain into/from the Brahmaputra. Perennial rivers, like the Lai, Lati, Kamlang, Tawa, Sinbrai, Lan and Tawai and Glaw Lake form many wetland areas inside the TR, and these wetlands are also the habitat of many species such as the otter, turtles and birds.

KTR has 24 villages around its periphery, and the nearest villages (Gundri and Kamja) are about 7 km from its boundary. There is almost no anthropogenic pressure from the villages. Livestock, except for mithun, which at times are left inside the buffer forest area to graze, do not enter the tiger reserve.

After visiting Kamlang Tiger Reserve (KTR), the MEE team made the following observations with respect to its strengths, weaknesses and required immediate actions:

Management Strengths

1. KTR forms a part of large landscape complex along with Namdapha and other connecting forests in India and Myanmar that holds the oldest tiger gene pool of the North-Eastern Hills.
2. The TR is inviolate, with no human habitations, both in the core and buffer areas, the nearest village being 7 km from its boundary. Hence the biotic pressure on this tiger reserve is negligible.
3. The area is floristically very diverse, comprising six vegetation types and a large number of endemic plant species, providing excellent habitats for the conservation of tigers, co-predators, ungulates, endemic primates, amphibians and many species of charismatic and endangered bird.
4. Fringe villages identify themselves with the forests and wildlife both culturally and socially, which provide an additional advantage when involving them in long-term conservation initiatives of this TR.

Management Weaknesses

1. KTR is a recently notified TR carved out of Namdapha Tiger Reserve. Most of the areas of the TR have difficult and inaccessible terrain and lack sufficient protection infrastructure such as roads, patrolling paths, check posts, watch towers and bridges. The core area of 696 km^2 has only four anti-poaching camps, and these are not deep inside the tiger reserve but are confined primarily to the border areas and concentrated in a very small part of the tiger reserve. Hence, the tiger reserve management is not in a position to maintain a watch over the entire area, both through manpower or use of modern gadgets and technology.
2. Presently, the TR has only one range and a skeletal staff. Only 20 frontline staff positions are filled up against the sanctioned strength of 46. Accordingly, a large part of the tiger reserve is still not manned, and many areas are rarely patrolled by the staff.
3. The tiger reserve lacks adequate financial resources for creating adequate new infrastructure like residential buildings for staff, camp sheds and patrolling tracks. The resources are also inadequate for maintaining the available meagre infrastructure. The TR requires infusion of funds on a larger scale, at least initially, to bring it on par with other tiger reserves.
4. The arms available with KTR are unserviceable. They do not have binoculars in required numbers, and there are no cameras for recording evidence recording. There is a lack of M-STrIPES-compatible mobile phones, and all deficiencies have a negative impact on the conservation efforts of KTR and the morale of the staff.
5. Despite difficult working conditions and an inhospitable terrain fraught with dangers of different types, many of the staff, including the contingency staff, are not covered under any insurance scheme.
6. Kamlang Tiger Reserve does not have a sanctioned post of a veterinary doctor. The veterinary services are presently being provided by the veterinarians of Wildlife Trust of India, Tinsukia, Assam, which is an approximately 4-hour journey from Wakro, the headquarters of Kamlang Tiger Reserve. Hence in cases of acute emergencies, this may prove costly.
7. The state government has notified 73 km^2 area for tourism in the buffer area of 87 km^2. However, scant tourist facilities are available. These include a track of about 1 km length from Sinbarai Camp. Another tourism site is Glaw Lake which is spread over 82 ha. Both these areas need upgrading in addition to the establishment of an interpretation centre. The existing system of providing guides, drivers, hikers, etc., who accompany visitors, is informal without the active involvement of the tiger reserve management. It is important that the services provided to the tourists also be formalized.
8. KTR does not have a very effective mechanism for disseminating information for visitors in the form of brochures, signage and sign boards at important places, including alongside roads. TR is yet to launch its own website.
9. Although the footfall in the tiger reserve is not heavy, an institutional mechanism for collecting and analysing feedback is required. The lack of one has deprived the TR of important inputs and suggestions for improvement that could have been utilized for its betterment in general and improving the tourist facilities in particular.
10. Constitution of eco-development committees (EDCs) in fringe-area villages for empowerment of local communities and garnering their long-term support for conservation of the TR, is in a preliminary stage as this reserve has been created recently. Establishment of self-help groups (SHGs) of rural poor women from the fringe villages and training them in livelihood-generation activities is a welcome step. But these SHGs are stand-alone groups and are not linked with an institutional mechanism, and hence there is always a danger that they may not continue for long and might go to oblivion with the shifting of the present incumbents.
11. Despite the reserve being a biodiversity hotspot and home to a wide variety of plants and animals, many of which are yet to be identified, not many studies have been carried out. The tiger reserve management is yet to attract the attention of local universities and research institutions for exploring this area.
12. Despite being a tiger reserve of the state that has promulgated the Pakke Declaration, which emphasizes climate-resilient forestry and rapid realization of the impacts of climate change, the reserve is yet to institute studies on carbon storage, carbon capture and carbon loss.
13. The tiger reserve is yet to initiate action on a few prescriptions made in the Tiger Conservation Plan. Some of them are listed here:

a. Corridors identified in the 2018 report "Status of Tigers, Co-predators and Prey in India", need to be worked upon for prioritization of linkages, development of land use approach, etc.

b. Namsai and Anjaw forest divisions have contiguous boundaries with Kamlang TR. KTR has requested the two divisions to incorporate tiger conservation in their respective working plans. But the action taken by these two territorial forest divisions is not known.

The Tiger Conservation Plan of KTR has prescribed a step-by-step approach to be followed on land use around the fringe villages. But not much information is available about the land use and structures of these fringe villages and hence needs to be taken up on priority.

Immediate Actionable Points

1. All efforts need to be made to keep the entire core area of the tiger reserve as inviolate aimed at conserving its uniqueness, huge biodiversity, both floral and faunal, and high endemism.
2. The state government needs to increase the number of ranges and further augment the staff strength of the TR keeping in mind its area, uniqueness, difficult terrain and inaccessibility. Filling up of the existing vacancies (26 vacant posts of frontline staff against the sanctioned strength of 46) should be the first step, followed by augmentation of the sanctioned strength to about 124, as suggested in the Tiger Conservation Plan (TCP).
3. Presently there are only four anti-poaching camps, and these are restricted to a few accessible areas of the TR. There is an urgent need to suitably increase the number of camps and cover all the sensitive areas of the reserve.
4. Being a new tiger reserve, sufficient infrastructure like residential buildings, roads, patrolling paths, check posts, watch towers and bridges are not available within the tiger reserve. Accordingly, the state government/NTCA have to provide sufficient funds, at least initially, so that all necessary good quality infrastructure, necessary to augment protection of this new but unique TR, is put in place in time.
5. To provide the services of a veterinarian to KTR, the state government may consider either posting a full time veterinary officer to the tiger reserve or may like to train a veterinary officer of the state animal husbandry department, posted at Wakro, the headquarters of KTR, in wildlife aspects.
6. The tourist facilities available at the tiger reserve are rudimentary and need to be greatly augmented, including the establishment of an interpretation centre.
7. The Field Director may take appropriate steps to formalize the existing system of providing guides, drivers, hikers etc. to visitors and tourists.
8. The Field Director also needs to immediately launch its own website, which should be interactive and user-friendly and contain sufficient information about the reserve, its activities, etc. Additionally, KTR needs to prepare brochures, etc. for dissemination among tourists, visitors and the villagers of the fringe villages and establish signage and sign boards at important places, including alongside roads.
9. The Field Director needs to devise a feedback system for visitors. The feedback received needs to be compiled, analysed and then ploughed back for further improving and strengthening the management and tourist facilities.
10. The Field Director, Kamlang Tiger Reserve needs to expedite the process of formation of eco-development committees in the fringe villages and start involving them in various activities of the tiger reserve so that they develop a stake in the existence and well-being of the tigers and the tiger reserve. For the SHGs formed in the fringe villages to be sustainable, there is a need to work in close association with the Rural Development Department of Government of Arunachal Pradesh, through the State Rural Livelihood Mission, which is implementing the Deendayal Antyodaya Yojana—National Rural Livelihood Mission (DAY-NRLM). This programme is for empowering rural poor women by federating them in SHGs and augmenting their livelihoods. It is imperative that KTR take advantage of this scheme of the rural development department to take the SHGs to greater heights.
11. The Field Director, KTR is required to immediately liase with and invite the local universities and research institutions to explore the hitherto unexplored areas of the tiger reserve, not only for documentation of various floral and faunal species but also to study the interaction of various ecological factors and their impacts etc.

12. To practice climate resilient forestry, as per Pakke Declaration, the Field Director, KTR has to get studies done in this regard, including studies on carbon storage, carbon capture and carbon loss but also so that the state and the country are ready to face the challenges posed by climate change.
13. As KTR is a newly constituted tiger reserve, it requires a steady flow of funds at a desired level. The KTR management also needs to liaise with donors for resources and with NGOs for initiatives for building the capacity of the staff.
14. Considering the difficult terrain of KTR and the inaccessibility and un-approachability of the area, it is important that the conservation efforts be supplemented by the state government with:

a. long endurance drones, suitable for the terrain

b. providing remote sensing applications and GIS to the KTR management, along with capacity building, for regular monitoring and evaluation of the habitat and vegetation. Existing time series data of remote sensing may be obtained from the National Remote Sensing Agency or any other suitable source for use in management and monitoring.

c. replacing the existing unserviceable arms and augmenting their numbers need to be looked into on priority.

d. procurement of equipment like binoculars, camera traps and cameras to record evidence and of sufficient numbers of mobile phones with the M-STrIPES software and capacity building of the staff regarding how to use the software in the offline mode.

e. bringing all the frontline staff under the insurance umbrella.

15. The tiger reserve is to immediately initiate action on various prescriptions made in the Tiger Conservation Plan and they include:

a. Corridors identified in the 2018 report "Status of Tigers, Co-predators and Prey in India" need to be worked upon by the tiger reserve management for prioritization of linkages.

b. KTR has requested both the Namsai and Anjaw territorial forest divisions to incorporate tiger conservation in their respective working plans. This requires a push from the state government and sustained persuasion by the FD, KTR.

c. To follow the step-by-step approach to land use around the fringe villages, as prescribed in the TCP, the management needs to initiate immediate action.

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NAMDAPHA TIGER RESERVE, ARUNACHAL PRADESH

3

MEE SCORE **57.58%**

Date of Evaluation
11-13 December 2022

Evaluators' Names
Sh. Anil Kumar Bhardwaj
Dr. Subrat Mukherjee
Sh. Prashant Kumar
Dr. R. Suresh Kumar

INTRODUCTION

Namdapha Tiger Reserve (NTR) has an area of 1985 km^2 and is a floral and faunal biodiversity hotspot in the Eastern Himalayas. This tiger reserve (TR) forms the north-western part of the Mizoram-Manipur-Kachin (Myanmar) rain forest eco-region. With its wide range of altitudinal variation (200-4571 m), it harbours an extremely rich floral and faunal diversity.

Four *Panthera* species are found in NTR, i.e., the leopard, snow leopard, clouded leopard and tiger. It has other predators like the wild dog, Malayan sun bear, Asiatic black bear and Indian wolf. There are smaller carnivores like the Eurasian otter, Indian civet, masked palm civet, Asian golden cat, marbled cat, spotted linsang, binturong, fishing cat and mongoose. The large herbivores are represented by the wild boar, musk deer, hog deer, Himalayan and mainland serows, Indian muntjac, takin, sambar and bharal. Indian elephants were reported in the habitat, but only a migratory population has been reported presently in the fringe forest division.

The non-human primates include the slow loris, stump-tailed macaque, hoolock gibbon and Assamese macaque. The birds include the white-bellied heron, a critically endangered species, which was recorded in 1994. NTR is also known for its butterfly diversity, which includes the kohinoor, Naga tree brown, red caliph and East Himalayan purple emperor.

The vegetation in NTR ranges from evergreen moist deciduous to temperate broad leaved to coniferous forests to alpine vegetation. More than 150 timber species are found in NTR, which has a rich diversity of dipterocarps, the hollong being the state tree of Arunachal.

The MEE team evaluated Namdapha Tiger Reserve (NTR) along with Kamlang Tiger Reserve, of the same landscape. The strengths, weaknesses and actionable points of NTR follow.

Management Strengths

1. NTR forms a part of a large landscape and is connected to Kamlang TR and other adjoining forests of Arunachal Pradesh in India and Hukawng Wildlife Sanctuary in Myanmar. It is an important protected area (PA) of this landscape, home to a high conservation priority population of the tiger (north-eastern hill tiger population), as this population probably shares its gene pool with the most critically endangered sub-species of tiger, i.e. *Panthera tigris corbetti*, which is found in Myanmar.
2. The mosaic of vegetation, due to the large altitudinal variation, is also home to some of endemic species like *Pinus merkusi* and *Abies delavasi*, which are not found elsewhere in India. There probably are many species that are waiting to be discovered.
3. The altitudinal variation further provides a diversity of wildlife habitats which support a large number of rare and endangered animal species, particularly small cats, amphibians, reptiles, butterflies and birds, including waiting to be discovered.

The area also has a very important hydrological role as it forms the catchment of the Noa-Dihing River, a tributary of the mighty Brahmputra. Numerous streams drain into the Noa-Dihing, and forest pools and natural salt licks are abundant in the area.

Management Weaknesses

1. Although NTR is surrounded by thick forests, the tiger reserve is facing alarming encroachment issues due to the increasing populations of the Lisus and other tribes. The Lisus are expanding their areas under cultivation and cardamom has a ready market as a cash crop. As of now, it is reported that there are eight Lisu villages with 311 families occupying the critical tiger habitat.
2. This sensitive landscape of 1985 km^2, with unique biodiversity, is managed by three ranges with a very meagre staff. The infrastructure for protection, like roads, patrolling paths, anti-poaching camps and motor cycles, is very poor. More than half of NTR is inaccessible to the management in the light of many problems, including approach issues, difficult terrain, insurgency and encroachment issues.
3. Out of the three ranges in NTR, only two ranges have field camps. The third range, which had only one camp, was burnt on 14 November, 2022. The habitation near the Myanmar border is known as Vijay Nagar, and it is connected by the Miao–Vijay Nagar road, which has been opened for traffic this year only, i.e., in 2022. There are no anti-poaching/protection camps on the Vijay Nagar side of NTR, and on this road, on the stretch from 31st Mile to 77th Mile, lie the eight enclaved villages, which make this area very sensitive from the point of view of protection. Significant forests of NTR lying beyond this stretch also require a continuous vigil.
4. There is a large number of vacancies among the frontline staff, and most of the present staff are aged too and will retire soon. Incidentally, none of the Range Officers stays inside the NTR area, and the responsibility of on-the-ground protection is largely delegated to the contingency staff, who are about 150 in number, out of which 50 are part of the tiger protection force. To man three ranges, there is only one regular Range Officer, and the other two ranges are manned by Dy. Rangers. There are only three Foresters and six Forest Guards available as of date to man an area of 1985 km^2 and hence the middle and upper reaches of NTR are literally unmanned. However, there are eight elephants to help criss-cross the lower areas of NTR.
5. Non-payment of wages to the contingency staff of the TR in the current financial year, due to non-receipt of funds from the state government/NTCA, is a major concern.
6. The MEE team has a serious concern regarding the presence of two major faunal species, i.e., tiger and elephant, in NTR. Both species have not been camera trapped or seen nor indirect evidence of their presence recorded within NTR. Three tigers were last camera trapped in 2015 and AITE 2018 concludes that 11 tigers are present in NTR on the basis of scat analysis. 24 scat samples have been sent to WII, Dehradun between January and March 2022 which were collected as part of AITE 2021, for which the report is yet to be received by the NTR management. The issue of population estimation of tigers has been discussed by the MEE team with WII. It was found that in Arunachal Pradesh, Mizoram, Nagaland and parts of Assam (Karbi Anglong Autonomous Council), the standard Phase I sampling could not be carried out due to logistic constraints and an absence of demarcated administrative units at the beat level. Therefore, the numbers of the entire landscape were worked out through a proxy methodology of targeting priority tiger habitats in these areas on the basis of past surveys and the literature and carrying out tiger estimation, scat-based DNA profiling and limited camera trapping.
7. So far as elephants are concerned, their presence, of late, has not been reported from within NTR. It is apprehended that probably the elephant population has adversely been impacted by hunting by tribes which might have found a ready market in the neighbouring countries.

Immediate Actionable Points

1. The core area notification of Namdapha Tiger Reserve does not include the 177 km^2 area of the Reserve Forest that was included in the TR later. This is a missing link and has also been mentioned in the Tiger Conservation Plan (TCP). A proposal/draft notification needs to be submitted urgently to the state government for inclusion of this area in the TR.
2. Efforts being made, since 1979, to evict encroachers and resettle Lisu families, have not been successful so far. The comprehensive relocation plan submitted by the TR to the state government needs to be pursued with the NTCA for early release of funds. Simultaneously, for effective implementation of the relocation programme, the trust between the communities and the TR management needs to be improved through intensive engagement

with the communities, negotiations and selective eco-development activities. Long-term technical support of TCF will go a long way in the implementation of this programme.

3. Considering the fact that the tiger population estimates were worked out based on a proxy methodology, it is now imperative that estimation of the tiger population, using standard protocols, is carried out at the earliest with the active involvement of the NTR management, state government and NTCA. This will require comprehensive Phase-I data collection covering all areas of the TR, followed by other standard protocols being used by WII. The exercise should be attempted during this season only, before the onset of rains in 2023, as a priority activity. A similar exercise needs to be carried out for elephants also.
4. The Miao Vijay Nagar road may get damaged due to heavy rains in the area and landslides. Adequate permitted steps may be taken for strengthening this road so as to facilitate smooth movements of the staff in the TR. Wherever required, permission(s) of the concerned governments may be taken for these works.
5. Considering the difficult terrain, and the inaccessibility of many areas in NTR, it is also suggested that helicopter services be provided for the NTR management.
6. Long endurance drones, suitable to the terrain, may immediately be made available to both Namdapha and Kamlang tiger reserves, which are part of the Namdapha–Kamlang Landscape.
7. To address the connectivity issues in the area, there is a need to establish networks of wireless/radio transmitters and mobile towers by NTR and mobile service providers, respectively. This will not only connect the population in Vijaynagar, Gandhigram with Miao but would also provide connectivity to the NTR staff and enable them to use M-STrIPES in further strengthening the protection/conservation efforts.
8. Urgent action is required on the part of the state government to first fill up all the existing vacancies and then sufficiently augment the sanctioned strength of the staff, which is commensurate to the requirements of NTR.
9. The TR must ensure timely payments to the contingency staff. This will require timely release of funds by the state government and the NTCA.
10. Large parts of TR presently do not have regular presence of staff as most of the camps are located in accessible areas. Therefore, a comprehensive plan should be prepared and implemented for creating a sufficient number of field camps with supportive facilities to cover all possible strategic locations of the TR for effective protection, in a phased manner.
11. To address the protection issues, the state government may study the orders issued by the Government of Assam for Kaziranga TR related to providing arms, including issuing special orders for their use by the forest staff, and creation of Special Tiger Protection Force (STPF), and arrive at its applicability in NTR, which appears to be in great danger because of encroachment and poaching issues and its proximity to the international border, coupled with the difficult terrain and inaccessibility.
12. Training the staff of NTR in various aspects of wildlife management, population monitoring, the use of modern equipment for protection, including the use of M-STrIPES need to be carried out as a continuous activity for building and upgrading the required competence among staff for better management of TR.
13. The field staff of NTR have to work under extremely difficult conditions. Maintaining their motivation and continuous encouragement are critical to achieve a high level of protection in this tiger reserve. Currently, there is no system of rewards and incentives for the field staff. The park management needs to evolve a system of incentives and rewards to encourage the staff and keep them motivated. Resources from Tiger Conservation Foundation (TCF) can be used for this important initiative.
14. The APO form of NTCA needs provisions for research to be included. Research in tiger reserves, including NTR, needs to be encouraged to achieve a high level of scientific management. Some of this can be done internally in NTR, while a lot can be done jointly by networking with other agencies.
15. The Tiger Conservation Foundation (TCF) of NTR is one of the oldest in Arunachal Pradesh. TCF has a critical role for inclusive management of tiger reserves. Keeping in mind the broad objectives of TCFs, an internal workshop should be organized for evolving a comprehensive strategy for effective management of Namdapha TCF, including generation of financial resources, activities for community participation, ecological and social monitoring and other supportive functions of TR management. Engagement of the technical staff in running TCF activities and timely periodic meetings of the Governing Body and Executive Body should be ensured.

PAKKE TIGER RESERVE, ARUNACHAL PRADESH

4

MEE SCORE 77.27%

Date of Evaluation
23-26 September 2022

Evaluators' Names
Sh. Anil Kumar Bhardwaj
Dr. Subrat Mukherjee
Sh. Prashant Kumar
Dr. R. Suresh Kumar

INTRODUCTION

Pakke Tiger Reserve (PTR), the 26th TR of the country, is also known as Pakhui Tiger Reserve and is situated in Pakke Kessang District of Arunachal Pradesh. This TR, with an area of 862 km^2, has a wide altitudinal variation, from 150 m to 2000 m above mean sea level, and hence it is home to a wide range of plants and animals. It also forms the north-western limit of the Indo-Chinese tiger range, bordering the eastern limit of the Bengal tiger range.

Hydrologically, KTR is bound by the Bhareli or Kameng River in the west and north and the Pakke River in the east. The main perennial streams include the Nameri, Khari and Upper Dikorai. The TR receives its average annual rainfall of 2500 mm from both the north-east and south-west monsoons.

The TR is surrounded by contiguous forests on most sides. To the east is Papum Reserve Forest, towards the south and south-east is Reserved Forest and Nameri National Park of Assam. On the west is Doimara Reserve Forest and Eaglenest Wildlife Sanctuary and to the north is Shergaon Forest Division.

The forest types found in PTR are Lowland Semi-evergreen, Evergreen Forest and Eastern Himalayan Broadleaf Forests with a high percentage of tree species (64%). Pakke TR has 343 woody angiosperm species, and at least 1500 species of vascular plants are expected from PTR. Many orchid species are also found in the TR. The forests of PTR are multi-storied, and the major species are bhelu (*Tetrameles nudiflora*), borpat (*Ailanthus grandis*) and jutuli (*Altingia excelsa*).

Due to the altitudinal variation, PTR shows a wide faunal diversity. At least 40 mammal species have been identified in PTR, including three large cats-the Bengal tiger, Indian leopard and clouded leopard-and two canids-the wild dog and the Asiatic jackal. Among the herbivores, the elephant, barking deer, gaur and sambar are most commonly encountered. The monkeys include the rhesus macaque, Assamese macaque and capped langur. Other mammals include the hog deer, wild boar, Himalayan black bear and Malayan giant squirrel. At least 296 bird species have been recorded from PTR, including the globally endangered white-winged wood duck, the unique ibisbill and the rare Oriental Bay owl. At least four species of hornbills are found in PTR, in addition to various other bird species like the pied falconet, white-cheeked hill partridge and grey peacock-pheasant. PTR is is also home to at least 36 reptile species, including the king cobra and Assam roofed turtle (a highly endangered species) and 30 amphibian species, including the pied warty frog, which resembles bird droppings. Out of 1500 butterfly species found in India, approximately 500 species could be found in this reserve.

For protection of the wildlife in PTR, they have 27 anti-poaching camps. In addition to the regular staff, these are manned by 104 local youths and the gaon buras (village elders/fathers) who act as forest watchers and assist in protection. The staff at each anti-poaching camp is equipped with uniform, ration, solar powered lamps and inverters for charging of mobiles etc, fencing against wildlife intrusion, access to clean drinking water, and toilets. Patrolling equipment, such as wireless devices, back packs, mosquito nets, torches, binoculars, first-aid kits, smart phones and GPS have been provided to the staff. Although the terrain of PTR is tough and many areas inaccessible, it has approximately 41 km of road constructed to ease the logistics and deter wildlife criminals, including poachers.

Management Strengths

1. The Critical Tiger Habitat of PTR is inviolate without any human settlements inside.
2. The Nyishi tribe, who inhabit the fringe villages, identify themselves with the tigers and protect them. The tiger is considered an elder brother by Nyishi tribals, and the death of any tiger attracts performance of the *Shradh* ritual of the deceased tiger, which has a cost, and this acts as a deterrent. The villagers do not allow any harm to the tiger. Thus the tiger is protected not only by law—protection is also deep rooted in the culture of the Nyishi tribe.
3. Another example of the involvement of the local tribe, Nyishi, in tiger protection is the formation of Ghora Aabhe Society, a group of 12 village heads of the fringe villages. The Society and the women self-help groups (SHGs) not only provide information for effective protection of the wildlife but also enforce the customary laws relating to prevention of hunting and logging.
4. This TR won the India Biodiversity Award 2016 in the category Conservation of Threatened Species for its Hornbill Nest Adoption Programme. The great hornbill, rufous-necked hornbill, wreathed hornbill and Oriental pied hornbill are found in the TR.
5. The altitudinal variation from 150 m to 2000 m within the TR, with an average annual rainfall of 2500 mm, has resulted in an enormous floral and faunal diversity.
6. The forested area of PTR forms the catchment of many perennial rivers which are the lifeline for downstream villages before they drain into the mighty Brahmaputra River.
7. PTR is also the place where first cabinet meeting of Arunachal Pradesh outside its capital, Itanagar, was held and the "Pakke Tiger Reserve 2047 Declaration on Climate Change Resilient and Responsive Arunachal Pradesh" was adopted. It focuses on a multi-sectoral approach to low emission and climate-resilient development in the state. It emphasizes climate resilient forestry by protecting the existing forests, restoring forests, etc., which will benefit future generations by safeguarding people from the dangers of climate change.
8. PTR has the Centre for Bear Rescue and Rehabilitation, run by WTI in partnership with the Department of Environment, Forest and Climate Change, Government of Arunachal Pradesh. The centre has been annually rehabilitating orphaned Asiatic black bear cubs in Pakke Tiger Reserve. The centre also plays a key role in rescuing wildlife in the region and successfully rehabilitating animals at Pakke.
9. Induction of sniffer dogs with dog masters and using them in patrolling and wildlife crime detection.
10. PTR has an interpretation centre at Tippi which has a theme relating to human health, which is very impressive.

Management Weaknesses

1. Most of the area of PTR is mountainous, with the elevation up to 2000 m, and hence the reserve has serious problems of access and consequently logistical support.
2. The tiger population of PTR is also a function of the migration of the spillover tiger population of Kaziranga Tiger Reserve. The tiger population in the TR had declined to three in 2018–19. The population estimation exercise has been so far restricted to the tiger alone and population estimation has not been carried out for co-predators like the leopard, clouded leopard, marbled cat and bear.
3. The 800 km^2 area of Pakke Tiger Reserve is under three ranges—Seijosa WL Range (458 km2), Tippi WL Range (240 km^2), and Rilloh WL Range (157 km^2)—and it can be seen that the distribution of area among the ranges is uneven. The ranges are also very large, with very difficult terrain and accessibility issues, which make these unmanageable.
4. The number of vehicles available in PTR is less than their felt needs. and this may have a negative bearing on many essential functions/duties within PTR.
5. Arms are available, but their numbers are less than required. This limits the capabilities of PTR to meet various essential protection function requirements.
6. The presence of invasive species in PTR is a threat to be reckoned with but they are yet to be mapped and monitored.

7. Although a Rapid Response Team is in place in PTR, the preparedness of the team to meet various exigencies still needs to be strengthened. Similarly, the Special Tiger Protection Force (STPF), although already sanctioned by the NTCA and approved in the TCP, is yet to be raised on the ground.
8. Although there are no human habitations inside the PTR, there are incidences of grazing.
9. Although PTR was declared a TR in 2002, eco-development committees (EDCs) have not been formed yet, and till now only a few meetings, with local communities, have been conducted for constituting EDCs.
10. The Local Advisory Committee (LAC) is yet to be constituted for the tiger reserve.
11. PTR does not have a website of its own. However, it can put more relevant information in the public domain through a website. Currently there is no online booking system for those who are desirous of visiting the tiger reserve
12. A detailed plan on carbon storage, carbon capture and carbon loss assessment has been drawn up but is yet to be implemented.

Immediate Actionable Points

1. Considering that a large part of PTR is mountainous with serious problems of access and consequent logistical support, it is important that the PTR management review its protection strategy at definite intervals, identify vulnerable areas and plan for appropriate protection measures, including suitably locating anti-poaching camps and making the staff available round the clock.
2. The PTR management needs to identify tiger bearing areas and plan and implement more intensive protection measures. Although tiger mortality has not been reported, a continuous strict vigil is required.
3. As the tiger population of PTR is also a function of the migration of the spillover tiger population of Kaziranga Tiger Reserve, it is incumbent upon the management of the TR to create congenial habitat conditions so that the migrating population becomes resident.
4. Although tigers have been camera trapped and a few pug marks collected, it is also important to collect/document more indirect evidence of tiger presence, such as scratch marks, scats, alarm calls and roars and kills. This would require building the capacity of the staff and regular updating.
5. It is important to estimate the population of co-predators, other threatened/endangered species like the leopard, clouded leopard, marbled cat and bear in PTR, in addition to the tiger. The state government needs to take up this estimation exercise on priority. Similarly, necessary actions are required for the conservation of the white-winged duck, an endangered species which is endemic to Pakke Tiger Reserve of Arunachal Pradesh and Nameri National Park of Assam, which have a common boundary.
6. It is imperative for the state government to rationalise the area under each range in PTR, increasing the number of ranges so that each range is smaller and manageable. A similar exercise is also required to augment the number of beats, with each having an area that is within manageable limits.
7. The number of vehicles available in PTR is less than the felt need and needs augmentation. The shortage of vehicles may have a negative bearing on many essential functions/duties within PTR. Therefore, the state government/NTCA may consider providing additional vehicles to the TR. Additionally, the PTR management may also make efforts to convince donors to donate vehicles for the noble cause of wildlife as has been done by the Airports Authority of India.
8. The state government/NTCA may take appropriate action to augment the protection capabilities of PTR by providing additional arms for effective discharge of the protection function by the staff.
9. Considering the presence of invasive species in PTR, it is imperative for the management to first map them and then start operations to eliminate them. This will require continuous monitoring as well. The state government/NTCA will have to commit funds for this important activity till it is taken to its logical conclusion.

10. The PTR management may review the preparedness of its Rapid Response Team (RRT) to respond to various exigencies. Also, it is incumbent upon the state government to take immediate steps to raise the Special Tiger Protection Force (STPF) at the earliest as the same has already been sanctioned by the NTCA. This will further strengthen the protection of PTR.
11. Although the anti-poaching camps of Pakke Tiger Reserve are well equipped, the management may consider preparing an ideal/model list of items/equipment required for each of the anti-poaching camps to facilitate longer stays of the staff by providing all these items.
12. Considering the impact of grazing in a TR, like the spread of various diseases from domestic animals to wild animals and competition for fodder, the PTR management needs to take immediate steps to curb grazing for the long-term health of the TR.
13. Even though there are no villages inside the reserve, the support of fringe area communities will always remain vital for the long-term conservation of this TR. Therefore, the PTR management should take immediate steps for establishing eco-development committees (EDCs) for fringe-area villages in a phased manner and make these functional. PTR should also encourage the formation of self-help groups (SHGs) of rural poor women in these villages so that they can take up livelihood augmentation activities.
14. The state government may take appropriate actions to notify Local Advisory Committees (LACs) for the tiger reserves at the earliest.
15. PTR already has a Facebook page and Instagram account as well as its own website. But not all the information is available for the public on this website. TCP, financial reports and all research cum monitoring reports need to be put up on the website. The website should also initiate an online booking system for those who are desirous of visiting the TR.
16. The proximity of KTR to Tezpur town, and the present infrastructure available are ideal for developing and marketing it as a conference destination. Developing this idea, including encouragement of home stay facilities, would also mean providing more livelihood opportunities for the local population. This would further strengthen the ties between the communities and Pakke Tiger Reserve.
17. The PTR management needs to implement the detailed plan prepared on carbon storage, carbon capture and carbon loss assessment.

Manoj Dholakia

ASSAM

KAZIRANGA TIGER RESERVE

5

MEE SCORE 84.09%

Date of Evaluation
26 October 2022 to
4 November 2022

Evaluators' Names
Sh. Anil Kumar Bhardwaj
Dr. Subrat Mukherjee
Sh. Prashant Kumar
Dr. R. Suresh Kumar

INTRODUCTION

Kaziranga National Park and Tiger Reserve has primarily been known for its long history of rhino conservation. It supports the world's largest one-horned rhino population, numbering around 2200, which is nearly two-third of the world population. The tiger-specific management in the area is only about 16 years old as it was notified a tiger reserve in 2006. This reserve has also been a World Heritage Site (WHS) since 1985.

Kaziranga Tiger Reserve (KTR) is a vast expanse of tall elephant grass meadows, swampy lagoons and dense tropical moist broad-leaved forests and is criss-crossed by four major rivers. The reserve is circumscribed by the mighty Brahmaputra River, which forms the northern and eastern boundary, and the river Mora Diphlu which forms the southern boundary. Other rivers are the Mora and Dhansa. The expanse of grassland is formed, supported and affected by erosion and silt deposition by the River Brahmaputra. The landscape consists of sand bars, flood-formed lakes, locally known as beels, and elevated regions, which are known as chaporis.

Located at the edge of the Eastern Himalayan biodiversity hot spot, KTR is home to a rich floral and faunal species diversity. Due to the altitudinal variations between the eastern and western areas of the TR, it has a wide range of vegetations-Eastern Wet Alluvial Grasslands, Assam Alluvial Plains, semi-evergreen forests, Tropical Moist Mixed Deciduous Forests, wetlands and sandy chaurs. Approximately 550 plant species, including many medicinal plants, have been recorded from the reserve. The important plants of the TR include *Bombax ceiba, Albizia procera, Albizia odoratissima, Albizia lucida, Careya arborea, Premna latifolia, Lagerstroemia parviflora, Dillenia pentagyna* and *Zizyphus jujuba*. The undergrowth comprises grasses like *Erianthus ravaneae, Saccharum spontaneum, Saccharum procerum, Imperata cylindrica* and species like *Clerodendron, Alpinia allughas* and *Leea*. There are patches of *Barringtonia acutangula* and *Crateva religiosa* in the low-lying marshy areas and *Lagerstroemia flos-reginae* in slightly higher grounds. Also, a good variety of aquatic plants can be seen in lakes and ponds and along the river shores.

KTR has a rich faunal diversity which includes 35 species of mammal, 480 species of bird, 17 species of turtle, 35 species of snake, 24 species of frog and 42 species of fish. Many endangered and threatened species like the rhino, tiger, eastern swamp deer, elephant, buffalo, hoolock gibbon, capped langur and Gangetic river dolphin are commonly found in the habitat. The five important mammals of KTR are the tiger, rhinoceros, elephant, wild buffalo and eastern swamp deer. The reserve is also the wild breeding area, outside Africa, for the largest number of cat species, including the tiger, leopard, leopard cat, fishing cat and jungle cat. The only species of ape found in the country, the hoolock gibbon, is also found in KTR. KTR has been identified as an Important Bird and Biodiversity Area (IBA) by BirdLife International. Birds like the lesser white-fronted goose, ferruginous duck, Baer's pochard duck and lesser adjutant, greater adjutant, black-necked stork and Asian openbill stork migrate from Central Asia to this area in winter.

Management Strengths

1. Not only the local population but the entire state identifies itself with the more than 100 years old Kaziranga National Park and Tiger Reserve and the rhinos. They feel proud of this heritage and have a sense of belongingness with the reserve. This is reflected from the fact that:

a. A special order was issued by the state government allowing the use of firearms by the forest staff and providing them immunity.

b. The state government has also ordered the addition of new neighbouring areas in the Kaziranga Tiger Reserve for more intensive conservation.

c. There is awareness and involvement of communities of fringe areas in providing safe passage to the animals across the National Highway, especially during the annual floods.

2. KTR is an excellent example of significant and ongoing, dynamic ecological and biological processes due to river bank erosion, sedimentation and formation of new lands as well as water-bodies, in addition to dynamic successional changes between grasslands and woodlands. This makes it an important destination for various research studies.

3. The sighting of wild animals inside the tiger reserve is among the best in the country, as reflected in the high footfall and experience of visitors as revealed to the MEE team during this visit.

4. Anthropogenic pressures appear to be minimal in the TR since the MEE team could not find much evidence of entry of cattle and people in the reserve during the field visits.

5. Excellent execution of protection and ecotourism components of wildlife management. All the protection infrastructure—network in the form of anti-poaching camps, firearms, staff deployment—is adequate, and the facilities in the anti-poaching camps praiseworthy.

Management Weaknesses

1. The Tiger Conservation Plan (TCP) of Kaziranga Tiger Reserve is still under revision, and the new TCP is due from April, 2025. This is not a good situation as the KTR is presently being managed through the prescriptions of an unapproved TCP.

2. There are a number of notifications issued by the state government of Assam for addition of new areas to KTR. But these notifications are preliminary notifications and have not been taken to their logical conclusion.

3. The forested areas of Karbi Anglong Autonomous Council have a contiguous boundary with KTR, which acts both as a corridor and refuge for the migrating wild animals of the reserve, especially during the floods. But the level of coordination between the two administrative units for protection is apparently not up to the desired level.

4. The shortage of compatible Android phones to use M-STrIPES and required capacity for their use are adversely impacting the tiger management, including generation of important data.

5. The status of record keeping, systematic continuous monitoring of various processes and use of this information for adaptive management falls short of expectations. For example, there is no institutional mechanism to compile relevant data generated through anti-poaching camp duty registers, wireless/radio transmitter registers, patrolling registers, etc. in a protection monitoring form at the division level, which will prove useful in making the protection strategy more effective.

6. Kaziranga Tiger Reserve also requires an institutional mechanism to:

a. obtain feedback from the visitors in the TR, analyse the feedbacks, cull out important suggestions, etc. This has deprived the TR of valuable inputs that could have played an important role in improving the visitor experience in addition to improving the management of the TR.

b. monitor the activities of eco-development committees (EDCs) that have come up in the fringe villages of KTR.

7. The WhatsApp Group of officials, which inter alia allocates night patrolling duties, although very effective, does not translate into record keeping for future tactical and strategic use.

8. The condition of the two interpretation centres of the TR is not commensurate with the status and reputation of the reserve. Visitors are not provided pre-visit briefings about the TR and are also not given pamphlets, information booklets/brochures, etc. prior to TR visits, which could enhance their experience.

9. KTR does not have a standard operating procedure (SoP) for the handling and redressal of complaints, protection monitoring and sighting of animals.
10. KTR is home to many important species. Major herbivores like the swamp deer, hog deer, rhinoceros, wild buffalo and elephant are dependent upon the health of the grasslands. The management could not provide information about mapping and distribution of various grass and fodder species in the TR, food preferences and seasonal variations of food requirement of different herbivores to the MEE team. Similarly, research information on invasive species, like the water hyacinth, are important as TR has dynamic aquatic habitats due to the presence of rivers and annual flooding. Being inundated by floods annually, studies on erosion/accretion, habitat status with respect to grasslands and water in the TR could also have been presented before the MEE team, if available.
11. The TR has not carried out an intensive exercise to compile the existing published research information with respect to KTR, understand the research gaps and formulate a strategy for long-term research.

Immediate Actionable Points

1. The state government and the NTCA must take cognizance of the still-under-revision Tiger Conservation Plan (TCP) of Kaziranga Tiger Reserve, and a definite timeline must be fixed for getting it approved.
2. The KTR management and the state government need to immediately start action on notifying the revenue lands of addition areas, transferred to KTR over a period of time, as tiger reserve lands, with definite timelines.
3. As the forested areas of Karbi Anglong Autonomous Council act both as a corridor and as a refuge for the migrating wild animals of Kaziranga Tiger Reserve, there is an urgent need to enhance the level of understanding and develop a strong institutionalized coordination mechanism between these two administrative units for protection.
4. The shortage of Android phones with M-STrIPES software needs to be met at the earliest to make the management of the TR more scientific and effective. The staff needs to be trained in the use of M-STrIPES, with refresher courses at regular intervals, both to generate data and to use it effectively.
5. As the record keeping (e.g., for wireless messages, recordings in anti-poaching camp registers, etc.) in the tiger reserve is not up to the mark, an SOP for record keeping, compilation, analysis, and its use for effective management needs to be developed and issued immediately.
6. KTR also needs to issue an SoP for the handling and redressal of complaints, protection monitoring and sighting of animals.
7. Ongoing eco-development initiatives should be strengthened by adherence to various provisions of existing government resolutions and subsequent orders/advisories and providing adequate resources and support of TCF.
8. The TR management need to carry out an intensive exercise to compile all the published research information with respect to KTR and keep them in the public domain, find out research gaps and formulate a strategy for long-term research. This strategy should be implemented using internal resources of the TR and Tiger Conservation Foundation (TCF) as well as by networking with other research institutions.
9. Although, information dissemination through the WhatsApp Group of officials is very effective as it is quick and reaches everyone in no time, it is good only for day-to-day monitoring. While continuing with this mechanism, there is a need to address the handicap of generation of records from WhatsApp chats/messages that can be stored, analysed and used for future management actions.
10. KTR needs to complete the upgrading and renovation of one of the two interpretation centres at Bagori on priority and take up similar actions on the second interpretation centre at the earliest. A system of briefing of visitors before entry to the reserve should be put in place. Sufficient information material in the form of pamphlets, booklets and brochures should be generated and made available for the visitors.
11. There is also a need to institutionalize the system of visitor feedback, its analysis and use for enhancing the visitor satisfaction and overall improvement of tourism facilities in the reserve.

MANAS TIGER RESERVE, ASSAM

6

MEE SCORE 85.61%

Date of Evaluation
19-22 September 2022

Evaluators' Names
Sh. Anil Kumar Bhardwaj
Dr. Subrat Mukherjee
Sh. Prashant Kumar
Dr. R. Suresh Kumar

INTRODUCTION

Manas Tiger Reserve (MTR) derives its name from the river Manas, which is a tributary of the mighty Brahmaputra. It is located in the Himalayan foothills, is densely forested and has a contiguous boundary with Royal Manas National Park, Bhutan.

Manas Tiger Reserve is one of India's first tiger reserves, declared in 1973, under Project Tiger. It was declared a World Heritage Site (Natural) by UNESCO in 1985. However, in 1992, UNESCO put it in the list of World Heritage Sites in Danger due to heavy poaching and extremist activities. Its status was restored again in 2011. The TR became part of a biosphere reserve in 1989 and an elephant reserve in 2003. In 2006, the one horned rhino was re-introduced in MTR, and in 2021 a pair of Asiatic buffaloes (one male and one female) were translocated from Manas TR to Chhattisgarh.

The first addition of 350 km^2 of area was made to Manas TR in 2016. There are no forest villages in the core of the TR except some issues of encroachment. 56 villages are located on the fringes of the reserve. In addition to these villages, many more surrounding villages are directly or indirectly dependent on the TR. The TR management has taken some excellent steps by stopping the entry of private vehicles inside the reserve and stopping night stays in the Mothanguri facility from the tourist season starting October 2022. These had been going on from olden times. These steps would definitely benefit the tigers and the TR in the long run.

Manas Tiger Reserve is CATS-accredited and was awarded the Global Tiger Conservation Excellence Award 2020 jointly with Royal Manas National Park. The IUCN WCPA-International Ranger Award-Wildlife Warrior Award was conferred on the Manas National Park Ranger Team (frontline staff) with a special "Highly Commended" certificate.

The Manas River flows through the west of the TR and serves as the international boundary between India and Bhutan. This river splits into two rivers-Bwrsi and Bholkaduba-as it reaches the plains. Five other smaller rivers also flow through the TR. The annual average rainfall is around 3330 mm.

Manas Tiger Reserve is one of the richest biodiversity areas in the world, and the main vegetation types include Sub-Himalayan Light Alluvial Semi-evergreen Forests in the northern parts, East Himalayan Mixed Moist and Dry Deciduous Forests, Low Alluvial Savanna Woodland and Assam Valley Semi-evergreen Alluvial Grasslands, which cover almost 50% of the TR. Manas TR, thus, has some of the largest remaining grassland blocks in the sub-Himalayan grassland ecosystems.

A total of 543 plants species have been recorded from the core zone of Manas TR. Of these, 374 species are dicotyledons (including 89 trees), 139 are monocotyledons, and 30 are pteridophytes and gymnosperms. Some of the important tree species are *Aphanamixis polystachya*, *Anthocephalus chinensis, Syzygium cumini, Syzygium formosum, Syzygium oblatum, Bauhinia purpurea* and *Mallotus philippensis*. The grasslands are dominated by *Imperata cylindrica, Saccharum naranga, Phragmites karka, Arundo donax, Dillenia pentagyna*, etc.

Manas Tiger Reserve is home to tigers and rhinos, in addition to 60 species of mammal, 50 species of reptile, 250 species of butterfly and 475 bird species. Some of the important wild animals, in addition to the tiger, are the elephant, rhinoceros, gaur, wild water buffalo, leopard, clouded leopard, Asian golden cat, jungle cat, leopard cat, fishing cat, marbled cat, wild dog, Assamese macaque, slow loris, black giant squirrel, porcupine, Indian pangolin, Chinese pangolin and wild boar. MTR is home to some rare and endangered endemic species like the Assam roofed turtle, hispid hare, golden langur and pygmy hog. It is also famous for its population of the wild water buffalo.

Management Strengths

1. Manas Tiger Reserve is one of the richest biodiversity areas in the world and forms a part of the larger Transboundary Manas Conservation Area (TraMCA) with its connectivity with Royal Manas National Park of Bhutan in the north and Buxa TR of West Bengal in the west.
2. In addition to the tiger, one-horned rhino and Asiatic wild buffalo, MTR is also the home to some of the rare and endangered endemic species like the Assam roofed turtle, hispid hare, golden langur and pygmy hog.
3. There is a high level of motivation, willingness and a sense of pride amongst the frontline staff.
4. The TR has the additional support of 51 personnel of the Assam Forest Protection Force, who are equipped with automatic weapons.
5. MTR enjoys the support of other conservation partners. This includes Bodoland Territorial Council, the communities around the TR, NGOs and CSR organizations.
6. The Critical Tiger Habitat of the reserve is inviolate as there are no villages inside the TR except for encroached areas and a seed farm area.

Management Weaknesses

1. MTR has issues of encroachment. There are four patches of about 36.78 km^2 area in the original core area and in the first addition area. Some of these areas are now under habitations. The management has made attempts to remove the encroachment and had put boundary pillars in these areas. However, there was public pressure, and the pillars were removed. The MEE team could observe these removed boundary pillars, demarcating the core.
2. Although the pygmy hog, Bengal florican and hispid hare are found in the same habitat, population estimates are available only for the Bengal florican. Estimations of the other two species have not been attempted so far. Similarly, there is no institutional mechanism to monitor seasonal migrations of important species of bird like the bar-headed goose.
3. Significant areas, particularly grasslands, are infested with invasive species like *Chromolaema odorata* and *Leea crispa*. A grassland management action plan has been provided for the removal of invasive species. However, so far the management has not been able to implement the plan effectively due to a lack of funds.
4. Though MTR forms part of a large landscape, the connectivity and corridor areas are perforated and fragmented due to presence of settlements.
5. The anti-poaching camps at various places are prone to elephant damage. Presently these camps do not have a safety mechanism to ward off these animals.
6. Even though the staff position has improved a bit after the last MEE, there are still many vacancies. This is presently being managed by deployment of Home Guards and the NGO Service Providers. But they lack proper orientation and training as far as wildlife management is concerned. Moreover, they do not get the facility of rations, like the regular staff of the TR.
7. The infrastructure, in general, of MTR is old and requires upgrading. The condition of the buildings available with the TR is not satisfactory, and they require major maintenance works. Moreover, the number of fit and working vehicles is not commensurate with the requirements of the TR.
8. The veterinary hospital building is ready, but it does not have the equipment needed for dispensing the services expected of it efficiently.
9. The social, cultural and spiritual values of the tiger reserve, which may include the sacred groves, sacred trees, local deities/icons, folklore, etc. are yet to be documented in detail.
10. The single string solar fencing put up by Wildlife Trust of India, at the time of the visit of the MEE team, was not found to be very effective.
11. Very late receipt of the first instalment of CSS funds (in the last days of March) translates into non-claiming of the second instalment of CSS funds, thus putting the tiger reserve at a great disadvantage.

12. A Local Advisory Committee (LAC) is yet to be constituted for Manas TR that reviews the tourism strategy, ensures site-specific norms regarding constructions, advises local and state governments and regularly monitors all tourist facilities as well as operations to ensure that the wildlife is not disturbed when visitors are taken into the reserve.
13. Control of the complete area of tiger reserve is yet not with the Field Director.

Immediate Actionable Points

1. The state government, the Bodoland Territorial Council and the TR management will have to take urgent steps for getting the encroachments relocated. This will make the TR inviolate and a habitat conducive for tigers and other species. Reclaiming the area from the Seed Farm Area, Kokilabari can be taken up on priority first followed by eviction of Betbari and Panbari areas. As eviction of some of these areas is is extremely difficult, some innovative strategies for rationalization of these areas will have to worked out. In this situation, the state government/Bodoland Territorial Council and the MTR management may explore the possibility of notifying portions of Raimona National Park as part of the core of MTR so that the boundaries of the core area of TR are rationalized for maintaining the ecological integrity of the reserve and retaining the habitation areas in the buffer zone.
2. The initiatives of the TR management in terms of stopping night stays at Mothanguri and entry of private vehicles and restricting vehicles coming from the Bhutan side must be continued and implemented strictly.
3. Although rhinos have been reintroduced in the reserve, the state government must consider maintaining their numbers to the peak carrying capacity of olden times. Efforts should not be made to enhance the rhino numbers in the TR by forcing habitat interventions as there might be parallel increases in prey, elephant and tiger numbers, resulting in conflict situations.
4. The tiger reserve management needs to capture all violations including grazing, fodder, fuel and small wood collection, and a database must be maintained to plan and execute necessary actions of the Field Director.
5. The population estimation exercise also include critical species like the pygmy hog, hispid hare, Bengal florican and swamp deer. The TR also needs to put in place an institutional mechanism to monitor seasonal migrations of important birds like the bar-headed goose.
6. The state government may take steps to ensure timely releases of both central and state shares of Centrally Sponsored Schemes and of state schemes. The state should also provide sufficient funds to MTR for the maintenance of its buildings which are presently not in very good shape.
7. The entire area of the TR should be put under the control of the Field Director.
8. The single-string solar power fencing put up by the Wildlife Trust of India along a certain length of the reserve's boundary needs to be converted into multi-string fencing to make it more effective, and all efforts should be made to electrify more lengths of the boundary.
9. The Field Director, MTR may consider installation of solar powered fences around the anti-poaching camps to prevent damage from raiding animals like elephants. Till this is put in place, elephant-proof trenches may be made around these camps.
10. Urgent action is required to provide necessary equipment in the veterinary hospital so that it becomes operational immediately.
11. MTR has initiated the process of upgrading old anti-poaching camps and construction of new camps. The TR management may prepare a list of items/equipment required for each of these anti-poaching camps and then put them in each camp. This will help in making the stay of the staff in these camps comfortable and longer. To instil a sense of healthy competition among the anti-poaching camps, the management of MTR may consider awarding one best-kept anti-poaching camp every month.
12. The state government needs to fill up the staff vacancies, including those of Forest Rangers, on priority so that the management, including the protection, of the TR is not adversely impacted. The Home Guards, the NGO Service Providers, etc. all need to be oriented, sensitized and trained in wildlife aspects as soon as possible. Similarly, a sympathetic consideration is required of providing rations for Home Guards, etc. on par with the regular employees.

13. The state government needs to sympathetically consider providing vehicles to the TR commensurate to their requirements. The FD may also take action on mobilizing more CSR funds from PSUs, business houses, etc. and getting vehicles and other support from donors.
14. The Field Director, Manas Tiger Reserve, needs to carry out an elaborate exercise to compile all the published research with respect to the TR and keep it in the public domain, find out research gaps and formulate a strategy for long-term research. This strategy should be implemented using internal resources of the TR and Tiger Conservation Foundation (TCF) and networking with other research institutions. New studies may include (a) impacts, if any, of shifting/advancing the burning period of grasslands in the TR from December to March, (b) development of a methodology to estimate populations of endangered species like the pygmy hog and hispid hare, which are endemic to Manas TR, and (c) documentation of social, cultural and spiritual values of the TR for the residents of the fringe areas for eliciting the support of communities.
15. The management should not only strengthen the eco-development committees but also take up income-generating activities to widen the livelihood options for fringe-area communities. This will require coordination with various other government departments and active involvement of TCFs.
16. Capacity building and regular skill upgrading are critical for the effective management of the TR. Therefore, a long-term arrangement for building the capacity of the staff should be put in place.
17. TCF has a wider objective of inclusive management of the larger tiger landscape by strengthening scientific management, building the support of local communities through eco-development and creating a larger constituency for the TR. Therefore, TCF need to be strengthened in terms of sources of income, technical staff and activities in the field. For enhancing the resources of TCF, increasing the entry fees of the TR should be considered. The resources from CSR should also be further explored for TCF. Creation of a corpus fund and putting in place a working manual as per the guidelines of the NTCA is urgently required for the effective functioning of the foundation and its sustainability.
18. It was learnt that there are some thoughts of opening new routes beyond the prescribed limits of TCP and keeping the TR open throughout the year. These steps will violate the carrying capacity principles of the reserve. Therefore, any new tourism initiatives should not compromise the carrying capacity of the TR.

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NAMERI TIGER RESERVE, ASSAM

7

MEE SCORE 56.82%

Date of Evaluation
13-15 September 2022

Evaluators' Names
Sh. B.K. Patnaik
Sh. G. Hari Kumar
Sh. Ajai Misra

INTRODUCTION

Nameri Tiger Reserve (NTR) was notified by the Government of Assam (vide notification number FRW-95/99/70, dated 1 March 2000). NTR is situated in the northern part of Sonitpur District of Assam and along the foothills of the Eastern Himalaya of Arunachal Pradesh. It shares a common interstate boundary on the northern side with Pakke Tiger Reserve of Arunachal Pradesh. NTR lies between latitudes 26° 50' 48" N and 27° 03' 43" N and between longitudes 92° 39' 00" E and 92° 59' 00" E. NTR is well connected by road, rail and air networks. The nearest airports are Tezpur (40 km) and Guwahati (220 km). The nearest railway stations are Balipara (15 km), Rangapara (20 km), Biswanath Chariali (51 km) and Guwahati (200 km).

The total area of NTR is 344 km^2, of which 200 km^2 of Nameri National Park forms the core. Prior to the declaration of Nameri as a wildlife sanctuary in the year 1985, the entire forest of the present day core was part of Naduar Reserve Forest. In the year 1998, the status of Nameri Wildlife Sanctuary was elevated to that of a national park, and later on Nameri Tiger Reserve was declared in the year 2000. In the same year 80 km^2 of the remaining Naduar RF and 64 km^2 of Balipara RF were added as the eastern and western buffers, respectively. Further, 120 km^2 of Sonai-Rupai Wildlife Sanctuary was declared a satellite core in 2015.

The core is under the administrative control of the DFO, Western Assam Wildlife Division, Tezpur, who has been also designated Field Director for coordinating with the buffer area DFOs. The eastern and western buffers are under the control of the DFO, Sonitpur East Division and the DFO, Sonitpur West Division, respectively. The overall control of the PA as well as the wildlife division rests with the Principal Chief Conservator of Forests (Wildlife) Assam and the Chief Wildlife Warden of Assam. The Field Director, NTR is assisted by an Assistant Conservator of Forest (ACF) who has also been re-designated Deputy Director of NTR. There is a beat office at the divisional headquarters at Tezpur and an office staff to assist the Field Director. During the visit of the MEE team, Mr. Nripen Kalita, DFO, Sonitpur West Division was holding additional charge of FD, NTR.

Every day field works, patrolling duties, anti-poaching drives, maintenance of park's infrastructure and implementation of various projects are carried out by the Range Officer, Nameri Wildlife Range under the supervision of the DFO cum Field Director. The range office is located at Potasali within the western buffer of NTR. There are no forest beats. But for ensuring the protection of forest and wildlife, 39 anti-poaching camps have been established at various places inside the core area. All the camps except Bogijuli and Paglabazar anti-poaching camps are located close to the Jia-bhoreli and Bordikorai River, which acts as a natural barrier for the core.

NTR belongs to the North-east Brahmaputra Valley Bio-geographic Province (9A) of the North-east India Bio-geographic Zone. The forest types are 1B/C2 (b), Upper Assam Valley Tropical Evergreen Forest; 2B/1S1, Sub-Himalayan Light Alluvial Semi-evergreen Forest; 2B/2S1, Pioneer Euphorbiaceous Scrub; 2B/2S2, Eastern Alluvium Secondary Semi-evergreen Forests; 2/E1, Cane Brakes; 3/C2d (iii), Eastern Heavy Alluvium Plains Sal; 3/1S1, Low Alluvial Savannah Woodland; and 4D/SS5, Eastern Dillenia Swamp Forest; (a) *Dillenia-Biscofia* composition, (b) *Dillenia-Mesua* composition.

NTR is home to eight globally threatened species, 11 threatened species and five near threatened species. It is one of the most important protected areas on the north bank landscape of Assam, and as a part of Sonitpur Elephant Reserve, it has been playing an important role in the conservation of the Asian elephant (*Elephas maximus*) in Assam. Further, NTR is one of the few remaining breeding places of the rare and endangered white-winged wood duck (*Asarcornis scutulata*). There are three major wetlands, namely, Borghuli Beel, Kurua Beel and Magurmari Beel, which form the habitat of the white-winged wood duck. The key species of NTR are the leopard, elephant, clouded leopard and white-winged wood duck. The results of 3 years' monitoring confirm that NTR is a low density tiger reserve with the tiger density varying from 1.3 to 1.5 tigers/100 km^2.

NTR shares the boundary of Pakke TR, Arunachal Pradesh, and the satellite core is adjacent to Doimara RF and contiguous to Eagle Nest WLS and Sessa Orchid WLS of Arunachal Pradesh. The two core areas are connected via Balipara RF and Chariduar RF. The entire landscape comes under Sonitpur Elephant Reserve. The corridors, viz, Kaziranga-Nameri Corridor (Borgang Corridor), Kaziranga-Nameri 2 Corridor (Jia-bhoreli Corridor) and Kaziranga-Papumpare Corridor (Burai River Corridor) were jointly delineated by WII and NTCA using tiger occupancy and other related data gathered over the years.

The average tourist visitation in NTR is around 8000 per annum. The Jia-bhoreli river rafting is the USP of NTR ecotourism. A 5 km long trail for wilderness experience and bird watching at Pota Sali Camp also awaits eco-tourists. Stay facilities are not provided within NTR. Privately managed eco-lodges and eateries are available in the fringes of NTR. Rubber boats are hired by tourists from private parties.

Management Strengths

1. NTR is one of the most important protected areas on the north bank landscape of Assam, and as a part of Sonitpur Elephant Reserve has been playing an important role in the conservation of Asian elephants (Elephas maximus) in Assam. NTR belongs to the North-east Brahmaputra Valley Bio-geographic Province (9A) of the North-east India Bio-geographic Zone. NTR is home to eight globally threatened species, 11 threatened species and five near-threatened species. NTR is one of the few remaining breeding places of the rare and endangered white-winged wood duck (*Asarcornis scutulata*).
2. The eco-sensitive zone notification has been issued by MOEF&CC on 27 October 2020. 120 km^2 of Sonai-Rupai Wildlife Sanctuary was declared the satellite core of NTR in June 2015. The corridors, viz, Kaziranga–Nameri 2 Corridor (Jia-bhoreli Corridor), Kaziranga–Nameri Corridor (Borgang Corridor) and Kaziranga–Papumpare Corridor (Burai River Corridor) were jointly delineated by WII and NTCA using tiger occupancy and other related data gathered over the years.
3. Nameri NP shares the boundary of Pakke TR, Arunachal Pradesh and the satellite core is adjacent to Doimara RF, contiguous to Eagle Nest WLS and Sessa Orchid WLS, Arunachal Pradesh. The two core areas are connected via Balipara RF and Chariduar RF. There are no revenue/forest villages both in the core and in the satellite core.
4. 39 manned APCs are operationalised for ensuring protection. Day and night, foot and elephant patrolling is done regularly. The existing section of the Assam Forest Protection Force (AFPF) is used as the strike force for dealing with wildlife crime in the buffer as well as the core of NTR. The sites of animal presence and human disturbances (threat) are mapped and strategic patrolling of the threat-prone areas is carried out.
5. Grassland management and weed eradication are integral parts of habitat management. The activities undertaken for grassland management are cutting of tree seedlings in grasslands in November and completing the task before grassland burning, and girdling of species such as *Albizia odoratissima* and *Salmalia malabarica* in November. Uprooting/cutting of weeds, and protecting the evicted area to prevent against re-encroachment and prevention of illegal grazing of grasslands is carried out by the management.
6. The current tiger abundance as estimated through the camera trap-based monitoring exercise is below the carrying capacity of NTR. The animals of Nameri and Pakke share a common landscape and movement pattern. The tiger population shows a stable trend, but it is below the carrying capacity.
7. The ecotourism conducted in NTR is non consumptive and non-intrusive. The Jia-bhoreli River rafting is the USP of the NTR eco-tourism. A 5 km long trail for wilderness experience and bird watching at Pota Sali camp also awaits eco-tourists. The trail and the watch towers are maintained well by the NTR management. Stay facilities are not provided within NTR.
8. The Sanctuary Nature Guide to NTR (published by Sanctuary Nature Foundation in association with Western Assam Wildlife Division and Balipara Foundation) takes tourists to a road less travelled with information on the flora and fauna, birding, history and accommodation and has a map. This publication with comprehensive tourism information is in the public domain.

Management Weaknesses

1. The scientific TCP of the NTR core, buffer and corridor areas expired in 2018.
2. The post of FD, NTR is vacant and the DFO, Sonitpur West Division is holding an additional charge of DFO, Western Assam Wildlife Division (FD, NTR). The sanctioned strength of the field staff is 133, and the staff in position is only 67, which is tantamount to 50% of field posts lying vacant.
3. In NTR, the core is managed by the DFO cum Field Director, NTR whereas the eastern and western buffers are under the control of the DFO, Sonitpur East Division and the DFO, Sonitpur West Division, respectively. While the core is under the control of the wildlife division, the buffers are under the control of the territorial divisions. Currently, there is a big difference in the approach and management strategies adopted for the core and for the buffers.
4. HWC happens in the buffer areas of NTR. The NTR management assists the territorial staff in dealing with HWC. From the discussions, it could be inferred that inordinate delays occur in paying compensation. Sonitpur West and Sonitpur East forest divisions have RRTs in position, but their preparedness is low. Currently, the data on elephant-related conflicts is maintained by the respective buffer area DFOs, but no systematic information about livestock depredation has been maintained by either the core or the buffer management teams.
5. The eastern buffer is more or less completely encroached and around 17 km^2 of sal and mixed forest is left over in the western buffer. Further, opportunistic cultivation of riverine islands, clearing of native vegetation which offer cover for the wildlife on the move, and dumping of pesticides and other agrochemicals have serious repercussions on the ecosystem. The threat of encroachment remains high.
6. The pressure on the natural resources of NTR for illegal exploitation, competition by domestic livestock for the herbivore resource base, invasion by weed species such as *Chromolaena odoratum* and *Mikania micrantha* and woodland encroachment in grasslands are high. Further, the fringe-area villagers are dependent on the satellite core for meeting their fuelwood, fodder and small timber requirements. 150 families have encroached an about 5 km^2 area of the NTR core/satellite core. The proposal and estimate for eviction from the encroached area and for restoration of the area after eviction was sent to the concerned authority for approval. Eviction is yet to be done.
7. Summer and winter uniforms are provided to the permanent staff, fixed pay staff and camp labourers. 39 Home Guards are not supplied with any uniforms. The state ration allowance of Rs.2000 per month and ration allowance of Rs.860 per month provided by Project Tiger are only up to the rank of Deputy Ranger. Home Guards do not fall in the ambit of any staff welfare activities.
8. APCs are frequently attacked by elephants, and no elephant-poof trenches/fences are constructed in APCs. The field staff posted in the APCs are not provided with quarters. There are no quarters for even the Range Officer at Kalamata. Most of the vehicles are old and prone to frequent breakdowns.
9. Equipment such as night vision devices, smart patrol devices, laptops, GPS and camera traps are all in short supply. Veterinary facilities are insignificant. Logistic infrastructure, such as rescue cages, specialised vans, tranquilising guns and medical equipment, is the need of the hour.
10. Inordinate delays are noticed in the release of NTCA funds by the state government. This has resulted in partial utilization with a resultant relegation of priority activities. During 2019-20, NTCA sanctioned Rs.218.41 lakhs and released the first instalment of Rs.154.72 lakhs on 27 September. The state government released the amount only on 27 March 2020, after a gap of six months, resulting in partial utilization, of only Rs.143.776 lakhs. In 2020-21, the allotment got reduced to Rs.170.43 lakhs and the utilisation was Rs.119.23 lakhs. During 2021-22, the allotment was Rs.139.87 lakhs and the utilisation was Rs.104.90 lakhs.
11. Record of training is not maintained properly. Staff Development Plan is not prepared and implemented.
12. Even though 18 EDCs were formed from the fringe villages, only one EDC, viz, Torajan Bongaon EDC is operative.

Immediate Actionable Points

1. Ad hoc management of NTR without a TCP is not acceptable.
2. The post of FD, NTR is vacant, and the DFO, Sonitpur West Division is holding an additional charge of the DFO, Western Assam Wildlife Division (FD, NTR). Following the all-India pattern, the DFO, Western Assam Wildlife Division, Dolabari, Tezpur has to be re-designated the FD, NTR. The ACF need to be re-designated the AFD, NTR. Immediate action is recommended for the redesignation and posting of an independent FD, NTR.
3. The HWC management needs to be revamped with a fully equipped and functional RRT. It is desirable to bring in payment of compensation under the ambit of citizen services with a time limit set for ensuring compliance. The data on elephant-related conflicts and the data on livestock depredation has to be maintained with the FD and NTR.
4. It is recommended that a mechanism/protocol be evolved to ensure timely submission of a prioritised APO/timely release of the state share and for full utilisation of the allotment. There is a delay in the release of a 10% State share under Project Tiger. To circumvent delay, the possibility of release of 10% APO as state share along with plan funds may be probed.
5. The threat of encroachment remains high in NTR. Opportunistic cultivators of riverine islands need to be evicted then and there. Approximately 150 families have encroached on an about 5 km^2 area of the NTR core/satellite core. The eastern buffer is more or less completely encroached and around 17 km^2 of sal and mixed forest is left over in the western buffer. Eviction of illegal encroachments is recommended. The pending proposal and estimate for eviction of the encroached area and for restoration of the area post-eviction may be expedited.
6. Veterinary facilities are insignificant. The wildlife in NTR is vulnerable to diseases from livestock. Logistic infrastructure, such as rescue cages, specialised vans, tranquilising guns and medical equipment, is to be procured. Prophylactic immunization of cattle is necessary. Further, to mitigate the human-elephant conflict, it is recommended that the services of a veterinary doctor along with the minimum support staff be provided to NTR.
7. Even though 18 EDCs were formed from the fringe villages, only one EDC, viz, Torajan Bongaon EDC, is operative. It is recommended that the Eco-Development Programme be implemented in all 18 villages in consultation with the villagers and after the due process of micro-planning and signing of MoUs. EDC members can be roped in for regular patrolling/protection and management, as part of a quid-pro-quo commitment.
8. The 39 APCs need infrastructure. Mandatory field equipment for M-STRiPES patrolling, torches, range finders, GPS, camera traps, night vision devices, smart patrol devices, laptops, etc. need to be provided. All the APCs are to be provided with sufficient numbers of walkie-talkies. Optimal staff amenities are to be provided in each of the APCs.
9. Wireless networks need strengthening with a wireless signal booster. The proposal pending due to a paucity of funds should be expedited.
10. It is recommended that all casual workers be enrolled in e-ashram and Ayushman yojana.
11. Filling up all vacancies of frontline staff positions in NTR is warranted.
12. Capacity building of staff in an ongoing manner is recommended. Further, it is also recommended that a Record of training be maintained and Staff Development Plan is prepared and implemented.
13. A proposal for upgrading the existing interpretation centre by using modern Audiovisual devices and a 3-D display cum lecture hall is pending for want of funds. The sanction and execution should be expedited on priority.
14. The TR should maintain a complaint register showing the logs of complaints received, enquired, and disposed of. Written order should be issued on complaint handling and disposal system including intimation to complainant.

ORANG TIGER RESERVE, ASSAM

8

MEE SCORE 68.18%

Date of Evaluation
11-13 September 2022

Evaluators' Names
Sh. B K Patnaik
Sh. G Hari Kumar
Sh. Ajai Misra

INTRODUCTION

The Orang TR (OTR) has been notified vide Notification no. FRW.14/2004/34 dated 24/2/2016 consisting of a core area of 79.28 km^2 and buffer area of 413.18 km^2. The core area of the reserve i.e. Orang National Park (ONP) was an erstwhile game reserve which was notified as a sanctuary in 1985 and eventually a National Park in 1999. The tiger reserve by virtue of its proximity to Guwahati and Tezpur is well connected by flight, road, and rail. Tezpur Airport and Guwahati Airports are 65 km and 110 km, respectively, being connected through major part of NH15 and NH 27 KM. The major Railway Stations nearby are Guwahati (110 km), Tezpur (70 km) and Rowta (23 km) from the Orang Tiger Reserve.

The core area of OTR, i.e. ONP, lying between the latitudes 260 29' N to 260 36' N and the longitudes 920 15' E to 920 25' E, is situated in the Northern bank of Brahmaputra River of Darrang and Sonitpur districts. The buffer area of the OTR has numerous revenue villages and riverine islands within but there are no reserve forests and protected areas in the buffer. The buffer area falls under 4 revenue districts of Assam, namely Darrang, Sonitpur, Morigaon and Nagaon. The south-west to north-east stretch in the southern part of the buffer is the Brahmaputra riverine area.

Currently, the entire area of the ONP (core area) is one range and is under the jurisdiction of Range Officer, ONP, Silbori. It is the only range under the jurisdiction of Mangaldai Wildlife Division and the DFO, Mangaldai Wildlife Division discharges the functions of the Field Director of the OTR and is assisted by an ACF and an attached Range Officer. There are no forest beats, but there are 40 permanent anti-poaching camps in the core, and each camp guards an average area of 2 km^2. It has two floating camps to manage the riverine areas. The buffer area falls under three territorial divisions namely, North Kamrup, Sonitpur West and Nagaon. Mangaldai Wildlife Division has no jurisdiction over the buffer area, and the area is under the jurisdiction of respective territorial divisions.

As Orang Tiger Reserve is part of the Brahmaputra floodplain landscape, the connectivity with the buffer area of Kaziranga Tiger Reserve (KTR) i.e., Laokhowa-Burhachapori WLS, is through the river and its riverine islands. These riverine islands are occupied by many for agricultural purposes and are hindering the connectivity to the landscape. In this regard, the final notification of 200.32 km^2 as the second addition to Orang National Park has been issued by the Government of Assam (vide letter no. FRW.14/2004/Pt/64 dated 25 August 2022. After the final notification of the second addition to ONP, the connectivity to the Kaziranga landscape through Laokhowa-Burhachapori WLS has been affected.

According to the classification of Champion & Seth, the forest types of the national park are (1) Eastern Seasonal Swamp Forests (4D/SS1); (2) Eastern Himalayan Moist Mixed Deciduous Forests (3C/C3b); (3) Khair-Sisoo Forests (5/1S2); (4) Eastern Wet Alluvial Grasslands (4D/2S2); and (5) Plantations.

OTR is characterized by and interspersion and juxtaposition of beels (water bodies), grasslands and woodlands, and is a representative of a riverine floodplains ecosystem and the ecological succession within the Kaziranga landscape. The area comprises grasslands with woodlands and water bodies. The succession is checked at the grassland seral stage by annual controlled burning and uprooting of trees which colonize the grasslands. The fertile soil deposited by floods every year also promotes growth of grasses.

The Central Brahmaputra Valley region in Assam is a stronghold of the rhino, tiger, water buffalo, elephant, and Gangetic dolphin as well as many other terrestrial and aquatic species. In this region, Orang Tiger Reserve and Kaziranga National Park house the highest-density tiger population in the world (AITM 2018). There are around an estimated 125-130 tigers between these two parks, OTR having 24. OTR has received International CATS (Conservation Assured Tiger Standards) accreditation. The certificate was received on 1st July 2021 on the Global Tiger Day.

Apart from the tiger and rhino, the other important key species are the Bengal florican, pygmy hog, swamp francolin, etc. The Asiatic elephant, hog deer, and wild pig are some of the mammals found in ONP. OTR is home to 284 species of bird, and critically endangered species such as the Bengal florican, greater adjutant stork, lesser adjutant stork, spot-billed pelican, Baer's pochard, Blyth's kingfisher, swamp francolin and yellow weaver find a home here.

The future of the tiger and other wildlife populations of ONP is dependent on the connectivity of the park area with the Kaziranga landscape. As Orang Tiger Reserve is part of the Brahmaputra floodplain landscape, the connectivity with the buffer area of Kaziranga Tiger Reserve (KTR), i.e., Laokhowa- Burhachapori WLS, is through the river and its riverine islands. These riverine islands are occupied by many for agricultural purposes and are hindering the connectivity to the landscape. In this regard, the final notification of 200.32 km^2 as the second addition to Orang National Park has been issued by the Government of Assam (vide letter no. FRW.14/2004/Pt/64 dated 25 August 2022. After the final notification of the second addition to ONP, the connectivity to the Kaziranga landscape through Laokhowa-Burhachapori WLS has been affected

There is an average footfall of 3500 visitors per year to OTR. No tourist guest house is available inside OTR. The reserve has only day tourism. There are a few private guest houses and hotels outside OTR for visitors. Ten safari vehicles operate in OTR with the help of Nalbari EDC. Four departmental elephants are engaged for elephant rides.

Management Strengths

1. It is a unique landscape of the floodplains of the River Brahmaputra, an extension of areas beyond the Kaziranga Tiger Reserve (KTR), comprising habitats with grasslands, wetlands, ponds, riverine islands, and woodlands for threatened and endangered species like the rhino, tiger, Bengal florican, pygmy hog, Gangetic dolphin and hog deer.
2. With the issue of the preliminary notification on 3 January 2022 of the first addition to OTR by including an additional area of 200.32 km^2 to the existing core area of 78.80 km^2, it is now a viable diverse habitat. The extended protected area network strengthens OTR connectivity with the KTR buffer area (Laokhowa-Burachapori WLS) by ensuring effective protection and helping maintain a healthy gene pool.
3. Network of 40 anti-poaching camps, with the presence of two sections of armed Assam Forest Protection Force (AFPF), along other staff, a dog squad and 42 camp elephants, has strengthened the protection considerably. Patrolling on elephant-back and in floating camps has made all areas of the OTR accessible to the protection staff for most of the year. Due to these measures, no poaching incident has been reported since 2018 in OTR.
4. Neither the existing core nor the first addition to the core area has any habitations/villages inside it. This makes the core area completely inviolate. Further, in the absence of any linear infrastructure like a highway or railway line passing through OTR, it is free from any problem of fragmentation of habitats.
5. Due to its proximity with Guwahati, it has good potential for eco-tourism. Presently about 3500 tourists are visiting OTR every year. Community based eco-tourism may be strengthened through EDCs. Entry fee collection will help realize a better income for the Tiger Conservation Foundation.

Management Weaknesses

1. Presently there are about 40% vacancies in various cadres in OTR. For effective management of OTR's activities, these vacancies need to be filled up on priority.
2. The buffer area of OTR has still not been transferred to it and continues to be with the adjoining territorial divisions. For addressing the important issue of confronting wildlife and human populations in the buffer areas, the core and buffer need to be brought under the unified control of OTR.
3. To address the livelihood issues, EDCs should have user groups and self-help groups, especially involving women. These groups can function on common interest and with local banking institutions on microcredit/financing. OTR may provide training and infrastructure support to them.

4. Invasive weeds, both on land and water, continue to be a threat to the habitat. *Chromolaena odorata, Mimosa species, Mikania species*, etc. are invading the grasslands, and water hyacinth the wetlands and ponds. The present efforts to eradicate them are not enough. *Bombax ceiba*, which was grown in the past (before these areas were brought under wildlife management) as a species in softwood working circle areas, is also invading the grasslands. Presently girdling of mother trees is being done to keep their regeneration under control and to save the grasslands.
5. Resource dependence of local communities in the buffer zone (grazing) is there in OTR. Solar fencing is erected to keep it under control. Concerted efforts may be made involving the EDCs to check this problem.
6. The Tiger Conservation Foundation has been established, but it does not have funds or a strong resource base to meet its objectives.
7. There is no institutionalized coordination between the OTR and the rural development or line departments implementing their programmes in the buffer areas.

Immediate Actionable Points

1. After the final government notification dated 25 August 2022 of the second addition of 200.32 km^2 to OTR, the matter may be followed up with revenue authorities for expediting the process of handing over the area to the forest department with necessary records and maps and taking further action to notify it as tiger reserve (as an addition to the existing tiger reserve area).
2. Filling up the vacancies on priority.
3. Transfer of buffer areas to OTR from adjoining territorial divisions, to have unified control of the core and buffer by Mangaldoi Wildlife Division (OTR).
4. Working out the thematic training modules, imparting training to the park staff and documenting the same.
5. The Local Area Committee (LAC) is yet to be formed—necessary action may be taken for its formation.
6. The notification of ESZ was not available. If it has already been issued, the same may be obtained and follow-up action taken.
7. The complaint handling system, both online and offline, in OTR needs to be revamped, making it responsive with periodic submission of reports/returns on receipt of complaints/its processing/action taken and review.

Manoj Dholakia

BIHAR

VALMIKI TIGER RESERVE

9

MEE SCORE 75.76%

Date of Evaluation
14-18 November 2022

Evaluators' Names
Sh. RN Mehrotra
Sh.N.K. Vasu
Sh. H. S. Upadhyay
Dr. G.V.Gopi

INTRODUCTION

Valmiki Tiger Reserve (VTR) is the only tiger reserve in the state of Bihar. It is contiguous with Chitwan National Park of Nepal and also connected with Suhagi Barwa Wildlife Sanctuary in Uttar Pradesh. The reserve is a vital area within the Terai Arc Landscape (TAL). Valmiki Tiger Reserve occupies 901.13 km^2 of the northernmost part of West Champaran District in Bettiah Taluka. The area lies between latitudes 27° 10' N and 27° 30' N and between longitudes 83° 50' E and 84° 10' E. Administratively, this tiger reserve is divided into two forest divisions (Division-1 and Division-2) and managed under eight ranges, namely Manguraha, Gobardhana, Raghia, Chiutaha, Harnatand, Ganuali, Valmiki Nagar and Madanpur, which have 65 forest sub-beats, known as management units. According to Champion and Seth, the vegetation of VTR has been classified into seven forest types. These vegetation types are (i) Bhabar Dun Sal Forest (3C/c2/b (i)), (ii) Dry Siwalik Sal Forest (5B/c1/a), (iii) West Gangetic Moist Mixed Deciduous Forest (3C/c3/a), (iv) Khair-Sissoo Forest (1S/2), (v) Cane Brakes (1b/e1), (vi) Eastern Wet Alluvial Grassland (4d/2s2) and (vii) *Barringtonia* Swamp Forest (4 d/ss2). VTR was notified (vide notification no. Vanyaprani 11/94-303-E/Va.Pa.Patna dated 11 March 1994) with an extent of 840.26 km^2, and the core/critical and buffer zones were notified (vide resolution no.22/08-608(E) pa.va. dated 26 November 2013) under Section 38 V of the Wild Life Protection (Amendment) Act, 2006.

Management Strengths

1. VTR has an excellent collaboration with WWF-India, who are supporting the research and management of VTR.
2. VTR receives adequate funds from the NTCA and state government.
3. VTR has a well delineated critical tiger habitat and inviolate areas.
4. VTR has wildlife-trained Field Directors (both FD and DFD).
5. The science and management interface is excellent in VTR.
6. VTR has complied with the four statutory requirements (SR) along with the Tripartite MoU and three SOPs
7. VTR has been able to manage the human–wildlife conflict to a significant extent with the active role of TR officials and staff members as well as the participation of NGOs such as WWF and WTI.
8. Valmiki Tiger Reserve (VTR) is well integrated into a wider ecological landscape, and periodic trans-boundary meetings with Nepal are held. It also has an effective tiger, co-predator and prey monitoring programme covering the TR systematically and periodically.
9. The 9 km eco-sensitive zone notified around the reserve is the biggest strength of the VTR.

Management Weaknesses

1. Though VTR receives adequate funds from NTCA, the funds are not received timely, which hampers the management.
2. There is no human habitation in the core, but there is still some biotic pressure due to enclaved villages (26 revenue villages with a population of over 60,000 humans and several cattle) situated in the centre and from several villages along the southern boundary (over 150 villages within 2 km). VTR has to engage with the local communities regularly and try to minimise their impacts.

3. The facilities in the APC has to be improved with separate facilities for both male and female workers.
4. Only about 5% of the area is covered by grasslands and even these are being invaded by woody growth and invasive weeds like *Eupatorium, Lantana, Parthenium* and *Cassia tora*.
5. Lack of non-PA forests and wastelands in the buffer zone and immediate interface of sanctuary areas with revenue villages with intense cultivation in the southern side.

Immediate Actionable Points

1. Since it is a transboundary tiger reserve, efforts should be made to institutionalize joint sharing of data and monitoring efforts with Chitwan NP, Nepal.
2. National Highway No. 28B, which passes through the western boundary of the reserve, has to have mitigation measures as stipulated in WII's eco-friendly Guidelines for Linear Infrastructure.
3. The railway line passing through Madanpur Block has to have mitigation measures as stipulated in WII's eco-friendly Guidelines for Linear Infrastructure.
4. Soil and moisture conservation works, when taken up, have to have a scientific approach. Applications like CLART may be tested and used. Composite Landscape Assessment and Restoration Tools (CLART), is a Geographic Information System (GIS) based Android tool—developed to enhance the planning of region-specific soil and water conservation measures. This will help effective ground-level implementation.
5. The rhinos generally come through the Gandak River during the flood season. They take shelter in Madanpur Block and have in the past taken to permanent residence. In addition to this, occasional migration to VTR occurs in the Sonha-Pachnad valley, bordering CNP, in Triveni Block of VTR, at the western end. There have been episodes of rhinos coming across the Thori–Jasauli border zone in the eastern end, and these rhinos remain confined to the swampy and grassy pockets in Someswar Block towards east beyond Manguraha and eventually return to CNP. Efforts to keep the migrating rhinos within VTR have to be made.
6. Specific actions pertaining to climate change have to be carried out either in terms of research or through adaptive mechanisms.

Manoj Dholakia

CHHATTISGARH

ACHANAKMAR TIGER RESERVE

10

MEE SCORE 69.70%

Date of Evaluation
12-19 December 2022

Evaluators' Names
Sh. RN Mehrotra
Sh.N.K. Vasu
Sh. H. S. Upadhyay
Dr. G.V.Gopi

INTRODUCTION

Achanakmar Tiger Reserve was notified in the year 2009 with a total area of 914.017 km^2 consisting of a 626.195 km^2 core and a 287.822 km^2 buffer as defined in the Wild Life Protection Act and is located between latitudes 22° 24' and 22° 35' N and longitudes 81° 34' and 81° 85' E. Achanakmar is part of Achanakmar–Amarkantak Biosphere Reserve and the Central Indian Satpura–Maikal Landscape. The tiger reserve is an important unit of a larger landscape in central India, having a variety of habitats suitable for many threatened species of plant and animals as well as significant tiger occupancy in many protected areas and tiger reserves. The tiger population in the TR is very low and the numbers are declining over successive All India Tiger Estimation exercises. The state government has initiated an ambitious programme for enhancing tiger-centric management with support from Global Tiger Forum and WWF. Many of the actionable points of the earlier MEE are yet to be complied. A detailed SWOT analysis was done in the approved Tiger Conservation Plan compiled for the period from 2013–14 to 2023–24. The present management needs to update the current status of the SWOT analysis. Indicative lists of strengths, weaknesses and immediate actionable points are listed below.

Management Strengths

1. The forests of ATR are part of a very large landscape in central India having a variety of habitats suitable for many threatened species of plant and animal and contributing to the population of tigers in the country.
2. The WII report "Connecting Tiger Populations for Long-Term Conservation" has identified Kanha–Achanakmar and Bandhavgarh–Achanakmar as important landscapes connected through identified corridors.
3. Achanakmar is part of Achanakmar–Amarkantak Biosphere Reserve and has cultural, spiritual and religious values, making it an important ecotourism destination.
4. The ITR has approved Tiger Conservation Plan (2013–14 to 2023–24), and the entire reserve (core and buffer) is under the unified control of the Field Director and his team. However, immediate revision based on NTCA guidelines and current priorities is required.
5. Amarkantak, which is in the close vicinity, is the source of the River Narmada, the only west-flowing river. It is a place acclaimed as a national pilgrimage destination.
6. The ATR management has been able to complete and update the mapping of incidences of fire, the number and locations of water bodies and the locations of villages, grasslands and infrastructure.
7. Public facilities for tourism have been developed in one complex at Shiv Tarai, outside the core and buffer areas.

Management Weaknesses

1. The presence of 19 villages in the core zone of the TR adversely impacts the habitat of wild animals in the TR. Though a relocation plan was stated to have been prepared, no action in this direction in the field was visible. The All India Tiger Estimation 2018 recorded very high numbers of livestock, viz., 33.70 photos per 100 trap nights. No other animal, mainly of wild prey species for tigers, is close to this number.
2. There appears a tendency amongst villagers to expand village boundaries by way of tree cutting and girdling of valuable trees as well as encroachments.
3. Management infrastructure including protection and communication is inadequate.

4. The estimated numbers of wild prey species are too low to support any sizeable population of tigers in the TR.
5. The existing number of individual tigers (5) captured after an extensive Phase-IV exercise is very low as well as highly skewed in terms of the male:female ratio.
6. The current status of the habitat suitability and security in the TR has not been fully explored.
7. Invasive species like *Parthenium hysterophorus* are threatening natural regeneration and the quality of the habitat for wildlife.
8. There is no perennial river inside the tiger reserve, but there are a number of seasonal streams and rivulets. However, these are not well distributed in time and space, sometimes posing problems in the dry season.
9. The Kota–Keonchi road, passing through the core area, has been opened to the public with an intervention through the High Court that can increase disturbances inside the TR.

Immediate Actionable Points

1. Although a security plan is detailed in the TCP, an immediate security audit as per the standard protocol needs to be done to identify gaps and take appropriate measures to minimize threats in the tiger reserve.
2. An annual land use land cover mapping based on high resolution satellite data procured from NRSA will help monitor the forest cover and other attributes remotely.
3. The actionable points of the previous MEE, mainly relocation of villages, training of officers and the staff in wildlife management, grassland management, interpretation facilities, inter-state coordination and rescue and rehabilitation with development of veterinary facilities, may be pursued sincerely.
4. Small research projects/inventories/surveys may be undertaken by local college and university students in addition to the major projects proposed by research institutes, departments and universities. The state biodiversity board may take appropriate initiatives in this regard.
5. The management of ATR should effectively control the movements of public vehicles on the Kota–Keonchi road in the interest of wildlife conservation.
6. The water conservation and percolation programme initiated by the TR management may be further extended to address the issue of water deficiency in various locations identified in the TR.
7. Pending the relocation of villages for creation of an inviolate space, the TR management has to bring in an inclusive approach involving local communities for effective execution of planned activities of the TCP. The local officials may incorporate innovative methods including a mass awareness programme, in addition to the present approach of participation through EDCs and the schemes of the forest department.
8. The critically low densities/numbers of the tiger and its wild prey species are a great concern for effective tiger reserve management. The TCP includes and recommends prey augmentation activities in the TR, but no such action has been initiated by the tiger reserve. ATR should therefore undertake active management of the tiger population and the prey based on tested methodology and protocols. However, no such introduction plan should be initiated till a proper security assessment and habitat assessment is done and the TR management is ready with the full control over the area required for intensive management of the tiger population. Interventions by GTF and WWF through their recently initiated project/programme may address the above concerns.
9. The NTCA and state government need to review the status of the fund deficit and consider meeting additional justified requirements of funds. Funds may be released in time for proper utilization in development activities.

INDRAVATI TIGER RESERVE, CHHATTISGARH

11

MEE SCORE 53.79%

Date of Evaluation
12-19 December 2022

Evaluators' Names
Sh. RN Mehrotra
Sh.N.K. Vasu
Sh. H. S. Upadhyay
Dr. G.V.Gopi

INTRODUCTION

Indravati Tiger Reserve (ITR) is one of the largest tiger reserves in central India (area-wise). The total area of the reserve is 2799.07 km^2, and the area of the core zone is 1258.37 km^2 and that of the buffer zone is 1540.70 km2. The River Indravati forms the northern and western boundaries of the park. It is also the inter-state boundary between the states of Chhattisgarh and Maharashtra. The forests of Indravati Tiger Reserve are the last abode of the state animal, the wild buffalo, in Chhattisgarh. Many of the important actionable points suggested by the previous MEE are yet to be addressed by the TR management due to the presence of left-wing extremism in the region.

Management Strengths

1. The forests of ITR are part of a very large landscape in central India having a variety of habitats suitable for many threatened species of wild animal and contribute to the population of tigers in the country.
2. The WII report "Connecting Tiger Populations for Long-Term Conservation" has identified Kanha–Navegaon–Nagzira–Tadoba–Indravati and Indravati–Udanti–Sitanadi–Sunebeda as important landscapes connected through identified corridors. A similar study showing further details was conducted by Space Application Centre Ahmedabad and authorities from Kanha National Park. The report was titled "Study of Network of Wildlife Reserves in Eastern Madhya Pradesh Using Remote Sensing Data".
3. ITR has approved the Tiger Conservation Plan and the entire reserve (core and buffer) is under the unified administrative control of the Field Director and his team.
4. Though surveillance in the area is difficult for the TR management due to left-wing extremism, the forests and habitats of many threatened species are intact and well preserved.
5. ITR has the last surviving population of the Asiatic wild buffalo in the Central India Landscape, and there is scope for maintaining a viable population of the species in this tiger reserve.
6. The Indravati River forms the northern and western boundaries of the TR, and many streams flowing through the TR are important sources of water.
7. The officers and staff have good orientation and are passionate towards wildlife conservation.
8. The extensive unexplored area of the TR provide immense scope for research in the field of biodiversity values of the TR.

Management Weaknesses

1. ITR has been affected by left-wing extremism (LWE) during the last few decades and is not accessible freely/easily for the TR management initiatives.
2. It is difficult for the tiger reserve management to control the TR landscape fully and implement approved planned activities of the management effectively.
3. The participation of important stakeholders other than the forest department is severely restricted due to the LWE.
4. Presence of large number of villages in the TR (core zone—56 villages 6914 families, buffer zone—81 villages and 1,14,422 families) adversely interacting with the habitat of wild animals in the TR.
5. Local tribes, mainly the Gond, Madia, Halba, Muria and Telenga people of the villages, indulge in their traditional hunting practice of pardas, extension of agriculture by encroachment, illicit felling, cattle grazing, firewood collection and collection of mahua and other MFP.
6. Although the River Indravati and various streams flow through the tiger reserve, the area faces a scarcity of water during the dry season.
7. Assessment and monitoring of the floral and faunal diversity on a regular basis cannot be done due to LWE.
8. The management infrastructure (including protection and communication) in the core area of TR is poor.
9. Tourist inflow and tourism infrastructure are negligible due to the LWE.
10. Trained human resources are not commensurate with the size and threats in the TR.
11. Highly skewed tiger population and populations of prey animals but little scope for intensive management due to non-implementation of planned activities as per the TCP.
12. Currently no studies or systematic observations are carried out to measure the impact of climate change on the floristic composition of the core habitat.

Immediate Actionable Points

Though free and unhindered access to the major portion of the TR is restricted due to the LWE, the following actionable points are suggested:

1. Although a security plan is detailed in the TCP, an immediate security audit as per the standard protocol needs to be done to identify gaps and take appropriate measures to minimize threats in the tiger reserve.
2. An annual land use land cover mapping based on high resolution digital data procured from NRSA or any other agency will help monitor the forest cover and other attributes remotely.
3. Actionable points of the previous MEE, mainly, relocation of villages, training of officers and staff in wildlife management, community awareness programmes, implementation of M-STrIPES, interpretation facilities, inter-state coordination, management of human–wildlife conflict, rescue and rehabilitation with development of veterinary facilities, etc. may be pursued sincerely.
4. Small research projects/inventories/surveys may be undertaken by local college and university students in addition to the major projects proposed by research institutes, departments and universities. The state biodiversity board may take appropriate initiatives in this regard.
5. Recent sightings and videos of the Asiatic wild buffalo indicate the presence of a healthy breeding population in the tiger reserve. Focused conservation initiatives are required for this proud species of Chhattisgarh state.
6. Pending the creation of an inviolate space, the TR management has no option other than to bring in an inclusive approach involving local communities for effective execution of planned activities of the TCP. The local officials may incorporate innovative methods in addition to the present approach of participation through EDCs and the schemes of the forest department.
7. Areas under the impact of changes in climate need to be distinguished from the areas affected adversely by biotic factors in the core of the TR. They must be identified for generating baseline data on the current status of the biodiversity. This could be done by laying out secure sample plots of suitable sizes with representative biota.

UDANTI–SITANADI TIGER RESERVE, CHHATTISGARH

12

MEE SCORE **56.82%**

Date of Evaluation
13-14 December 2022

Evaluators' Names
Sh. RN Mehrotra
Sh.N.K. Vasu
Sh. H. S. Upadhyay
Dr. G.V.Gopi

INTRODUCTION

Udanti–Sitanadi Tiger Reserve, situated in District Gariyaband, Chhattisgarh, was notified in the year 2009 with two notified core areas, namely Core 1 (Udanti) and Core 2 (Sitanadi). The total area of the TR is 1842.54 km^2, out of which 851.09 km^2 is the core area and 991.45 km^2 is the buffer area. The TR derives its names from the Udanti and Sitanadi, perennial rivers flowing through Core 1 and Core 2, respectively. The rivers are the only permanent water sources for the wildlife in the core of the tiger reserve. Apart from this, the location of the reserve is strategic since it also connects with Kanker and North Kondagaon forest divisions, forming a contiguous forest corridor to Indravati Tiger Reserve in the Bastar region. The reserve has corridor values which require a focused study and survey, which can help in future planning of conservation of free-ranging species, especially the tiger, wild buffalo and gaur, in the area. Many of the important actionable points suggested by the previous MEE are yet to be addressed by the TR management due to the presence of left-wing extremism in the region.

Management Strengths

1. The forests of USTR are part of a very large landscape in central India having a variety of habitats suitable for many threatened species of wild animal and contributing to the tiger population of the country. The Udanti–Sitanadi and Sonabeda WLS (proposed tiger reserve) landscape is a single compact forest of about 3000 km^2 that represents a large, rich and diverse habitat.
2. The WII report "Connecting Tiger Populations for Long-Term Conservation" has identified Indravati–Udanti–Sitanadi–Sunebeda as important landscapes connected through identified corridors. A similar study showing further details was conducted by Space Application Centre Ahmedabad and authorities form Kanha National Park. The report is titled "Study of Network of Wildlife Reserves in Eastern Madhya Pradesh Using Remote Sensing Data".
3. USTR has approved the Tiger Conservation Plan, and the entire reserve (core and buffer) is under the unified control of the Field Director and his team.
4. Though control of the area is difficult for the TR management due to left-wing extremism, the forests and habitats of many threatened species are intact and well preserved.
5. USTR has the last surviving population of the Asiatic wild buffalo in the Central India Landscape and there is scope for maintaining a viable population of the species in this tiger reserve.
6. The officers and staff have good orientation and are passionate towards wildlife conservation.
7. The extensive unexplored area of the TR provides immense scope for research in the field of biodiversity values of the TR.
8. There is potential for tourism in the buffer and peripheral areas of the core and in Udanti Wildlife Sanctuary.
9. The EDCs are cooperative in providing protection to the area because of eco-development works carried out by the tiger reserve in collaboration with WTI (NGO).
10. The Asian Wild Buffalo Centre in the Udanti area (Core 1) was established under a recovery plan in collaboration between the tiger reserve and WTI. The centre is working on the revival of the buffalo as well as on community awareness and development works.

Management Weaknesses

1. USTR has been affected by left-wing extremism (LWE) during the last few decades and is not accessible freely for the TR management.
2. It is difficult for the tiger reserve management to control the TR landscape fully and implement approved planned activities of management effectively.
3. The participation of important stakeholders other than the forest department is severely restricted due to the LWE.
4. The presence of a large number of villages in the TR adversely affects the habitat of the wild animals in the TR.
5. The local tribes, mainly the Gond, Madia, Halba, Muria and Telenga people of the villages, indulge in their traditional hunting practice of pardas, extension of agriculture by encroachment, illicit felling, cattle grazing, firewood collection and collection of mahua and other MFP.
6. Although the river and various streams flow through the tiger reserve, the area faces a scarcity of water during the dry season.
7. Assessment and monitoring of the floral and faunal diversity on a regular basis cannot be done due to LWE.
8. The management infrastructure (protection and communication) in the core area of TR is poor.
9. The tourist inflow and tourism infrastructure are negligible due to LWE.
10. Trained human resources are not commensurate with the size and threats in the TR.
11. The highly skewed tiger population and the population of the prey cannot be subjected to intensive management due to non-implementation of planned activities as per the TCP.

Immediate Actionable Points

Though free and unhindered access to the major portion of the TR is restricted due to the LWE, the following actionable points are suggested:

1. Although a security plan has not been detailed in the TCP, an immediate security audit as per the standard protocol needs to be done to identify gaps and take appropriate measures to minimize threats to the tiger reserve.
2. Annual land use land cover mapping based on high resolution digital data procured from NRSA or any other agency will help in monitoring the forest cover and other attributes remotely.
3. Actionable points of the previous MEE, mainly relocation of villages, training of officers and the staff in wildlife management, conducting community awareness programmes, implementing M-STrIPES, providing interpretation facilities, managing human–wildlife conflict, developing grasslands, maintaining roads and carrying out rescue and rehabilitation with the development of veterinary facilities, wireless communication, etc. may be pursued sincerely.
4. Small research projects/inventories/surveys may be undertaken by local college and university students in addition to the major projects proposed by research institutes, departments and universities. The state biodiversity board may take appropriate initiatives in this regard.
5. More focused conservation initiatives are required for establishing a healthy population of the Asiatic wild buffalo in USTR.
6. Pending the creation of an inviolate space, the TR management has no option but to bring in an inclusive approach involving local communities for effective execution of planned activities of the TCP. The local officials may incorporate innovative methods in addition to the present approach of participation through EDCs and the schemes of the forest department.
7. Actionable Point 2 of the previous MEE regarding introduction of tigers will depend on the conditions when all other action points are acted upon. It is therefore suggested that no such introduction plan be initiated till a proper security assessment and habitat assessment is done and the TR management is ready with full control over the area as required for intensive management of the tiger population.

8. Local communities were seen to be very supportive of eco-tourism activities at Mechka Eco Park. The activities can be further supported and the possibility of establishing similar activities in other areas may be explored.
9. Water conservation works initiated by the TR may be extended to other areas in the core and buffer of the TR.
10. The lack of infrastructure and the inadequate numbers of camera traps need to be addressed effectively to get the true picture of tigers and prey species in the reserve.

Shibu Nair

JHARKHAND

PALAMAU TIGER RESERVE

13

MEE SCORE 65.91%

Date of Evaluation
6-11 October 2022

Evaluators' Names
Sh. D N S Suman
Dr R K Singh
Shri Nitin Kakodkar

INTRODUCTION

The Palamau TR (PTR) with an expansive forest area (1144sq.kms), was amongst the first 9 Tiger reserves notified in 1973 and is endowed with rich floral and faunal biodiversity. Connectivity with adjoining forest blocks within and outside the State e.g.,: Chhatisgarh (Guru Ghasidas National Park) and Madhya Pradesh in the west, Odisha and Singhbhum Forests in the South, and the Gautam Buddha Sanctuary, Hazaribagh Sanctuary, Kodarma Sanctuary and Lawalong Sanctuary in the East adds to its value in the landscape. It is home to more than 800 different species of flora including rare species such as *Begonia picta, Cassytha filiformis, Chenopodium murale, Clematis gouriana, Drosera burmannii* amongst others. It is also home to many endangered species of fauna including a wide diversity of Odonates.

The area of the Tiger reserve is compact, the tree cover being intact with over 75% categorized as Very Dense forests and 25% as Moderately Dense Forests. It is the source of origin of the Burha river, a major tributary of the North Koel river and the water availability is well distributed and mostly perennial. Historically the Betla area has been a tourist attraction and continues to be so, along with newer attractions like the Lodh Waterfalls, Maromar Camp, Mirchaiya Waterfalls, Netarhat Hill Station, Palamau fort which have resulted in opening up of Ecotourism possibilities with the engagement of the local Eco development Committees. The Palamau fort was the seat of the Chero Kings including King Medini Ray (Rai) and thus has immense cultural value.

Attention is being given to increasing the area under grasslands which has very minimal spread, under expert guidance. There is relatively low Human Wildlife Conflict in spite of a good population of Elephants. Though the human presence in the Core and the fringe areas is high at present around 24 Villages out of 34 are willing to get rehabilitated. Effective and quick action to speed up Rehabilitation would help in creating a large inviolate area and help in reducing the biotic interference to a great extent.

Management Strengths

1. Large and expansive forest area (1144 km^2) with a rich floral and faunal biodiversity. Connectivity with adjoining forest blocks within and outside the state, for example, Chhatisgarh (Guru Ghasidas National Park) and Madhya Pradesh in the west, Odisha and Singhbhum Forests in the south, and the Gautam Buddha Sanctuary, Hazaribagh Sanctuary, Kodarma Sanctuary and Lawalong Sanctuary in the east. The TR has a comprehensive and relevant TCP, duly approved by the NTCA.
2. It is home to more than 800 different species of plant including rare species such as *Begonia picta, Cassytha filiformis, Chenopodium murale, Clematis gouriana* and *Drosera burmannii*. It is also home to many endangered species of fauna including the Odonata.
3. The area of the tiger reserve is compact, with a good tiger habitat. The tree cover is intact with over 75% categorized as Very Dense Forests and 25% as Moderately Dense Forests. The scenic beauty of the tiger reserve has immense potential to attract visitors.
4. The Field Director has unified control of the core and the buffer of the tiger reserve.
5. It is the source of origin of the Burha River, a major tributary of the North Koel River, and the water availability is well distributed and mostly perennial.
6. The newly recruited frontline staff, being young, can be trained in field craft and protection.
7. In view of the above, small but focused actions can contribute towards improving the status of the tiger and other wildlife.
8. Attention is being given to increasing the area under grasslands, under the expert guidance of Dr. Gajanan Muratkar from Maharashtra.

9. There is a relatively low level of human–wildlife conflict in spite of a good population of elephants.
10. Though the human presence in the core and the fringe areas is high at present, around 24 villages out of 34 are willing to get rehabilitated. This would help in creating a large inviolate area and help in reducing the biotic interference to a great extent.
11. Historically the Betla area has been a tourist attraction and continues to be so, along with newer attractions like the Lodh Waterfalls, Maromar Camp, Mirchaiya Waterfalls, Netarhat Hill Station and Palamau Fort, which has resulted in opening up of eco-tourism possibilities with the engagement of the local eco-development committees. Palamau Fort was the seat of the Chero Kings, including King Medini Ray (Rai), and thus has immense cultural value.
12. Many 11 kW electrical lines have been covered with aerial bundled cables across the area of the tiger reserve at the expense of the power supply department.
13. The funding support from the state government is fairly good.
14. The extent affected by left-wing extremism has reduced (almost 15%), and consequently the area available for executing protection and habitat improvement measures has increased especially in view of the good network of fair weather roads in the interiors.
15. The pucca watch towers have the potential to act as very good anti-poaching camps with a little modification. 92 such structures have been already identified, and the process of modification has been initiated.

Management Weaknesses

1. The increasing extent of invasive alien species like *Parthenium* and *Lantana* is affecting the regeneration of the local species and thus the browse availability for the herbivores.
2. The virtual absence of the sambar in the tiger reserve is a cause of concern. The chital and gaur populations outside Betla Range are also deficient.
3. Linear intrusions in the form of a state highway and a railway line pose dangers to the wild animals and also lead to fragmentation.
4. The vacancies in the posts of Range Forest Officers (only 3/8 filled) and Assistant Conservators of Forest (all three posts vacant), Foresters (only 4/29 filled) and Forest Guards (only 113/175 filled) are a serious cause of concern.
5. The frontline staff as well as the officers are not trained in wildlife management except for some exposure during the forestry induction training or a few exposure visits.
6. Only about 10 watch towers are being used as makeshift anti-poaching camps, thus impacting the staff presence in the interior and affecting the effective use of M-StriPES.
7. Very few EDCs are functioning well except for those handling tourism activities and stray livelihood activities.
8. The grasslands are sparsely distributed and hardly cover about 1000 ha.
9. The zone of influence has about 200 villages and impacts the habitat through NTFP collection, firewood and small timber collection, grazing leading to spread of fires, weed infestation and poaching of small animals.
10. The rehabilitation of villages from the core, though at advanced stages of planning, has not started at least as far as two villages are concerned. As many other Villages are willing, the success of this rehabilitation will spur the others on to follow suit.
11. The in-house veterinary capability, animal rescue and rehabilitation facilities and protocols continue to be inadequate.
12. LWE is still prevalent in some areas, putting constraints on the access available to the field staff.
13. The internal revenue earning capacity through gate collections or CSR funding is very low.

Immediate Actionable Points

1. There are 34 villages in the core area and around 200 villages in the zone of influence of PTR, causing anthropogenic disturbances in the reserve. Urgent steps must be taken for speeding up the process of voluntary rehabilitation of the 34 villages from the core area in a time-bound manner.
2. There is an urgent need to strengthen the security measures in PTR. At present, only 10 out of 92 watch towers are being used by the patrolling staff. Only about 65% of the area of the reserve is covered by the wireless network. A protection audit should be conducted to reassess the need for patrolling camps and the requirement of additional wireless towers and hand held/stationary sets. M-StriPES needs to be used effectively and extensively.
3. The core and buffer of the PTR have been extensively invaded by invasive alien species such as *Lantana camara* and *Parthenium* species. The grassland area in the PTR is only around 1000 ha. A detailed 5-year plan for the eradication of invasive alien species and grassland management should be prepared, implemented and monitored. The capacity of the staff should also be developed for the management of the grasslands.
4. The Wildlife Recovery Plan being prepared by the Wildlife Institute of India should be completed urgently so that the recommendations therein for the restocking of the chital and sambar populations and the reintroduction of the tiger can be implemented on priority.
5. Highways and rail lines passing through the core and buffer of the PTR are a serious concern for the conservation of wildlife. The traffic volume in and around the PTR is estimated to increase in the future. Therefore, it is necessary to commission a study to identify the critical stretches for long-term mitigation and retrofitting measures to keep the landscape permeable and connected, allowing safe wildlife movements.
6. The inadequacy of the staff continues to remain a major management problem for PTR. Steps necessary to fill the existing vacancies should be taken. Redeployment of frontline staff as well as ACFs and RFOs from adjoining territorial divisions should also be done if the herbivore and carnivore populations have to be restocked. It needs to be noted that PTR was amongst the first nine tiger reserves to be notified when Project Tiger was launched.
7. The newly recruited frontline staff should be urgently trained in special wildlife conservation courses. The Training Need Assessment (TNA) of the key stakeholders should be conducted periodically to set learning objectives for future training courses and preparation of the Annual Training Plan.
8. The current pandemic has brought wider recognition of the problems posed by the diseases caused by multi-host pathogens (MHP). Hence, continuous health monitoring and surveillance of wild animals, proper diagnosis and timely veterinary interventions are essential for effective conservation of wild animals and control of zoonoses. An adequate number of trained wildlife health professionals are required for wildlife health management and disease monitoring and surveillance to prevent spilling over of MHP to humans and domestic animals. As per the recommendation of the National Wildlife Action Plan (2017–31), the tiger reserves were expected to establish a well-equipped wildlife rehabilitation cum disease surveillance centre supervised by trained wildlife veterinarians by 2023. Efforts should be made to establish the centre in PTR and create posts for a veterinary doctor and a compounder.
9. The present TCP (2013–14 to 2022–23) has been approved by the NTCA. The preparation of the TCP for the next 10 years is underway. The plan for the core area is expected to be completed in October 2022. The preparation of plans for the buffer and corridor has not started. Effective community consultation is necessary for the preparation of the plan for the buffer and corridor. Steps should be taken to ensure adequate community consultation in the preparation of plans.
10. The eco-sensitive zone (ESZ) of PTR has been notified. However, neither have committees been constituted nor has the Zonal Master Plan been prepared. Expeditious steps should be taken to constitute committees and prepare the Zonal Master Plan for the ESZ.
11. The website of PTR should be altered to ensure compliance with the latest edition of the Guidelines for Indian Government Websites prepared by the National Informatics Centre (NIC). The research/studies reports and learning resources of the reserve should be uploaded on the website.

12. There are wide variations among states in their compensation policies for depredation by wild animals. An amount of Rs.20 lakhs is paid on account of the death of a human being in Maharashtra as against Rs.4 lakhs in Jharkhand. It would be appropriate for the state government to periodically review the compensation policy while taking into cognizance changes made in other states.
13. The headquarters of the Field Director, Deputy Director (North Division), and Deputy Director (South Division) are in Daltonganj. The entire area under the jurisdiction of the DD (South Division) is in Latehar District. The nearest administrative boundary of South Division from Latehar is 23.5 km whereas the nearest administrative boundary from Daltonganj is 44 km. The average distance of the range headquarters will reduce by around 10 km by shifting the headquarters of the DD (South Division) to Latehar and it will also help improve the coordination of PTR with the district administration. Therefore, the state government may consider shifting the headquarters of the DD (South Division) from Daltonganj to Latehar.
14. PTR should collaborate with reputed research/academic institutions to promote research activities as this would help in periodically assessing the various values of the reserve and filling the gaps in knowledge.
15. PTR, in collaboration with the district administration and civil society organizations, should actively support EDCs to promote livelihoods and eradicate multi-dimensional poverty in the zone of influence. PTR should develop more routes for tourism so that the tourist pressure on the Betla route could be brought down. It should also take necessary steps to improve the participation of local tribal communities in eco-tourism.
16. Regular follow-up to get CSR funding as well as to explore means to improve the corpus of the Tiger Conservation Foundation is required.
17. Mahuadaur Wolf Sanctuary, located in PTR, is the only wolf sanctuary in India. An Indian grey wolf population of 79 has been reported in the latest estimate (2021–22) of PTR. More focused efforts are required for conserving the wolves and habitats in PTR.
18. Measures to strengthen the corridors and monitor them on a regular basis should be taken up. This would need regular interactions of the Field Director with the Regional CFs/CCFs and interstate coordination.

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KARNATAKA

BANDIPUR TIGER RESERVE

14

MEE SCORE 93.18%

Date of Evaluation
20-22 August 2022

Evaluators' Names
Sh. U.M Sahai
Sh. Pawan Kumar
Sh. A.K. Mishra
Sh. Yogesh

INTRODUCTION

Bandipur Tiger Reserve is one of the five tiger reserves in Karnataka. Bandipur was one of the first nine tiger reserves in the country, which were declared when Project Tiger was initiated in the year 1973. It was declared a national park through an initial notification in the year 1974, followed by the final notification in the year 2001. As per the Government of Karnataka notification, the total area of Bandipur Tiger Reserve is 1469.69 km^2 area (core and buffer), which includes 872.24 km^2 of Critical Tiger Habitat' and a 597.45 km^2 buffer. Currently, the total forest area under the tiger reserve management is 1036.22 km^2. Bandipur Tiger Reserve is located in Gundlupet and Chamarajanagar taluks of Chamarajanagar District and H.D. Kote, Sargur and Nanjangud taluks of Mysore District, Karnataka. Bandipur Tiger Reserve is regarded as one of the most beautiful and better-managed tiger reserves of India. Bandipur Tiger Reserve is situated at 76° 45' E, 11° 48' N. It receives an annual rainfall of 700–1200 mm. The major forest types of Bandipur include Scrub-Type Forest, Southern Tropical Dry Deciduous Type Forest and Southern Tropical Moist Deciduous Type Forests. Bandipur Tiger Reserve remains one of the mega biodiversity areas in the country, representing the Western Ghats Biogeographic Zone. Bandipur remains a significant component of the 5520 km^2 Nilgiri Biosphere Reserve, the first biosphere reserve in the country. Bandipur is also part of the Bandipur–Mudumalai–Sathyamangalam–Wayanad–Nagarahole landscape complex, which is known to have the largest source population of wild tigers in the world, with an estimated 724 (SE 635–813) tigers.

Bandipur is home to about 35 species of mammal, 289 species of bird, 34 species of reptile, 21 species of amphibian and 25 species of fish. As per the 2019–20 Phase IV monitoring exercise, the tiger population of Bandipur Tiger Reserve has been estimated as 143±8 tigers, whereas, the 2018 AITE found out that around 173 tigers were using Bandipur as their territories. Bandipur also forms part of the Mysore Elephant Reserve (MER) and has a population of 3047 elephants, with 2.95±0.71 elephants per square kilometre. Further, Bandipur holds the second largest leopard (*Panthera pardus*) population in India, after Panna Tiger Reserve. There are no human settlements/villages located within the core area of Bandipur Tiger Reserve and thus it is free from human and biotic interferences. The Bandipur eco-sensitive zone was the country's first eco-sensitive zone, notified on 4 October 2012, spread over an area of 479.18 km2, including 123 villages. The areas surrounding the park have large anthropogenic habitat modifications such as agricultural lands, plantations and pasture lands. There are over 156 villages located around the park, supporting a population of 1,26,000 people and a livestock population of 1,16,000.

Management Strengths

1. **The location of the Bandipur Tiger Reserve with regional connectivity:** Bandipur Tiger Reserve remains part of the Western Ghats Tiger Landscape, consisting of Mudumalai Tiger Reserve, Nagarhole Tiger Reserve and Wayanad Wildlife Sanctuary. The south-eastern portion of the tiger reserve gets connected to the adjoining tiger landscape of BRT, M.M. Hills and Cauvery Wildlife Sanctuary through Sathyamangalam Tiger Reserve. Bandipur Tiger Reserve is part of the Bandipur–Mudumalai–Sathyamangalam–Wayanad–Nagarhole landscape complex, which is known to have the largest source population of wild tigers in the world, with an estimated 724 (SE 635–813) tigers, which is 1/8th the worldwide tiger population and 1/4th of India's tiger population. It is also the single largest population of tigers in India within this landscape. Further, this landscape remains part of Western Ghats landscape complex, having an estimated tiger population of about 981 (871–1093), constituting the single largest wild population of tigers in the world. This landscape of Bandipur, Nagarhole, Mudumalai and Waynad is home to the single largest Asian elephant population in the world and is part of the Mysore Elephant Reserve (MER), notified through notification no. FEE 231 FWL 2000, dated 25 November 2002.

2. **Absence of human settlements inside the core and buffer zones of Bandipur Tiger Reserve:** There are no human habitations or human settlements within the core and buffer zones of Bandipur Tiger Reserve. The entire 1036 km^2 area of Bandipur Tiger Reserve is inviolate, free from human habitations and their disturbances.
3. **Notified Bandipur eco-sensitive zone:** The Bandipur eco-sensitive zone was gazette-notified on 4 October 2012. It is the first eco-sensitive zone of Karnataka. Further, the monitoring committee regularly convenes meetings to monitor the developmental activities of the ESZ. So far the monitoring committee has met nine times to discuss the development activities of Bandipur ESZ. The last meeting was during 30th June 2022.
4. **Excellent Inter-state coordination:** Bandipur is located at the tri-junction of Karnataka, Tamilnadu, and Kerala states and shares boundaries with the Kerala (Wayanad Tiger Reserve) and Tamilnadu (Mudumalai and Sathyamangalam tiger reserves) forests. The coordination between the Karnataka, Tamilnadu, and Kerala forest departments is very smooth, without any strain, and it helps address various issues like forest and wildlife protection (intelligence gathering and anti-poaching activities), prevention and control of forest fires, management of human–wildlife conflict, monitoring of wildlife across borders, management of traffic along NH 766 (Mysuru–Cochin) and NH 181 (Mysuru–Ooty) and tourism management.
5. **Massive protection infrastructure and patrolling activities:** Bandipur Tiger Reserve has 53 anti-poaching camps established at strategic places and manned by temporary AP camp watchers and one permanent protection watcher. These AP camps and their camp watchers foot- patrol the jurisdictional area and thus keep the tiger reserve secured from all the existing threats. These AP camp watchers were very experienced watchers working with the tiger reserve over 15 to 20 years and thus are very loyal and thus became an asset to the tiger reserve. These camps were regularly supplied with food rations and are equipped with a wireless network system, a solar lighting system and other field equipment like torch lights, handsets for M-STrIPES patrolling and weapons. There is a good road network connecting all the AP camps with the range headquarters and other sensitive areas. Over the years, this protection infrastructure, like AP camps, road networks, wireless networks and their patrolling activities, has remained one of the major strengths of Bandipur Tiger Reserve.
6. **Special Tiger Protection Force (STPF):** Bandipur has the service of STPF staff since 2011–12 and they were specially recruited for the tiger reserve as a strike force against any threats. They were specially trained in the field of intelligence collection on poaching and other forest/wildlife threats, anti-snare combing operations, mob management during human–wildlife conflict situations, sniffer dog squads and other special operations like forest fires, jungle survival skills, interception and detection of habitual offenders and combing for tigers during human–tiger conflict situations.
7. **Eco-developmental activities in the fringe villages:** Bandipur Tiger Reserve has a record of supplying alternative fuel (LPG connections) to fringe-villagers from the year 2010 and thereby significantly reduced the firewood collection from the tiger reserve. Currently, almost all the fringe villagers are provided with LPG connections by Namma Sangha Indane Gas Agency (local NGO), and so the fuel wood dependence on and, thus, fuelwood collection from the tiger reserve have reduced significantly.
8. **Long history of wildlife conservation:** Historically, an area of about 90 km^2 was declared Venugopala Wildlife Sanctuary by the Princely State of Mysore in 1941 under the Mysore Game and Forest Preservation and Regulation Act, 1931. Subsequently, the area was increased to an extent of 800.00 km^2 by the addition of adjoining forest areas in 1942. Of this, in the year 1973, an area of 683.52 km^2 (potential tiger habitat) was brought under the ambitious Project Tiger. This is one of the first nine tiger reserves in the country. This year (2022) is the 50th year of Project Tiger, and Bandipur also completed 50 years of tiger conservation. Bandipur's tiger numbers were just 39 (1979), which improved to 53 (1984), 50 (1989) and 66 (1993). Later, scientific estimation of tiger population was started in India, using the capture–recapture–mark technique, and then the tiger population was estimated as 39±2.61, in the year 2010–11, as per the second All India Tiger Estimation. Then this population rose to 99±10 as per the 2013–14 Phase IV monitoring exercise. Later the tiger population was estimated at 120 ±13, as per the 2014 AITE. Subsequently, the tiger population rose to 126±2 (AITE-2018). Now, as per the 2019–20 Phase IV monitoring exercise, the tiger population of Bandipur tiger reserve has been estimated as 143±8 tigers.

But, as per the 2018 AITE, around 173 tigers were using Bandipur as its territory. Additionally, as per the 2018 AITE, Bandipur has 3,047 numbers of elephants (@ 2.95±0.71 elephants' density per square kilometre), which clearly indicates the success of Bandipur as a very important destination for wildlife conservation and more specifically for tiger conservation.

9. **Long term wildlife & ecological research data:** Bandipur tiger reserve remains one of the very few protected areas where wildlife research and monitoring activity was permitted and taken up since the days of project tiger in 1973. Number of wildlife research organizations like the Centre for Ecological Studies, Indian Institute of Science, Wildlife conservation society and others have been involved in the long term research and monitoring projects providing crucial management inputs for the better management and conservation of the tiger reserve. Further, the Camera Trap Technique/methodology has been employed here for the better identification and estimation of tigers for more than two decades.
10. **Bandipur Tiger Conservation Foundation:** BTCF and its fund remains one of the strengths of Bandipur which helps the tiger reserve management in addressing some of the livelihood concerns of the local community and staff welfare measures for the daily wage employees and other frontline staff of the tiger reserve. Further, this BTCF fund also helps the local communities through Eco-development activities, research and monitoring, wildlife education and awareness activities. Ultimately, this BTCF fund helps in meeting any emergency requirements like human–wildlife conflict management, staff health and other welfare measures in lieu of the government budget.
11. **Important Eco-tourism destination:** Since Bandipur has a long history of wildlife conservation and remains successful in the protection and conservation of wildlife with special emphasis on tiger and elephants; it has the tradition and brand of one of the top destinations for wildlife tourism. Further, its strategic location, all along the Ooty road and very close to Mysuru and having good road connectivity with Bengaluru, Coimbatore has made this area very famous for wildlife based eco-tourism.
12. **Night Closure of Public Roads passing through the tiger reserve:** The two National Highways (NH 766 & NH 181) passing through the Bandipur tiger reserve, are closed for traffic during night from 9 PM to 6AM.
13. **Effective management of Human–wildlife Conflict Issues:** Among all the threats facing the Bandipur tiger reserve, human–wildlife conflict remains serious threats facing the Bandipur tiger reserve Bandipur has about 314.6 kilometers of periphery abutting about 136 villages with high density of Human and Cattle population and thus prone to conflict between human and wild animals. Bandipur remains one of the hotspots for human–wildlife conflict. Against this background, one of the major achievements of Bandipur Tiger Reserve towards mitigation of human–elephant conflict over the years is the significant reduction in the number of human and elephant deaths. During the year 2014, 2015 and 2017, there were four human deaths each year, followed by three human deaths in the year 2020. Further, there were two human deaths in the years 2016 and 2021. Three elephant deaths were recorded in the year 2015, followed by two elephant deaths each during the years 2014, 2016, 2017 and 2018, followed by the death of one elephant each during the years 2019, 2020 and 2021. Now there is a declining trend in both human and elephant deaths, and as on 31 March 2022, there is no human death or elephant death at Bandipur Tiger Reserve.
14. **Public participation in the activities and management of the tiger reserve:** Bandipur Tiger Reserve has the tradition of involving local people (EDC members), local NGOs, youths, media people and other wildlife enthusiasts in its daily activities. Further, the Bandipur management has organised many nature education and awareness programmes for school and college students and other audiences. 44 EDC's and many self-help groups are in active operation in this area. Therefore, different stakeholders actively participate in the various activities, which helps in developing the feel/sense of ownership among the local communities.
15. **Presence of in-house resident veterinary doctor and his full-time service to the tiger reserve:** Bandipur has in-house veterinary doctor and laboratory for veterinary care services.

Management Weaknesses

1. **Linear shape of the tiger reserve:** One of the main weaknesses of Bandipur Tiger Reserve is its linear shape, having a 314.6 km outer boundary, shared with about 136 villages. The linear shape with a long boundary exposes more than 50% of the tiger reserve area to the people living outside the tiger reserve and thus increases the park–people interaction.
2. **High level of human–wildlife Conflict:** Bandipur has about 314.6 km of periphery abutting about 136 villages with high-density human and cattle populations and thus is prone to conflicts between humans and wild animals. Currently, both the human and livestock populations in the buffer/eco-sensitive zone are increasing constantly and serving as fuel to the existing conflict between the humans and wildlife. In this human–animal conflict, both animals and people get affected and many times people and animals lose their lives. Among the wildlife species, the elephant is the prime species involved in the conflict with the people, followed by the tiger and leopard. Other species, including the sloth bear and wild pig, are also involved in the conflict with people.
3. **Changing land use pattern in the buffer or eco-sensitive zone:** The increase in the intensity of land usage and change in land use pattern in the buffer/eco-sensitive zone exert a high level of pressure on the fragile ecosystem of Bandipur Tiger Reserve. Land conversion to non-agricultural activities such as home stays and changes in cropping patterns towards cash crops like banana and sugarcane cause serious human–elephant conflicts.
4. **National highways passing through the tiger reserve:** The passing of national highways 212 and 67 across Bandipur Tiger Reserve poses serious threats to the native wildlife. The persistent demand by the state of Kerala to relax the night road closure poses a real threat to the wildlife. Further, the proposed construction of a railway line/elevated highway through the tiger reserve would result in further damage to the wildlife.
5. **Invasive alien species:** Invasive alien species like *Lantana camara, Senna spectabilis, Chromolaena odorata, Parthenium hysterophorus* and *Opuntia dillenii* have indirectly affected the quality of the wildlife habitat and thus the wildlife population at Bandipur TR. Currently, the entire 876 km^2 core area of Bandipur Tiger Reserve is infested with *Lantana camara*. About 38% of the core area is covered with high-density Lantana, and thus the area is impenetrable for wild animals. About 50% of the core area is infested with moderate-density Lantana, and the remaining 12% of the core area is infested with low-density Lantana.
6. **Forest fires:** Forest fires remain one of the serious threats facing Bandipur Tiger Reserve. The historical forest fire data show there were large-scale forest fires recorded at this tiger reserve, damaging a large extent of the forest area (around 3000–4000 ha), impacting the wildlife and its habitat.
7. **Staff vacancies:** Persistent vacancies of about 40.7 % in the frontline staff positions remain one of the weak points of Bandipur Tiger Reserve. Without adequate permanent staff, it is very difficult to supervise and execute the works in the field.
8. **Poaching and other illegal activities:** On the northern side, Bandipur shares a boundary with revenue lands and private lands, abutting about 136 villages. People from these villages are dependent on the resources of Bandipur Tiger Reserve, and thus poaching/hunting of wild animals for bush meat, illegal tree cutting (sandalwood) and illegal removal of forest produce remain a major threat facing the tiger reserve. Hunters employ guns as well as a wide array of ingenious traditional methods such as poisoning, snaring and electrocution.
9. **Absence of in-house adaptive experimental research facilities:** Though there is a history of long term research and monitoring work, carried out by the local wildlife NGOs, there are no in-house adaptive experimental research facilities at Bandipur and this is one of the weak points. It denies the frontline staff experience and capacity building and ultimately the required data for management decisions.
10. **Poor regeneration of bamboo at the Kabini backwaters area:** Due to large scale flowering of bamboos during 2011–12 and the subsequent death of all the bamboo clumps, the regeneration of bamboo along the Kabini backwaters is very poor. This is a serious problem for the elephants as bamboo is a major fodder for elephants. Poor regeneration of bamboo will lead to a shortage of fodder for elephants in the near future.

11. **Absence of large-scale eco-development activities and skill development programme for the local tribes and EDC members:** Though there are 43 EDC's, there are no large-scale eco-development activities and skill development programmes for the local tribes and EDC members, which remains a weakness for Bandipur Tiger Reserve.
12. **Religious pilgrimage inside the tiger reserve:** There are many small temples located within Bandipur Tiger Reserve. Local tribes and local people often approach the management to visit these temples for performing poojas. Though the tiger reserve management is trying to stop these activities, the local culture and tradition keep this activity continuing and it is difficult to stop all of a sudden. Already, efforts are being made to relocate a few temples from inside the tiger reserve to outside.
13. **Livestock grazing in the buffer zone:** Though livestock grazing was stopped in the core area of the tiger reserve, grazing is still prevalent in the buffer zone. Efforts are being taken to stop livestock grazing in the buffer zone also. It will take some more time to achieve this target.

Immediate Actionable Points

1. Fire preparedness work and fire protection works are required.
2. Integrated approach and multiple interventions for mitigation of human–wildlife conflict are urgently required.
3. Continuous and serious efforts must be made to eradicate invasive alien species like *Lantana camara* and *Senna spectabilis* and to develop grasslands every year.
4. A world-class interpretation centre should be established at Melukamanahalli safari point to create awareness about Bandipur Tiger Reserve, its wildlife and its conservation importance. The entry to the interpretation centre or guest houses should be handicapped-compliant.
5. A training cum skill development centre needs to be established in order to impart entrepreneurship skills among the eco-development committee members.
6. An exclusive nature education programme (NEP) and education camps may be organised for the local students so as to create awareness about Bandipur Tiger Reserve, its flora, its fauna and its conservation importance.
7. A wildlife research, monitoring and training centre must be established at Bandipur, with in-house research fellows, to take up in-house adaptive management research and wildlife monitoring exercises.
8. Continuous monitoring and regulation of tourism and other developmental activities in the eco-sensitive zone through the Bandipur ESZ monitoring committee.
9. The night traffic ban on national highways (NH 766 and NH 181) passing through the tiger reserve may be extended from 6 PM onwards
10. Regulate and stop livestock grazing in the buffer zone.
11. Regulate and stop religious pilgrimage inside the tiger reserve and shift the temples from inside the tiger reserve to outside.
12. Necessary efforts must be made to fill up the vacancies among the frontline staff on a priority basis.
13. Organising regular training and capacity-building programmes for the frontline staff.
14. Improvement of the eco-tourism infrastructure and its facilities on par with global standards is required.
15. Surveys and long-term monitoring of the lesser fauna including amphibians, fishes, reptiles and birds should be carried out.
16. The rescue centre needs upgrading with a cage to be manufactured with improved techniques, preferably with the use of remote control through sensors for the safety of the staff.
17. A proposal for an elevated highway through the TR must be prepared and approval obtained from the government.
18. Corridors identified and mapped need to be better managed
19. There should be a Braille corridor/section about the flora and fauna for visually impaired persons in the interpretation centre.

BHADRA TIGER RESERVE, KARNATAKA

15

MEE SCORE 90.91%

Date of Evaluation
4-6 October 2022

Evaluators' Names
Sh. U.M Sahai
Sh. Pawan Kumar
Sh. A.K Mishra
Sh. Yogesh Malik

INTRODUCTION

The Government of Mysore declared a 124.64 km^2 area of Jagara Valley in Chikkamagaluru Jagara Valley Game Sanctuary in 1951. The Government of Karnataka expanded its area to 492.46 km^2 in 1974 and created Bhadra Wildlife Sanctuary. The reserve derives its name from the River Bhadra. Bhadra Wildlife Sanctuary was designated as Bhadra Tiger Reserve in 1998 under Project Tiger, making it India's 25th tiger reserve, which was notified in 2007 by the Government of Karnataka. The Government of Karnataka notified an area of 571.84 km^2 to be the buffer zone of Bhadra Tiger Reserve. This consists of 51 villages in the taluks of Chikkamagaluru, Narasimharajpura, Tarikere, Bhadravathi and Shivamogga of Chikkamagaluru and Shivamogga districts. The reserve is shaped like a saucer with mostly undulating terrain with valleys and steep hillocks. It has four hill ranges namely of Hebbegiri, Gangegiri, Mullayanagiri and Bababudangiri that form a geographic barrier between the coastal areas and the hinterland. The highest peak in the reserve is Kalluhattagiri, with a height of 1875 m above mean sea level (MSL). The reserve had 13 villages amidst the forest having a population of about 4000. The villagers used to cultivate paddy in the swampy grasslands. However, all the villagers were relocated outside the reserve in 2002. The abandoned paddy fields in the swamps are locally known as *hadlus*. They have become feeding grounds for many species. Bhadra is home to more than 40 mammalian species, including the tiger, leopard, and dhole as the top predators. The tiger reserve receives south-west and the north-east monsoon rains, with an average annual rainfall of 1500–1700 mm in 98–104 rainy days, and it is well drained by the River Bhadra and its tributaries. The major forest types of the reserve include a Southern Moist Mixed Deciduous Forest of type 3B/C2, Southern Dry Mixed Deciduous Forest of type 5A/C3 and Shola Forests of type 2A/C2[9]. The forest is dominated by *Tectona grandis, Terminalia tomentosa, Terminalia paniculata, Pterocarpus marsupium, Dalbergia latifolia, Lagerstroemia lanceolata, Dendrocalamus sp.* and *Bambusa bamboo*.

Management Strengths

1. The core of the reserve is surrounded by notified forests of the buffer divisions in most parts, which gives additional space for protection and dispersal of animals.
2. Sizeable areas of the reserve are free of human habitations.
3. Grazing and related problems are restricted to the buffer areas.
4. Most of the families have been rehabilitated outside the reserve. Hence the biotic interference in the reserve is limited.
5. Rich habitat/water sources—the reserve has very good vegetation cover and is home to several different types of forest.
6. Bhadra Tiger Reserve is contiguous with several reserve forests and deemed forests that connect to the neighbouring Kudremukh National Park which has been proposed to be a new tiger reserve. This gives tigers considerable space for movement from one protected area to the other.
7. The reserve is surrounded by Bhadra Reservoir on the northern and western sides and the high mountain ridge from Kemmannugundi to Gangegiri on the eastern and southern sides. These act as natural barriers and help protect the tiger reserve.
8. The staff are generally sincere, obedient and faithful.
9. Major parts of the reserve are devoid of anthropogenic interferences.
10. Rich floral and faunal diversity.
11. The reserve is an important catchment area for the River Bhadra and its tributaries.

12. The location of Bhadra Tiger Reserve is a great advantage as it has good connectivity with adjoining areas.
13. The reserve has a strong history of protection.
14. Has great potential to support good numbers of tigers because of its rich prey base.
15. Strong support from locals and NGOs and pro-wildlife activists.
16. A considerable amount of research has been conducted by organizations such as CWS and WCS on the tigers of Bhadra over the last few years.

Management Weaknesses

1. Vacancy of frontline protection/law enforcement staff.
2. Inadequately maintained road network, protection infrastructure and intelligence network due to heavy rainfall.
3. Spreading of invasive species.
4. There are still human settlements at the fringe of the reserve.
5. Biotic pressures from fringe areas.
6. Lack of professional training of frontline staff for protection work and law enforcement.
7. Weak baseline information and long-term monitoring.
8. Bababudangiri State Forests (Kemmannugundi), Madhuguni SF and Aldhara SF areas are separated from the main areas of the reserve by government lands and Bhadra Reservoir, respectively, which makes monitoring and management of the entire reserve as a whole difficult.

Immediate Actionable Points

1. Extensive threat analysis and mapping along with preparation of threat management plans.
2. Expeditious filling of vacancies among the frontline staff.
3. Extensive documentation of research-based findings for planning and implementation of various managemental practices.
4. Appointment of in-house research officer for Bhadra Tiger Reserve.
5. Development of training modules for protection, enforcement and regular carrying out of capacity building programmes for the frontline staff.
6. Improvement of patrolling amenities with night vision gear and all-terrain vehicles.
7. Effective implementation of security audits.
8. Effective regulation of private resorts and homestays, which are coming up in the coffee estates between the buffer zones.
9. Strengthening of public relation infrastructure.
10. Establishment of in-house staff training facility.
11. Improvements of Salim Ali Interpretation Centre at Muthodi Wildlife Range.
12. Assessments of carbon storage, carbon capture and carbon loss for management actions in the tiger reserve.
13. Strengthening of eco-development committees (EDCs) and self-help groups (SHGs) by involving them in livelihood activities other than eco-tourism.
14. Strengthening of public participation in various management and implementation programmes.
15. Appointment of permanent wildlife veterinarians and improvement of veterinary infrastructure.
16. Braille corridor should be established in the interpretation centre. The visually challenged persons don't get the feel of flora/fauna/wildlife shown in interpretation centre, therefore the Braille language should be used in each diagram for understanding the templates.
17. All visitors' places should have handicapped-friendly infrastructure and logistics.

BILIGIRI RANGANATHA TEMPLE (BRT) TIGER RESERVE, KARNATAKA

16

MEE SCORE 91.67%

Date of Evaluation
23-25 August 2022

Evaluators' Names
Sh. U.M. Sahai
Sh. Pawan Kumar
Sh. A.K. Mishra
Sh. Yogesh Malik

INTRODUCTION

This tiger reserve is known as Biligiri Ranganathaswamy Temple (BRT) Tiger Reserve.This unique bio-geographical entity, situated as the ecological bridge connecting the Western Ghats and Eastern Ghats in south India, is located between latitudes 11° 43' N and 12° 09' N and between longitudes 77° 01' and 77° 15' E. The entire tiger reserve lies in the southernmost district of Karnataka, called Chamarajanagara. The protected area and its adjoining forest areas form the entire forest areas of Chamarajanagar Taluk and Yelandur Taluk and parts of the forest of Kollegal and Hanur taluks. The tiger reserve spreads over 574.82 km^2, the forested area of 359.10 km^2 being the core and the remaining 215.72 km^2 being the buffer zone. There is a 198 km boundary surrounded by agricultural lands. There is a tribal community living within the tiger reserve known as the Soliga tribe. There are 57 tribal settlements called podus with 3823 tribal families. It is estimated that the BRT has about 800 species of higher plant, representing 445 genera and 123 families. There are 115 tree species, 105 shrubs, 445 herbs and 101 climbers and lianas. The area is endowed with a rich diversity and abundance of animal life. There are over 40 species of larger mammal, over 250 species of bird, 30 species of reptile, 15 species of amphibian and 10 species of fish. These animals appear in various schedules of the Wild Life (Protection) Act, 1972 indicating their endangered status.

Management Strengths

1. The BRT landscape has a high tiger density.
2. Monitoring tiger source populations in BRT through regular Phase-IV monitoring using M-StrIPES.
3. There are 26 permanent anti-poaching camps at selected strategic locations all over the tiger reserve, providing the strong base for protection in the reserve.
4. All the camps have been equipped with the basic amenities for permanent camping of Watchers and Guards, apart from the equipment required to ensure protection and communication.
5. Check posts are located at entry and exit points of the reserve and BR Hills enclosure, and all the vehicles passing through these check posts are recorded and checked for any illegal possessions.
6. Foot and vehicle patrolling is regularly done, and elephant patrolling is being planned.
7. Effective management of man–elephant conflict
8. Prompt *ex-gratia* payments for depredation due to wild animals
9. Ecodevelopment in buffer areas to enlist local public support, including supplying LPG connections, reducing the resource dependence.
10. Banning vehicle movements on roads entering the tiger reserve between 6:00 PM and 6:00 AM
11. Regulation of tourism as per the guidelines issued by the National Tiger Conservation Authority
12. Intelligence-based enforcement and anti-poaching operations
13. Rapid Response Team along with vehicle in place for tiger rescue operations
14. Rescue squad of elephants along with rescue vehicle for tiger rescue operations in place.
15. Compensation in case of human casualty and cattle kill is paid regularly
16. Necessary accessories cage, net, tranquilizing gun, trained veterinarian and team are in place for rescue operations.

17. Demarcation of all forest areas on the ground has already been completed.
18. The FRA settlements and the settled lands given to beneficiaries have been recorded in the form of coordinates.
19. The boundaries are regularly checked by the staff.
20. Habitat management with respect to fodder availability is practised every year, and waterhole management (desilting of waterholes) for elephants and other animals is undertaken every year. As fire protection measures and view lines, *Lantana* is removed, providing fodder and yarding place for ungulates.
21. During 2019–20 to 2021–22, uprooting of *Lantana* and grassland management works were carried out in 466.07 ha.
22. Desilting of tanks and construction of tanks, check-dams and other soil and water conservation structures was taken up periodically. Areas with tall grass were burnt in patches for obtaining fresh and palatable grass.
23. Use of secret services (informants)
24. Fire-monitoring by erecting watch towers, using a wireless network, using mobiles, etc.
25. The TR is adequately provided with personnel, who are appropriately supported and explicitly allocated (list of staff attached)
26. Final eco-sensitive zone (ESZ) notification is done.

Management Weaknesses

1. BRT Tiger Reserve is surrounded by more than 100 fringe villages and agriculture fields which grow attractive crops like banana, sugarcane, tomato and maize hence human–elephant conflicts are quite common.
2. Enclosures within the core area of the tiger reserve
3. Threat to protection because of interstate border
4. Frontline staff vacancy at Forest Watcher level
5. The reserve has a sanctioned but vacant post of Second Division Surveyor. Having a surveyor can help in conducting regular field surveys and checking boundary lines.
6. The elephant corridors were broken by human settlements and grantis, and the process of acquiring these lands in corridors is in progress.
7. The ESZ Master Plan needs to be prepared.

Immediate Actionable Points

1. Forest Fire:

- There is a need to hire fire watchers from the tribal people living in the podus inside the tiger reserve.
- Early burning of the roadverges along the public roads and inside the tourism zone is required.
- Re-clearing of fire lines in the high fire occurrence areas on priority, prior to the onset of the fire season, should be done.
- The assistance of the local people should be obtained in convincing the villagers to refrain from setting fire to the forest.
- Having an incentive scheme for the fringe villages for the non-occurrence of fires in their neighbouring forest areas is very much needed.
- During the summer season, fire brigades are to be stationed at vulnerable locations every year.

2. Mitigation measures to prevent elephants straying into human habitation.

- Excavation of elephant-proof trenches (EPTs)
- Upgrading/restoring EPTs
- Construction of rubble stone masonry walls
- Construction of size stone masonry walls/pillars
- Erection and maintenance of double-line tentacle solar power fence.
- Erection of barricades using railway rails.

3. Involvement of local people and other stakeholders

- Participation in protection activities
- Involvement in anti-depredation activities and fire protection works
- Partner in eco-tourism activities
- Contribution to development of tiger reserve by CSR funds
- Regulation of tourist flow
- Staff meetings, workshops, etc.
- Fire planning exercise for frontline staff
- Stakeholders' meeting with JLR

Nilanjan Chatterjee

KALI (DANDELI ANSHI) TIGER RESERVE, KARNATAKA

17

MEE SCORE 90.15%

Date of Evaluation
1-3 October 2022

Evaluators' Names
Sh. U.M. Sahai
Sh. Pawan Kumar
Sh. A.K. Misra
Sh. Yogesh Malik

INTRODUCTION

Kali Tiger Reserve is part of a landscape with nearly 8800 km^2 of tiger habitat made up of statutory forest areas. Kali Tiger Reserve shares a border with Bhimghad Wildlife Sanctuary in the north, which is further connected to Radhanagari and Koyna wildlife sanctuaries in Maharashtra. To the west, Kali Tiger Reserve shares borders with five protected areas in Goa. Kali Tiger Reserve is situated in Dandeli, Joida, and Karwar taluks of Uttara Kannada District in Karnataka. Uttara Kannada District which was part of the Bombay Kanarese, is known for its rich biodiversity. The landscape witnessed extraction of natural resources and rampant hunting during the British era. To restrict this hunting in at least the Dandeli region of Uttara Kannada, an area of 207.05 km^2 was declared Dandeli Game Sanctuary in the year 1956. It was later declared a wildlife sanctuary. Dandeli Wildlife Sanctuary and Anshi National Park are contiguous to each other and form a single protected area located in the biologically sensitive Western Ghats. These two protected areas were administratively unified under Dandeli–Anshi Tiger Reserve (DATR) in the year 2007 (vide G.O. No. FEE 254 FWL 2006 dated 4 January 2007). The entire Dandeli–Anshi Tiger Reserve (DATR), with an area of 814.884 km^2, was notified the core/critical tiger habitat by the state government (vide order no. FEE 299 FWL 2007 dated 20 December 2007) under the provisions of Section 38V of the Wild Life (Protection) Act, 1972, (53 of 1972). The state government, under Section 26A of the Wild Life (Protection) Act, 1972 (53 of1972) (vide its order no. FEE-16-FWL-2008 dated 21 August 2009 and notification no. FEE 123FWL 009 dated 1 September 2010), notified an area of 282.63 km^2 as the buffer zone of Dandeli–Anshi Tiger Reserve. Under Section 26A of the Wild Life (Protection) Act, 1972 (Central Act 53 of 1972) (vide order no. FEE-302-FWL-2011 (1) dated 27 December 2011), an extent of 248.0661 km^2 was added to Dandeli Wildlife Sanctuary from Tinaighat Range of Haliyal Division. Currently Dandeli Wildlife Sanctuary has 886.4144 km^2 and Anshi National Park 459.3023 km^2 of the area. With order no. FEE-245-FWL-2015 dated 11 December 2015, Dandeli–Anshi Tiger Reserve was renamed Kali Tiger Reserve (KTR).

Management Strengths

1. Connectivity of Tiger Landscape

Kali Tiger Reserve is situated in the central Western Ghats and covers an area of 1425.025 km^2 with an adequate prey base. The reserve comprises Dandeli Wildlife Sanctuary and Anshi National Park, bordered by six protected areas of Goa and Maharashtra. The recent migration of the tiger from Sahyadri Tiger Reserve of Maharashtra to Castle Rock Range of Kali Tiger Reserve shows the connectivity of the habitat in the landscape. From a future perspective, Kali Tiger Reserve is an ideal place for tigers in the landscape, having a source population.

2. Wildlife Ecological Research

A number of research organizations like the Centre for Ecological Studies, Indian Institute of Science and Indian Wood Science and Technology have been involved in various long-term research projects, providing crucial management inputs for better conservation of the reserve.

3. Diversity of Habitat and Species

The forest area of this reserve represents a transition zone between moist deciduous forests with bamboo to evergreen forests. The forest types represented are: South Indian Moist Deciduous Teak Forests (3B/C1), Southern Moist Mixed Deciduous Forests (3B/C2), West Coast Semi-Evergreen Forests (2A/C2), Moist Bamboo Brakes (2B/E3) and Cane Brakes (2B/E1). The floral diversity includes 1740 species of plant. The flora of the evergreen forest is represented by species such as *Olea dioca, Hopei wightania* and *Diospyros canollena*. To the east of the crest line are the moist deciduous forests, with species such as *Xylia*

xylocarpa, *Dalbergia latifolia, Tectona grandis* and *Terminalia spp*. The dry deciduous forests are towards the Deccan Plateau in the east, having typical species such as *Anogeissus latifolia, Terminalia tomentosa, Grewia tiliaefolia* and *Tectona grandis*. Bamboo is present throughout this area. KTR presently holds a population of 30–40 elephants. The rare wild animals found here include the melanistic leopard (unusually rich in the region), king cobra, ornate flying snake, Ceylon frogmouth, Malabar trogon, Wroughton's free-tailed bat (*Otomops wroughtoni*), Theobald's bat (*Taphozous theobaldi*) and many lesser-known small cats. About 272 species of bird (TCP, KTR 2015) and mammals such as the tiger, leopard, dhole, elephant, gaur, sambar, chital and wild boar have been reported from this area. The presence of many endemic species such as the Castle Rock night frog and orchids makes it a unique ecosystem for explorers, nature lovers and researchers.

4. Catchment Area

Kali Tiger Reserve forms the major catchment area that drains several perennial streams like the Kaneri, Vakki and Nagzari. Other than these, there are several streams, springs, ponds like Shivali Nala, Shiroli Nala, Gangoda Nala and Kavala Nala. Nearly 37 springs flow inside the reserve. All of them are perennial in nature. These springs are formed in the hills wherever the topographic slope cuts the water table. As the area is more into paddy cultivation, this supports the livelihood of the local people and provides ecological and ecosystem services like water for drinking and catchment protection.

5. Effective Relocation

Nearly 7000 families live in about 150 hamlets distributed in 87 revenue villages. The 2011 census record shows that Kali Tiger Reserve has a population of 29,461 (6914 families). The three major communities in KTR are Kunbi, Maratha and Gouli. The Kunbis mainly reside in Kumbarwada, Anshi and Phansoli wildlife ranges. The Marathas are distributed in Phansoli and Castle Rock wildlife ranges, and the Gowlis are mainly found in Kulgi Wildlife Range. There is also a small population of the Havyak Brahmin community in Gund Wildlife Range. Under the Centrally Sponsored Scheme of Project Tiger, Rs.2224 lakhs was released to Kali Tiger Reserve between the years 2013–14 and 2015–16. Till date 380 families had benefited from this programme and have moved out of the tiger reserve. The major settlements from which people have moved out are Sulavali, Gowliwada and Godshet from Kumbharwada Wildlife Range, Sulugeri, Kailwada, Babakumri and Matgaon in Anshi Wildlife Range and Ambikanagar and Amgaon in Kulgi Wildlife Range. The experiences with these are certainly helping the reserve in their present relocation programmes and will continue to help future relocation plans for tribes and other forest dwellers, which form one of the strengths of this tiger reserve.

6. Infrastructure

Kali Tiger Reserve has good protection infrastructure like anti-poaching camps, road networks, rest houses, a wireless and communication network, firearms, protection gear, patrolling vehicles like jeeps and boats, etc, to meet the management challenges. Staff quarters are maintained regularly.

7. Traffic Control

Some major roads within the protected area are closed to the public from 6 PM to 6 AM. As per the orders of the District Magistrate, the traffic between Potoli check post and Marda check post of State Highway 46 and between Kulgi check post and Bhagvathi cross of district major road is stopped for the night, thereby reducing the disturbance to wildlife and vulnerability in road accidents.

Management Weaknesses

1. Long boundary having an interface with the dense human and cattle populations of the landscape
2. The reserve faces a serious anthropogenic pressure due to the presence of about 52 villages and a large cattle population.
3. Frequent man–animal conflicts compromise the conservation values.
4. Presence of monoculture Acacia plantations which rarely support any undergrowth or regeneration of native species and thus has little wildlife values.
5. Existence of around 25–30% vacancy in the permanent field staff.

6. Since it is a very hilly, undulating terrain, the communication network is weak in some of the ranges.
7. Presence of religious temples like Ulvi and Kavala attracting huge numbers of devotees.
8. State highway cutting across the reserve.
9. Absence of long-term research in prey–predator dynamics at both regional and landscape levels is lacking, which would solve many management issues.

Immediate Actionable Points

1. Systematic long-term ecological research needs to be planned
2. Since Kali TR acts as an important protected area in the landscape, strengthening of the law enforcement capacity by having a dedicated forensic cell will cater to the needs of the entire landscape.
3. The economic valuation of Kali Tiger Reserve needs to be assessed
4. A veterinary support system is required to cater to the growing challenges of human–wildlife conflict management and wildlife rescue and rehabilitation needs.
5. Large Acacia plantations on grasslands need to be removed, and these areas are to be managed as grasslands as prescribed in the Tiger Conservation Plan.
6. Still, many settlements are left in Kali Tiger Reserve. The ongoing voluntary village relocation needs to be scaled up.
7. All the eco-development committees need to be actively engaged by identifying locally relevant economic/livelihood opportunities. This would help generate public support for the tiger reserve
8. A systematic study on elephants needs to be undertaken with regular monitoring to assess the population status annually.
9. A framework for interstate co-operation/collaboration with Goa needs to be established to strengthen the protection of the connected tiger populations of the two states in this landscape.
10. Human–wildlife conflict is on the rise in the landscape. Systematic planning is required to mitigate the impact on local communities and conservation of wildlife.
11. The reserve is emerging as an important destination for wilderness experiences. There is good scope for development of eco-tourism. More attention needs to be given to improving the available facilities and providing a meaningful user experience.

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NAGARHOLE TIGER RESERVE, KARNATAKA

18

MEE SCORE 92.42%

Date of Evaluation
7-9 October 2022

Evaluators' Names
Sh. U.M.Sahai
Sh. Pawan Kumar
Sh. A.K. Misra
Sh. Yogesh Malik

INTRODUCTION

Nagarhole Tiger Reserve, one of India's best-known wildlife reserves, lies 90 km west of Mysore City, on the tableland of the Deccan Plateau, adjoining the Western Ghats. The tiger reserve is named after a small river, Nagarhole (literally, 'Snake Stream' in Kannada), that meanders elaborately within the TR before joining the Kabini River. It is situated in the districts of Mysore and Kodagu in the southern Indian state of Karnataka. Blessed with a moderate climate and diverse geographical features, the TR supports a great abundance of varied plant and animal species, making it a veritable paradise for wildlife. Nagarhole Tiger Reserve (11° 45' N to 12° 15' N, 75° 55' E to76° 20' E) is flanked by Karnataka's Bandipur Tiger Reserve to its south-east and Kerala's Wyanad Wildlife Sanctuary to its south-west. The three protected areas, together with Tamil Nadu's Mudumalai Wildlife Sanctuary and Kerala's Silent Valley Reserve, constitute the Nilgiri Biosphere Reserve, which is the best remaining stretch of habitat for the Asian elephant. It is also India's first biosphere reserve and encompasses an area of about 5500 km^2.

Area of the tiger reserve		
Core/critical tiger habitat	:	643.35 km^2
Buffer/peripheral area	:	200.57 km^2 (forest area)
	:	361.84 km^2 (non-forest area)
Total	**:**	**1205.76 km^2**

Management Strengths

1. Location of the tiger reserve with regional connectivity

The location of Nagarhole Tiger Reserve is so special and unique that it has very good connectivity with other protected areas or managed forests like Bandipur Tiger Reserve on the south-eastern side, Wayanad Wildlife Sanctuary on the south-western side, Brahmagiri Wildlife Sanctuary on the western side and reserve forests of Anechowkur, Maukal, Devmachi, Doddaharave and Dubare on the northern side. Thus, Nagarhole Tiger Reserve became a natural habitat for the breeding population (source population) of tigers which supports many meta-populations around this critical tiger habitat by way of spillover and thus maintains a perfect metapopulation dynamic in the Nagarhole–Bandipur–Mudumalai–Wayanad Tiger Conservation Unit (TCU) of the North-Central Western Ghats Landscape. Further, Nagarhole Tiger Reserve is a part of the 5520 km2 Nilgiri Biosphere Reserve and the Mysore Elephant Reserve, providing connectivity not only for tigers but also other territorial, long-ranging animals like the Asiatic elephant. In the context of the present-day model of tiger conservation in India, i.e., core–buffer corridor/connecting link, the location of Nagarhole Tiger Reserve is so crucial and strategic because it is a part of the Nagarhole–Mudumalai–Wayanad Tiger Conservation Unit (TCU) of North-the Central Western Ghats Landscape and a perfect place which can support the long-term survival of tigers in India.

2. Effective protection strategy

With the establishment and operationalization of 24 anti-poaching camps distributed all over the tiger reserve, the level of protection in the Nagarhole tiger reserve have improved significantly over the years, which has ultimately brought forest and wildlife offences inside the tiger reserve under control. But, still there is lot of scope to improve and strengthen the intelligence network and protection system in this tiger reserve. Nagarhole Tiger Reserve has a very good network of roads, fire lines and communication facilities which help the management authority to reach any spot in no time and thus support the management in

dealing with all forms of threats to its protection strategy. For the first time in India, recently there was recruitment and constitution of a Special Tiger Protection Force (STPF) specially trained for the protection of tigers in and around Nagarhole and Bandipur tiger reserves, which has added strength to the protection effort of Nagarhole Tiger Reserve.

3. Perfect assemblage of mega-herbivores and charismatic carnivores

Nagarhole Tiger Reserve has an assemblage of many mega-herbivores like the Asiatic elephant, Indian gaur, sambar and spotted deer. It also has an assemblage of top carnivores like the Bengal tiger, leopard and Asiatic wild dog (Dhole) and omnivores like the sloth bear. Being a continuation of the Western Ghats, Nagarhole Tiger Reserve is a hotspot of biological diversity, with a high level of endemism, and has become a home to many rare, endangered and threatened species of the Indian Sub-continent.

4. Presence of special habitat—hadlus

One of the special features of Nagarhole Tiger Reserve is the presence of swampy marsh habitats called *hadlus*. *Hadlus* are unique ecosystems which hold water for the major part of the year and thus attract large numbers of wild ungulates during the pinch period. Thus, the *hadlus* are the single most important reason for the presence of a high density of ungulates in Nagarhole Tiger Reserve.

5. Long-term wildlife ecological research

Nagarhole is the only protected area of this country having long-term monitoring data on its predators, co-predators and prey species. Through its support for various research projects since 1984, the reserve has generated long-term baseline data on prey–predator dynamics, which have ultimately paved the way for development of wildlife science in our country, apart from continuously guiding the reserve in making certain management decisions. The seed for the recently adopted capture–recapture model (through camera trap techniques) for the estimation of tiger numbers in our country was sown in Nagarhole Tiger Reserve.

6. Important catchment area

Nagarhole Tiger Reserve forms the major catchment area that drains several perennial streams and large rivers like the Kabini, Lakshmanateertha, Taraka and Nagarhole. These rivers in turn form important tributaries of the River Cauvery and thus become the major source of water for agriculture in Karnataka and the neighbouring Tamil Nadu and Puducherry. By supporting the livelihoods of the local people and people of southern India through its ecological and ecosystem services (water for irrigation and drinking, catchment value), the Nagarhole forest forms one of the major strengths of Nagarhole Tiger Reserve.

7. Pro-conservation policy of the Karnataka government

Till the mid-1980's, the then forest area of present-day Nagarhole Tiger Reserve was generating lot of revenue through timber extraction and sale. Through its pro-conservation policy, the Karnataka government boldly declared these forest areas a wildlife sanctuary in 1955 and then a national park in 1983. By preserving these forest areas for conservation of wildlife, the state government incurred a huge revenue loss to its exchequer which otherwise it would have otherwise earned through timber extraction and thus became a champion of the cause of wildlife and its conservation. The state government is very firm and determined in supporting the vision and mission to conserve the biodiversity of this landscape. This is considered one of the greatest strengths of Nagarhole Tiger Reserve.

8. Constitution of Tiger Conservation Foundation

Nagarhole is one of the few tiger reserves which have constituted the Tiger Conservation Foundation in time. The constitution of this Nagarhole Tiger Conservation Foundation has led to greater financial autonomy and administrative flexibility in the day-to-day management of the tiger reserve.

9. World famous destination for wildlife tourism

Because of its terrain (gently undulating terrain with good sighting of wild animals), healthy population of wild animals (assured sighting of many animals), diverse habitats (Jeep safaris in wooded areas and boating at Kabini backwaters), location (close to and easily accessed from Mysore, Bangalore and the adjacent states of Tamil Nadu and Kerala) and year-round tourism, there is a huge inflow of tourists (both Indian and foreign tourists) interested in wildlife sighting and/or wildlife photography. Further, the recent boom in the software profession at Bangalore has attracted more tourists recently.

10. Backwaters at Kabini and Taraka

During the lean period of summer, when the Kabini backwaters start receding, the grassland takes up the area, which attracts major herbivores including large numbers of Asiatic elephants from all the nearby protected areas and thus forms the largest congregation of Asiatic elephants in the world. During summer, new habitats are created every 10th day, which supports the major herbivore population and thus sustains the dependent top carnivore populations of the tiger, leopard and wild dog. Further, the backwaters add diversity to Nagarhole Tiger Reserve by supporting aquatic plants and animals like aquatic birds, crocodiles, otters and turtles.

11. Smooth relations with the bordering states and their protected areas

Since Nagarhole Tiger Reserve is situated on the inter-state borders of Kerala and Tamil Nadu; it enjoys an ecological advantage of having a continuous stretch of forest cover and wildlife habitat. But, it does face some unique threats and administrative challenges, which have been nullified due to the smooth relations with the bordering states and the absence of any irritants. Further, Karnataka enjoys full cooperation and coordination with the bordering states, which has become a strength of its management and administration.

12. Experience from the earlier tribal relocation programmes

Nagarhole National Park did its first tribal relocation project in 1999 and till today it has learnt a lot from that programme. These experiences are certainly helping the reserve in their present relocation programmes and will continues to help us future relocation/rehabilitation plans for tribes and other forest dwellers. This forms one of the strengths of this tiger reserve.

13. Good infrastructure

Though there is considerable scope to improve the infrastructure of Nagarhole Tiger Reserve to meet the present day management challenges, it has reasonably good basic infrastructure like anti-poaching camps, road networks, IBs, a wireless communication network, firearms, protection gear and patrolling vehicles like jeeps and boats for patrolling and other protection work. Compared with many other tiger reserves of our country, Nagarhole has reasonably good infrastructure for protection and management.

14. Positive historical background in the protection and conservation of wildlife

Nagarhole has a strong tradition of a pro-wildlife conservation policy and activity since the time of the Mysore Maharaja and British rulers. After the Indian Independence, the park was converted into a commercial timber harvesting area, which was later reversed by looking back to our historic periods of conservation. This motivated the state government to declare this area a protected area and ultimately revived the wildlife population of Nagarhole. Thus, the historical background always forms a basic strength of Nagarhole Tiger Reserve.

15. Presence of large number of government and non-government organizations in the state/district:

These NGOs and other government organizations are considered a strength because they will be involved in the various stages of management and implementation of any plan to achieve the set goals and objectives.

16. One of the centres of the IEDP project

Nagarhole is one of the seven protected areas of our country where the India Eco-Development Project (IEDP), funded by GEF and IDA and monitored by the World Bank, was implemented in 1997, with the object of conserving the biodiversity by reducing the pressure of surrounding villages on the park resources and at the same time reducing the pressure of wildlife on the surrounding villages. These objectives were sought to be achieved with the help of six sub-plans, viz., Village Eco-development, Capacity Building, Research and Monitoring, Infrastructure Development, Tourism and Environmental Education and Park Management. The experience and knowledge gained from this project will certainly help the reserve in dealing with the new emerging challenges and become a strength of this tiger reserve. Further, many EDCs were formed during this project period, which can be considered one of the strengths. This may be useful in many ways to the reserve in the future in achieving its management goals and objectives.

17. Practice of closing roads from 6 PM to 6 AM

As per the direction of the Karnataka High Court, the Mysore–Mananthavady road, Hunsur–Kutta road and Kallahatti–Murkal–Karmad roads have been closed for traffic between 6 PM and 6 AM, thereby protecting the wild animals from the threats of night traffic and road accidents.

Management Weaknesses

1. **Presence of human settlements inside the Critical Tiger Habitat (CTH):** Inside the 643.39 km^2 Critical Tiger Habitat of Nagarhole Tiger Reserve there are about 6145 tribes from 1550 families living in 54 hamlets called *haadies*. Apart from the tribal *haadies*, there are 14 village settlements inside the Critical Tiger Habitat of Nagarhole Tiger Reserve. Around 11 village settlements situated within Kakankote State Forest covering an area of about 534 ha and 3 village settlements situated in Arakeri Reserve Forest covering an area of 7.7 ha. Further, there are many encroachments which form an enclosure within the tiger reserve. These settlements exert lot of pressure on the natural resources of the tiger reserve, which has a negative impact on the population of wild animals and on their habitats.
2. **Monoculture plantations inside the tiger reserve:** An around 107 km^2 area of the tiger reserve is occupied by the plantations raised during different periods before 1984. Of the total 10716.97 ha, teak plantations occupy 9233.99 ha, eucalyptus 539.63 ha and miscellaneous species the remaining 943.35 ha. These monoculture exotic plantations rarely support any undergrowth or regeneration of native species and thus hold little wildlife value.
3. **Presence of state highways running across the CTH:** Some of the highways running across the Nagarhole tiger reserve are Mysore–Mananthavady, Hunsur–Kutta and H.D. Kote–Kallahatti–Murkal roads. There is heavy traffic across the park because of them. The traffic along these roads causes serious disturbances to the wild animals and many times kill wild animals.
4. **Large portion of the boundaries having interface with village settlements:** On its eastern and western borders (200 km length), Nagarhole Tiger Reserve has revenue villages and private coffee estates, which makes it susceptible to various threats like illegal timber cutting, illegal grazing and snaring for bush meat. Further, in the recent past, there have been increasing incidences of wild animals straying out and, thus, of human–animal conflict, which works against the management goals and objectives.
5. **Delay in notification of buffer zone around the western side of the tiger reserve:** After continued and persistent efforts, the buffer zones on the northern, eastern and southern sides of the core area of Nagarhole Tiger Reserve were notified very recently. But, the buffer zone demarcation and its notification on the western side (coffee planters of Coorg District, bordering Nagarhole and Kallahalla Range) could not be achieved due to misconceptions of the local people about the buffer zone concept, the parochial attitude of the local pollical class to wildlife conservation and strained park–people relationships. Thus, till date the buffer zone on the western side of Nagarhole Tiger Reserve has not been declared. The approval of the local panchayat could not be obtained.
6. **Existence of a 25–30% vacancy in the permanent field staff:** Though it faces a shortage of field staff at present, the reserve is likely to get an additional force of newly recruited members for protection.
7. **Defunct EDCs:** Though around 76 EDCs were formed during the IEDP period, presently is a huge vacuum in the working of these EDCs. Most of the EDCs became dormant due to stoppage of fund flow after the completion of IEDP project. Thus, there exists hardly any dialogue between the tiger reserve and these EDC members, which has led to an absence of any cooperation from the fringe-area people with the management of the reserve.
8. **Weak coordination exists among various institutions:** Presently there is hardly any coordination mechanism among the forest department, EDCs, NGOs and other government organizations due to a lack of frequent dialogues.
9. **Absence of adaptive experimental research:** Though there were long-term basic research on tigers and their prey–predation relation, hardly there was any adaptive experimental research which could find immediate solution to the existing management problems like arresting the spread of obnoxious weeds, replacing the monoculture exotic plantations with native species of trees and grasses, regeneration of native species of trees etc.
10. **The porous interstate boundary with Kerala:** On the south-western side of the Kerala–Karnataka border is the River Kabini, which was crossed by the people of Kerala for illegal activities like illegal fishing and timber cutting at night.
11. **Short tenures of the Deputy Directors (DCFs):** In the last decade, many DCFs were posted at Nagarhole and they did not serve more than a year or two. So, within their short tenures they could not do any justice to the management of the reserve, and ultimately the tiger reserve suffered from a lack of continuity in the management inputs or decisions, which is one of the major weak points of the tiger reserve.

12. **Administration of the core, the proposed buffer and relocation by a single Deputy Director/Director:** Due to the administration of the core, the proposed buffer and tribal relocation by a single Deputy Director or Director, there will be an increased work load, and pilling up of files could delay the execution of any management decision.
13. **Inadequate regeneration of native species:** Due to occupation by weeds of large areas and the presence of monoculture plantations on a 107 km^2 area, the regeneration of native species was found to be unsatisfactory, which can be considered one of the weak points of Nagarhole.
14. **Absence of updated baseline data and week database management:** The database management system is very poor in this division. So there should be one qualified person appointed exclusively to look after database management. Presently there is no matching of data between the range office and the division office. The person appointed as data manager should be given regular training in various aspect of database management with respect to forest department works.
15. **Absence of interpretation centre or visitor centre at Nagarhole:** Though Nagarhole Tiger Reserve is famous for many reasons including wildlife tourism, there is no interpretation centre or visitor centre for nature education and awareness creation about the importance of wildlife and its conservation.

Immediate Actionable Points

Apart from the actionable points mentioned against each strength and weakness, the following points have to be taken care by NTR.

1. The rehabilitation of tribal families from the core area of TR has to be expedited.
2. Research works are being carried out, to be followed up with the research institution or organization to get the outcomes for course correction.
3. Nagarhole Tiger Reserve has done excellent work in removal of lantana as part of habitat improvement, and this activity should be continued with the support of a continuous flow of funds.
4. There are 108 EDCs in NTR, out of which 35 EDCs are active. Efforts should be made to strengthen and support the EDCs and SHGs.
5. A study on carbon storage, carbon capture and loss assessment to be carried out in consultation with technical agencies.
6. Establishment of Local area Braille corridor should be established in the interpretation centre.
7. All visitors' place should have handicapped-friendly infrastructure and logistics.

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KERALA

PARAMBIKULAM TIGER RESERVE

19

MEE SCORE **84.09%**

Date of Evaluation
25-28 August 2022

Evaluators' Names
S.S. Srivastava
Sh. M.S. Negi
Sh. Ravi Kant Siha
Sh. Alok Kumar
Dr. Vishnupriya Kolipakam

INTRODUCTION

An area of the Nelliampathy–Anamalai landscape of the southern Western Ghats in India known as the Parambikulam Tiger Reserve is one of the country's most ecologically significant areas. It is situated in Kerala's Palakkad District. It is one of the world's biodiversity hotspots, supporting a variety of habitat types. IIt is characterized by endemism, moist deciduous forests, dry deciduous forests, and shola forests. Low, marshy grasslands, or vayals, are another uncommon environment. With a total size of 643.66 km^2, including a core area of 390.89 km^2 and a buffer area of 252.77 km^2, it was designated a tiger reserve in 2010. Along with a healthy population of tigers, this area is home to large carnivores including the leopard, wild dog and sloth bear. It is also home to elephants and other herbivores, such as the spotted deer and sambar.

Management Strengths

1. Due to the contiguity with Anamalai TR of Tamil Nadu and the PAs in the Munnar landscape and the interspersed forest areas in various territorial FDs in the Kerala part, the core, the buffer and adjoining areas of Parambikulam TR make one of the best potential locations for the long-term conservation of tiger and its ecosystems.
2. Systematic monitoring of the tiger population is in place through a well trained tiger monitoring team.
3. There is a good network of roads and trek paths for patrolling. Smart patrolling is in place, and arrangements for reviewing it regularly have been made. The smart patrolling system is working efficiently.
4. There is almost negligible biotic pressure on the habitat of the core, viz., there is no fuelwood collection, no cattle grazing and no tourism in the core area.
5. There is very healthy support from dependent local communities through EDCs. The EDCs are working well here, and they are involved in the management activities of the tiger reserve. Local communities are getting their livelihood through eco-tourism and other management activities of the reserve.
6. Several man-made reservoirs and natural river systems, besides adding to the beauty of the place, support several unique life forms. Also, Parambikulam provides the life support system for the human population living in the plains of Kerala and Tamil Nadu by supplying good water and air. Water harvested from PKMTR is used for irrigating several lakhs of hectares of farmland, in both Tamil Nadu and Kerala. Water is also not the limiting factor for the wild animals.
7. The reserve is rich in RET species and endemic plants and animals. The habitats supporting a suitable prey base (sambar and spotted deer), and thus sufficient food is available for the carnivores.
8. A network of patrolling camps at strategic locations has been established to undertake anti-poaching activities. Due to this effort, poaching of large carnivores is stated to be totally stopped. An extensive and well-documented protection plan is in place. The field staff are locally trained in dealing with poaching and other emergency situations.

9. The area is not prone to fire despite there being good numbers of bamboo clumps due to the moist conditions prevailing in large tracts, and there are no human settlements in the core confined within the enclaved villages.
10. There is inter-state coordination and bilateral support, fostered through regular meetings, interactions and exchange of relevant information in a planned manner.
11. With its biological richness, the reserve offers excellent scope for scientific research. The recently developed research infrastructure facility makes it a tempting place for the scientific community.
12. The aesthetic appeal of the reserve with its lush greenery, magnificent wildlife, inviting peaks, serene valleys, meandering rivers and placid lakes adds to the ecotourism value of the area.
13. The intangible benefits accruing from the reserve are enormous and invaluable. Specifically, this is a carbon sink and an important life-support system for the vast adjacent plains of Kerala and Tamil Nadu.

Management Weaknesses

1. Due to the hilly terrain, steep slopes and very thick vegetation, some areas become inaccessible during the monsoon, and thus there is difficulty in patrolling.
2. Power lines and tar roads through the core area are a source of disturbance and create protection issues and cause man–animal conflicts.
3. Invasions of woody and exotic species into the grasslands/*vayals* disturb the support system of the prey base.
4. Non-registration of licensed arms holders at the periphery of PA is a cause of concern for the protection of sandalwood and the fauna.
5. The lack of a buffer on the northern and western sides of the tiger reserve may create an adverse impact in the future.
6. The large size of administrative units and the inadequate staff lead to adverse impacts on the protection and management needs.
7. Posting of staff members without an orientation towards wildlife management is a major concern for the management.
8. Parambikulam Tiger Reserve is landlocked and is surrounded by Tamil Nadu over a long length of the boundary, and the remaining border within the Kerala side is inaccessible, with difficult terrain. The Field Director, with HQ at Palakkad, has to access Parambikulam Tiger Reserve through Tamil Nadu only.
9. Inadequate communication facilities and a very poor mobile network of BSNL make the job of the Dy. Director and the other field staff difficult. In case of emergencies, they cannot get immediate support from the district administration and their own senior officers.
10. Poor infrastructure and camping facilities affect the management of the tiger reserve.
11. The long inter-state boundary, private estates on the boundary and inter-state sandalwood smuggling impact the protection of the flora and fauna of the reserve.

Immediate Actionable Points

1. Local communities, mainly indigenous tribes in the enclaved villages within the core area, are totally dependent for employment and their livelihood on the tiger reserve management. This is not sustainable with the growth of the population in near future. There is a lack of higher education facilities and skill development programs for men and women to encourage them to get reasonable employment/jobs outside of the cities and come into the mainstream of development. So, the management must initiate action on these issues of education, health and skill development in an organised manner with support from the state government and make the core area inviolate.
2. There has been little enhancement of economic activity over the years for the forest-dependent people residing within the TR. In the past, due to sterling efforts of the TR Management, all cattle grazing was stopped in the area. As an incentive to sacrifice their

cattle, the owners at the time were provided jobs and opportunities by the forest department. However, those who did not have cattle were not given the same opportunity and have started to expect and demand some opportunities. The management is to look into their expectations.

3. The electric lines passing through the core area need to be insulated in a phased manner to avoid electrocution of wild animals and creating fires in the forests in the future.
4. The vehicular traffic on the tar road passing through the core and non-core areas needs to be regulated by ensuring that there is a definite time lag between two vehicles at any point of time so that movements of a large number of wild animals are not affected by these roads on and adjoining such roads.
5. Due to the inaccessibility of large areas during the monsoon, more patrolling posts, communication gadgets and camping facilities are needed to monitor the sensitive areas thoroughly.
6. There should be a plan for the management of grasslands/vayals to keep them free of woody vegetative growth and invasions of exotic species. There should be annual habitat management operations in a well-planned manner as palatable grasslands are key to supporting the prey base of the desired number.
7. All vacant posts among the frontline staff should be filled up at the earliest to fulfil the managerial needs, giving priority to those who have an inclination and orientation towards working in a PA.
8. Female staff members need to be provided with rooms/accommodation in the camps separately, not mixed with those of the men, i.e., either in different floors in multi-storey buildings or in different wings on the ground floor. Their rooms need to be attached with bathrooms.
9. While on patrolling duty with men, arrangement of temporary toilets for female field staff on patrolling routes need to be provided. These may be damaged by wild animals like elephants, etc. Still they need to be provided and repaired as and when damaged.
10. Registration of licensed arms of villagers residing within the TR or within 10 km from the boundary of the TR needs to be taken up on priority in consultation with the district administration for an effective check on poaching and smuggling of sandalwood as per the provisions of the Wild Life (Protection) Act, 1972.
11. Infrastructure at vantage positions should be created to facilitate the working of the management in a more organized manner.
12. The Government of India is to take special care for the timely release of the CSP Fund under Project Tiger so that grassroots workers like watchers get their wages timely and the management is able to execute all the planned work in time.
13. Since there is a definite threat from poachers and smugglers, patrolling during the night time need to be more organised and as effective as it that during the daytime.
14. The state government to provide the Dy. Director and other Range Officers of the tiger reserve with satellite phones to overcome the poor network problem and inaccessibility to the District HQ as well as to tackle any emergency effectively.
15. Parambikulam Tiger Reserve has a very young Field Director whose HQ, Palakkad, is quite far from the tiger reserve boundary. He has to approach the tiger reserve through Tamil Nadu only as the approach through Kerala is very difficult. The FD has been given an additional charge of another circle also. Thus he may not be able to devote time and supervise the field work of Parambikulam TR. The state government to kindly take steps to make him free from additional charges of the other circle.

Nilanjan Chatterjee

PERIYAR TIGER RESERVE, KERALA

20

MEE SCORE 94.53%

Date of Evaluation
17-19 September 2022

Evaluators' Names
Sh. U.M. Sahai
Sh. Pawan Kumar
Sh. A.K. Misra
Sh. Yogesh Malik

INTRODUCTION

Periyar Tiger Reserve (PTR) has a total extent of 925 km^2. The 'Periyar Wildlife Sanctuary Proper, with an extent of 777 km^2, was constituted in 1950 as per notification number F1.2854/49/DD dated 11 August 1950. The Sanctuary was brought under Project Tiger in 1978 as the 10th tiger reserve in the country and named Periyar Tiger Reserve. In 1982, an area of 350 km^2 within the Sanctuary was notified as Periyar National Park (vide S. R. O. No. 1407/82 (G.O (P) 310/82/AD dated 27 October 1982). An extent of 881 km^2 was notified (vide S.R.O. No. 1089/2007 (G.O. (P) No.75/07/F&WLD dated 31 December 2007)) as the core or Critical Tiger Habitat of PTR, which includes 733 km^2 of Periyar Wildlife Sanctuary Proper and 148 km^2 of reserved forests of the adjoining Goodrical Range of Ranni Division. An extent of 44 km^2 was notified as a buffer to PTR (vide G.O (P) No.18/2011/F&WLD dated 22 March 2011). The areas are drained by two major river systems, namely the Periyar and Pampa. Three major reservoirs, viz., Periyar Lake, Pampa and Kakki, exist within this area. The area has a high drainage density in most places. In addition to the natural water sources in the reserve, artificial waterholes are created to ensure water availability to animals during peak summer. 288 water holes have been created and maintained in the tiger reserve.

Management Strengths

1. PTR, which covers an area of 925 km^2, is the largest contiguous block of forest in the southern Western Ghats. Its various ecosystems serve as habitats for a wide variety of plants and animals.
2. There are no settlements or biotic interferences in the PTR core.
3. Since their start, eco-development programmes have been successful in PTR, which promotes local communities' participation and collaboration in PA management from planning to implementation.
4. A professionally trained and competent staff enables efficient administration.
5. Wide range of infrastructure available with the PA for dealing with multiple objectives of protection, ecotourism, nature education, communication and so on.
6. As an area rich in biodiversity, PTR has provided the ground for numerous scientific research projects leading to thorough and in-depth knowledge of various facets of biodiversity.
7. Since the PA operates in a culture that values literacy and environmental awareness, all of its inventions, successes and initiatives have received the proper media coverage and public acclaim.
8. A significant support system for PTR management is provided by the Periyar Tiger Conservation Foundation (PTCF), which offers essential expert and technical assistance for scientific monitoring of tigers, co-predators and the prey.

Management Weaknesses

1. Biological pressure brought on by the Sabarimala pilgrimage, which affects even up to 1 crore people over the 2-month-long season.
2. The interior is inaccessible due to difficult terrain, particularly during the monsoon.
3. Spread of invasive woody species in the grasslands and infestation by weeds like *Lantana*.
4. Shortage of funds, especially when the flow of tourists declined due to the massive floods of 2018–19 in Kerala, followed by the COVID-19 pandemic.

Immediate Actionable Points

1. Ensuring implementation of Sabarimala Master Plan and pilgrim management involving SAPP EDCs.
2. All existing anti-poaching camps will be made fully functional as per the prescriptions in TCP.
3. Eco-restoration activities are to be taken up in identified areas with exotic woody vegetation like eucalyptus, as per the eco-restoration policy and TCP prescriptions.
4. Alternate financial resources, including CSR funds, to be explored.
5. Security audit of Periyar Tiger Reserve, as suggested by the NTCA, is to be conducted.
6. Introduction of Braille data in the interpretation centre and other visitor facilities shall be made to make them more friendly to the visually challenged.
7. As 90% of the slots are being booked online and 10% offline for all the community-based eco-tourism (CBET) programmes and 50% of the boat tickets are booked online, an automatic messaging system shall be evolved to get the feedback from the tourists online.
8. Moreover, suggestion boxes can be kept at vantage locations where tourists can drop their feedback slips offline.

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MADHYA PRADESH

BANDHAVGARH TIGER RESERVE

21

MEE SCORE 83.33%

Date of Evaluation
27-30 September 2022

Evaluators' Names
Sh. Azam Zaidi
Dr. Pradeep Vyas
Sh. Shailendra Kumar Singh
Dr. Kausik Bannerjee

INTRODUCTION

Bandhavgarh Tiger Reserve (BTR) lies between the Vindhyan Range and the north-eastern flanks of the Satpura Mountain Range in the extreme north-eastern part of Madhya Pradesh. The tiger reserve is located between latitudes 23° 27' 00" N and 23° 59' 50" N and longitudes 80° 43' 15" E and 81° 15' 45" E. The Bandhavgarh landscape has a long history of wildlife conservation and is potentially rich in natural, spiritual, ecological, archaeological and sociocultural heritage. Besides, a very dense population of tigers and a wide variety of plant and animal species considerably add to the significance of this landscape. The tiger reserve, with an area 1536.938 km^2, comprises of a core area (716.903 km^2) and a buffer area (820.035 km^2). The remaining area of 13.273 km^2, not included in the core, but technically still a national park, is occupied by villages. The core or the critical tiger habitat is almost completely surrounded by the buffer zone, barring part of the eastern boundary running along the Madhya Pradesh–Chhattisgarh interstate border. The Bandhavgarh landscape of sal (*Shorea robusta*) and mixed woodland interspersed with grassy expanses and bamboo patches chronicles a glorious history of wildlife conservation and is potentially rich in natural heritage.

Management Strengths

1. With an estimated population of 104 tigers (as per All India Tiger Estimation 2018–19), Bandhavgarh Tiger Reserve serves as an important source population for tigers in the central Indian landscape.
2. Bandhavgarh TR is part of a large tiger landscape (~13,000 km^2). The reserve is connected with Sanjay Dubri TR, in Madhya Pradesh, which is contiguous with Guru Ghasidas National Park, in Chhattisgarh. 3607 km^2 of this forested landscape supports about 141 (126–156) tigers as per the last cycle of All India Tiger Estimation. Furthermore, to the north-eastern side, this zone is connected with Palamau TR, in Jharkhand. The reserve is also connected with the forests of Katni Division, Veerangana Durgawati Wildlife Sanctuary and Nauradehi Wildlife Sanctuary.
3. The tiger reserve area forms the catchments of several perennial rivers, viz., the Son, Umrar, Janad, Johila and Halpal. There are other streams like the Charanganga, Damnar, Bhadar, Chachai, Chamkuli, Baruanala, Amanala and Badbada. All these ensure the water security of the region.
4. Historically, the area attains great significance in the form of Bandhavgarh Fort, ancient caves, rock paintings and carvings. The park area was the shooting reserve of the erstwhile Rewa State. The fort is surrounded by as many as 32 hillocks. There are many caves named after rishis and Hindu gods, with ancient inscriptions. The Bandhavgarh Hills with their escarpments all around, form unique features. They provide roosting, nesting and perching points for raptors. The vertically rising hills create ideal gliding conditions for these birds, which can glide and scan the area down below effortlessly. Many of the slopes also provide unique habitats for smaller mammals like rodents and reptiles. Some of these slopes are cut off and isolated by cliffs, making them untouched and virgin habitats due to their inaccessibility.
5. The tiger reserve supports a productive ecosystem characterized by a mosaic of grasslands and woodlands. An interspersion of trees, grasses and bamboo throughout make the habitat ideal for prey and tigers.
6. tiger reserve has evolved an effective habitat recovery programme for the development of waterholes and grasslands (25 ha grass seed collection plot available) without resorting to

the usual strategy of burning grasslands. The park has more than 50 km^2 of grasslands. Strip management of grasslands has resulted in selective augmentation of ungulates. Waterholes have been developed adjoining each grassland to ensure an even distribution of ungulates.

7. The tiger reserve has been proactive in taking active conservation measures for important endangered species. Gaurs, reintroduced in the tiger reserve, are flourishing well and are being rigorously monitored by the tiger reserve management. Commendable efforts are being made to reintroduce the hard-ground barasingha in the tiger reserve.
8. An in-situ tiger enclosure constructed at Baheraha has been extremely useful in rewilding tigers. The enclosure has also been important as a rescue and rehabilitation centre for treating conflict and injured animals in the landscape. A continuous monitoring system for the animals residing inside the enclosure is in place.
9. The tiger reserve management has been able to relocate four villages from inside the core, while efforts are underway for relocating the remaining. This has created more inviolate areas for the wildlife, with substantial reduction of anthropogenic pressures from the core zone.
10. Bandhavgarh Tiger Reserve has an excellent protection regime in place. The park has a good network of well-equipped patrolling camps manned by the frontline staff and the Tiger Protection Force. A total of 394,685 km of foot patrolling using M-STrIPES was done by the frontline staff in the year 2021–22. Regular surprise checking of electric fences in the agricultural fields by the tiger reserve management has substantially reduced the number of electrocution cases.
11. Although the park experiences a higher number of human–wildlife conflict cases, ex-gratia payment for human death/injuries and compensation for livestock loss are prompt and effective.

Management Weaknesses

1. Bandhavgarh Tiger Reserve does not have an approved Tiger Conservation Plan (TCP) even 15 years after its declaration, and the current draft TCP is with the NTCA for approval.
2. The tiger reserve has an increasing population of elephants that has colonized the PA in recent years. Although the park management is considering this as an opportunity, this may be a threat to human safety in the landscape since local communities do not have memories of living with elephants.
3. The infestation of grasslands with invasive species may reduce the nutritional carrying capacity of the grasslands for wild ungulates.
4. Compensation for crop losses is dealt with by the revenue department, and there are delays, which causes resentment among the villagers.
5. Delays in fund release hinder the park authorities from achieving the targets of grassland management, weed eradication, etc.
6. The traffic on the Umaria–Rewa and Paraxi–Khitauli state highways, passing through the TR, is heavy. These unmitigated roads obstruct the movements of wild animals, and instances of wildlife mortality have been recorded.

Immediate Actionable Points

1. The tiger reserve management should actively pursue the approval of the TCP with the NTCA.
2. A grassland management plan with dynamic monitoring and integration with research institutions needs to be taken up on a priority basis. The weed eradication from grasslands and woodlands should be in a cyclic manner and should be scientifically monitored and planned.
3. Land use patterns hostile to tiger conservation in the landscape should be regulated as per extant legal provisions. All road infrastructure in and around Bandhavgarh Tiger Reserve should be appropriately mitigated with smart green technologies (animal passage structures, etc.) for maintaining landscape permeability for uninterrupted dispersal of tigers

and other wildlife. As implemented in Satpura Tiger Reserve, the Government of Madhya Pradesh should attempt to implement a Zonal Master Plan for the tiger conservation landscape, further rationalizing the land use patterns.

4. The management of elephants in the landscape should be an integral part of the conservation priority for the tiger reserve authorities.
5. A single-channel mechanism needs to be adopted for payment of crop damage compensation. The forest department should be made the nodal agency for this for avoiding delays in payment. This would foster greater tolerance among the local communities towards the wildlife. This is particularly important since the landscape has elephants.
6. The tiger reserve management should carry out regular security audits of the park as per NTCA protocols.
7. Distribution of arms and ammunition to the frontline staff is the need of the hour to further strengthen the protection regime in the park.
8. The tiger reserve should initiate a scientific study of carbon credits and sequestration to understand its role in climate change mitigation so as to achieve India's targets of the Sustainable Development Goals.
9. The scope of the current research collaborations needs to be expanded further by the tiger reserve management. Key management issues which require research inputs (such as restoration of ancient historical monuments, weed eradication, grassland management, gaur ecology, conflict hotspots and the impact of tourism) should be taken up with institutes, agencies and universities of international and national repute.
10. The mechanism of dissemination of all relevant information pertaining to the management in the public domain needs to be strengthened by the park authorities.
11. All stakeholders should be made aware of garbage disposal, waste management, water harvesting, plastic pollution, rights in the eco-sensitive zone, etc.

Nirmalya Chakraborty

KANHA TIGER RESERVE, MADHYA PRADESH

22

MEE SCORE 91.67%

Date of Evaluation
24-27 September 2022

Evaluators' Names
Sh. Azam Zaidi
Dr. Pradeep Vyas
Dr. Shailendra K. Singh
Dr. Kausik Banerjee

INTRODUCTION

Kanha Tiger Reserve has an extent of 940 km^2 is located in the Madhya Pradesh districts of Mandla and Balaghat. It is located between latitudes 22° 1' 5" and 22° 27' 48" and between longitudes 80° 26' 10" and 81° 4' 40". The Madhya Pradesh Maikal Range of the Satpura Hills, part of the Central Indian Highlands, is adjacent to Kanha National Park. The national park is hailed as one of the best wildlife locations in the world In 1879, Kanha National Park was designated a reserve forest, and in 1933 it was reclassified as a wildlife sanctuary. In June 1955, it received a further upgrade to the status of national park, and in 1973, it received the designation of tiger reserve. Kanha National Park is an excellent habitat for a variety of wild animals, including the powerful tiger, the hard ground barasingha, many species of plant, bird, reptile and insect. Due to an enabling infrastructure, , this reserve has captured the attention of many tourists from around the world. Two entrance gates, one at Khatia-Kisli and the other at Mukki Gate, are located at the park's opposite ends. These two gates are separated by 40 km. The tiger reserve's perimeter reaches Chhattisgarh.

Management Strengths

1. Situated in Mandla and Balaghat districts of Madhya Pradesh, Kanha Tiger Reserve is a typical geo-physiographical representative of the Central Indian Highlands. Nestling in the northern slopes of the Maikal Hills of the Satpuras, the tiger reserve and its surroundings were once proud witnesses to an amazing era of conservation history. The Kanha landscape chronicles a glorious history of wildlife conservation and is potentially rich in natural heritage. Besides the viable population of tigers and, till recently, the only world population of the hard ground barasingha (*Rucervus duvaucelii branderi*), a wide range of plant and animal species considerably add to the significance of this landscape. All the floral and faunal attributes make the tiger reserve a significant repository of biodiversity in the country.
2. Kanha presently also serves as a self-sustained source population for tigers and ungulates that can repopulate some of the other tiger reserves and protected areas in Central India such as Panna, Bandhavgarh, Nauradehi, Satpura and Satkosia. Kanha is also important from the point of view of the species recovery programme for the barasingha. Similar recovery programmes have also been done for the gaur and blackbuck in the past.
3. Kanha is well connected with Achanakmar Tiger Reserve in Chhattisgarh (in the north-east) and Pench Tiger Reserve in Madhya Pradesh (in the south-west) and with Pench and Nawegaon Nagzira tiger reserves in Maharashtra. This strong connectivity makes Kanha an important tiger habitat. The Kanha–Achanakmar connectivity is important for the survival of tigers in Central India. The Kanha–Pench corridor, though fragmented, is used by tigers frequently. The Kanha–Pench corridor is one of the first wildlife movement corridors in the country to have a Corridor Management Plan involving all the stakeholders, including line departments of the government, civil society organizations, academic and research institutions and local communities. Maintaining the permeability of these corridors would be key to the persistence of tigers in the Central Indian landscape in the future.

4. Geographically, Maikal Range is the most important terrain feature, running along the eastern boundary of the core zone of Kanha Tiger Reserve, forming the watershed between the rivers Narmada and Mahanadi. This hill-range continues to the west within the core zone as the Bhaisanghat Ridge, bifurcating the Narmada catchment between the Banjar river, to the southwest and west, and the Halon river, to the east and the north-east. Many spurs branch out to the north from the main Maikal and Bhaisanghat ridges, and divide the headwaters of the Halon into a number of tributaries, viz., the Phen, Gourdhuni, Kashmiri and Gondla. Bhaisanghat Ridge bifurcates near Bamhnidadar, with the main spur running to the north, while its branch, running west, sub-divides the Banjar catchment between the Banjar itself and its tributary, the Sulkum. All these ensure the perpetuity of the water security in the region.
5. The Indian Institute of Forest Management (IIFM), Bhopal, conducted a study of the ecosystem services of Kanha Tiger Reserve and reported that besides conserving wildlife, this reserve also provides a range of associated economic, social, cultural and spiritual benefits. A total of 25 such ecosystem services were assessed by IIFM, and it was found that for every rupee spent on management costs, benefits of approximately Rs.273 were realized in and around the tiger reserve. Nearly 10% of the flow benefits from the reserve accrued at the local level, 49% at the national level and 41% at the global level. The estimated benefits from the ecosystem services of Kanha were valued at Rs.16,451 million.
6. The tiger rewilding programme carried out in Kanha has proved out to be crucial for the recovery and augmentation of tigers in low-density tiger areas in Central India such as Satpura, Panna and Nauradehi.
7. The park has an effective protection strategy with a fairly good network of manned patrolling camps in the core and buffer. On an average, approximately 4 lakh kilometres of foot patrolling is being conducted annually by the frontline staff in the tiger reserve. The physical infrastructure of the anti-poaching camps is well maintained. The dog squad has been useful in detecting 31 wildlife crime cases in the last 5 years.
8. The park management has successfully relocated 37 forest villages outside the core zone between 1969 and 2016. The relocation has helped the Kanha management to reclaim 8052.00 ha. of wildlife habitats. While there was earlier no attractive and concrete government policy as such, the relocation of all these villages was carried out in different years and in a phased manner, with desired/appropriate inputs, such as site clearance, house construction, ploughing of fields, approach roads and drinking water facilities, provided at the new sites of resettlement. With the gradual change of status of this forest tract and managerial interventions and reduction of biotic pressure with village relocation, these old pasture lands have mostly morphed into excellent grasslands with a wide range of palatable grass species for herbivores.
9. Kanha Tiger Reserve has been a stronghold for wildlife research since the 1960s. Besides in-house studies, various long-term collaborative and institutional studies have also been conducted in the core zone. Such institutions include various universities, Wildlife Institute of India, Dehradun, Centre for Cellular & Molecular Biology, Hyderabad, Indian Space Research Organization, Zoological Survey of India, Tropical Forest Research Institute, Jabalpur, State Forest Research Institute, Jabalpur and Wildlife Disease Diagnostic & Research Centre, Jabalpur. Over time, the reserve has developed a good information database based upon a number of valuable studies, research programmes and documentation. Phase III and Phase IV monitoring of tigers, co-predators and prey is being conducted regularly at Kanha Tiger Reserve. Documentation of other wildlife has been carried out using M-STrIPES, transect monitoring and bird and butterfly surveys.
10. The park has an excellent integration with local communities and NGOs. Local communities are largely supportive towards the park. Most of the eco-development committees are functional and adequately funded. HThere is fair representation of women, and the EDCs generate employment for local communities. The school and dispensary run by the management in Mukki are excellent initiatives for eliciting larger public support towards tiger conservation.
12. The management has also set up a waste segregation and bio-composting plant near Mocha that caters to all the vegetable and food wastes from the resorts around the reserve. This is an innovative initiative and needs to be replicated in other similar areas. Many private resorts have also developed their own system of rainwater harvesting and a waste disposal mechanism, which is encouraging.

Management Weaknesses

1. Reports of left-wing extremism are a matter of concern.
2. The pastoral history, regressive natural grasslands and successional intricacies impact a substantial part of the grassland habitat. The infestation of the grasslands with invasive weeds and coarse grass species is reducing the fodder value for the ungulates.
3. Poaching, although it is of a limited magnitude, seems to be a continuing problem, particularly on the periphery of the Tiger Reserve.
4. Delays in fund release hinder the park authorities from achieving the targets of grassland management, weed eradication, etc.
5. Compensation for crop losses is dealt with by the revenue department, and there are delays, which causes resentment among the villagers.
6. Approximately 50 km of the Chilpi–Mukki highway passes without any wildlife mitigation through a large section of the core zone of the Tiger Reserve.

Immediate Actionable Points

1. The Government of Madhya Pradesh should immediately attempt to resolve the issue of left wing extremism in the tiger reserve by restoring/improving the law and order situation. This has to be prioritized before the morale of the frontline forest staff gets adversely impacted and the management loses its control over the tiger reserve.
2. Kanha Tiger Reserve is one of the very few reserves in the country where the management interventions are based on robust scientific information. The Tiger Reserve has been managed under the visionary and competent leadership of wildlife managers, and their legacy has been transferred to the present management. The dogma of "information–experimentation–learning–expanded implementation" has largely been followed by the tiger reserve management for many years, and it has made the management very effective. This system needs to be sustained.
3. A grassland management plan with dynamic monitoring and integration with research institutions needs to be taken up on a priority basis.
4. Dedicated specialized anti-poaching squads need to be established for curbing poaching in the buffer and periphery of the tiger reserve.
5. The issue of restoration of corridors and an eco-sensitive zone needs to be taken up with various stakeholders on a priority basis, including territorial divisions, local communities present in these areas, the district administration and other line departments. The land should not be diverted to uses that are not compatible with tiger conservation objectives.
6. The management should carry out regular security audits of the park as per NTCA protocols.
7. A single channel mechanism needs to be adopted for payment of crop damage compensation. The forest department should be made the nodal agency for avoiding delays in payment. This will foster greater tolerance among the local communities towards wildlife.
8. In recent years, elephant herds have migrated into Kanha. This has already started human–elephant interactions, leading to crop damage and occasional property damage. Currently, the quantum is small, and so it is not a major problem. However, with time, the problem is likely to escalate. The management should take immediate appropriate action in this regard.

PANNA TIGER RESERVE, MADHYA PRADESH

23

MEE SCORE 83.33%

Date of Evaluation
27-31 August 2022

Evaluators' Names
Sh. A.V. Joseph
Dr. Bipin Behari
Sh. Pradeep Kumar

INTRODUCTION

Panna TR is situated in the northern part of the Vindhyan Range, straddling south-west to north-east of the Panna, Chhatarpur and Damoh districts of MP. It forms an important connecting link between the eastern and western wildlife populations through the Vindhyan Range. The forest type, teak association with kadhai (*Annogeisus pendula*), forms a unique ecotone, of northernmost extension of teak and easternmost extension of kadhai species. Panna is the only TR located in the Bundelkhand region. The name Panna is derived from a small and lesser-known but important Rajput kingdom of central India. Incidentally, the area was a *shikargarh* and hunting ground for the rulers before its merging with the Indian union.

The terrain is typical bench topography with plateaus, gorges, cliffs, overhangs and mesic sites offering a variety of niches and habitats for wildlife to thrive in. Eight species of vulture visit the park, four of which are residents, nesting and breeding here. There are ancient rock paintings dotted around the landscape dating back to 2000 years and of the pre-historic period. The Ken River flows through the reserve from south to north, over a distance of 55 km, and it is the home of the gharial and mugger crocodiles and other aquatic animals.

The plateau areas are characterized by savannah forests with very thin vegetation and continuous grass cover, where dry deciduous scrub forests are seen. The slopes and valleys are filled with dense forests. Bamboo associations are seen only on the slopes. The *Anogeissus pendula* forest is an edaphic sub-type (on specific rock type, i.e., conglomerate) which occurs mainly in a long strip of a small width (0.5–1.0 km) on the foothills from Pipartola to Gangau dam on the banks of the Ken River. *Sterculia urens* (kullu) is in abundance, with good regeneration.

Panna TR spreads over an area of 1578 km^2 with six forest vegetation types, 150 species of bird, 10 species of reptile, 50 species of fish and many species of mammal, of which the tiger is the key species. The Panna tiger reintroduction plan and its monitoring are considered as one of the most successful reintroduction plans in the annals of Indian PA management, and it can be taken as a benchmark study for such proposals in the future. The corridor plan has been well chalked out, with four possible corridors having been identified, extending over a landscape spread over 15,000 km^2.

Management Strengths

1. Panna Tiger Reserve is located at an important part of the tiger bearing landscape and links the eastern and western populations of the wildlife (north-east to south-west) of the Vindhyan Range. With its plateaus, valleys, undulating hills, gorges, cliffs, cave shelters, crevices, etc it provides a varied habitat for the fauna and flora.
2. PTR represents the northern-most extension of teak forests and the eastern limit of *Anogeissus pendula* forests. The ecotones of both teak and *A. pendula* fall in the area.
3. The unique composition of 60% open woodlands and meadows present in the park provides a vital habitat supporting herbivores, carnivores and grassland birds. Finding a habitat that supports sambar, chital, chinkara, chousingha, barking deer and nilghai all together is rare. The landscape offers one of the best habitats for the vulture species of India, and eight species of vultures visit the park.
4. The Ken River, flowing from south to north in the park (51 km length), forms the lifeline of the park.
5. The Integrated Landscape Plan is an excellent document for holistic conservation of the tiger.

Management Weaknesses

1. The TCP for the core, buffer and corridor have been nicely prepared. In the absence of its approval, there is no administrative legality for implementation of the plan.
2. The proposed Ken–Betwa link project, if implemented, will inundate 51 km^2 of pristine riparian vegetation of PTR, seriously disrupting the water flow regiment and depriving the wildlife of cover and of food resources during the pinch period and jeopardising the existence of specialised wildlife species that live in the area.
3. The presence of (3) villages in the core, (49) villages in the buffer and (151) villages within a distance of 5 km from the periphery of PTR boundary exerts a huge pressure on the limited biomass resources present in the park.
4. The existing NH 75 from Panna–Chhatarpur (13 km length) and SH 46 from Panna to Amonganj (35 km length) pose a grave danger to the free movements of wildlife in the park. The high-speed vehicles that pass through the road give no chance to any wildlife, from butterflies to tigers, to cross the road safely without being collided with or crushed.
5. There are (151) EDCs for which 35 micro plans have been prepared. The rest are under preparation. There is a lack of a clear funding mechanism to sustain the functioning of the EDCs.
6. The corridor plan identified (4) important corridors that connect PTR with Bandavgarh NP, Sanjay NP, Nauradehi, South and North Panna, etc. So far, no work has started, while the tiger population in the park has increased to 57–60. There is bound to be a conflict between tiger and man.
7. At the senior level, apart from the park veterinarian, none are trained in wildlife management. Against (67) posts of Forester sanctioned, only 25 are in position, and the remaining posts are vacant. There is an urgent need to fill the vacant posts.
8. LAC has been constituted in 2018, but so far, no meetings have been held.

Immediate Actionable Points

1. Out of the 16 villages in the core area of Panna TR, 13 villages have been relocated, leaving three villages to be relocated. The park authorities have linked the relocation of Dhodhan, Palkoha and Khariyani-Minari villages with the implementation of the Ken–Betwa project. The project when completed will inundate and submerge all the three villages and the R&R (Rehabilitation and Resettlement) activity has to be implemented by the district authorities. Relocation of the three villages is essential and should be expedited as the core (CTH) will then be completely free of all biotic pressure and it will aid in tiger management and other wildlife of the area. Relocation should be taken up without waiting for the construction Ken–Betwa project.
2. There are two drones in use in PTR, of which one is a thermal imaging drone. The use of drones in PTR will increase in future, and as a futuristic policy, the PTR authorities should train competent in-house field staff members in drone technology and equip all the peripheral ranges with thermal imaging drones. The straying of tigers into the human-dominated landscape is bound to increase, and it will be good to equip the staff in thermal drone technology as it will be of great assistance in tracking straying tigers in the night. Similarly, the staff have to be equipped with night vision devices with necessary training to assist with night time tracking of straying wildlife.
3. The Integrated Landscape Management plan for Panna TR, approved by NTCA, has been very well prepared and covers all the critical angles of tiger conservation exhaustively. However, this has to be converted into a time-bound action plan and implemented by the state forest department so that tiger conservation in MP can be implemented in a holistic manner.
4. There are 49 villages within the buffer and 151 villages within 5 km of the periphery of the park. There is heavy biotic pressure as observed from the condition of the vegetation in the buffer zone, and serious efforts have to be made to reduce the dependence of the villagers on the resources of the park. Innovative planning has to be done involving the district administration in formulation of plans leading to a reduction of the fuelwood consumption and grazing pressure on the buffer vegetation.
5. There are two roads passing through PTR, viz., NH 75 (13 km length) and SH 46 (35 km length). It is heartening to know that there is a proposal to shift NH 75 to the periphery of the park. If this is done, it will be a significant decision of NHAI. Regarding SH 46, since there is no proposal to shift it outside the park, it is better that the responsibility of implementing wildlife mitigation measures for linear projects be imposed on the user

agency when widening or maintenance of the road is proposed/approved. In the interest of PTR, all road kill data of wildlife for both NH 75 and SH 46 should be collected and entered in a register with details and photographic evidence for future use in strengthening the case for road shifting and for planning mitigation measures.

6. The veterinary unit of PTR is well trained and provided with the necessary infrastructure. There is one Daninject tranquilising gun in good working condition. It is better that a second tranquilising gun be procured and kept in reserve. Further, apart from the park veterinary doctor, there is no second trained veterinarian at the park. It is wise to train the local VAS of the AH dept in tranquilisation so that the services can be requisitioned in times of necessity by the park authorities.
7. PTR is stated to experience four to six drought periods in adecade. Drought proofing is essential, and in the interest of the park, a detailed climate study should be undertaken and remedial measures determined. Similarly, a carbon study must be undertaken to estimate the capture or loss of carbon in the park.
8. The research in PTR should be enhanced to assist the FD in taking management decisions. It is essential to have a team of researchers to undertake surveys of the flora and fauna within the park and map their spatial distribution/abundance, etc., which will provide the baseline data for future decisions. Local universities should also be engaged in this exercise, and researchers should be encouraged to do research in wildlife subjects, including wildlife health, pertinent to the park.
9. While all the resources in the park, especially the distribution of water, grasslands and cover, have been listed and mapped, the presence of natural salt licks has been overlooked. Natural salt licks play an important role in wildlife biology, and from the management perspective, it will be wise to list and map them and include the map in a protection plan of patrolling to safeguard the wildlife that uses them regularly.
10. The draft TCPs for the core, buffer and corridor have been made nicely and are have been submitted for approval. In the corridor plan it is observed that eco-tourism has been proposed as a component of plan implementation. It may be examined whether eco-tourism in the corridor will hinder the smooth dispersal of wildlife, and decisions should be taken accordingly.
11. It is important to encourage women from EDCs to participate in TR management and to constitute SHGs with funds from the Govt.
12. During Independence Day and Republic Day functions, meritorious staff may to be awarded merit certificates for wildlife conservation works.
13. With repeated outbreaks of zoonotic diseases in the wild and transmission of diseases from domestic animals to wildlife, the wildlife health monitoring needs to be strengthened.
14. Bamboo is an important browse material of the sambar, deer and chousingha, and the rhizome is a food of wild pigs. The past distribution of bamboo is to be compared with the present distribution in the park, and efforts should be made to reintroduce bamboo in the depleted areas. Seed ball sowing of bamboo is said to be successful, and this should be done along with rhizome planting along nallahs.
15. PTR has a functional dog squad with one dog and is very effective as a deterrent in preventing the commission of wildlife crimes. However, it will be good to add another dog squad to complement the existing one and train the dogs in tracking and uncovering traps and snares laid, as well as in tracking offenders in wildlife crime.
16. The Pardhi/Baheliya, a hunting tribe, may be educated, and alternative livelihood opportunities may be encouraged with the help of all stakeholders in the larger interest of the protection and conservation of PTR and its animals and birds.
17. Cremation places may be made at suitable places outside PTR with the help of the district administration to stop cremation by local villagers in the PTR buffer area, which often causes fires.
18. Invasive weeds like *Parthenium, Eupatorium* and wild basil in the core and buffer areas need to be systematically removed and indigenous palatable grass species are to be encouraged so that wild herbivores may find sufficient grass to feed on.
19. The habitats of the threatened species, viz., the wolf, pangolin, rusty spotted cat, caracal, etc are to be identified and the conservation interventions may be carried out accordingly.
20. The growth of the tiger population and the carrying capacity of the core and buffer must be studied scientifically and assessed so that artificial support of the tiger population is avoided and its spillover into the human-dominated landscape can be eliminated/reduced.
21. The Special Tiger Protection Force may be created at the earliest.
22. A security audit needs to be done on priority.
23. PTR may prepare a Disaster Risk Management Plan for emergent threats.

PENCH TIGER RESERVE, MADHYA PRADESH

24

MEE SCORE 89.39%

Date of Evaluation
24-28 September 2022

Evaluators' Names
Sh. A.V. Joseph
Dr. Bipin Behari
Sh. Pradeep Kumar
Dr. Rajeev K. Srivastava
Dr. Parag Nigam

INTRODUCTION

Pench Tiger Reserve includes Indira Priyadarshani Pench National Park and Pench Mowgli Sanctuary, along with the buffer. The reserve is located in Seoni and Chhindwara districts of Madhya Pradesh. Pench Tiger Reserve has been named after the River Pench, which meanders along the centre of the national park, bisecting it in almost two equal parts. This river forms a boundary between Seoni and Chhindwara districts and finally between the states of Madhya Pradesh and Maharashtra.

Management Strengths

1. Pench Tiger Reserve is located in the central highlands of the southern slope of the Satpura Range, linking with Kanha Tiger Reserve through Seoni, Balaghat and Mandla districts. PTR is linked with Satpura Tiger Reserve through Chhindwara District and is contiguous with Pench TR of Maharashtra to the south. The PTR core (411 km^2), buffer (768 km^2), corridor (3145 km^2) and ESZ (771 km^2) area, forms a compact landscape for supporting a viable population of tigers.
2. PTR functions as a source of dispersing tigers, and the spillover population is a boon for neighbouring territorial divisions.
1. The dominant vegetation is teak, corresponding to the Southern Tropical Dry Deciduous Forest type. The endangered animals present are the tiger, leopard, grey wolf, wild dog, Bengal fox, sloth bear, smooth-coated otter, gaur, rock python, etc. The forests are extensive and dense. It gets its name from from the River Pench which flows through the TR.
3. PTR forms an important catchment for Bawanthadi and the Pench River, the lifeline of the park and the main source of drinking water for Nagpur and other towns of Maharashtra, apart from being a source of hydro-electric power for Maharashtra. The Totladoh reservoir, located within the park, is an Important Bird Area. This waterbody attracts numerous migratory birds.
4. PTR supports a good population of endangered vultures and helps the overall conservation of the vultures in the country. PTR has six species of vulture. Their healthy population is an indicator of a good ecosystem.
5. The critical core of the PTR is free from habitations and livestock, and thus the habitat is pristine.
6. The buffer has the an excellent habitat to support wild ungulates and carnivores and absorbs the spillover from the populations in the core. It helps in diffusing tourism from the core area and is efficiently administered by PTR.
7. PTR has taken up the onerous task of registration of firearms within a 5 km distance, thereby helping the management control and monitor the poaching.
8. PTR has a dispersed population of prey species in abundance in the core and buffer. Hihj cheetal population supports the tiger and its young ones and forms one of its major strengths.

Management Weaknesses

1. Pench Tiger Reserve is dotted with 107 villages distributed in and around its buffer area and may be potential threat on the habitat.
2. The illegal fishing activity indulged in by people from the nearby villages in Maharashtra and in MP are a thorn in flesh for the administration, and the weed growth in the submergence area of Totladoh reservoir poses serious ecological problems.
3. The 11 KV capacity power line passing through the buffer area of TR (over a length of 547.088 km), of which 150 km passes through the sensitive portion, poses a serious threat of electrocution to the wildlife.

Immediate Actionable Points

1. Pench Tiger Reserve needs an electronic eye for surveillance in Totladoh reservoir to prevent illegal fishing.
2. PTR is endowed with a rich diversity of plants and animals, including endangered species. Research on the distribution of the flora and fauna in the park, abundance, seasonality, etc. are to be studied and documented. The availability and distribution of grasslands, browse material, salt licks, cover, etc. are also to be studied and correlated with the distribution and abundance of the prey and predator species. A well-established lab staffed with a biologist/researcher is to be engaged for taking up long-term studies on keystone species and to assist the management with taking proper decisions.
3. The villages Ambadi, Khamba and Khamreeth, which are located on the periphery, are to be provided with suitable livelihood programmes to reduce their dependence on the resources. Alternatively, a rehabilitation programme is to be planned for relocating these three villages and other critical villages that have an impact on the resources of PTR, and relocation is to be implemented.
4. Electrocution of wildlife is a problem faced in PTR due to the running of naked overhead electrical lines through the buffer area over a length of 547 km. The vulnerable section is the 150 km length that passes through the park. Taking advantage of the Supreme Court's orders, the matter is to be taken up with the electricity department for plastic coated overhead wires or underground cables.
5. Immediate action is to be taken to insulate the vulnerable section (150 km) of electric line passing through PTR.
6. Pench Tiger Reserve had a good distribution of bamboo. Bamboo is a good browse material for gaur, sambar, chousingha and barking deer, and the rhizome is food for wild pigs. Bamboo also provides good cover for ground birds and other wildlife. An exercise should be done to study the satellite/aerial images of the past 30 years and assess the growth/decline of bamboo in PTR and accordingly take up intervention measures to improve the bamboo stocking. Bamboo rhizomes can be planted along streams and nallahs during the planting season, and bamboo seed balls can be sown before the onset of the monsoon, a technique that was found to be successful in the regeneration efforts of the Orissa FD.
7. A dog squad is present in PTR, and it is functional. However, a sniffer dog squad is to be provided for each peripheral range as these dogs are effective in detecting snares, traps, wildlife crimes and human intrusion. The very presence of a dog squad will have a psychological effect and prevent the commission of a wildlife crime.
8. Trees that grow along National Highway 44 need monitoring, their branches near the edge of the highway must be trimmed aesthetically and carefully without causing damage to the trees. It is a potential danger for leopards or other arboreal animals if they scale the fence and encounter fast moving traffic on the highway.
9. The forest fire management needs a critical re-look up to the beat level. Keeping seasonal and vegetational variations and the slope aspect in mind, the most vulnerable, less vulnerable and least vulnerable areas are to be identified for better fire management.
10. Immediate action is to be taken to address the invasion of water hyacinth as some of the water bodies in the core area are infested with the weed. Similarly, *Cassia siamea*, an exotic tree species, is gradually creeping along the boundaries of the core and should be removed by uprooting it before it overruns the habitat.

SANJAY–DUBRI TIGER RESERVE, MADHYA PRADESH

25

MEE SCORE 71.97%

Date of Evaluation
27-30 October 2022

Evaluators' Names
Sh. A.V. Joseph
Dr. Rajeev K.
Sh. Srivastava
Dr. Parag Nigam

INTRODUCTION

The north-eastern region of Madhya Pradesh is where the 1674.511 km^2 Sanjay–Dubri Tiger Reserve is located. It has been identified as one of the prospective tiger meta-population landscapes and is a part of the Bandhavgarh–Sanjay–Guru Ghasidas–Palamau landscape. SDTR is blessed with a diverse ecology with bamboo forests, moist and dry deciduous sal woods, unusual riparian plants, grasslands and water sources, among other things. In the south and west of the landscape, there are grassy plains, and in the north and east, there are hills. The TR is criss-crossed by many perennial rivers, such as the Gopad, Banas, Mawai, Mohan, Kodmar and Umarai, and the reserve serves as a significant catchment area that finally supplies the Ganges. The TR supports a variety of threatened species, including the Gharial, Tiger, Leopard, Elephant, Sloth bear, Chowsingha, Blackbuck, Narrow-headed soft-shelled Turtle, Indian Skimmer and Vultures.

Management Strengths

1. The core area, the buffer area and the ESZ notified, all totalling more than 1674.511 km^2 form a compact tiger habitat that has the potential to support a viable breeding population of tigers.
2. The forests of TR function as a watershed and trap rainwater, recharging the soil. The rivers Son and Ganges are the lifeline and support a huge human population living in the lower Gangetic delta belt.
3. The SDTR landscape has five important external corridors linking Bandhavgarh TR to the west and Palamau, Guru Ghasidas NP, Singrauli Division and the Baikunthpur–Kachan–Sarai–Gopad–Bakunthpur corridor to the east. The tiger reserve is a part of the Bandhavgarh–Sanjay–Guru Ghasidas–Palamau landscape (over 25,000 km^2) and has been identified as one of the four potential tiger meta-population landscapes.
4. The Gidda Pahar area and Simhra Ghat area of the TR have potential habitats for vultures and the sloth bear and may be accordingly developed.
5. SDTR is staffed with young and enthusiastic personnel both at the management level and at the field level. All the field staff have undergone post-induction training. The field staff are motivated and disciplined. The veterinary officer has undergone various training programmes both nationally and internationally. The services of the field staff, including the veterinary officer, have been duly recognized by the Madhya Pradesh Forest Department, NTCA and other organizations with various awards given in the last 4 years.
6. The TR has planned re-introduction of gaur, which went locally extinct two decades back. The effort would help in restoring the natural biodiversity, re-establishing a keystone species in the landscape and providing long-term economic benefits (tourism value). The reintroduced gaur would also perform the critical ecological function of grassland management, which would support the ungulate population in the park.

Management Weaknesses

1. The wild prey density in the TR (CZ, BZ and ESZ) is low, and livestock forms a considerable part of the diet of the tiger (based on kill records). In the coming times, this would pose one of the major problems for tiger conservation.
2. There are 32 villages remaining in the CZ and 89 villages in the BZ, exerting a huge pressure on the resources of the TR. Most of the villages are populated with tribal people, and all their needs, including fodder, fuel and livelihood, are fully met from the forests, thereby degrading the forest habitat around the villages. The cattle compete with the wild ungulates for fodder.
3. The 22 km of rail track and the 99 km of roads and electrical lines within the TR endanger the wildlife and the wildness of the park. The rail track bisects the park into two halves, while the roads further fragment the park, hindering the free movement of wildlife. The high-tension electrical lines through the TR also pose a serious threat.
4. The industrialisation and allied activities in Singrauli District, adjacent to the TR, need to be critically studied in coming times. There are a number of coal/iron ore/limestone mines, and their activities have a deleterious impact on the TR, endangering the environment and the wildlife moving through the area.
5. There are 76 posts vacant from the FG level to the FRO level, and this needs immediate attention.
6. Crop damage compensation is dealt with by the revenue department, for whom this is not a priority. This needs to be reviewed and appropriately addressed.
7. The chital breeding in the herbivore section of the enclosure (training boma) continues to be very low. Steps needs to be taken to identify the reason for their poor breeding, and appropriate steps should be taken to address the shortcoming after due consultations with experts and institutions. The techniques deployed in captive (conservation) breeding centres can be adopted, and the sex ratio of breeding adult males to breeding adult females can be followed with enriched feed to accelerate the breeding. Similar initiatives may be taken to augment the chital population in-situ.

Immediate Actionable Points

1. The core zone and CTH of the TR has 32 villages, which are exerting a biotic pressure on the habitat. Though efforts are being made to relocate the villages, these efforts need to be stepped up and the relocation done on priority. There are a total of 4.4 lakh domestic cattle and 1 lakh goats present in the impact zone around the park, exerting severe pressure by grazing, competing with the wild herbivores and causing degradation of the habitat. The park authorities have to address this issue innovatively in a progressive manner so as to reduce the livestock population and grazing pressure for which they may implement habitat recovery programmes.
2. The TR has a low density of wild herbivores [14 animals/km^2 (Chital, Nilgai and wild Pig as per 2019 density data)], and this calls for intensive studies to flag the reasons so that they are appropriately addressed. Supplementation of ungulates from other protected areas though envisaged, needs to be also augmented.
3. SDTR is criss-crossed by roads (74 beats) and railway lines spanning about 100 km and 22 km, respectively, and instances of wild animal death have been recorded frequently. Remedial measures of either realigning the linear infrastructure or providing safe crossings may be developed and the matter taken up with the appropriate authorities.
4. SDTR has a common interstate boundary with Guru Ghasidas NP of Chhattisgarh. Though interstate meetings are held between the forest departments of the two states, there is still some lack of coordination, resulting in non-sharing of information when elephants migrate between the states and sometimes driving back of elephants, leading to further aggravation of the HWC. It will be better if a working relationship is established and minutes drawn between the two states' forest departments for implementation of common management issues, which will result in better conservation of the wildlife of the two states.
5. Singarauli District is industrially developing very fast, with a number of heavy industries and mines (coal, iron ore, limestone, etc) being established, and some of the mines are

situated close to. The forests of Singarauli District adjoin the park and are corridors for dispersal and migration of wildlife. With the fast industrialization, the survival of far-ranging wild animals can be jeopardised. The reserve may become a conflict hotspot in the future. Any further expansion or development work needs to be evaluated in terms of its impact on wild animals and their habitat. The mitigation measures for the existing mines/industries located within the impact zone (10 km from the park boundary) need to be assessed and the threats adequately addressed. The TR should beef up the protection measures against poaching in vulnerable beats adjoining Singarauli District.

6. The corridor plan prepared by the SDTR authorities is an excellent document, and to make it effective, its approval should be communicated officially by the state government. This will give administrative strength to the implementation of the plan as certain portions of the corridor pass through non-forest areas.
7. The bamboo distribution in the TR should be assessed and mapped using GIS tools. In areas where bamboo regeneration has declined, a concerted effort of fresh plantation may be made. Additionally, bamboo rhizomes can be planted along stream banks and nullahs. Bamboo seed balls can be sowed.
8. There are 71 patrolling camps and 23 check posts in SDTR, and some of them are old buildings which need urgent maintenance. The rooms in the camps need to have proper ventilation, and the amenities should be improved. Rainwater seepage inside the rooms of the camps should be appropriately addressed. Firewood use for cooking should be avoided as far as possible, and gas stoves with timely refills should be in place. A few camps have been damaged by elephants and need to be appropriately repaired with proper elephant-proofing (elephant-proof trench, solar fencing, etc.) for human safety.
9. The elephant monitoring/patrolling team should be equipped with better safety gadgets as presently only basic equipment has been provided. Though the field team has good participation of local communities, they should be exposed to similar work being carried out in Chhattisgarh (Suguja, Ambikapur, etc.).
10. Though 138 EDCs have been formed in the park, no micro plans have been prepared. Micro plans are the main basis for assessing and formulating alternate income generating programmes, reducing the dependence on fuel and fodder and developing the villages overall to compensate the loss (opportunity cost) caused by the creation of the TR.
11. The wildlife veterinary health infrastructure needs strengthening in terms of a field hospital with an animal holding (temporary) facility to cater to emergency situations. A field-based laboratory for carrying out basic laboratory work and handling biological samples may also be developed in consultation with local institutions and experts. A dedicated staff duly trained in carrying out various activities should be provided for each facility. There is a need for managing the data relating to the wildlife health activities being undertaken by the TR, including surveillance and monitoring of major diseases in and around the park, necropsy details, rescue and rehabilitation, animal treatment, preventive medicine programmes (vaccination drives, health camps) etc. at a single platform.
12. SDTR is endowed with threatened species such as the wolf, pangolin, vultures, narrow headed soft turtle, sloth bear, chousingha and Indian skimmer. It is better that a separate action plan be formulated to conserve the threatened species and monitor regularly their consolidation in the park. Wildlife research should form part of this conservation plan. Though few research studies have been carried out in the past, based on priority and fund availability, small field-based research projects addressing important management issues (grassland management, water management, habitat use and resource competition, invasive species, waterhole management, disease prevalence, etc.) may be supported.
13. With the resident population of 14 wild elephants in SDTR and likelihood of more animals passing through the park, it would be appropriate to improve the available habitat addressing the needs of growing elephant populations and also for meeting requirements of Gaur planned for reintroduction.

SATPURA TIGER RESERVE, MADHYA PRADESH

26

MEE SCORE 93.18%

Date of Evaluation
8-11 September 2022

Evaluators' Names
Sh. Azam Zaidi
Sh. Shailendra K. Singh
Sh. Kaushik Banerjee

INTRODUCTION

Satpura Tiger Reserve (STR) is located in Hoshangabad district Madhya Pradesh, which has recently been renamed as Narmadapuram district. The Satpura Range inspired the name of the region. It has an extent of 524 km^2 (202 square miles). Together with the neighbouring Bori and Pachmarhi wildlife sanctuaries, Satpura National Park offers 2200 km^2 (850 square miles) of a rare central Indian highland habitat. The national park's landscape is made up of sandstone peaks, deep ravines, little gorges and exceptionally rough terrain. There are between 300 m and 1352 m of elevation (984–4436 feet). It has the nearly level plains of Churna and the 1350 m high Dhoopgarh hill (4430 feet). There is a large and diverse wildlife population in Satpura National Park and the area surrounding it. The list of wildlife species that are now present demonstrates the unique environment and lengthy history of wildlife conservation in this woodland area. For enthusiasts of wildlife, Satpura National Park's fauna is a breathtaking jungle feast. The park is home to 30 species of reptile, 50 species of butterfly, 254 species of bird and 50 species of mammal. Along with the important species, the tiger, the wildlife in this area also includes the Leopard, Sambar, Chital, Barasingha, Indian Muntjac, Nilgai, Four-horned Antelope, Chinkara, Wild Dog (dhole), Wild Boar, bear, Indian Fox, Porcupine, Flying Squirrel, Mouse Deer, and Indian Giant Squirrel. There are numerous kinds of birds. Peafowl and hornbills are frequently seen bird species here. Sal, Teak, Tendu, *Phyllanthus emblica*, Mahua, Bel, Bamboo, grasses and medicinal plants make up the majority of the flora. 10% of Satpura Tiger Reserve is designated as grassland, including the naturally occurring empty stretches on the Pachmarhi plateau, anthropogenically created grasslands produced after the evacuation of settlements and the Tawa reservoir's drawdown regions. Neemghan, Madai, Keria, Dhain, and Geetkheda are the names of these grasslands. The relocation of 29 villages from the reserve's central area has also resulted in the creation of some additional grasslands. Most of the existing grasslands are anthropogenically created and are used for grazing and cultivation. These grasslands will soon vanish if nothing is done to prevent the invasion of woody plants. The Satpura Tiger Reserve administration provides these grasslands with a high level of protection and upkeep in order to support the sizeable population of animals that rely on them.

Management Strengths

1. Satpura Tiger Reserve (STR) is one of the largest tiger habitats of the Central Indian Highland ecosystem, with representative and diverse faunal and floral elements. Due to its geographical location, it harbours elements from both the Himalaya and the Western Ghats. The natural boundaries and terrain of the tiger reserve are a major strength for the management. Due to the steep gorges, vertical scarps and the large Tawa reservoir, the terrain is very difficult to negotiate. This contributes towards the natural protection of the tiger reserve against poachers.
2. STR has an excellent habitat of miscellaneous forests with an admixture of bamboo and teak. The presence of palatable grasses under the trees of the woodlands makes them ideal habitats for wild ungulates.
3. STR is home to a second population of the endangered hard ground barasingha. A total of 78 barasingha have been translocated to STR from Kanha by the Madhya Pradesh Forest Department. Special barasingha enclosures created at Bori, Dhain and Ratibandar are well managed and have contributed in the recovery of the species in the tiger reserve. A total of 67 barasingha are ranging freely at the Bori meadows and 25 in the Malini meadows of Churna Range as on June 2022, and the population is breeding naturally.
4. The tiger reserve has an excellent water regime with many perennial streams and water sources. STR constitutes a significant catchment of the Tawa and Denwa river systems together with their tributaries that drain into the Narmada River, which ensures the water

security of the landscape. The 225 km^2 Tawa reservoir created by its namesake dam, besides representing the lifeline of the inhabitants of Narmadapuram, Chindwara and Harda districts, has made a most significant contribution within its command area to the economy in the agriculture sector. The sustenance of the reservoir, the river systems and the regional economy owes to the catchment capability of the forests in STR.

5. STR represents significant cultural values in its 55 prehistoric rock-shelters and pictographs, which are dated between 5000 and 10,000 years before the present. Besides there are monuments of other cultures of the past, historic and colonial buildings replete with anthropological, socio-cultural, historic and archeological importance. These together with the natural values, including the scenic points along the Pachmarhi plateau, and the reputation of the township as one of the few least disturbed hill resorts in the country constitute a repository of eco-tourism opportunities to the benefit of the local communities.
6. STR supports the natural linkage between Pench Tiger Reserve, on the eastern side, and Melghat Tiger Reserve, on the south-west, even though the forests are fragmented due to habitations, railway lines and coal mine operations outside the area.
7. From the year 2004–05 to 2021–22, STR relocated a total of 49 villages from the tiger reserve, out of which 30 villages consisting of 1485 units were forest villages and 19 villages consisting of 3645 units were of revenue villages. All the villages have been relocated from the core area. So all the immediate threat-causing factors like fire, grazing, fishing, encroachment and poaching have mostly been removed. Also, 13 villages have been relocated from the buffer area, which has reduced lot of biotic pressure on the buffer and corridor areas. The tiger reserve management has been able to declare relocated villages as revenue villages, which ensures better support from local communities.
8. STR has developed grasslands of palatable grass species on relocated villages sites. Manpower has been deployed for regularly weeding out undesired species in accordance with advice of a grass expert. The grasslands and drawdown areas were found to be free of weeds.
9. The eco-sensitive zone of the tiger reserve has been notified, and a Zonal Master Plan for STR has been prepared and approved by the Government of Madhya Pradesh, which is a welcome step as such an initiative is not seen in most of the tiger reserves in the country. In this Zonal Master Plan, all ecologically fragile areas have been identified and mapped, and all the developmental activities are listed. Provisions have been made to improve the landscape through identifying thematic areas and streamlining all developmental and eco-tourism activities.
10. The tiger reserve management has been extremely successful in mobilizing external funds and resources from different donors and conservation partners under Corporate Social Responsibility schemes. These permit the management to carry out essential operations such as grassland management, weed removal and soil moisture conservation works unhindered.
11. STR has an excellent protection regime represented by the presence of 184 patrolling camps, adequate vehicles and boats for patrolling, a dog squad, elephant teams, etc. In the year 2021–22, the total patrolling effort made by the tiger reserve using M-STrIPES was 540,785 km against the target of 316,800 km.
12. The tiger reserve is a stronghold for wildlife research, and it has deputed a field biologist. STR has active collaborations with institutes and universities of international and national repute to carry out research relevant for management.
13. The considerably long tenure and proactive leadership of the Field Director has boosted up the morale and motivation of the frontline staff, which has been reflected in the overall improvement of the park.

Management Weaknesses

1. The tourist and pilgrim influx in Pachmarhi poses a considerable threat to the tiger reserve since it causes a lot of disturbances in the park and creates issues pertaining to plastic pollution and garbage disposal.
2. The delay in the procurement of wireless sets for the tiger reserve is a matter of concern.
3. The Betul–Bhopal highway (NH 46) passing through the Satpura–Melghat corridor near Kesla Ghat causes hindrances to wildlife movements.

Immediate Actionable Points

1. The tiger reserve should initiate a scientific study on carbon credit and sequestration to understand its role in climate change mitigation.
2. Sample plots need to be laid in grasslands of STR for monitoring them scientifically. Efforts can be made to understand the impact of village relocations on abiotic factors (water, air, soil quality).
3. STR should establish a well-equipped, state-of-the-art training cum orientation centre for conducting regular training and refresher courses for the frontline staff of Satpura and other tiger reserves and protected areas of Madhya Pradesh.
4. Collaborations should be made with the Special Area Development Authority (SADA) and Cantonment Board in Pachmari by the STR management for waste management and garbage disposal.
5. As a part of the implementation of the Zonal Master Plan, land use patterns hostile to tiger conservation in the landscape should be regulated as per extant legal provisions. All road and railway infrastructure in and around STR should be appropriately mitigated with smart green technologies (animal passage structures, etc.) for maintaining the landscape permeability for uninterrupted dispersal of tigers and other wildlife.

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MAHARASHTRA

BOR TIGER RESERVE

27

MEE SCORE 77.27%

Date of Evaluation
30 August to
2 September 2022

Evaluators' Names
Sh. Bishan Singh Bonal
Dr. Sandeep Tripathi
Sh. Shailesh Prasad
Dr. Gautam Talukdar

INTRODUCTION

Bor Tiger Reserve of Maharashtra was notified on 16 August 2014, with an area of 138.12 km^2 as the core comprising Bor Sanctuary (61.10 km^2), New Bor Sanctuary (60.70 km^2) and the extended New Bor Sanctuary (16.32 km^2). It became the 47th tiger reserve in India and the sixth tiger reserve in Maharashtra State. A total adjoining area of 678.15 km^2 (355.83 km^2 of forest area and 322.32 km^2 of non-forest area) was declared the buffer area of Bor Tiger Reserve on 4 December 2015. It is located in Seloo Tahsil of Wardha District and Hingana Tahsil of Nagpur District in Maharashtra.

The tiger reserve represents a typical assemblage of the Central Indian flora and fauna. Though smaller in size, this tiger reserve is a stepping stone within a larger landscape comprising several important tiger reserves and protected areas in the Central India landscape. It is well connected through corridors with Tadoba Andhari Tiger Reserve, Pench Tiger Reserve, Melghat Tiger Reserve and Umred–Paoni–Karhandala WLS.

The core area of Bor Tiger Reserve is under the administrative control of the Field Director, Pench Tiger Reserve. Bor (Wildlife) Division is headed by the Division Forest Officer (Wildlife), Bor Sanctuary, Nagpur. At present the buffer area of the tiger reserve is under the administrative control of the Wardha and Nagpur territorial forest divisions. During the MEE it was been suggested that the buffer areas too be brought under the unified control of the Field Director .

The core area of the tiger reserve is divided into two ranges, namely Bor (wildlife, with an extent of 61.10 km^2, having two round offices, eight beats and 38 camps) and New Bor (wildlife, with an extent of 77.02 km^2, comprising two round offices, 10 beats and 32 camps headed by the DFO/DD, Bor Wildlife Division and supported by the SDO WL, Seloo.

There is a proposal submitted for reorganisation of administrative units in buffer area (355.82 km^2) under the unified control of the Field Director with three ranges (1) Kawadas Range (88.43 km^2), with two rounds and nine beats, (2) Hingani Range (133.55 km^2), with three rounds and 13 beats and (3) Bangdapur Range (133.84 km^2), with three rounds and 13 beats.

BTR has no STPF; however it has all sanctioned posts filled except six posts of FGD. Besides the sanctioned posts, 60 labourers are deployed and posted at different protection camps and check posts on a temporary basis to assist the Forest Guards for protection.

Management Strengths

1. Bor Tiger reserve is an active "stepping stone corridor" for tigers moving within the Vidarbha landscape. As such it has the potential for fostering tiger meta-population dynamics through tiger gene flows between small populations and between tiger source areas (Pench, Melghat).
2. BTR is an important catchment for several rivers and rivulets in the region.
3. BTR has the potential to be a model for eco-tourism to benefit local communities by providing livelihood opportunities in the buffer.
4. BTR has the opportunity to undertake the relocation of five adjoining villages that are willing to move out. And notifying the area as a wildlife sanctuary would lead an increased inviolate space in BTR.
5. There are no cases in the last three years as per MODIS fire data of FSI and very few in earlier years in BTR.
6. The tiger population of the TR is nine (two males, seven females), which is optimal, considering the estimated tiger carrying capacity of 8–14 of BTR.

7. A number of innovative measures have been taken by BTR to retain water for the pinch period, by the construction of Gabion bandhara and Hybrid culvert with an elevated wall on one side, which helps in retaining water.

Management Weaknesses

1. The core and buffer of BTR are not under a unified control. Moreover, the size of the core is small, compared with the larger peripheral buffer.
2. Proximity to a large number of human settlements in the periphery, with resource dependence leading to biotic interference, including vulnerability to man-made fires and poaching. In the absence of land use guidelines, mushrooming of resorts in the adjoining areas is likely.
3. Varied land uses in the buffer landscape increase the chances of a human–tiger interface.
4. Lack of water retention in the substratum aggravates water scarcity during the summer months.
5. Fishing in late hours in the Bor backwaters still continues, which disturbs the wildlife.
6. As there are fewer registered Gypsy vehicles under MoUs with private operators, private vehicles of tourists are also allowed, which is not ideal as per protection security protocols.
7. There is inadequate CSS funding to the TR in the last two years, which is putting a strain on the smooth management of the TR.
8. The TR is highly vulnerable to weed infestation, particularly *Hyptis* and *Lantana*.
9. The habitat is primarily teak along with *Butea* and associates. There is very little grasslands but for areas of the relocated Navargaon village, which has good fodder growth.

Immediate Actionable Points

1. The core, with only two ranges, and the buffer area, proposed to have three ranges, should be brought under the unified control of the Field Director, PTR to facilitate tiger-focused protection and management strategy in the buffer area. As the issue is pending with the state for long, NTCA may issue a suitable reminder to the state government.
2. Expeditious action needs to be initiated to relocate the five willing villages by declaring the area a sanctuary in the Bor buffer area to make the buffer area more suitable for tiger habitation and dispersal.
3. The new draft TCP for the period 2021–22 to 2031–32 has been submitted to CWLW. It is therefore incumbent on the part of PTR/CWLW to move to the NTCA for its expeditious approval.
4. Since 2019, a meeting of the steering committee has not been convened. The meeting should be convened as per the provisions of WPA, 1972.
5. The importance of Bor as a stepping stone corridor has been established. With the protection now afforded by its current status as a TR, notifying the buffer as a wildlife sanctuary and reorganizing will potentially create a viable tiger population. The presence of breeding tigresses strengthens this view.
6. The shape and design of BTR (a small core surrounded by a human-dominated large buffer) make it vulnerable to negative interactions between humans and wildlife, especially between humans and tigers, as evident from six human kills by tigers in the last 2 years. Thus flexible management strategies should be adopted to cope with HWC in the future.
7. The huge reservoir of the dam on the Bor River under the control of the irrigation department, located in the centre of the CTH, causes disturbances to wildlife. At the same time, in some way it is an advantage for the wildlife. Therefore, for its protection, it is advised that a proposal be initiated for declaring it a "conservation reserve" by bringing the matter to the Steering Committee.
8. An appropriate protocol should be developed by BTR for preventing fishing in the late hours in the Bor reservoir, which causes disturbances to the wildlife.

9. The poor water retention potential of the substratum aggravates the water scarcity during the summer months. Large-scale water conservation measures should be adopted.
10. There are only two tourist check gates, i.e., Bordharan and Adegaon. The Adegaon route remains submerged in the water for a long period, thus necessitating a Tourist Tract Rationalization Plan to augment the diminishing tourism revenue.
11. The BTR management should expeditiously take steps for availing CSS funding, which has been zero in the last two years.
12. The BTR management should make appropriate measures to attract more CSR involvement in different management and protection activities of BTR.
13. To prevent the haphazard mushrooming of resorts around the BTR, the Tourist Carrying Capacity must be worked out and a proposal brought to the Local Advisory Committee for the revenues dept to issue appropriate instructions restricting resort construction as per the carrying capacity of the TR.
14. Though the staff vacancy positions are very few, there are only 54 sanctioned staff positions to manage the core area, which needs to be augmented pending the merging of the buffer and core and brought under unified control.
15. Expeditious steps to be taken for placement of a full-time permanent veterinarian to cater to the pending wildlife health and mitigation issues.
16. As there is very little grassland in the TR, except in the relocated Nawargaon village, with no assessment of the grassland area percentage, there is a need to create grasslands in open spaces to cater to herbivores' needs by consciously removing undergrowth.

Rathika Ramasamy

MELGHAT TIGER RESERVE, MAHARASHTRA

28

MEE SCORE 84.85%

Date of Evaluation
20-24 September 2022

Evaluators' Names
Sh. Brij Kishore Singh
Dr. Anup Kumar Naik
Sh. Surendra Kumar
Sh. Sanjay K. Srivastava

INTRODUCTION

At the northern extreme of Amravati district of Maharashtra, on the border of Madhya Pradesh, lies Melghat in the South-Western Satpura mountain ranges. Melghat means 'meeting of the ghats', which describes the area as a large tract of unending hills and ravines scarred by jagged cliffs and steep climbs. Melghat was declared a tiger reserve in 1974. Presently, the total area of the reserve is around 2768.52 km^2. The forest is tropical dry deciduous in nature, dominated by teak (*Tectona grandis*). The reserve is a catchment area for five major rivers: the Khandu, Khapra, Sipna, Gadga and Dolar, all of which are tributaries of the river Tapti. Many different kinds of wildlife, both flora and fauna, are found here. Tapti River and the Gawilgadh ridge of Satpura Range form the boundaries of the reserve. Climate of Melghat varies due to variation in altitude, and there are three distinct seasons viz. Monsoon or rainy, Winter & Summer. The area experiences a good rainfall during monsoon which varies from 950 mm to 1400 mm with average number of rainy days being about 60 to 65. Temperature varies considerably with altitude. The high hills, plateau and valleys to the north of Gavilgarh ridge are cooler in summer than the southern foothills. The plateau and high hills enjoy almost equitable pleasant climate throughout the year. The average mean maximum annual temperature is 46°C. and the average mean minimum temperature is 4°C.

When a tiger census was conducted in 1972 Indian Government was alarmed to find only 1800 tigers as against 20000 to 40000 estimated at the turn of the 20th century. This led the Government of India under the then Prime Minister Smt. Indira Gandhi to set up Project Tiger in 1973 on the matter of tiger conservation. Nine tiger reserves were established in the first phase in the country during the year 1973-74. Melghat Tiger Reserve was one of these nine tiger reserves and came into being on 22nd February 1974. Initially it was over an area of 1571.74 sq. km. This was the first tiger reserve to be declared in the state of Maharashtra, which subsequently got expanded to 2029.04 sq. km. Gugamal National Park, which forms the core area of the reserve, has an area of 361.28 km^2. carved out in 1987. The mystic landscape of Melghat has vast tracts of inviolate natural forests consisting of unique and representative ecosystems with rich biodiversity and varied habitats offered by deep valleys (locally known as 'khoras') and high hills (locally known as 'ballas'), daunted with rivers and 'nallahs having water all the year round in the 'dohs".

Management Strengths

1. The TR is a large forested landscape with a good buffer around the core area and supports many rivulets of the River Tapi.
2. The TR receives good support from local people, particularly in buffer areas, where there are homestay facilities adventure tourism has been taken up with their participation. Hired specialists like a livelihood expert, eco-tourism manager, M-STRiPES expert, and computer teacher engaged from the Foundation are doing a good job. An exemplary livelihood initiative through the development of the skills of local youth is in place through the efforts of the management.

Management Weaknesses

1. In the last ten years, TR has lost 19.36 km^2 of its forest cover, according to the most recent ISFR 2021. The TR management has not conducted any research to map the area of losses or to identify the causes of such losses.
2. The economic values of TR are not well monitored.
3. The relocation of six villages has been going on for a while. After the MEE of the IV cycle, no notable advancements have been made. One family resides in Pili village, and the management has not made sufficient attempts to remove that family. Similarly, Pastalai only has five families left, and it is said that left-wing extremism supports them. The priority of the entire state administration, not only the TR management, is to remove these families.
4. Three roads in Sipna Division in the core area of the TR are all being considered for renovation: the Chaurakund–Khopan–Kholmar road, Karanjkheda–Hatru–Raipur–Semadoh Road (Part 3) and Karanjkheda–Hatru–Raipur–Semadoh Road (Part II). After a visit from the CEC, a suggestion is anticipated. Making the TR independent of the communities would be challenging.
5. The MEE crew examined the tiger reserve's Sipna, Gugamal, and Akot divisions' Chaurakund, Harishal, and Shahnur ranges' forest offence registers. Aside from grazing and fire-related offences, cases involving illegal felling of teak and other timber species, as well as pole crops manufactured from these species, have also been reported, but no steps have been taken to identify the perpetrators or to bring them to justice.

Immediate Actionable Points

1. The decadal assessment of change in forest cover within Melghat Tiger Reserve (MTR) by Forest Survey of India, Dehradun during the period between IFSR 2011 (2008–09 satellite data) and IFSR 2021 (2019–20 satellite data) was carried out primarily to assess the impact of various conservation measures and management interventions during the period. As per the change analysis matrix, it is observed that the forest cover during IFSR 2011 was recorded as 1866.34 km^2 and in IFSR 2021 as 1846.98 km^2 with an overall loss of 19.36 km^2 (-1.04%). As per the above data, without going into the details of the areas of change in the canopy class (>10%), there is an urgent need to verify the locations where a loss of 19.36 km^2 has been reported by the acquisition of data from FSI and analysing the same in the spatial domain and taking corrective measures.
2. As per the report titled 'Status of Tigers, Co-predators and Prey in India, 2018', the sambar was the most abundant ungulate, with a density of 2.55/km^2, but the same appears to have gone down in the subsequent enumerations: 2.07/km^2 (2019) and 1.60/km^2 (2020). Similar reductions are observed in the Chital, Barking Deer and Nilgai, whereas increases are seen in the gaur and wild pig. Also, during the same period, substantial livestock depredation is also seen with 138 nos (2018), 113 nos (2019) and 77 nos (2020) in the 3-year period. However, there is now a decreasing trend, i.e., livestock depredation. Considering the low prey base, the related livestock depredation and the subsequent resettlement of the villages, it is all the more relevant to plot the prey–predator population and livestock depredation in a spatial domain on the LULC map and the same needs to be monitored for any management intervention.
3. During the inspection of the Memna, Vairat, Gularghat, Dhargad, Kelpani and Bori rehabilitation sites after the relocation of villages from the core of the TR, very good natural grasslands for ungulates and bovids were observed. At the same time, the habitat utilization by wildlife in the relocated sites appears to be quite restricted. It should be borne in mind that the chital population, though the animal is a prolific breeder, is abysmally low in in the reserve and may need management interventions.
4. Melghat Tiger Reserve has a good network of anti-poaching camps (APCs) in the sensitive areas and fringes, with the basic facilities required by the protection staff. During the visit, the APCs at Harisal, Memana, Morjhari and Narnala were inspected. The camps are located at vantage points and have the requisite facilities. However, the camps do require a changed strategy in terms of wildlife offence detection, with the establishment of an intelligence network, keeping in view the low prey base and the related availability of suitable wildlife habitats in the reserve. Besides, some the APCs need to be equipped with proper gear. The Anti-poaching Watchers need to be supplied uniforms, and the officers

need to carry out regular monitoring and inspection. The patrolling staff are contracted for a short duration, and they generally lack the required patrolling equipment.

5. Melghat Tiger Reserve has a fire management plan with a dedicated fire control unit in place. As part of the forest fire management, a fire sensitivity map has been prepared for fire prevention. It is a known fact that all fires in the reserve are man-made and there has been a reduction in the incidences over the last few years; still, the fires in Melghat require intensive management due to their deleterious effect on the wildlife habitat. It is suggested that a strategy be developed based not only on a sensitivity/vulnerability map but also on quantifying various causative factors for having a geo-information system approach to developing forest fire likelihood and envisaging steps for a more focused preventive strategy.
6. Melghat Tiger Reserve has many seasonal rivers with boulder beds and major rainwater is lost as runoff, and hence, water becomes a limiting factor in habitat utilization and wildlife distribution. Many measures have been taken by the Reserve for providing access to natural water sources as well as creation of artificial water sources but it also needs to focus on the conjunctive use of surface water and ground water resources in water management. The vesicles and amygdaloids of basalt along with perched water table on plateau area (Chikaldhara, Makhla)in the Deccan trap soil serve as good ground water sources and same could be replenished by percolation trenches for utilization during the pinch-period by tapping such aquifers. The underground reservoirs/resources could be identified with the help of the Ground Water Board or using remote sensing technology or in collaboration with some research institution for developing an integrated water management and utilisation plan for the wildlife.
7. As per the summary report on the status of tigers, co-predators and prey in India (2018) (NTCA, TR No./2019/05), the tigers were increasing at a rate of 6% per annum in India when consistently sampled areas were compared from 2006 to 2018. However, the data in respect of Melghat (MTR) in the last three enumerations indicate an increase by almost 100% in a 4-year cycle as follows: 13 nos. (2010), 25 nos. (2014) and 47 nos. (2018).
8. It would be worthwhile to plot the last three enumeration's data in the spatial domain, and the explanation for the two spurts in the population could be substantiated by establishing the prey–predator relationship and habitat considerations.

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NAWEGAON NAGZIRA TIGER RESERVE, MAHARASHTRA

27

MEE SCORE 83.33%

Date of Evaluation
20-23 September 2022

Evaluators' Names
Sh. Bishan Singh Bonal
Dr. Sandeep Tripathi
Sh. Shailesh Prasad

INTRODUCTION

Nawegaon-Nagzira Tiger Reserve (NNTR), Gondia was notified as the 44th tiger reserve of India and the fifth tiger reserve in the state of Maharashtra on 12 December 2013. Geographically, NNTR is situated between latitudes 79° 42' E and 21° 21' N and between longitudes 80° 10' E and 21° 06' N. Administratively, it is located in the central part of Gondia and Bhandara districts in the north-eastern corner of Maharashtra. NNTR encompasses five protected areas: (1) Nawegaon National Park, (2) Nagzira Wildlife Sanctuary, (3) New Nagzira Wildlife Sanctuary, (4) Nawegaon Wildlife Sanctuary and (5) Koka Wildlife Sanctuary. The total area of NNTR is 1894.90 km^2, out of which 656.36 km^2 forms the core area and the remaining 1241.24 km^2 is part of the buffer region. NNTR has also declared the eco-sensitive zone under the Environment (Protection) Act, 1986, with a total area of 2333.39 km^2. Strategically, the tiger reserve is located in the heart of the Central Indian Landscape and provides corridors to other tiger reserves located in the southern and northern parts of India. The region comes under Tropical Dry Deciduous Forest 5A/C3, as per Champion and Seth's classification of Indian forest types. This area provides an excellent habitat for almost all the major floral and faunal species found in Central India.

For administration, NNTR has a comparatively young frontline staff (field staff and STPF), with few vacancies in the frontline staff. NNTR has a total of 187 sanctioned posts, out of which 157 are filled and 30 are vacant. Key positions, viz., DFO, ACF and Forest Guard cadre, are vacant. Apart from the field staff, NNTR has 112 sanctioned posts of the Special Tiger Protection Force (STPF), out of which 105 have been filled (around 42% of them are women). NNTR also has one Rapid Response Team (RRT) with supporting logistics, veterinary facilities and a dedicated vehicle and one sniffer dog unit dedicated to all types of field operations. The Phase-IV data show an increasing trend in the tiger numbers of NNTR: 8 (3:5) with 2 sub-adults and 9 cubs in 2022 as against 6 (3:2:1) in 2013, 3 (1:2) with 3 cubs in 2014, 7 (3:4) in 2015, and 8 (5:3) with 5 cubs in 2018.

Management Strengths

1. The landscape of Nawegaon Nagzira Tiger Reserve is connectivity with six TRs (Achanakmar, Kanha, Satpura, Melghat and the twin Pench TRs) in the north and three TRs (Tadoba Andhari, Indravati and Kawal TRs) in the south.
2. NNTR has a rich biodiversity and is an excellent habitat for wildlife, with a good number of water sources, both natural and artificial. The NNTR landscape acts as a critical catchment area for the Vainganga, Chulbandh and Gadvi rivers.
3. NNTR has an effective protection strategy, with 69 anti-poaching camps and 16 check posts in place for the protection of the area.
4. The core of NNTR has no human settlements as all five villages have been successfully relocated outside the Critical Tiger Habitat.
5. Adequate and comparatively young staff (Field staff and STPF) with few vacancies in the frontline staff.
6. In 2016, NNTR notified a 1241.27 km^2 buffer area under the Wild Life Protection Act, 1972 and a 2333.39 km^2 eco-sensitive zone under the Environment (Protection) Act, 1986.
7. NNTR has total of of 105 STPF staff members (112 sanctioned posts, with around 40% women) with a Rapid Response Team (RRT) having a sniffer dog unit with supporting logistics such as a drone, a well equipped vehicle, essential veterinary facilities, etc.
8. NNTR has taken good advantage of Dr. Shyama Prasad Jan Van Vikas Yojana through comprehensive eco-development of villages in buffer area of NNTR providing livelihood opportunities which has led to reduction in biotic pressure on the forest area. Out of a total

of 185 villages in the buffer of NNTR, 140 have EDCs. There are ample opportunities of generating livelihoods and good revenues for local people through eco-tourism activities at the 10 entry gates.

9. NNTR has actively pursued the involvement of various stakeholders right from the planning phase to the execution phase. Also, the management has involved other departments in the districts such as the revenue department, police and MSEB for augmenting the conservation efforts by organising proper coordination meetings from time to time.
10. NNTR is easily accessible by road and rail from cities like Nagpur and Gondia in Maharashtra, Balaghat in Madhya Pradesh and Rajnandgaon, Bhilai and Raipur in Chhattisgarh. There is immense potential for eco-tourism and allied livelihood opportunities for local communities. Also, such connectivity gives enormous opportunities for wildlife and biodiversity studies and research in the landscape.
11. NNTR has put excellent efforts aimed at regulating traffic at night on the roads passing through the CTH of the NNTR landscape.

Management Weaknesses

1. NNTR has a fragmented habitat with two separate administrative blocks connected with a highly fragmented landscape, along with a high boundary-to-area ratio, which puts pressure on the management and protection efforts.
2. Fragmentation of the corridor and buffer area due to linear development activities such as the Mumbai–Howrah and Gondia–Chandapur railway lines, NH-53 (old NH-6) and the Tumsar–Sakoli and Sakoli–Tirora state highways, posing long-term threats to the tiger reserve.
3. Although the initiative to bring the buffer area under the unified control of the NNTR authorities has been started, it is yet to materialize. As of today, the buffer zone is under the control of the FDCM, Bhandara, Territorial Bhandara and Territorial Gondia forest divisions.
4. The area under grasslands (meadows) is very small as the landscape has dense vegetation cover with a profuse under-storey, leaving little scope for the growth of fodder species. This is affecting the prey base, which is very low at present. Further, Koka Wildlife Sanctuary and New Nagzira Wildlife Sanctuary, transferred from FDCM division, have a teak plantation that spreads over 50% of both sanctuaries, with limited scope for providing fodder.
5. A community forest rights (CFR) area still exists inside the Critical Tiger Habitat up to an extent of 3.25%, which is around 2000 ha.
6. Presence of left-wing extremism reportedly inside Nawegaon Block of NNTR, affecting the regular wildlife management and protection works.
7. Buffer area having human–wildlife conflict issues due to the high density of villages (185 villages) in the buffer zone, exerting high anthropogenic pressure along the periphery of the core and in the buffer zone.
8. NNTR is having inadequate infrastructure, with 263 out of 398 offices/residential buildings required for FD/DD/ACF/RFOs and the frontline staff. Particularly, 96 residential quarters are required for the STPF salary (total strength 108). Also, the number of vehicles that have become unserviceable and are putting a strain on the smooth management and surveillance in the tiger reserve.
9. There are vacancies in key positions (one DFO, five ACFs and 35 Forest Guards/STPF), which are affecting the smooth management and anti-poaching/conflict-mitigation/rescue operations.
10. Overall, signage and gates of appropriate standards are visibly lacking. Interpretation centres and basic amenities for visitors are lacking.
11. The existing manpower in NNTR lacks specialized wildlife trained officers and field staff members.
12. The release of funds from the state government is generally delayed. It is observed that NNTR is yet to receive the full amount under CSS-PT from the state. Consequently, the salary payment for the STPF staff has been delayed and is pending since October 2021. Further, funds from the state scheme are not released in a timely manner. NNTR is heavily dependent on district funds and the meagre foundation funds available for priority activities and maintenance of the civil infrastructure.

13. FDCM is still operating tourism activities at the centre of the core area at Nagzira Sankul in Nagzira Wildlife Sanctuary, which is putting anthropogenic pressure on the habitat.
14. The barbed wire and concrete fencing of the plantation area observed adjacent to the core area is affecting the movement of wildlife from the core area.
15. There is no sanctioned post of veterinary doctor in NNTR.

Immediate Actionable Points

1. As the area under grasslands (meadows) is very low in NNTR due to the dense vegetation cover with a dense under-storey, there is little scope for the growth of fodder species. This is affecting the prey base, which is very low at present, except for the area retrieved after village relocation. Therefore, there is an urgent need for removal of the undergrowth, weed removal on a consistent basis and removal of unsuitable vegetation growth in the entire landscape of NNTR to facilitate the creation of meadows to address the issue of the low prey base.
2. The buffer area is still under the control of the FDCM and territorial divisions and has not yet been brought under the unified control of the Field Director, NNTR. The matter should be taken up with the appropriate authority for issuing an expeditious notification in this regard.
3. NNTR has identified 13 villages situated in the buffer area at very strategic locations regarding the core zone which have a high-impact disturbance factor. Relocation of these villages will reduce the boundary-to-area ratio of NNTR. Hence, NNTR may consider submitting a proposal to the government on the lines of TATR for considering the relocation of these buffer village as done in Madhya Pradesh and Odisha, where relocation of villages from PAs/RFs/corridors is also permissible.
4. Nawegaon Bandh, a historical, renowned place with an area of 1200 ha is located in Arjuni Morgaon Taluka, which is under the control of the irrigation department. NNTR may take steps to create livelihood opportunities through various eco-tourism activities in Nawegaon Bandh in collaboration with other line departments.
5. There is no sanctioned post of Veterinary Officer in NNTR, and presently one contractual veterinary officer is engaged through the Foundation. Efforts should be made to get the sanctioned post of Veterinary Officer from the government and to make the recruitment at the earliest.
6. NNTR had submitted a proposal titled “Capture, Translocation and Release of Sambar and Chital at Selected Sites in NNTR” in 2019 and had in 2022 requested the state government to implement the same. The matter may be pursued with the state government to address the issue of the low prey base in NNTR.
7. As the population of tigers in NNTR remains less than 10, well below the estimated carrying capacity of 20, the MoEF&CC, approved the proposal of the state government on 15 September 2022 for the radio collaring and conservation translocation of four or five female tigers from the Bharampuri landscape to NNTR. NNTR may expedite the implementation. However, it may ensure that the issue of the prey base and habitat development is addressed following appropriate security protocols.
8. Though the Steering Committee was constituted by the state government in 2008 and revised in 2013, no Steering Committee meeting has taken place since 5 December 2018. Action may be taken by the state government to convene Steering Committee meetings on a regular basis.
9. There are a number of vacancies in the management and the key frontline staff, with one at the DFO level, five out of six at the ACF level and 35 out of 247 at the Forest Guard/STPF level. The management may immediately appeal to the government to fill up these vacancies.
10. There is inadequate infrastructure, with a huge requirement of 263 out of 398 offices/residential buildings/APCs for FD/DD/ACF/RFOs and the frontline staff. Particularly, 96 residential quarters are required for the STPF staff (total strength 108). Also, the number of vehicles that are unserviceable is putting a stress on the smooth management and surveillance in the tiger reserve. Due to the meagre funds in the Foundation, urgent support from state funds/CAMPA/DPDC and CSS-PT is required. NNTR may pursue the matter to access funds from the above sources.

11. Overall, signage and gates of the appropriate standards are visibly lacking. Interpretation centres and basic amenities for the visitors are lacking. Therefore, upgrading the signage with information in two languages, establishment of tourist entry gates of appropriate standard along with basic amenities for visitors and establishment of an interpretation centre are urgently required to ensure effective information dissemination.
12. The FDCM is still conducting tourism activities at the centre of the core area at Nagzira Sankul in Nagzira Wildlife Sanctuary, which is putting anthropogenic pressure on the habitat. Therefore, immediate action is to be taken for NNTR to take over the said facilities and notify the area as the core of NNTR.
13. Efforts should be made to depute officers and staff members for specialized wildlife training to the appropriate institutions as and when the opportunity arises.
14. The release of funds from the state government is generally delayed. It is observed that NNTR is yet to receive the full amount under CSS-PT from the state. Consequently, the salary payment for the STPF staff is delayed and is pending since October 2021. Appropriate immediate action may be taken to get the remaining CSS-PT grant from the state government.
15. As human–wildlife conflict is frequent in the buffer area and NNTR is divided into two separate blocks, there is a need to create an additional RRT unit to ensure smooth conflict management in both the blocks.
16. Research projects may be undertaken through various institutions, universities and colleges in NNTR: traffic flow studies to regulate the traffic on state highways, studies on the dhole/wild dog, size of dhole pack, behaviour and impact on the dispersal of the tiger population and status surveys of threatened species other than the tiger in NNTR.
17. The range offices do not have lock-up rooms. It is envisaged legally that there will be separate lock-ups for males and females. The state government needs to ensure this by suitably modifying the plans/estimates of the range offices being constructed in the state henceforth.

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PENCH TIGER RESERVE, MAHARASHTRA

30

MEE SCORE 90.91%

Date of Evaluation
27-30 August 2022

Evaluators' Names
Sh. B.S. Bonal
Dr. Sandeep Tripathi
Sh. Shailesh Prasad
Dr. Gautam Talukdar

INTRODUCTION

Pench National Park came into being when the Government of Maharashtra declared its intention to constitute the protected area with an extent of 257.26 km^2 (vide gazette notification no. PGS 1375/121758-F I dated 22 November 1975). Later on Pench National Park was declared as the 25th tiger reserve of India (vide Government of India letter F No. 1-1/96-PT, dated 18 February 1999 and Government of Maharashtra resolution no. WLP-1095/CR-110/F-1 dated 23 February 1999). Pench Tiger Reserve comprises seven ranges which are separated by the Pench River. The forest is of the Southern Tropical Dry Deciduous type, in which teak is substantially present. Important carnivores in its faunal wealth are the tiger, leopard, wild dog, jackal, hyaena, jungle cat, etc. The herbivores include the sambar, nilgai, gaur, chital, barking deer, chausinga, wild boar and bear. Pench Tiger Reserve, along with the adjoining forests of Pench Tiger Reserve (MP), forms an important joint conservation unit. The forests of the park are major catchments for the Totladoh reservoir and play an important role in ensuring water availability in and around the TR as well as Nagpur city.

Pench Tiger Reserve, Maharashtra was notified in 1999 with a total area of 741.41 km^2, consisting of a 439.41 km^2 core and a 301 km^2 buffer, which was earlier notified as Pench National Park in 1975. Pench forms a crucial link with Pench (MP), Kanha, TATR, Bor, and NNTR, which makes it the pivot of the Central Indian Landscape. Only village Fulzari is left in the core. There are seven ranges. 1001 species of angiosperm, 71 species of mammal, 310 species of birds, 53 species of reptile, etc have been reported. The TR forms major catchments that ensure that water is available in Nagpur city. The TR has seven ranges. Paoni UC and Nagalwadi ranges are in the buffer, and East Pench, Devalapar, Chorbahuli, West Pench and Saleghat ranges are in the core area. Pench Tiger Reserve received the CA/TS accreditation in 2021.

During the first scientific camera-trapping exercise of the area in 2008, a total of nine tiger individuals were captured, and according to the latest report of Wildlife Institute of India (2020), the number of tigers is 44. Phase IV monitoring and monitoring of mitigation measures are undertaken every year with the help of WII. Camera traps are being deployed by the staff throughout the year. Information about individual tigers is being tracked and tiger movements being monitored through a tiger monitoring register and camera trap data analysis. Animal crossing points are being monitored through CCTV cameras. The TR is regularly sharing Phase IV data with MP and Territorial forest for knowing the movements of the tigers beyond the boundary.

Habitat restoration work after removing all the buildings of irrigation department, Totladoh colony under NAFCC and developing meadow and high density plantation, MIYAWAKI is a highly appreciable model project. SMC works are being undertaken on the basis of the watershed approach.

PTR is using M-STrIPES extensively. The TR has increased the number of protection huts from 57 to 63 (1 PH per 11.76 km2) with basic facilities (water, toilet, solar power, separate kitchen, library, carom boards and other playing equipment) to ensure a healthy atmosphere. Camera traps are being placed at all possible entry points of the TR for monitoring trespassing. An effective intelligence network has been created. The secret fund is being used effectively.

There are 81 STPF staff sanctioned for protection purpose. A Joint meeting and operations are being undertaken with territorial staff , Pench MP, police etc.

Aerial Bunch cabelling is being installed to arrest electrocution. Anti-snare drives and anti-electrocution drives are being carried out throughout the boundary areas in coordination with the police and MSEB.

Three tier system consisting of PRT (Primary Response team at village level), QRT (Quick Response team at range level) and RRT (rapid response team at division level) are in place. With 39 villages, there are 34 EDCs in PTR, and MoUs have been signed for preventing illegal grazing, illicit felling, etc. Community based agro-ecotourism such as Kolitmara project is in

operation. Livelihood support under NAFCC, Foundation tribal plan, etc. have created huge people support. The considerable benefits provided by eco-tourism activities have ensured the consistent support of the people for conservation. The community-based fire-free Pench programme got success as 37 out of 39 villages voluntarily supported the initiative, resulting in a 67% reduction in the total number of fire cases. Engaging public representatives, wildlife wardens, NGOs and other stakeholders has secured the people's confidence. Community support in voluntarily patrolling, shram dan activities, cleaning drives, plastic free Pench River is overwhelming.

The plastic-free Pench programme is an effort aimed at responsible tourism. The entire TR is being made carbon-neutral by making the entire infrastructure solar based. PTR has applied project for carbon credit and ecosystem service of the core area has been assessed , rest is under process.

PTR has a strength of 108 FGs in place against the sanctioned number of 141 FGs to be deployed in 78 beats. The average age of the staff members is 28 years, and the average area allocated to them is approximately 9.5 km^2. An MoU has been signed with HDFC to provide them insurance. Van Kalyan Nidhi is for emergencies. Emergency support for health conditions is provided from the foundation. There is an MoU with a Rotary club for regular health check-ups, and the health indicators of each staff member being preserved and monitored. There is a special email account for establishment-related grievances and follow-up. Regular staff meetings are held for staff-related issues. Shukanya Samruddhi Yojana, for supporting the girl child, is being carried out by the foundation.

Management Strengths

1. The reserve receives adequate funds from the NTCA and the state government.
2. Excellent coordination between the officers and staff of Pench TR. The average work force is young and dedicated.
3. Through the National Adaptation Fund for Climate Change (NAFCC), PTR completely restored the irrigation department project site by removing all the buildings, foundations and dumps, including restoration through fodder development/Miyawaki plantations, which is exemplary.
4. There are MoUs with WRTC and other organisations in place for disease surveillance in and around PTR.
5. Though collaboration with NGOs is limited, the TR obtains support in research and monitoring and in organising resources for management and protection such as vehicles and equipment.
6. Pench Tiger Reserve, Maharashtra together with Pench Tiger Reserve (Madhya Pradesh) is connected with Kanha Tiger Reserve, Nawegaon-Nagzira Tiger Reserve, Tadoba–Andhari Tiger Reserve and Satpura Tiger Reserve and Melghat Tiger Reserve through territorial forests. This connectivity is good for the long-term conservation of tigers in the central India landscape.

Management Weaknesses

1. The draft TCP for the period of 2022–23 to 2031–32 has been submitted to the CWLW. It is yet to be approved.
2. Though PTR receives adequate funds from the NTCA and the state government, the fund flow is erratic.
3. The experienced staff members in PTR are due for transfers, and hence there is a need to train the staff members who are next in line.
4. Illegal fishing in the Totladoh reservoir (24% of the 77 km^2 reservoir is in Maharashtra) is one of the threats that demands substantial time and effort from the management.
5. The tourism booking is online, but it has to be made user-friendly and easily accessible.
6. The website of the TR has been developed, but it is yet to be approved.
7. The social media presence is weak and needs to be enhanced (Facebook, Twitter, etc.).
8. Pench is able to levy conservation fees from hotels and resorts except for one resort, Wild Woods Resorts (Ali Arcadia).

9. A Steering Committee meeting has not been convened since 2019.
10. The Local Advisory Committee for Ecotourism requires immediate revision as submitted by PTR.
11. Pench TR Maharashtra is often confused with Pench TR MP. Renaming of the reserves may be considered so as to create separate identities.

Immediate Actionable Points

1. The TCP for the period of 2009–10 to 2019–20 has expired. The new draft TCP for the period 2022–23 to 2031–32 has been submitted to the CWLW. It is therefore incumbent on the part of PTR/CWLW to appeal to NTCA to approve the prescriptions of the existing TCP till the final approval of the new TCP.
2. Fulzari village in the core area has been only partially relocated, with 61 families rehabilitated and 57 families still remaining in the core. The PTR management should initiate a dialogue and take immediate action to relocate the balance families at the earliest to make the core area inviolate.
3. The STPF has two vacancies of RFOs out of three sanctioned positions. For smooth and effective management of the STPF, the vacancies should be filled at the earliest.
4. The salaries and food allowances of the STPF have not been paid since January 2021 because of non-receipt of the CSS grant from NTCA. NTCA may release the required funds expeditiously.
5. It was observed that the area being diverted from FDCM in Chorbahuli, Hattigota and some areas of West Pench Range has substantial teak coppice growth from the thinned-out plantations. Such growth interrupts the understorey growth of palatable grasses for herbivores. It is suggested that a committee be formed by NTCA to examine this issue.
6. The patrolling registers of beats/ranges were examined, and it was observed that both daytime and night-time patrolling are carried out regularly. But the registers are maintained only for daytime patrolling. It is advised that the night-time patrolling also be reflected both in the registers and in M-STrIPES. In addition, the patrolling registers should also be routinely inspected by higher officials.
7. Recruitment of Forest Guards (27 vacancies) was put on hold due to COVID-19. PTR is advised to take steps to fill up these vacancies at the earliest.
8. The PTR management has taken the excellent initiative to have air bunch cabling to prevent electrocution incidences over about 5 km. This should be replicated by the electricity department/PTR in other electrocution hotspots.
9. The NH 44 underpass is being actively monitored through 13 CCTV cameras and about 53 camera traps on pillars. It is suggested that the tracks/corridors which were being used by tigers and other animals in the past also be monitored. Further, it is suggested that provisions be made for a light and sound barrier along NH 44.
10. The range office should have separate lock-up rooms for both males and females as per security audit guidelines of NTCA.
11. The provision for levying conservation cess from all the resorts and hotels should be implemented firmly. In this regard, Wild Woods Resorts (Ali Arcadia) also needs to be made accountable.
12. The issue of transfers of the STPF staff should be adhered to as per NTCA guidelines. The transfer policy for the other frontline staff members, needs to be revisited.
13. The intended proposal by PTR for rationalisation of Nagalwadi Range into two ranges, i.e., North Nagalwadi and South Nagalwadi ranges, should be considered by the state government to ease the accessibility and management constraints.
14. The constraints being faced by PTR in regard to the disbursement of the salaries of the STPF could be taken care of by the release of the funds against the CSS on time by the state government. The funds are usually released at the fag end of the financial year.
15. As the percentage of grassland in PTR is less than 6% thus all areas below High Tension lines should also be developed as grasslands, including some stretches below the transmission lines where the trees are left uncut/half cut and undergrowth is not fully removed by MSEB as carried out in certain places of the TR.

16. All innovative best practices should be systematically documented and put in the public domain/website/social media of PTR. For example, restoration of areas of irrigation projects under NAFCC and encroachment removal should be showcased.
17. The training facility of PTR should be further diversified to provide training to improve livelihoods in areas such as office management, computer training, automobile, electrical and plumbing maintenance and health care best practices.
18. Pench TR Maharashtra is often confused with Pench TR MP. Hence renaming them should be considered so as to create separate identities. It is suggested that PTR Maharashtra be renamed Mowgli TR after Rudyard Kipling's Jungle Book.
19. The families of STPF staff members should be provided accommodation matching the paramilitary forces.
20. The recruitment of a permanent veterinary doctor should be carried out at the earliest to fill up the sanctioned post.
21. Since 2019, no meeting of the Steering Committee has been convened. The meeting should be convened as per the provisions of WPA, 1972.
22. A provision should be made for a mobile veterinary van and animal transport vehicle which would be useful to cater to the local demands for conflict management.

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SAHYADRI TIGER RESERVE, MAHARASHTRA

31

MEE SCORE 78.79%

Date of Evaluation
1-5 November 2022

Evaluators' Names
Sh. Bishan Singh Bonal
Sh. Sandeep Tripathi
Sh. Shailesh Prasad
Dr. Gautam Talukdar

INTRODUCTION

Sahyadri Tiger Reserve (STR), the fourth tiger reserve of Maharashtra, is the northernmost tiger habitat in the Western Ghats. It was notified on 5 January 2010 with a total area of 741.22 km^2, comprising Chandoli National Park (317.67 km^2) and Koyna Wildlife Sanctuary (423.55 km^2). It is one of the World Natural Heritage Sites declared from the Western Ghats, declared by UNESCO in 2012. It is one of the biodiversity hotspots, with endemic plant and animal species. Koyna WLS is an Important Bird Area declared by Birdlife International. The Maharashtra State Government (vide notification no. WLP-2012/CR.NO.240/F-1, dated 21 August 2012) notified an area of 600.12 km^2 as the critical tiger habitat or core area and 565.45 km^2 as the buffer or peripheral area of the Sahyadri Tiger Reserve, with a total area of 1165.57 km^2.

STR has two wildlife divisions headed by the respective Divisional Forest Officer/Deputy Directors of Karad, Satara District, namely Sahyadri Wildlife Sanctuary Division and Chandoli National Park Division, under the administrative control of the Conservator of Forests and Field Director, Kolhapur. The TR has four sub-divisions, five ranges, 15 rounds and 56 beats. STR also has one mobile squad unit headed by an RFO. The TR has solar fencing at different locations, but this is not sufficient.

The source population of tigers is far away from STR, and only transient tigers visit the reserve. There is no resident population so far. The STR has an inadequate prey base. A project to augment the cheetal is being implemented. This needs to be expedited, with more sites, so that transiting tigers may return.

Management Strengths

1. Sahyadri Tiger Reserve's (STR) laterite plateaus are unique in nature and are a key element of the water security of the many villages surrounding the lateritic plateau of Satara, Kolhapur, Sangli and Ratnagiri.
2. STR forms the catchment for about 14 rivers including the Koyna and Warna rivers, and it has one of the largest reservoirs in the country. All these features ensure the long-term preservation of this area.
3. STR is a very important link between the northern part and the southern part of the Western Ghats Tiger Landscape. It is also a part of Western Ghats World Heritage Site, inscribed by UNESCO in 2012. It harbours rich biodiversity, including some rare and endemic species.
4. Eco-development committees are doing good work in terms of preserving the gene pool of the wild edible fruits. For example, a very large number of wild jackfruit and mango species have been collected and are being planted at various places.
5. Livelihood improvement training programmes such as paper bag-making and cloth bag-making are organized for the women of the villages who are dependent on the tiger reserve. Training programmes to impart skills in organic farming, hospitality and guiding, beekeeping and honey collection and cultivation of bamboo, spices and medicinal plants are being organised for the people of the local villages. Milch cattle are also distributed for additional income.
6. Out of 64 villages in the core of STR, 56 has been relocated and only eight villages remain to be relocated. The relocation may happen as early as next year subject to the support of state government. The proposal for the relocation of five villages is in the final stage. Three villages in the corridor have also been relocated.
7. The TCF of STR is well managed and has substantial funds which earn an interest approximate of Rs.3 crores per annum.

8. STR has identified 40 research management priorities and initiated six conservation fellowships for researchers who work on management problems of STR to the tune of Rs.50,000 per fellowship.
9. The source population of tigers in the adjoining area is increasing. Efforts are made to protect corridors by declaring conservation reserves.
10. The buffer areas of STR are under unified control with the STR management.

Management Weaknesses

1. At present there are no resident tigers in the reserve. Evidence of tiger presence came from genetic analysis of scats and sporadic capture in camera traps. According to this evidence there are about eight tigers between Radhanagari WLS and Vishalgad CR which occasionally visit STR.
2. Traditional hunting and poaching for meat could be the factor for the low prey density in the area as there was no direct sighting of wild animals by the MEE team.
3. The terrain and location of the park make it inaccessible for proper surveillance. The undulating terrain and huge water body make the Koyna part of Sahyadri Tiger Reserve very difficult in terms of access to the interior. There are comparatively few internal roads in Koyna Wildlife Sanctuary and a survey is being conducted to make the old village roads functional.
4. Two separate distinct units of the Critical Tiger Habitat are connected by a 10 km wide forested buffer in the middle. Though the forests afford connectivity, they are on private lands and hence are open to incompatible land-use. The stretch from village Rasati to Kemse-Ghatmatha is part of the critical corridor and is frequently used by wild animals.
5. The national highway from Karad to Chiplun passing through the buffer is being upgraded to a four-lane highway. Also, there is a proposal to widen the Kolhapur–Ratnagiri highway, which passes through a corridor of STR.
6. The tiger movement corridor has become fragmented probably because of previous bauxite mining in the area.
7. Large-scale plantation of exotic species such as *Eucalyptus*, Australian *Acacia*, *Casuarina*, etc was carried out in the past on most of the edge habitats (primarily grassy blanks) in the Koyna part of the tiger reserve.
8. The source population of tigers is far away from STR; only transient tigers visit, with no settled population so far.
9. Commercial developments in corridor/connectivity areas need to regulated and monitored.
10. The tiger reserve is spread over four districts. Hence, it is very difficult to have good coordination with other departments and administrative control.
11. Existence of windmills on the ecologically unique and sensitive lateritic plateau (Sada) threatens the unique biodiversity and heritage values.

Immediate Actionable Points

1. Sahyadri Tiger Reserve is doing preparatory work to reintroduce tigers. However, to ensure a viable tiger population, efforts should also be made to secure the corridors connecting this tiger reserve with other tiger-bearing forest areas and protected areas in the Western Ghats Landscape. Thus, it is important to maintain and restore connectivity between the Radhanagari–Tillari forests of Maharashtra; Bhimgad Wildlife Sanctuary and Kali Tiger Reserve of Karnataka; and Mhadei Wildlife Sanctuary (tigers are present in these protected areas), Cotigao Wildlife Sanctuary and Netravali Wildlife Sanctuary of Goa.
2. Vishalgad CR and Panhalgad CR should be handed over to the STR buffer area to ensure connectivity with Radhanagari and bottleneck area management. The remaining CRs, mainly Gaganbawda, CSMAB, Dodamarg and Chandgad, should be handed over to Kolhapur Wildlife Division. A detailed planning study of this corridor should be undertaken.
3. Radhanagari WLS is an important PA in the corridor that enables tiger movement naturally towards STR. Therefore it recomended that Radhanagari WLS be declared a satellite core and initiate CA/TS project.

4. A good network of internal roads should be created to facilitate protection and management in STR keep in mind environmental safeguards.
5. Data collection forms are primarily used to record the daily patrol data. Animal sightings/signs are not recorded in the data sheets. This needs to be attended to.
6. Training on the OUVs of the Sahyadri World Heritage Site should be provided to the frontline staff. WII or any other institute of repute might be approached for the training purpose.
7. The proposal to reorganize STR by making beat and range boundaries smaller, manageable beats as submitted by the STR should be expedited by obtaining approval from the competent authority at the earliest.
8. Habitat improvement interventions should be planned systematically with monitoring of the impacts of the interventions as an integral part of the programme. It is important to assess the effectiveness of the interventions. Mapping and monitoring unique and special habitats, wallows and salt licks, grasslands and lateritic plateaus should be an integral part of management.
9. The ongoing cheetal augmentation project should be expedited by augmenting the number of Wildlife Transport Vehicles. Also, more sites for augmentation should be established in a similar manner.
10. Separate lock-up facilities for males and females should be built and included within the Range Office.
11. Delayed release of funds affects development work. Therefore, the government may consider releasing funds on time.
12. The proposal to construct Phase V and VI hydroelectric power sites should be re-visited in the light of the fact that the WHS site may be put in "Danger List" by UNESCO due to its stringent reporting requirements.
13. The next TCP is from 2023–24 to 2032–33. Although the preparation of the new TCP is in the final stage, it should be sent to the competent authority for approval at the earliest.
14. Sahyadri Tiger Reserve should make efforts to tap the CSR funds mainly from Maharashtra State Power Generation Co. Ltd., Krishna Valley Development Corporation, the authorities of existing windmills in the buffer area, ICICI, etc.
15. Sahyadri Tiger Reserve consists of the intact forest patches of Chandoli NP and Koyna WLS, but in the buffer areas and outside the critical wildlife habitat, there are healthy forest patches of private owners. In order to maintain continuity and to secure the corridor, it is important to preserve such vulnerable areas of private owners. In Kemse village there is more than 250 ha area of privately owned forest, which is a good connecting link between the two PAs. The concerned owners are positive about handing over/selling this area to the forest department. The state government should accelerate/emphasize the process of acquisition of private lands/forests in Kemse village.
16. To reduce the poaching threat, there should be a good database regarding intelligence, weapons and licenses with villagers within 10 km of STR. The management should collect the data relating to existing weapons and licenses with the villagers as per the Wild Life (Protection) Act, 1972.
17. There are a good number of feral cattle in STR that will be a good prey base. For effective management, there should be a systematic monitoring of these feral cattle. Necropsy of such feral animals killed by wildlife should be done. If possible, forensic analysis should be carried out for any possible disease, along with immunization.
18. The eight villages are still to be relocated from the Critical Tiger Habitat, and the process of rehabilitation should be completed as early as possible. The state government should take efficient policy decisions to issue proper guidelines regarding the existing lacunas and problems associated with the pending rehabilitation.
19. The tiger reserve is inaccessible due to the hilly terrain and large water-bodies. For proper monitoring and control there should be use of modern technologies like LIDAR, drones, hot air balloons, e-surveillance, satellite mapping and the use of all-terrain vehicles, water scooters, etc.
20. There is good potential for eco-tourism as there are metropolitan cities close to to STR. The management authorities should try to promote eco-tourism to earn the maximum revenue for the Tiger Conservation Foundation and to have the necessary good infrastructure. It is also suggested that tiger safaris be conducted in the buffer area to attract more tourists, with due permission from CZA and NTCA.

21. As STR is a World Natural Heritage site and biodiversity hotspot, there should be a complete ban on laterite mining in the buffer, ESZ and corridor areas of STR.
22. To protect the buffer area of the TR and adjoining vulnerable areas like the lateritic plateau (Sadas) and corridors, the state town planning department should strictly implement the concerned state government's resolutions and guidelines. The STR authorities and the forest department should have good coordination with the state town planning department.
23. Patel Colony of Navaja land, with the irrigation department, should be taken over by STR. This area is a critical part between two core areas and acts as a corridor.
24. The tiger recovery project phase II proposal as submitted to the PCCF (Wildlife) and PCCF (CAMPA) needs to be pursued. It is suggested that tigers be brought from within the state for easy cordination and speed.

Shibu Nair

TADOBA-ANDHARI TIGER RESERVE, MAHARASHTRA

32

MEE SCORE 88.64%

Date of Evaluation
17-20 September 2022

Evaluators' Names
Sh. B.S. Bonal
Dr. Sandeep Tripathi
Sh. Shailesh Prasad

INTRODUCTION

Tadoba Tiger Reserve (625 km^2) was notified on 23 February 1995, comprising Tadoba NP, one of the oldest national parks of India, declared in 1955 (116.55 km^2) and Andhari Wildlife Sanctuary, declared in 1986 (508. 85 km^2). In 2007 the Government of Maharashtra declared a 625.82 km^2 area of Tadoba–Andhari Tiger Reserve (TATR) as the Critical Tiger Habitat as per the provisions of Section 38 V of the Wild Life Protection Act, 1972. In 2010, a total extent of 1101.7711 km^2 of forest land and a 401.4902 km^2 extent of non-forest land, consisting of 106 villages, was notified as the buffer zone of Tadoba–Andhari Tiger Reserve. It is under the unified control of the Conservator of Forest and Field Director TATR, with two Deputy Directors who are the executive officers of the core and buffer areas of TATR. There are a total of 11 ranges in TATR, out of which six ranges are in the buffer and five in the core area.

Adequate number of staff have been sanctioned as part of the process for reorganisation of beats, but there are some vacancies against the sanctioned strength, particularly the posts of Forest Guard (35 vacant against the sanctioned strength of 159) and Forest Guard STPF (34 vacant against 81). Apart from the permanent staff, more than 300 daily wage staff nominated by EDCs are deployed at patrolling camps to assist the Forest Guards. Contractual posting of a veterinarian, GIS expert, wildlife biologist, legal advisor and tourism manager has been done by the TR's conservation foundation. In addition, more than 300 fire-watchers are also deployed seasonally during the fire season, i.e., 15 February to 15 June.

The Special Tiger Protection Force (STPF) was established in the tiger reserve in 2012 with three units with sanctioned posts of one ACF, three RFOs, 81 Forest Guards and 27 Forest Watchers. They are stationed at three different locations (Chimur, Chandrapur and Mul) which strategically cover almost the entire area of TR and adjacent areas. A specially trained dog squad is also in place. The STPF also conductes joint patrolling with MSEB to avoid any case of electrocution.

The ongoing project to restore the habitat and remove weeds within the Critical Tiger Habitat is funded by the state CAMPA and ICICI Foundation, with expert guidance from Dr. Gajanan D. Muratkar. The checklist of edible grass species and invasive weeds present in the area has been published for the use of the frontline staff. An effort is made every year to periodically remove terrestrial and aquatic exotic weeds.

TATR is blessed with perennial and seasonal water sources but during summer months several water sources dry upThere are 134 water holes in the core area (one in each 5 km × 5 km grid) that are managed to reduce conflicts , especially in the dry season, when tigers and other wildlife are likely to stray out into villages in search of water. Auto-operated solar water pumps are installed at artificial water holes in the core and buffer (50 in the buffer and 44 in the core).

Five out of six villages have been voluntarily rehabilitated from the Critical Tiger Habitat, and efforts to secure the voluntary relocation of the last remaining village, Rantalodhi, are in progress.

The participatory eco-tourism involving the local community, especially in buffer areas, seems have incentivized local communities to preserve the forest habitat. TATR provides training in alternate livelihoods in the hospitality sector as well as independent professions such as tailoring and agarbatti making. Home stays are promoted in adjoining villages. Buffer villages are provided with LPG connections under the Shyama Prasad Mukherjee Jan-Van Vikas Yojana (SPMY).

A comprehensive Crisis Management Plan has been developed to prevent, monitor and control fires. Control rooms have been established at the offices of the Deputy Director (Core) and DD (Buffer).

To minimize damage caused by potential outbreaks, fire lines are cut and burnt annually before the fire season commences.

A satellite-based fire alert service operated by the Forest Survey of India, Dehradun, and NASA's FIRMS (Fire Information for Resource Management System) are also used to access “near-real

time" active fire data. The fire control teams' dedicated "Hotshot Crew" members operate under each control room. Mobile fire-fighting units provided with wireless handsets, leaf blowers, water tankers, fire beaters, shovels and rakes are stationed at every Range HQ.
A specific plan has also been developed to address multifarious issues – including fire hazards due to the presence of dried and dead bamboo – caused by the current cycle of gregarious bamboo flowering,

To handle and rescue conflict animals, two Rapid Rescue Teams are in place, one at Chandrapur Forest Division and another at Tadoba–Andhari Tiger Reserve. They are supported by a wildlife veterinarian and police constable (on deputation). The teams are well-equipped with tranquilizer guns, medicines, trap cages, etc. and are trained extensively to meet the challenges of the RRTs.

Management Strengths

1. TATR is well connected with different tiger reserves through effective corridors, viz., Bramhapuri Forest Division towards the east and Chandrapur Forest Division towards the west. It is also connected to Kanha Tiger Reserve through Navegaon-Nagzira, Indravati Tiger Reserve and Pench Tiger Reserve. Further, it is connected to Kawal and Indravati tiger reserves in the south.
2. The relocation of five villages from CTH has been completed, adding more than 622 ha of area for wildlife use free from excessive anthropogenic disturbance. The last village in CTH, Rantalodhi, is currently being relocated, and the process is expected to be completed by 2023.
3. Ongoing efforts to protect the tiger and its habitats as part of TATR's overall management strategy also serve the goals of preserving the habitat for the herbivore species. The grassland management plan has been prepared in collaboration with Prof. Muratkar; a three-year meadow development and weed removal plan is operational with funding support from the state CAMPA and ICICI Foundation in an around 800 ha area.
4. The tiger reserve has perennial water sources such as the Andhari River; Kolsa, Pangadi, Mohorli, Tadoba, Telia Dam, Erai dam; supplemented by various water holes with provision of solar pumping system within TATR which makes it a good habitat for wildlife.
5. The management of the buffer area with the help of EDCs seems to be effective.
6. TR has been successful in tapping donations from various organizations under CSR which supplements state resources.
7. TATR has an established fully functional wireless network with two base stations at each range, which has made communication in the core and buffer areas more effective.
8. To improve the visitor's experience, TATR has established a fully functional call centre.
9. TATR has adopted Bagheera App, which helps the administration track and control movements of tourists during safaris. Bagheera App helps the management get the exact location, time, duration and distance covered of the safari vehicles.
10. TATR, with the help of Dr. Muratkar (grassland expert), has conducted research in the relocated areas and other grassland areas for ensuring effective habitat management.
11. To ensure effective work in the field, the TR has been conducting 10 days' orientation workshops for staff members who have joined the TR. They focus on areas like habitat management and wildlife technical issues at Chandrapur Forest Academy on a regular basis.
12. TR has been successful in providing solar fences to more than 4000 beneficiaries spread in 92 villages of the buffer area which have drastically reduced human–wildlife cases and reduced compensation amounts as well.
13. TR has carried out a successful reorganization of ranges and beats which made the administration more effective. The size of beats was reduced from 1800 ha to 1000 ha and the number of ranges was increased by two.
14. TATR has effectively used real time NASA FIRMS and FSI fire data to reduce fires drastically in the last three years. Further, a fire control room has constituted in 2022 to deal with emergency cases.
15. TATR has developed a website through the foundation, which is effective in engaging tourists and disseminating information.

16. Successful prevention of Bander Coal Block from mining has prevented degradation of the critical habitat for wildlife.
17. The residential area and office have been relocated from the core area and electric lines have been removed, which reduce habitat degradation.

Management Weaknesses

1. The existing TCP of TATR, valid for 2008–09 to 2018–19, was later extended to 2015-16 to 2025-26 by NTCA. The TCP has a lot of decade-old data and few prescriptions for protection/management or habitat management/effective monitoring.
2. There are 92 villages in the buffer area, out of which 23 villages have high impact disturbance factors. The resources dependence of theses villages puts a lot of biotic pressure on the TR apart from undesirable biotic interference.
3. There are a number of vacancies among the frontline staff (57 FGs vacancies out of a 240 sanctioned strength). Further, in the case of the STPF this is more pronounced (i.e., 25 out of sanctioned 81 posts of FG) as the state government has modified the provision to mandatory service up to attaining 40 years of age before transfer from STPF.
4. There are two sanctioned posts of Veterinary Officer which are managed by contractual persons and not regular recruited doctors.
5. Though the Steering Committee has been constituted by the state government in 2008/revised in 2013, no Steering Committee meeting has taken place since 2018.
6. The area outside and adjoining TATR in the Chandrapur–Gadchiroli landscape is one of the worst impacted human–tiger interface areas of the country.
7. The Chandrapur–Mul–Gadchiroli highway has had casualties of wild animals in the last few years, which is serious threat to wildlife.
8. 10. There is no interpretation centre at TR to ensure effective information dissemination to visitors. Further, there is no proper directional signage at the gate and other locations.
9. A night safari is being operated by TATR in the buffer area, which has an adverse impact on ecosystem.

Immediate Actionable Points

1. The existing TCP of TATR was valid for 2008–09 to 2018–19. It was later extended to 2015–16 to 2025–26 by NTCA. The TCP has a lot of decade-old data and few prescriptions for protection/management or habitat management/effective monitoring protocols. It is high time that the TCP is updated. The TATR management may prepare immediately a mid-term revision document, as prescribed in TCP, with all the latest data for mid-term alteration due approval from NTCA.
2. TATR is proposing to prepare a vision document of TR with due stakeholder consultation including public representatives. It is a positive step; however, it may be ensured that the vision document is in consonance with the TCP objectives. It is suggested that relevant technical/managerial prescriptions of the vision document be included in the draft mid-term appraisal TCP of TATR.
3. TATR has relocated five villages out of six villages recently, which is to be appreciated. The process of relocation of the remaining village, Rantalodi, has already been initiated with Stage I FC approval of the identified forest land. Out of 244 families, 211 families have already agreed and have been given preparatory Rs.1 lakh advances. Efforts should be made to take on board the remaining 33 families for relocation outside the core area. Immediate steps should be taken by the authorities to relocate this village to make the core area inviolate.
4. There are 92 villages in the buffer area out of which 23 villages are with high impact disturbance factors. TATR has prioritized out of these nine villages for resources dependence analysis. The analysis for one village, Karwa, adjoining to the core has already been done through the BNHS. A proposal for its relocation has been sent to the government. TATR may take up the matter with the government to consider such relocation as in MP and Odisha, where relocation from PAs/RFs/corridors is also permissible.

5. There are a number of vacancies in the STPF (25 out of 81 sanctioned posts of FG) as the department has modified the provision of mandatory service up to attaining 40 years of age before transfer from STPF. The management may immediately move the department to fill these vacancies and take up fresh recruitment in SPTF strictly following NTCA guidelines to stop the demoralisation of the STPF and avoid the creation of vacancies as a fallout of transfers outside the STPF.
6. There are two sanctioned posts of Veterinary Officer which are managed by contractual persons. Steps may be taken to fill up these posts with freshly recruited candidates or candidates on deputation.
7. Though good fodder management and GIS mapping over 731 ha has been taken up, there is lack of clarity on the extent of area under grassland. For management it is suggested that assessment of the area under grasslands may be taken up by the TATR staff or some reputed organisation.
8. The TR has taken excellent steps for encroachment removal over 550 ha out of 1329 ha. However, for the balance 395 ha, the proposal is pending with the Collector for the last 1.5 years. The state government may be pursued through the appropriate authority to immediately dispose the pending cases.
9. Though most of the resorts are paying the conservation fee, a few owners are yet to pay the same. The management needs to take steps to bring all the private resorts on the same footing, making them pay the requisite fee to the Foundation.
10. Though the Steering Committee has been constituted by the state government in 2008/revised in 2013, no Steering Committee meeting has taken place since 5 December 2018. Action may be taken by the state government to convene the Steering Committee meetings on a regular basis.
11. TATR has prepared a proposal to extend the area by adding Andhari WL Sanctuary (78 km^2) and to notify the extended area as the CTH to reduce the biotic pressure on the TR. The proposal has been duly approved by the State Board of Wildlife, and the notification is pending with the state government. The state government needs to issue a notification in this regard immediately.
12. The Range Offices do not have lock-up rooms. It is envisaged to have separate lock-ups for males and females. The state government needs to ensure this is realised by suitably modifying the plans/estimates of the range offices being constructed in the state henceforth.
13. Retrofitting of the Chandrapur–Mul–Gadchiroli highway needs to be taken up immediately considering the casualties of wild animals on the road in the last few years.
14. Overall, the signage and gates are inadequate. Basic amenities for the visitors and interpretation centres at important gates are also not up to the standard. Therefore upgrading the signages with information in two languages is required. Establishment of tourist entry gates of appropriate standards along with basic amenities for visitors and establishment of an interpretation centre need to be undertaken by TATR to ensure effective information dissemination to visitors.
15. Research projects may be undertaken through various institutions, universities and colleges in TATR (studies of DNA mapping of rescue and conflict animals, economic evaluation of TR and impact on dispersal of tiger population, status surveys of the threatened species in TATR other than the tiger).
16. TR has proposed an additional 10,000 solar fences for beneficiaries from the buffer area to cover the entire villages in buffer areas, which need to be undertaken expeditiously.
17. Although an effective awareness campaign has been conducted, a technology-based surveillance solution for advance information dissemination to villagers about wildlife movements needs to be provided.
18. The proposal to establish a tiger safari and rescue centre as approved by NTCA may be expedited taking into account the recent legal developments. .
19. The night safari being operated by TATR in the buffer area has an adverse impact on the ecosystem and is not in consonance with the directives of NTCA. The management may consider closing the night safari.

MIZORAM

DAMPA TIGER RESERVE

33

MEE SCORE 50%

Date of Evaluation
16-19 September 2022

Evaluators' Names
Sh. B.K. Patnaik
Sh. G. Hari Kumar
Sh. Ajai Misra

INTRODUCTION

Under Project Tiger, Dampa Wildlife Sanctuary was declared a tiger reserve in the year 1994. In accordance with the Wild Life (Protection) Act, an area of 988 km^2 (consisting of 500 km^2 as the core/Critical Tiger Habitat and 488 km^2 as the buffer area) was notified as Dampa Tiger Reserve (vide notification no. B.12011/14/2009-FST dated 16 March 2011). Subsequently, in 2018 an area of Serhmun village with an extent of 45 km^2 (earlier notified as the buffer) was added to the core, increasing the area of the core to 545 km^2.

Dampa TR (DTR) is located in Mamit District of western Mizoram. It is surrounded by the Chittagong Hill Tracts of Bangladesh to the west, the Indian state of Tripura (Mamit and Kawrthah forest divisions) to the north and Mamit Forest Division to the south and east. The area lies in the Lushai Hills, a series of parallel, north–south-oriented ranges allied to the Rakhine Yoma Arc. The reserve lies between longitudes 92° 16' 08" E and 92° 27' 41" E and between latitudes 23° 18' 27" N and 23° 43' 50" N. The Tropic of Cancer passes through Dampa TR, near the Range Office at Phuldungsei.

The core area is under the control of the Field Director, but the buffer zone is not under the control of the FD.The control of the buffer is vested for part of the areas of Mamit Range, Marpara Range and Saithah Range in Mamit Forest Division and for Kawrtethawveng Range in Kawrthah Forest Division. The headquarters of Dampa TR are located at West Phaileng. The distance from the nearest airport, Aizawl is 60 km and the nearest rail station, Bairobi, is 80 km away. The core area is divided into two ranges, namely Teirei Wildlife Range, with its headquarters at Teirei, and Phuldungsei Wildlife Range, with its headquarters at Phuldungsei. There are eight beats (four beats under each range) in the core area. In addition, there are 20 APCs, which are manned by the Tiger Protection Force (constituted by engagement of casual workers), patrolling the core area on a rotational basis. During visit of the team Sh. Lalnunzira was holding the additional charge of the FD in addition to the charge of DCF, Wildlife Mizoram.

Dampa TR lies at the tri-junction of Bangladesh and two Indian states viz., Mizoram and Tripura. It is the largest protected area (PA) in the state of Mizoram, occupying 4.68% of Mizoram's geographical area. The old core of the TR is inviolate, being free from human habitation. It has a single and probably an isolated population of the tiger. The picturesque reserve is interspersed with precipitous hills, sparkling streams and rivulets, and dominated by moist deciduous forests in the lower reaches while a mixture of tropical wet evergreen and tropical semi-evergreen forests occur in rest of the reserve. The altitudinal variation is from 50 m to 1095 m, and heavy precipitation is received, with an annual average rainfall of approximately 2000 mm to 2,500 mm. This high diversity of habitats helps comprehend why Dampa supports such an astonishingly diverse flora and fauna.

According to Champion and Seth's (1968) classification, the vegetation/forest types of Dampa TR are (1) Tropical Evergreen and Semi-evergreen Forests (1Bc3 and 2Bc2); (2) Tropical Moist Deciduous Forests (3C/C3b and 3C2S1); and (3) Sub-montane Type (2B1b).

There are wet evergreen and semi-evergreen forests, orchid areas and two famous bamboo species of Mizoram, *Melocanna baccifera* (Mautak) and *Dendrocalamus longispathu*s.

The TR has a large number of important endangered and threatened species. The endangered species (CR/EN) in the TR are the tiger, dhole, elephant, western hoolock gibbon, Phayre's/spectacled leaf monkey, Bengal slow loris, fishing cat, Chinese pangolin, Asian brown tortoise, and red flying squirrel. The vulnerable (VU) species include the leopard, clouded leopard, gaur, stump-tailed macaque, northern pig-tailed macaque, capped langur, Asiatic golden cat, Malayan sun bear, Asiatic black bear, binturong, hog badger, king cobra, Burmese python and small clawed otter. A survey of the faunal diversity indicates that there are 242 species of bird in the TR.

DTR has a single and probably the only isolated population of the tiger in the region. With its completely inviolate core habitat, Dampa has a potential for not only the tigers but scores of other equally important species. Along with the core and buffer areas, the adjoining area of DTR is equally important for long-term tiger conservation in this landscape. There are possibilities of

establishing connectivity between the core area of DTR and the adjoining areas such as Thorangtlang Wildlife Sanctuary (TWLS), which has an area of 198 km2. TWLS has natural habitat suitable for tigers, co-predators and prey. This extension is important to accommodate the spillover population of tigers, co-predators and prey, and TWLS can be considered as the satellite core of DTR.

Eco-tourism is almost non-existent in TR.

Management Strengths

1. The initially notified core area of 500 km^2 is completely inviolate. The newly (2018) added area of 45 km^2 of the core has also almost become inviolate after the relocation of 229 families (only nine families are to be relocated).
2. Dampa TR is a part of the north-eastern hill region landscape, contiguous with the with Chittagong Hill Tract region of Bangladesh. It is located at a unique junction of the Indian, Indo-Malayan and Indo-Chinese bio-geographical realms. This landscape is also a part of the Indo-Burma Global Biodiversity Hotspot, an Endemic Bird Area (EBA) and one of the Terrestrial Eco-regions of the World.
3. The picturesque reserve is interspersed with precipitous hills, sparkling streams and rivulets and dominated by moist deciduous forests in the lower reaches, while a mixture of tropical wet evergreen and tropical semi-evergreen forests is found in the rest of the reserve. The altitudinal variation is from 50 m to 1095 m and heavy precipitation is received, with an annual average rainfall of approximately 2000 mm to 2500 mm. This high diversity of habitats helps in comprehending why Dampa supports such an astonishingly diverse flora and fauna.
4. DTR is gifted with a very rich floral/faunal diversity which is still unexplored. Out of the 15 primate species in India, eight are found in Dampa. It includes the western Hoolock Gibbon, one of the world's 25 most endangered primate species. The endangered species (IUCN's CR/EN) include the Tiger, Dhole, Elephant, Western Hoolock Gibbon, Phayre's/spectacled leaf monkey, Bengal slow Loris, Fishing cat, Chinese pangolin, Asian Brown Tortoise and Red Flying Squirrel. The vulnerable (VU) ones are the Leopard, Clouded Leopard, Gaur, Stump-tailed Macaque, Northern Pig-tailed Macaque, Capped Langur, Asiatic golden cat, Malayan sun bear, Asiatic black bear, Binturong, Hog Badger, King Cobra, Burmese Python and Small-clawed Otter. A total of 242 species of bird have been identified so far.
5. There is no grazing pressure due to the absence of livestock in the buffer areas.
6. The roadless wilderness area with excellent primary and regenerating secondary forests.
7. The boundaries of the reserve are well-defined, and there are no conflicts over the protected area's land.
8. Presence of perennial water sources such as springs and nallahs and many pools of water in dry stream beds.

Management Weaknesses

1. Out of a total of 37 field positions, 20 posts (54%) are lying vacant. Against the sanctioned posts of 15 Forest guards and 10 Foresters, only four persons and one person, respectively, are in position (vacancy of 80 %). Apart from the unusually high vacancy, the number of sanctioned field posts of the core area is very low. With a core area of 545 km^2, the sanction of two ranges and eight beats (with sizes ranging from 39 km^2 to 54 km^2) is well below the standard norms. The proposed reorganization to five ranges and 30 beats as proposed in TCP-Core 13.4 appears to be rational. Severe understaffing is the greatest weakness in the DTR management.
2. To overcome the severe shortage of staff, about 176 casual workers have been employed and named the TPF (Tiger Protection Force). But the mode of their deployment in APCs is only for 7 days, and moving them out to non-patrolling duties is not desirable for efficient smart patrolling. These TPF staff members have not been provided with gadgets, equipment and devices essential for effective patrolling due to their changing nature of duties. Consequently, all the devices are lying in range offices instead of in APCs.

3. There are very few incentives for the staff and little capacity-building. Modules have not been prepared for the training to be carried out as proposed for Human Resource Development and anti-poaching/patrolling.
4. Lack of ecological information on the key threatened species including the tiger, co-predators, prey and other plants and animals of the reserve.
5. Very small tiger population—in the recent estimation, only one tiger was captured in the camera traps.
6. Extremely difficult terrain and lack of road network, including bridle/foot tracks to patrol interior areas.
7. The forest areas within the buffer area of the reserve are still not within the unified command of the Field Director, which adversely affects the buffer area management.
8. The feeling of alienation by the local people due to conservation-related restrictions has not been alleviated because the eco-development/JFM and eco-ecotourism activities are extremely inadequate.
9. Eco-tourism has been completely neglected in the TR, and as a result of poor eco-tourism infrastructure, such a beautiful area is hardly frequented by tourists.

Immediate Actionable Points

1. The vacant positions should be filled up immediately.
2. The patrolling equipment like GPS, binocular, walkie-talkie, smart patrol devices and first-aid kits should be made available as per norms to all patrolling teams along with all standard camp amenities. Lighting of all camps by electricity or solar power should be done as a top priority.
3. The personal kits and camp equipment are meagre and not as per standard norms. The essential personal amenities for staff in anti-poaching and observation camps like mosquito nets, daos (machetes), torch lights, water bottles, back packs and measuring tapes etc. as per standard norms should be provided.
4. There are no vehicles for Range Officers, which is a cause of concern keeping in view the need to patrol the area, especially in the rainy season, when the road conditions are bad.
5. The wireless sets and equipment have become totally defunct. In the absence of wireless communication, the staff are forced to communicate using mobiles. The network in the TR is very limited. Efforts should be made to revive the wireless network at the earliest.
6. Proper training records for all training programmes should be maintained both module-wise (in one register) and person-wise (in another register) so that the information for any person or for any particular module can be retrieved easily.
7. The amount of funds allocated to the TR are not adequate. Besides the limited fund allocation, the late release/sanction of funds has created problems for timely commencement of the works, and often the funds remain unutilized in the year, resulting in non-implementation of many essential works proposed in the year. Hence, all concerned should try to remove the delay in fund allotment and provide the TR the required funds for effective management.
8. Eco-development and eco-tourism programmes should be taken up in mission mode. Various activities of IGA and SHG programmes need to be carried out by leveraging funds from the district and other sources for addressing livelihood issues and providing alternatives.
9. The guidelines for the display of work details with year and cost at all work sites as well as maintenance of year-wise photo albums of all works should be rigorously complied with.
10. M-STrIPES, which has not been implemented so far, should be implemented without any further delay.
11. The TR has to regularly carry out Phase IV estimation every year. The TR must develop its capability of making in-house the analysis of data by utilizing the service of the Biologist who has been deployed in the TR. His services should also be utilized for assessment of the carrying capacity as well as for monitoring the populations and habitats of key endangered and threatened species including the tiger. NGOs should be involved in tiger estimation as per NTCA guidelines.

12. In the newly added Serhmun village (added to the core from the buffer), out of 238 families, nine families have not yet opted for relocation. The decision of the Chief Secretary's meeting to expedite the process of their voluntary relocations should be implemented. Similarly, families who are trying to stay after accepting money should be evicted as per the decision without any delay. The vacated sites must be ecologically restored.
13. A security audit and threat assessment and preparation of threat maps should be carried out expeditiously following the NTCA-circulated protocols. Listing and prioritization of key biological resources should also be done.
14. Threat from poaching is high in the TR. The TR managers should make serious efforts to apprehend all the offenders and ensure that they are punished after a successful prosecution. The investigating staff should be specially trained in techniques of detection, investigation, collection of proper evidence and collection of forensic reports mechanisms for regular monitoring of court cases at appropriate levels should be established and in important cases, engagement of special counsels should be done. Rigorous punishment of offenders is always the best deterrence.
15. Rapid Response Teams with proper training and necessary equipment should be in place to deal with emergent HWC situations.
16. The TR should maintain a complaint register showing the logs of complaints received, enquired into and disposed of. Written orders should be issued on the complaint handling and disposal system including intimation to the complainant. Suggestion registers should be made available at public places for receiving feedback from visitors.
16. Proper records of the execution of annual fire prevention operations, extent of fires, assessment of fire damage, the monitoring and reporting system adopted and preparation of fire maps and fire-fighting measures taken should be maintained without fail.

Shibu Nair

ODISHA

SATKOSIA TIGER RESERVE

34

MEE SCORE 75%

Date of Evaluation
26-30 September 2022

Evaluators' Names
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Dr. R.K. Singh
Sh. Nitin Kakodkar

INTRODUCTION

Satkosia Tiger Reserve (SKTR), with an area of 1136.70 km^2, including a buffer of 440.26 km^2, was notified a tiger reserve in 2007 and is unique as it has species representing the Deccan Peninsula as well as the Eastern Ghats, with a few representative elements of the Western Ghats (for example, Entada phaseoloides). It has a magnificent long and wide gorge (22.5 km) of the Mahanadi River encompassing the aquatic biodiversity of the Eastern Ghats. The area also forms part of Mahanadi Elephant Reserve. Unified control of the core and the buffer and the creation of two divisions (Satkosia Wildlife Division and Mahanadi Wildlife Division) and management of the adjoining Athmallik, Athgarh, Dhenkanal and Angul territorial divisions under the Field Director with contiguous forests will help monitor the possible dispersal of tigers into Satkosia along the corridors and adjoining forest areas and help elephant management in the future. The corridors, including the Similipal–Satkosia Corridor, have been identified and delineated.

The area is dominated by Tropical Moist Deciduous Forest, with more than 400 plant species comprising 126 tree species (including sal and its associates), 98 shrubs, 125 herbs (including orchids) and 51 climbers, 38 species of mammal, more than 200 species of bird, 27 species of reptile, four species of amphibian, 183 species of fish and many invertebrate species. The flagship species among the fauna include the Tiger, Leopard, Wild Dog, Elephant, Gaur, Gharial and Mugger and four species of endangered turtle (*Chitra indica, Lissemys punctata punctata, Kachuga kachuga, Trionyx gangeticus*).

The anti-poaching camps have been strengthened with basic amenities with enforcement instruments. There is continuous patrolling in all the nine ranges of the tiger reserve. The protection strategy, involving nine ranges, 105 permanent anti-poaching camps, one sniffer dog, extensive use of the M-STrIPES with the support of 58 VHF base stations, 14 vehicle-mounted base sets, 138 walkie-talkies and 95 mobile cell phones, has improved the protection status.

The village relocation from Raigoda has led to expansive meadows with an increasing herbivore presence. Good meadow development work in other areas is continuing under expert advice.

A total of 92 EDCs have been formed, and different livelihood options are being offered to them. The eco-development committees in the villages located in the core are very supportive because facilities have been provided by mobilising resources from Central Government schemes and involving major government departments. The local communities have been involved in forest protection and eco-development activities to help the reserve in protection and management.

Ecotourism activities are well organized and the engagement of local communities is generating good revenue for them Ex: tourism complex at Badmul (Satkosia Sands Resort) managed by the EDC of Village Muduligadia is also generating employment for the local EDCs.

The funding support from the state schemes and CAMPA is encouraging, and utilization of these funds for strengthening the infrastructure and for rehabilitation of villages from the buffer is noteworthy and encouraging. Local industries need to come forward to fund activities under the CSR component. Uncertain and delayed funding affects the planned deployment of casual labour in anti-poaching camps. The funding from district agencies is meagre.

The challenges faced by the reserve management include the presence of a large number of human habitations in and around the tiger reserve, the practice of subsistence hunting and poaching, setting off fires for mahua flower collection and for increasing the yield of kendu (tendu), the presence of a large number of cattle (including a substantial goat population), which have a severe impact on the habitat, including the spread of alien invasive species like *Lantana*, *Eupatorium* and *Parthenium*, affecting the natural regeneration of the local species, a large number of vacant posts in the frontline cadre, a lack of trained manpower, a lack of in-house research and insufficient associations with local universities. SKTR should deploy a Special Tiger Protection Force (STPF) for providing additional support to the protection efforts.

Frequent transfer of key officials from the reserve during the period of relocation of villages is not desirable as building rapport and trust with the communities takes time. Rapport and trust are

essential during the period of relocation and hand-holding support. Since SKTR is endowed with a rich biodiversity, further studies should be commissioned to assess the biological values and list the flora and fauna to ensure that the rich biodiversity is further documented. Expeditious steps should be taken to notify the ESZ.

Only one veterinary assistant surgeon has been posted in SKTR. An adequate number of posts in the para-veterinary staff should be created for the proper functioning of the centre.

Necessary steps should be taken to constitute the Local Advisory Committee.

Management Strengths

1. Satkosia Tiger Reserve (SKTR) is one of the unique tiger reserves in the country, representing the biodiversity of both the Deccan Peninsula and Eastern Ghats with a few representative elements of the Western Ghats (for example, *Entada phaseoloides*). It has a magnificent long and wide gorge (22.5 km) of the Mahanadi River encompassing the aquatic biodiversity of the Eastern Ghats. This is also the southernmost natural home of the gharial. The Mahanadi is an important spawning site for important carps and prawn species.
2. SKTR has an area of 1136.70 km^2, including a buffer of 440.26 km^2. It was notified as a tiger reserve in 2007 with two sanctuaries, Satkosia and Baisipalli. It spreads over four districts in Odisha, namely Angul, Cuttack and Boudh. The area also forms part of Mahanadi Elephant Reserve. Satkosia Gorge has also been designated as Ramsar site. Unified control of the core and the buffer and the creation of two divisions (Satkosia Wildlife Division and Mahanadi Wildlife Division) and the management of adjoining territorial divisions (Athmallik Forest Division, Athgarh Division, Dhenkanal Division and Angul Division) under the Field Director with contiguous forests will help in monitoring the possible dispersal of tigers into Satkosia along the corridors and adjoining forest areas and will help elephant management in the future. The corridors, including the Similipal Satkosia Corridor, have been identified and delineated.
3. The area is dominated by Tropical Moist Deciduous Forest, and the floral diversity includes more than 400 plant species comprising 126 tree species (including sal and its associates), 98 shrubs, 125 herbs (incl.orchids) and 51 climbers, and the faunal diversity includes 38 species of mammal, more than 200 species of bird, 27 species of reptile, four species of amphibian, 183 species of fish and many invertebrate species. The flagship species among the fauna include the tiger, leopard, wild dog, elephant, gaur, chowsingha, sambar, barking deer, giant squirrel, gharial and mugger and four species of endangered turtle (*Chitra indica, Lissemys punctata punctata, Kachuga kachuga, Trionyx gangeticus*). The area harbours bird species such as the emerald dove, Malabar pied hornbill, shaheen falcon, Malabar trogon, blue-tailed bee-eater, stork-billed kingfisher and Indian skimmer.
4. The anti-poaching camps have been strengthened with basic amenities and enforcement instruments. There is continuous patrolling in all the nine ranges of the tiger reserve. This helps the overall protection and management. Due to the efficient patrolling and active protection measures, a large number of wildlife offence cases have been detected by the management of the reserve. The protection system includes nine ranges, 105 permanent anti-poaching camps, one sniffer dog and the use of the M-STrIPES app, extensively aided by 58 VHF base stations, 14 vehicle-mounted base sets, 138 walkie-talkies and 95 mobile cell phones. It has improved the protection status.
5. The village rehabilitation from Raigoda has led to expansive meadows on the vacated agricultural lands and attracted large herds of ungulates such as the gaur and chital. The good meadow development work in other areas is continuing under expert advice. The relocation of Raigoda village outside the tiger reserve as New Raigoda Village, providing all necessary arrangements by mobilizing resources from the major line departments, is commendable work done by the management.
6. A total of 92 EDCs have been formed, and different livelihood options are being offered to many of them. The eco-development committees in the villages located in the core are very supportive because facilities have been provided by mobilising resources from Central Government schemes and involving major government departments. The local communities have been involved in forest protection and eco-development activities to help the reserve with protection and management.
7. Ecotourism activities are well organized, and the engagement of local communities is generating good revenue for them. It has become a new source of livelihood to the forest-dependent communities. For example, the tourism complex at Badmul (Satkosia Sands Resort), managed by the EDC of village Muduligadia, is also generating employment for the local EDCs.

8. The funding support from the state schemes and CAMPA is encouraging, and utilization of these funds for strengthening the infrastructure and for rehabilitation of villages from the buffer is noteworthy and encouraging. Rehabilitation of the villages Katranga and Asanbahala is underway. This will be extremely beneficial in the long run as it is rendering critical areas adjoining the core inviolate.

Management Weaknesses

1. The presence of a large number of human habitations (four villages in the core, 131 villages in the buffer, 234 villages in the surrounding impact zone) in and around the tiger reserve poses a threat to it and is highly detrimental to the effective management of the reserve.
2. Although the protection measures have been scaled up, due to the large number of human settlements (tribal and non-tribal communities), subsistence hunting and poaching threats continue, posing a challenge to the management of the reserve.
3. The frequent fires set off for mahua flower collection as well as for increasing the yield of kendu (tendu) and the presence of a large number of cattle (including a substantial goat population) have a severe impact on the habitat and also encourage the spread of alien invasive species like Lantana, *Eupatorium* and *Parthenium*, affecting the natural regeneration of the local species.
4. A lack of adequate staff, a large number of vacancies in the frontline cadre, and a lack of trained manpower are the major issues and challenges faced by the park. 65% of the Forest Guard posts and 33% of the Range Forest Officer posts are vacant.
5. In-house research activities are lacking. The training inputs are good but inadequate. These need to be increased manifold, more so when the newly recruited frontline staff join the tiger reserve. The association with local universities is insufficient.
6. The Local Advisory Committee has not been constituted. Local industries are not coming forward to fund activities under the CSR component.
7. Although the corridor has been identified and delineated, there is no management plan for monitoring and improving protection in the corridor areas.
8. The proposal for the creation of the Special Tiger Protection Force is still only in the planning phase.
9. The dependence on hired vehicles is very high. This can affect patrolling in remote areas and in areas with mountainous terrain.
10. Uncertain and delayed funding affect the planned deployment of casual labour in anti-poaching camps. The funding from the district agencies is meagre.

Immediate Actionable Points

1. The TCP of the STR (2016–17 to 2026–27) has been approved by the NTCA. However, subsequently, an additional area of around 359 km^2 from five adjoining forest divisions (Athamalik, Angul, Dhenkanal, Athagarh and Boudh) has been added to SKTR (vide government notification dated 14 December 2018), for which a separate plan should be prepared and included in the TCP as an annexure.
2. Considering the successful rehabilitation of Raigoda village from the core area, followed by habitat development works, which has yielded excellent results, consistent efforts should be made to rehabilitate the remaining four villages from the core. Most of the families from Katranga village, which has an extent of 448 ha and is located at the fringe of the core, have been relocated voluntarily. The remaining families are expected to be relocated shortly. Some other villages from the buffer have voluntarily requested rehabilitation. This process needs to be expedited. Frequent transfers of key officials from the reserve during the period of relocation of villages are not desirable as building rapport and trust with the communities takes time. Rapport and trust are needed during the period of relocation. The state government may consider having a separate transfer policy for tiger reserves engaged in relocating villages.
3. SKTR is endowed with a rich biodiversity, which has been reported on in the various studies conducted in the past. Studies should be commissioned in the future to assess the biological values and list the flora and fauna to ensure that the rich biodiversity of the reserve is further documented. The research monitoring programme needs to be enhanced, and detailed habitat management-related research at the landscape level is required. Engaging local universities would be beneficial in the long run.

4. The economic values of a few villages of SKTR have been assessed internally. SKTR should collaborate with research/academic institutions for economic valuation of the entire reserve. The outcomes of the assessment should be shared with the local communities and other stakeholders. Such studies in the long run would help in mobilizing resources for the management of the reserve apart from ensuring effective participation of the local communities and other stakeholders.
5. Inadequacy of staff continues to remain a major management problem. Around 65% of the posts of Forest Guard, 50% of posts of Deputy Ranger and 33% of posts of Range Officer are lying vacant. Necessary steps should also be taken to fill the vacancies and train the newly recruited/posted staff.
6. SKTR should deploy the Special Tiger Protection Force (STPF) for providing additional support to protection efforts. The recruitment process for the STPF may have a preference for the local tribals.
7. The eco-sensitive zone (ESZ) of SKTR has not been notified. Expeditious steps should be taken to notify the ESZ.
8. The website of SKTR should be altered to ensure compliance with the latest edition of Guidelines for Indian Government Websites, prepared by the National Informatics Centre (NIC). The research studies and reports and learning resources of the reserve should be uploaded on the website.
9. The Training Need Assessment (TNA) of the key stakeholders should be conducted periodically to set learning objectives for future training courses and preparation of the Annual Training Plan. Officers of the reserve should be encouraged to attend long-term specialized training in wildlife management as only the DFO, Satkosia Wildlife Division has attended the Diploma and Certificate courses of the WII, Dehradun.
10. There is a wide variation among states in compensation policies for depredation by wild animals. An amount of Rs.20 lakhs is paid on account of the death of a human being in Maharashtra as against Rs.4 lakhs in Odisha. It would be appropriate for the state government to periodically review the compensation policy while taking into cognizance changes made in the other states.
11. The current pandemic has brought wider recognition of the problems posed by the diseases caused by multi-host pathogens (MHPs). Hence, continuous health monitoring and surveillance of wild animals, proper diagnosis and timely veterinary interventions are essential for effective conservation of wild animals and control of zoonoses. An adequate number of trained wildlife health professionals are required for wildlife health management and for disease monitoring and surveillance to prevent spilling over of MHPs to humans and domestic animals. As per the recommendation of the National Wildlife Action Plan (2017–31), the tiger reserves are expected to establish well-equipped wildlife rehabilitation cum disease surveillance centres supervised by trained wildlife veterinarians by 2023. Efforts should be made to establish a centre in SKTR. Only one veterinary assistant surgeon has been posted in SKTR. An adequate number of posts of para-veterinary staff should be created for the proper functioning of the centre.
12. Family hostel facility should be provided in the first phase for 20 families at Angul and in the second phase at Nayagarh. Additional units may be constructed in the hostels at appropriate locations to accommodate the families of the remaining frontline staff posted in the core of SKTR.
13. The Forest Guards and Foresters of the reserve are provided rations, whereas the facility is not given to protection assistants and camp labourers who also live in remote areas and face the same difficulties. The state government may consider providing rations to the protection assistants and camp labourers.
14. SKTR may collaborate with reputed research/academic institutions for developing the capacity for using artificial intelligence for forest fire risk prediction. The capacity to predict fire incidences with high levels of accuracy can substantially improve the resource allocation, mitigation and recovery efforts of forest fire management.
15. SKTR has not received funds from donors, CSR and NGOs in the last 3 years. It should work on fund raising strategies targeting various sources of funds and make consistent efforts to mobilize financial resources.
16. Timely availability of funds for the tiger reserve needs to be ensured for better management and the smooth functioning of the reserve.
17. Necessary steps should be taken to constitute the Local Advisory Committee.

SIMILIPAL TIGER RESERVE, ODISHA

35

MEE SCORE 90.15%

Date of Evaluation
21-25 September 2022

Evaluators' Names
Sh. D.N.S. Suman
Dr. R.K. Singh
Sh. Nitin Kakodkar

INTRODUCTION

Similipal Tiger Reserve (STR) was amongst the first nine tiger reserves declared in India, in 1973. SMTR is one of the largest tiger reserves in India (2750 km^2, with a core of 1195 km^2) and the largest tiger reserve in the state, situated in Mayurbhanj District of northern Odisha. It is part of an elephant reserve and the Biosphere Reserve Network and is home to unique pseudo-melanistic tigers. Situated in the Deccan Peninsular Bio-geographic Zone, it harbours a unique blend of Western Ghats, Eastern Ghats and eastern Himalayan biodiversity. The floristic composition indicates a connecting link between south Indian and north-eastern sub-Himalayan species, with extensive sal forests. The landscape supports 1352 species of plant, 101 species of orchid, 62 species of reptile, 361 species of bird and 55 species of mammal. There are many species of rare and threatened animals such as the tiger, elephant, gaur, mahseer, hornbills, chowsingha, mouse deer, giant squirrel, flying squirrel, striped necked mongoose, mugger and civets.

The village rehabilitation has led to expansive meadows on the vacated agricultural lands and attracts large herds of ungulates such as the gaur, sambar and chital as evident in the Devasthali and Upper Barakamuda (UBK) meadows. Good meadow development work is continuing under expert advice. The deployment of the STPF at Bhanjabasa, Gurguria and Jenabil for protection against Akhand Shikar and for night patrolling and the 250 well equipped anti-poaching camps spread across the core as well as the buffer are proving beneficial. The use of MSTRIPES is extensive.

The eco-tourism activities at Gurguria, Kumari, Jamuani and Baheripani are well organised, and the engagement of local communities is generating good revenue for them and has become a good source of livelihood to the forest-dependent communities. Some private entrepreneurs have also set up accommodation units in the vicinity of the tiger reserve. Two orchidariums have been developed for showcasing and preserving the orchid diversity.

The overall infrastructure available with the tiger reserve management is impressive. The association with North Odisha University through the setting up of a Centre for Similipal Studies is bound to result in good field-based research and documentation and provide a source of capacity building for the local students. Some of the young frontline staff are taking keen interest in documenting the biodiversity of the tiger reserve and in monitoring the health of the wild animals through new initiatives like Body Scoring.

The funding support from the state and CAMPA is encouraging, and utilization of these funds for strengthening the infrastructure and for rehabilitation is noteworthy. The core and buffer are under the unified control of the Field Director, who also controls the adjoining territorial divisions. The Hadgarh and Kuldiha sanctuaries need to be brought under the Field Director. This will help in monitoring future dispersal of tigers and elephants along the corridors and adjoining forest areas.

There are many vacant posts among the frontline staff, and this has forced the management to employ casual labourers in a big way, which could be detrimental in the long run. This issue needs to be addressed on priority. The Local Advisory Committee needs to be constituted urgently. This would help in the convergence of many developmental schemes for the villages in the buffer as 64 villages in the buffer and one village Bakua in the core are posing a threat in terms of illicit firewood collection, illegal trade, poaching, forest fires and NTFP collection. The spread of invasive alien species is evident in the areas around most villages. A staff deployment plan needs to be put in place for effective training.

Periodic assessment of the biological, ecological, economical, and socio-culture-spiritual values of the STR is required. Such studies in the long run would help in mobilizing resources for the management of the reserve apart from ensuring effective participation of the local communities and other stakeholders.

Bakua village in the core area should rehabilitated urgently. The practice of identifying and rehabilitating willing villages from the buffer needs to be continued and should in fact be given further impetus. Expeditious steps should be taken to notify the ESZ, followed by the preparation of the Zonal Master Plan.

Efforts should be made to establish a well-equipped wildlife rehabilitation cum disease surveillance centre supervised by trained wildlife veterinarians along with an adequate number of posts of para-veterinary staff for the proper functioning of the centre.

Timely availability of funds for the tiger reserve needs to be ensured for better management and for the smooth running of all activities of the reserve.

Management Strengths

1. Similipal Tiger Reserve (STR) was on the first list of nine tiger reserves declared in India, in 1973. STR is one of the largest tiger reserves in India (2750 km^2, with a core of 1195 km^2) and the largest tiger reserve in the state, situated in Mayurbhanj District of northern Odisha. It is part of an elephant reserve and the biosphere reserve network and is home to unique pseudo-melanocytic tigers.
2. The area lies in the Deccan Peninsular Bio-geographic Zone and harbours a unique blend of Western Ghats, Eastern Ghats, and eastern Himalayan biodiversity. The floristic composition indicates a connecting link between South Indian and North-eastern sub- Himalayan species, with extensive Sal forests. It is at the confluence of two forest types in India, which makes it a unique terrestrial assemblage of floral and faunal elements. The landscape supports 7% of the plants (1352 species), 8% of the orchids (101 species), 7% of the reptiles, 62 species (20%) of the birds (361 species) and 11% of the mammals (55 species) of India. There are many species of rare and threatened animal such as the tiger, elephant, gaur, mahseer, hornbills, chowsingha, mouse deer, giant squirrel, flying squirrel, striped necked mongoose, mugger and civets.
3. The village rehabilitation has led to expansive meadows on the vacated agricultural lands which attract large herds of ungulates such as the gaur, sambar and chital as evident in the Devasthali and Upper Barakamuda (UBK) meadows. Good meadow development work is continuing under expert advice.
4. The deployment of the STPF at Bhanjabasa, Gurguria and Jenabil for protection against Akhand Shikar and for night patrolling is proving to be beneficial.
5. The eco-tourism activities are well organized, and the engagement of the local communities is generating a good revenue for them. It has become a new source of livelihood to the forest-dependent communities. The tourism complex at Gurguria Range has six cottages maintained by tribal communities. Similarly, Kumari has 15 cottages and machans, and Jamuani has nine tribal cottages and one bamboo cottage. The Barehipani Nature Camp is also generating employment for the local EDCs. New accommodation facilities in the form of tree houses and Santhali cottage units are attracting a lot of tourists. Some private entrepreneurs have also set up accommodation units in the vicinity of the tiger reserve.
6. The protection system includes 250 well-equipped anti-poaching camps (APCs) spread over the core as well as the buffer. Each APC roughly covers about 11 km^2 of surrounding forests, with one Forest Guard (FG) and four or five Protection Assistants. The VHF network, GPSPDA patrolling, elephant patrolling, foot patrolling, dog squad, and fire management system are noteworthy.
7. The orchidarium at the Gurguria Tourism Complex, with 66 species of orchid, and the newly developed orchidarium (February 2022) at Patbil add value to STR. The diversity of orchids in the tiger reserve is very high.
8. The overall infrastructure available with the tiger reserve management is impressive, and recent developments in the form of new range offices (for example, Jenabil, Kabatghai), well-designed anti-poaching camps, eco-tourism complexes and restored Forest Rest Houses, even in remote locations. are worthy of emulation.
9. The association with North Odisha University through the setting up of the Centre for Similipal Studies is bound to result in good field-based research and documentation and provide a source of capacity building for the local students. This will also generate awareness amongst the students about the importance of Similipal.

10. Some of the young frontline staff are taking a keen interest in documenting of the biodiversity of the tiger reserve as well as monitoring the health of the wild animals through new initiatives like Body Scoring.
11. The funding support from the state and CAMPA is encouraging, and utilization of these funds for strengthening the infrastructure and for rehabilitation is noteworthy.
12. Unified control of the core and the buffer and creation of two divisions (Similipal North and Similipal South) and management of adjoining territorial divisions under the Field Director will help monitor the dispersal of tigers along the corridors and adjoining forest areas and help elephant management in the future.

Management Weaknesses

1. There are a lot of vacancies among the frontline staff. Nine posts out of 24 posts of RFO, seven posts out of nine posts of Dy RO, 35 posts out of 104 posts of Forester and 144 posts out of 226 posts of Forest Guard are lying vacant. This has forced the management to employ casual laborers which may create management problems in the long run.
2. The STPF, though functional, does not have exposure to specialized training, including training in the use of arms. There are 112 posts under the STPF (one ACF, three ROs, 81 FGs and 27 FWs), of which only 55 are working (three ROs and 52 FGs).
3. The Local Advisory Committee (LAC) has not been constituted. The LAC has a mandate to review the tourism strategy and advise the local self-government and the state government on issues related to the development of tourism in and around the tiger reserve and regularly monitor the tourist facilities and suggest mitigation and retrofitting measures in such facilities and augment the employment opportunities for members of the local communities. Since the LAC is headed by the Divisional Commissioner and has the local MLAs, the District Collector, officials of the Tribal Department and Tourism Department and other local officials and public leaders as members, it would help in the convergence of many developmental schemes for the villages in the buffer.
4. There are 64 villages in the buffer and one village, Bakua, in the core, posing threats to the reserve such as illicit firewood collection, illegal trade, poaching, setting off forest fires and NTFP collection. The spread of invasive alien species is evident in the areas around most villages.
5. MstriPES, though used extensively, will be more effectively used for management decisions only when the staff note down details about their observations during patrolling.
6. The staff development plan is not in place, and this is leading to unplanned allotment for training in specialized subjects.
7. The Hadgarh and Kuldiha sanctuaries, which have been identified as potential corridors, are not under the unified control of the Field Director, STR.

Immediate Actionable Points

1. Areas adjacent to Similipal Tiger Reserve, such as Hadgarh and Kuldiha sanctuaries, which have been identified as potential corridors or are being presently used by tigers, should be included in the tiger reserve. All identified corridors need to be regularly monitored for possible dispersal and safe passage of the tigers.
2. Potential ecosystem values of STR have been recognized in the study commissioned by the NTCA (published in 2019). However, there is a need to periodically assess the biological, ecological, economical, and socio-cultural-spiritual values of STR, for which it may collaborate with research/academic institutions. STR staff and stakeholders should be actively involved in these studies with the aim of building in-house capacity to undertake such studies in the near future. The outcomes of the assessment should be shared with the local communities and other stakeholders. Such studies in the long run would help mobilize resources for the management of the reserve apart from ensuring effective participation of the local communities and other stakeholders.

3. Inadequacy of staff continues to remain a major management problem. The vacancy among the field staff is around 50%. Necessary steps should be taken to fill the vacancies and train the newly recruited staff. Recently recruited staff should be posted to the tiger reserve on priority by the government.
4. Consistent efforts should be made to voluntarily relocate families from Bakua village, which is the only village that remains to be rehabilitated from the core area. The practice of identifying and rehabilitating willing villages from the buffer needs to be continued and, in fact, given further impetus.
5. The eco-sensitive zone (ESZ) of STR has not been notified. Expeditious steps should be taken to notify the ESZ, followed by the preparation of the Zonal Master Plan.
6. STR is endowed with a rich biodiversity which has been reported in the various studies conducted in the past. Studies may be commissioned in the future to list the flora and fauna to ensure that the diversity is further documented. The Centre for Similipal Studies, set up at North Odisha University, should be encouraged to take up such studies on a regular basis.
7. The website of STR should be altered to ensure compliance with the latest edition of Guidelines for Indian Government Websites, prepared by the National Informatics Centre (NIC). The research studies and reports and learning resources of the reserve should be uploaded on the website.
8. The Training Need Assessment (TNA) of the key stakeholders should be conducted periodically to set learning objectives for future training courses and preparation of the Annual Training Plan. Officers of the reserve should be encouraged to attend specialized training programmes in wildlife management.
9. There is wide variation among states in the compensation policies for depredation by wild animals. An amount of Rs.20 lakhs is paid on account of the death of a human being in Maharashtra as against Rs.4 lakhs in Odisha. It would be appropriate for the state government to periodically review the compensation policy while taking into cognizance changes made in the other states.
10. The current pandemic has brought wider recognition of the problems posed by the diseases caused by multi-host pathogens (MHP). Hence, continuous health monitoring and surveillance of wild animals, proper diagnosis, and timely veterinary interventions are essential for the effective conservation of wild animals and the control of zoonosis. An adequate number of trained wildlife health professionals are required for wildlife health management, and disease monitoring & surveillance to prevent spilling over MHP to humans and domestic animals. As per the recommendation of the National Wildlife Action Plan (2017-31), the Tiger Reserves were expected to establish a well-equipped wildlife rehabilitation cum disease surveillance centre supervised by trained wildlife veterinarians by 2023. Efforts should be made to establish the centre in the STR. Only one veterinary assistant surgeon has been posted in the STR. An adequate number of posts of para-veterinary staff should be created for the proper functioning of the centre.
11. Families of some of the frontline staff posted in the core areas of the reserve have been allotted hostels for their families at Baripada and Jeshipur. Additional units may be constructed in the hostels at Baripada or Jeshipur to accommodate families of the remaining frontline staff posted in the core of STR.
12. The Forest Guards and Foresters of the reserve are provided rations, whereas the facility is not given to the protection assistants and camp labourers, who also live in remote areas and face the same difficulties. The government may consider providing rations to protection assistants and camp labourers.
13. STR may collaborate with reputed research/academic institutions for developing the capacity to use artificial intelligence for forest fire risk prediction. The capacity to predict fire incidences with high levels of accuracy can substantially improve the resource allocation, mitigation and recovery efforts of forest fire management.
14. Timely availability of funds for the tiger reserve needs to be ensured for better management and the smooth functioning of the reserve.
15. Necessary steps should be taken to constitute the Local Advisory Committee.

RAJASTHAN

MUKUNDARA HILLS TIGER RESERVE

36

MEE SCORE 60.16%

Date of Evaluation
8-11 September 2022

Evaluators' Names
Sh. Azam Zaidi
Dr. Pradeep Vyas
Sh. Shailendra K. Singh
Dr. Kausik Banerjee

INTRODUCTION

Mukandara Hills Tiger Reserve (notified through S. No. F3(8) FOREST 2012 dated 9 April 2013) includes Mukandara National Park, Darrah Sanctuary, Jawahar Sagar Wildlife Sanctuary and part of Chambal Gharial Sanctuary. The administrative headquarters of Mukundara Hill TR are situated at Kota, Rajasthan. However, this tiger reserve is spread over four districts of Rajasthan—Kota, Bundi, Chittorgarh and Jhalawar. MHTR approximately lies between latitudes 24° 38' N and 25° 7' N and between longitudes 75° 26' E and 76° 12' E. The extent of the core area is 417.17 km^2 and that of the buffer is 342.82 km^2. The total area of MHTR is 759.99 km^2. The flora of MHTR is very rich, and the main species are *Anogeissus pendula, Boswellia serrata* and *Acacia catechu*. Miscellaneous forest trees like *Butea monosperma*, forest along nalah in which Bamboo, Sitafal, Unbia, Arjun, Jamun, Khajur, Gunjan etc are found. There are 80–90 species of tree that are very important as well as 30–40 types of shrub, around 50 types of climber, 120 types of herb, 40 types of grass, epiphyte and pteridophyte in the park. The fauna of MHTR is also very rich. The reserve has a good population of mammals, viz., Chital, Sambar, Neelgai, Hyena, Fox, Jackal, Jungle Cat, Ratel, Sloth Bear, Chinkara, Small Civet, Porcupine, Indian Hare, Mongoose, Langur, Leopard and Tiger. The birds of MHTR are also very vivid, and around 140 birds species have been reported in the park. Many migratory and resident birds are present here. Reptiles ranging from snakes to crocodiles are present in the park. Around 70 species of fish have been reported in different rivers and water bodies of the park.

Management Strengths

1. Mukundara Hills Tiger Reserve (MHTR) is well integrated within a larger landscape with the potential to accommodate more dispersing tigers from Ranthambore Tiger Reserve. There is habitat connectivity with Ranthambore Tiger Reserve through a cluster of protected areas including Indergarh–Lakheri–Ramgarh Vishdhari Tiger Reserve–Jawahar Sagar Sanctuary and with Darah through the ravines of the Chambal and Kalisindh rivers. Another possible corridor is up to Gandhi Sagar Sanctuary of Madhya Pradesh through Bhainsroadgarh Sanctuary. With Ramgarh Visdhari having been declared a tiger reserve, the network has further been strengthened, and the entire landscape has come under the purview of scaled-up conservation efforts.
2. Vegetation and grasses have come up well in the 82 km^2 enclosure. Some of the areas can be used for prey augmentation in the reserve.
3. Mukundara Hills Tiger Reserve, nestled in the Vindhya mountain ranges, is a repository of serene dense forests, wide valleys and sprawling plateaus. With a good supply of water from Chambal, the tiger reserve supports unique habitats (water bodies and forests in scenic landscape) and biodiversity, demanding targeted efforts for their conservation.
4. The core and buffer of the tiger reserve are under the unified control of the Field Director, making the administration efficient. The agenda of tiger conservation is well integrated within the working plans of adjoining territorial forest divisions.
5. The tiger reserve authority has substantially complied with the recommendations made during the last cycle of MEE. Laxmipura village has been completely relocated, while Kherli Bawadi and Ghati have been relocated completely for except the absentee landlords. Mashalpura village has been partially relocated, while deliberations are underway for relocating Damodarpura and Giridharpura out of the tiger reserve.

i. The tiger reserve has a strong protection regime with a fully operational M-STrIPES, surveillance system and deployment of armed border home guards including women personnel. In compliance with the Hon'ble High Court's directions, the department has deployed Border Home Guards (BHGs) till regular recruitment of Forest Guards for the Special Tiger Protection Force (STPF) is made. The experiment has yielded good results compared with the STPF (police model) operational in Ranthambore Tiger Reserve.

ii. Efforts have been made by the management for harmonizing existing and upcoming linear infrastructure projects with tiger conservation needs. Wildlife mortality-prone segments of the Delhi-Mumbai Railway track have been mitigated by the construction of wall fencing. An underground tunnel is under construction for mitigating the greenfield 8-lane highway under Bharatmala Pariyojana passing through the core of the tiger reserve.

Management Weaknesses

1. The linear shape of the tiger reserve is an inherent disadvantage to MHTR, making it vulnerable to anthropogenic pressures exerted by surrounding villages. A sizeable tiger population in the tiger reserve in future is likely to severe cause human–tiger interfaces in the region.
2. The feral population of cattle inside the reserve is a matter of concern as it is increasing with time. They are a threat to the TR as they damage the grassland of the reserve.
3. The Tiger Conservation Plan (TCP) has been drafted and submitted to NTCA, and its approval is long awaited.
4. The infestation of *Prosopis, Lantana* and *Ocimum cannum* in many parts of the tiger reserve is a limiting factor for herbivores.
5. National Highway 12, the Delhi–Mumbai railway track and the Kota–Rawatbhata highway (SH 33) are without wildlife mitigation measures and continue to pose serious threats for the tiger reserve.
6. There is a dearth in staff since approximately 55% of the positions of frontline staff lie vacant and a substantial proportion of the staff are ageing. Although staff quarters/camps were adequately equipped, there is no family accommodation. Moreover, the staff are not formally trained in wildlife management.
7. Although LPG connections were provided in the past to decrease the demand for fuelwood, a report by the Government of Rajasthan indicates that more than 75% of the beneficiaries have discontinued the use of LPG and depend on the forest for fuelwood collection.
8. Although 28 EDCs are currently in place, their participation in the planning and decision-making is negligible. Sharing of relevant information in the public domain by the tiger reserve management is minimal.
9. At present, there is no provision for compensation for crop damage by wildlife anywhere in Rajasthan. This might make the local communities hostile and escalate human–wildlife conflicts in future.
10. Few research projects have been conducted in the tiger reserve since its declaration except a few studies on biodiversity documentation. Monitoring, trend analysis and futuristic projections are lacking for the majority of activities taken up by the tiger reserve management.
11. Delays in fund release are another serious concern for the tiger reserve since a substantial portion of the released funds remains unutilized. There is a paucity of funds in the Tiger Conservation Foundation. The involvement of conservation partners/donors and NGOs is minimal.

Immediate Actionable Points

1. Bhainsroadgarh Sanctuary, in Chittorgarh District, has already been included in the tiger reserve management. Attempts should be made to integrate it as a core with MHTR along with addition of some adjoining forest areas as buffer as it will help the viability of tigers in long term. Further, this would ensure habitat connectivity up to Gandhi Sagar Wildlife Sanctuary in Madhya Pradesh and bolster tiger conservation efforts in the landscape.
2. Approval of the Tiger Conservation Plan should be actively pursued. Without this, many of the management approaches would be ad hoc.
3. *In-situ* conservation breeding facilities for prey need to be established within the tiger reserve to support the prey augmentation programme. It is essential that the released prey populations should be intensively monitored for understanding their demography and survival parameters.

4. Grazing and the feral cattle population have been a major threat to the tiger reserve. Attempts should be made to minimize these without compromising with the livelihood economy and social customs of the local communities. If required, stall feeding should be gradually encouraged and local communities should be made aware of its benefits. Alternatives to LPG connections (such as solar cookers, improvised smokeless chullas and biogas) should be considered so as to reduce the local communities' dependence on forest resources.
5. Proposed village resettlement should be carried out in a time bound manner. More investments are required for grassland development in the resettled village sites and management of invasive species in the tiger reserve. Water points and talabs run by solar pumps should be created at regular intervals within the tiger reserve and maintained especially during the pinch season. The efficacy of these structures should be appropriately monitored for adaptive management.
6. The impacts of hostile land use patterns in the landscape on the persistence of tigers and other endangered wildlife should be cumulatively evaluated in MHTR with immediate effect. Tigers, once released, should be intensively monitored as per the established protocol.
7. There is an urgent need for filling up the staff vacancies. RFOs and ACFs should be regularly sent to the Wildlife Institute of India for attending wildlife diploma and certificate courses. The frontline staff should be frequently trained in important aspects such as wildlife management and monitoring, analysing signs, evidence and pug impression pads (PIPs), camera trapping, crime investigation, intelligence gathering, participatory approaches, etc.
8. Currently the scope of research in the tiger reserve is low. In light of this, it is pertinent that long-term studies on tigers, predators, prey, habitat, socio-economy of local communities, etc. should be initiated and continued. Moreover, information on ecosystem services rendered by the tiger reserve and carbon sequestration to mitigate climate change are some other areas which should be actively addressed. Collaborations should be made with institutes and universities of national and international repute for carrying out such long-term research and studies in the landscape.
9. There is an urgent requirement of introducing compensation for crop damage by wildlife. Without this, the local communities are likely to become hostile and retaliate sooner or later.
10. The EDCs are nascent, and their role in tiger reserve management is limited. A more active participation of EDCs in the planning process need to be ensured. MHTR should launch a website, and all relevant information pertaining to good practices in the tiger reserve should be made available in the public domain.
11. Enhancing management effectiveness will require a significant investment of money, especially for upgrading the infrastructure, skills and equipment, training the staff and village-level engagements. Additional resources may be provided for these. The Tiger Conservation Foundation should be made financially viable and fully operational. The scope of investments from extra-budgetary sources like CAMPA, MNREGS and rural and community development programmes of the Central and state governments should be explored for tiger conservation. The tiger reserve management should explore corporate social responsibility (CSR), which is an innovative policy instrument and can be utilized for the cause of conservation of forests and wildlife through converging partnerships. The state government and Tiger Conservation Foundation need to gear up and play a pivotal role to explore avenues to garner support through this CSR mechanism.

RANTHAMBORE TIGER RESERVE, RAJASTHAN

37

MEE SCORE 73.48%

Date of Evaluation
11-15 September 2022

Evaluators' Names
Sh. A.V. Joseph
Dr. Rajeev Srivastava
Dr. Parag Nigam

INTRODUCTION

Ranthambore Tiger Reserve is named after the majestic fort of Ranthambore, situated in the national park on top of a hill which is a great monument of history, bravery, culture and natural beauty. The fort was built more than 1000 years ago. Ranthambore Tiger Reserve lies between latitudes 25.51890° N and 26.36670° N and between longitudes 75.85700° E and 77.23180° E. The reserve is situated in the south-eastern part of Rajasthan and spreads over four districts, viz., Sawai Madhopur, Karauli, Bundi and Tonk. The mighty River Chambal is located on the eastern side of the reserve. The other river, the Banas, divides the reserve in two parts. In the North-East direction Keladevi WLS is situated which is partially included in the reserve. Project Tiger was launched by the Government of India in 1973 to save the tiger from extinction. Ranthambore was one of the first nine wildlife areas selected as Project Tiger reserves. The core area of Ranthambore Tiger Reserve was notified as Ranthambore National Park by notification no. F.11 (26) Raj-8/80 dated 1 November 1980 under the Wild Life Protection Act, 1972.

Management Strengths

1. RTR is located at the junction of the Aravallis and Vindhyas, providing a wide range of ecologically diverse habitats comprising grasslands, undulating plains, plateaus, ridges and hill streams supporting a good population of the apex predator, the tiger, the leopard and associated prey species.
2. The area supports natural water bodies, streams, nallahs and chaatas complemented with anicuts, check dams and ponds, resulting in infiltration of moisture and an improved habitat supporting a sustainable population of animals.
3. RTR's panoramic landscape, from plains to gently undulating terrain, makes tiger sighting more thrilling. Moreover, the geological terrain with its beautiful natural features keeps the tourists engaged and mesmerized, and it attracts many Indian and foreign tourists and generates huge revenues. The livelihood status of the local people has improved greatly.
4. The existence of long and sturdy stone wall is a great help to mitigate the issue of man–animal conflict. This is one of the strengths of the TR in addressing the man–animal conflict since it is close to human habitations.
5. The recent relocation of villages has helped in increasing the foraging ground for the prey base. An increase in the prey base was witnessed and verified in Indala. Even some of the water bodies were created recently to improve the water availability status in the upper plateau to provide the wild animals with sufficient water in summer.
6. Presence of chowkies at vulnerable areas and regular foot patrolling by the dedicated staff keep intruders and poachers away.
7. Being close to the national and state capital, it invites visits of high-profile persons, which has an added advantage of prompt redressal of issues of the park. In the past, TR got the attention and funds to deal with various urgent issues.
8. Most of the staff working in RTR are passionate and dedicated. There are young and enthusiastic managers. They have a sense of pride to be part of the TR.
9. RTR has taken proactive steps to ensure that the tourist vehicles operated within the park are renovated and painted. It has also ensured that the upholstery is upgraded and the vehicles have been mechanically checked so that tourists are not put to anyinconvenience. The aesthetic appearance of the vehicles is very pleasing to the eye, and all credit goes to RTR management.

10. RTR has replaced all fossil fuel-based water distribution systems with solar power, which is an innovative way of shifting towards renewable energy and sustainable management practices.
11. The patrolling roads make an extensive network which covers almost all vulnerable areas of RTR. This robust system helps efficient and effective monitoring.

Management Weaknesses

1. The sites which were vacated by the villagers are gradually getting converted to woodlands with *Prosopis juliflora* dominating. The very purpose of enhancing the foraging ground for the prey base is therefore getting defeated.
2. Shrines present inside the park attract a huge number of pilgrims which not only generate tons of garbage but also disturb the wildlife for certain periods. There is no system of checking the visitors or educating them to use eco-friendly materials.
3. The presence of livestock is a threat to the habitat.
4. EDC functioning has to be made more meaningful to address the TR objectives although there is an indirect positive impact on the economy.
5. The gadgets and equipment provided to the patrolling staff need to be strengthened and improved. Equipment like GPS, cameras and binoculars are in short supply. All staff members need proper uniform. It will give them a sense of belonging and confidence.
6. The lesser-known faunal species need more scientific studies in terms of their habitat and conservation. They are the backbone of an ecosystem—sustainable populations of these species will ensure the survival of apex species.
7. Keystone species of the flora and fauna and their conservation need special attention for a sustainable ecosystem.
8. The population of the marsh crocodile needs to be monitored to assess possible conflicts in the future.
9. The wild pig population has a hybrid strain, with domestic pigs causing genetic erosion. There is a need to study this critical issue and evolve solutions.
10. The Rapid Response Team (RRT) needs to be improved. Although basic facilities are in place, much more is needed to tackle the various wildlife species with specific SOPs and a checklist of equipment.
11. The veterinary centre is very basic in nature and is not as per the standards prescribed for the Rapid Response Team.
12. A total of 61 villages (18 from RTR-I and 43 from RTR-II) need to be relocated with a proper plan and strategy at the earliest.

Immediate Actionable Points

1. RTR has more than 50% vacancies among the permanent staff. The floating influx of temporary staff is good for the time being but not for a longer period. It has its own threats. Further temporary staff are not legally empowered to implement the forest and WL acts. To avert legal complications, TR needs to address the issue immediately and fill up the vacancies with permanent staff.
2. TR must identify the gaps in the capacity building of various cross-sections of the staff as required. It will not only enrich their knowledge but also make them more efficient to discharge their duties efficiently. Specialized training such as crime control, tranquillizing WL and weapon training needs to be done annually to hone their skills.
3. A dog squad should be in place as in other tiger reserves. The dog squad will further strengthen the protection system, enabling the detection of snares, traps, intrusion, laying of electric wires to hunt animals, illicit removal, etc. The mere presence of a dog squad will be a deterrent to poachers.
4. There should be inventorization of lesser-known animals and plants (terrestrial and aquatic) of the TR for updating and for making appropriate management interventions..

5. Presently, the revenue generated out of tourism goes to the finance department. As per NTCA guidelines it should be deposited in the TR foundation. The foundation is a registered society governed by the Societies Registration Act of 1860. This practice of depositing money with the government should be reviewed , and all the funds generated must be in the foundation to address the immediate conservation issues without waiting for funds from the government.
6. The tourism fees include the eco-development fees which are 50% of the total fee. To make the EDCs more vibrant, immediate steps are needed to enhance the livelihood status of the villagers.
7. The capacities in wildlife health, disease monitoring, and wild animal capture of the veterinary doctors posted in RTR needs to be enhanced, and the supporting working facilities have to be improved. It should be developed as a centre of excellence, with proper training and veterinary education being conducted at regular intervals. The doctors should be exposed to national and international best practices. Proper monitoring of wildlife diseases should be carried out and vaccination drives should be undertaken as per NTCA protocols.
8. Officers should be sent to other places or given foreign exposure to inculcate the best standards at RTR.
9. The use of drones in RTR is to be strengthened with a thermal imaging facility, and in-house personnel should be trained in drone operation technology. The RTR staff are to be equipped and trained with night vision devices having a thermal imaging function.
10. The interpretation centre at RTR is to be suitably equipped to educate the visitors on the uniqueness of the TR and the values and the behaviour expected when inside park.
11. There are 61 villages in the core, and their relocation is to be taken up in a time-bound manner. Once the village is relocated, there should be a proper plan for maintaining the land as a grassland for management of wild herbivores.

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SARISKA TIGER RESERVE, RAJASTHAN

38

MEE SCORE 64.89%

Date of Evaluation
7-10 September 2022

Evaluators' Names
Sh. A.V. Joseph
Dr. Rajeev Shrivastava
Dr. Parag Nigam

INTRODUCTION

Sariska TR the westernmost limit of tigers in the country and holds a unique assemblage of flora and fauna representatives of Aravalli range. The park plays an important role in the overall conservation of tigers in the landscape and acts as umbrella species besides having high tourism value. The 1200 km^2 of forests (core and buffer) acts as a watershed for rain water and the existing vegetation plays an important role in soil and moisture conservation. The Ruparel River that originates within the park and is the major source of water for many villages including the Alwar city. The STR landscape plays a crucial role in enhancing ecological services.

Management Strengths

Tiger Conservation

1. STR harbours a reintroduced population of tigers that needs to be intensively managed due to the isolated location of the reserve and considerable anthropogenic pressures. The conservation of tigers in Sariska is dependent on the intensive field-based monitoring of individual tigers by a dedicated team of forest officials and the field staff. The intensive monitoring of tigers in STR has also helped in understanding tiger ecology, tiger movements, habitat use, natality and dispersal, which is critical for future management and can provide prescriptions for other reserves in the future.
2. The relocation efforts in the recent past have demonstrated that the efforts have resulted in making more areas of the habitat available for tigers and making the TR more viable.
3. With the relocation of villages from the core of the TR, there is considerable scope for development of grasslands to support the wild herbivores and ultimately support tiger conservation. Development of grasslands also helps prevent the straying of tigers out of the TR's boundaries and improve the carrying capacity in the reserve. This relocated land also provides opportunities for providing such habitats for other threatened species including the caracal, for which initiatives have been taken by STR.
4. The issues of the communities have been addressed amicably by the management by entering into dialogues with these communities and effectively addressing their concerns and problems in a holistic manner (engaging in developmental works, decision making, providing alternative livelihoods, etc.). There has been a participatory approach in the routine management interventions in the park, and no resentment was reported during the previous years, providing a good example for others to follow.

Tourism value

Sariska is equidistant from the national capital and the state capital and provides a good tourism opportunity. The existence of ancient forts and temples in STR embellishes the park with a historical flavour and adds to the TR's values. Thus, the visitors to the park not only enjoy the fauna and flora of STR but also the many forts and temples dotted around its landscape and the associated stories of valour, greed and treachery.

Management Weaknesses

1. The tiger population in STR was established from a single source population, and the reserve has minimal connectivity with other PAs, making the possibility of inbreeding a major challenge.
2. STR has porous boundaries and is accessible from all sides and so it is prone to intrusion by poachers and encroachers, as a result of which there is huge exploitation of natural resources.
3. There are 24 villages located inside the core and 153 villages in the periphery. The biotic pressure and human population inside the park pose a challenge for conservation. The heavy biotic pressure exerted on the resources of the park (grazing, lopping, fire damages etc.) has a visible effect on the ecosystem and the vegetation.
4. There are 309 temples located in the core and buffer zone of STR. The religious festivities and pilgrimage result in habitat loss and destruction due to activities like pollution of natural springs by bathing, exploitation of natural resources and pollution of the environment (throwing of leftover food and packaging material). These activities also create hindrances to animal movements, especially in the core area, which is the critical tiger habitat in STR. Such activities may result in serious health hazards to the wildlife.
5. The 22 km of SH 248A (NH-29A, SH-13) bisecting the TR has a serious impact on the wildlife movements in the park. The movement of vehicles on the road contributes to noise and environmental pollution in the park apart from contributing to road kills.
6. Invasive species like *Prosopis juliflora*, *Lantana camara*, *Parthenium* species and *Cassia tora* have overrun the grasslands in the park, smothering the grass species, thereby endangering the lives of the wild herbivores that depend on the grass for their food.
7. The final notification of ESZ is pending, and legalised mining activities are still occurring outside the tiger reserve. The destructive process of mining may affect the wildlife along the boundaries, making them move towards the core, thereby reducing the effective area available for the wildlife.
8. Scientific applied research addressing management issues is quite important for STR as it is an isolated park with major biotic pressures. There are no major research projects to address the dynamic issues of water management, weed invasion, impact of livestock, unregulated temple tourism, habitat recoveries, socio economic aspects, wildlife crime, etc.
9. The waste generation in the park, which is occurring due to the pilgrimage to the temples inside the reserve, is a concern and has to be addressed in its totality, right from preventing entry of waste to its collection and its appropriate disposal. The efforts put in by Amarabad Tiger Reserve, Telangana, which has a robust system, may be studied and emulated with appropriate modifications.
10. STR has more than 50% vacancies among the permanent staff. Though contractual engagements have been done at the frontline staff level and 65% of the beats are manned by outsourced staff, this is not desirable as the short and temporary engagements can compromise the protection efforts and long-term survival of tigers in STR.

Immediate Actionable Points

1. There are 24 villages in the core area, exerting severe biotic pressures on the resources of the park. A total of six villages are proposed to be relocated during this financial year. A pragmatic plan of relocation of the remaining villages is to be designed so that a cluster of villages located in prime tiger habitat will be relocated first, followed by the next batch in priority. It should be implemented in a time-bound manner, taking the due support of identified line departments.
2. The grasslands and the *Prosopis juliflora*-uprooted land in the TR, measuring approximately 400 ha, is overrun with invasive weeds like *Parthenium* and *Cassia tora*. Because the allocated funds are not released in a timely manner, the weed removal works are kept pending, and this affects the wild herbivore populations and ultimately the apex predator, the tiger. A systematic and scientific approach is needed to eradicate invasive species and enhance the foraging ground for the wildlife.

3. The TR has a sanctioned strength of 133 posts of Forest Guard, of which 61 are vacant. Due to the policy of the government, it is being noticed that there is a delay in fresh recruitment of staff members. Similarly, even though sanction has been accorded to the department to put in place the STPF (tiger protection force), no recruitment has been done so far. As a stop-gap arrangement, home guards and border home guards are employed on deputation basis and the protection works carried out. The temporary staff cannot discharge the statutory duties of the forest personnel and book offence cases or prosecute the offenders in a court of law as they do not have legal powers to do so. This basic fact should be brought to the notice of the government and filling the vacant posts in the TR with regular staff members pressed for.
4. The veterinary doctor posted in STR has basic knowledge and experience in wildlife rescues; however, his capacities need to be enhanced in wildlife health, disease monitoring, wild animal capture and associated works. It would also be appropriate to establish a well-equipped veterinary unit to cater to the needs of the park. The veterinary unit needs to be appropriately strengthened by engaging additional veterinary staff.
5. An RRT with adequate infrastructure needs to be constituted to meet the needs of STR as is done in other tiger reserves.
6. The use of drones in wildlife management is fast gaining use as they can be operated remotely and quickly and can cover inaccessible areas. In the interest of the department, a few competent in-house personnel should be trained in drone operation technology and a couple of drones with thermal imaging capability procured, so that wildlife can be tracked at night when animals stray out of the tiger reserve. These drones can be used to detect human intrusion even at night. The tiger reserve staff should be equipped and trained with night vison devices having a thermal imaging facility.
7. The tiger reserve should have a dog squad with a trained dog to track intrusion, snares, traps, etc. in the park. Trained dogs are useful in prevention of WL offences and in detecting traps, snares etc., apart from tracing offenders in WL cases. The very presence of a dog squad invariably acts as a deterrent to the commission of WL crimes.
8. Sariska TR is considered as a closed area (meta population) for tigers as there are no corridors connecting one population of tigers with another. Recent studies have established that STR tigers will face a serious problem of genetic isolation and loss of genetic viability because of the isolation of the reserve. Unless fresh infusion of genetic material takes place, the long-term survival of tigers in STR is bleak. Hence a study on strengthening the genetic base of the tiger should be carried out and steps taken to introduce fresh stock on scientific lines.
9. The interpretation centre at Sariska is not up to the mark due to a lack of funds, and urgent steps are to be taken to renovate the centre with a thematic approach.
10. There are 24 villages in the core and 153 in the periphery, with considerable livestock. The cattle from these villages extensively graze in the park during the monsoon and may even enter the core, destroying the vegetation besides promoting weed dispersal and soil compaction and posing disease threats to wild ungulates. The villages in the core resort to illicit lopping of trees, which results in considerable habitat destruction and loss. It is important that livestock pressures in the core be eliminated and efforts to relocate villages be carried out with utmost priority. In the meantime, the communities need to be exposed to alternative income generation schemes in order to reduce the dependence on the forest.
11. STR gets establishment and non-establishment budgetary allocations from state plan and non-plan schemes. It also receives central funds under Project Tiger for developmental activities in STR. As of date, STR has received only the state release for implementing time-bound developmental activities as well as emergency works. The state/central government must be approached for creation of a revolving fund for the TR with a one-time grant of Rs.25 crores to overcome the issue. The revolving fund will be replenished once regular releases are received under schemes. This arrangement will enable the TR to carry out seasonal operations in a timely manner without waiting for regular releases.
12. The receipts from the tourist fees should come into the account of Sariska Tiger Conservation Foundation directly as per the guidelines issued by the NTCA.
13. Implementation of community based eco-tourism (CBET) in STR is advised so that the EDC members are employed in the tourism sector and the financial benefits go to the EDCs. CBET is very successfully run by the women EDCs' members in Periyar TR. A few staff

members and EDC members can be taken on tour to PTR to study the modus operandi and implement the best practice in STR.

14. Though efforts have been made for alternative vehicular support for pilgrims, it would be appropriate to have eco-friendly vehicles so that the carbon footprints are minimised.
15. Capacity building of the officials and frontline staff through training programmes on identified themes addressing various issues of wildlife management needs to be routinely organised. In this regard, an annual plan for training should be prepared and exposure visits of officials and the frontline staff to other well-managed tiger reserves should be organized to emulate the best practices.
16. EDCs have been formed as per the requirements; however, they have to be made more vibrant to achieve the conservations. Micro-plans for EDCs should be prepared for reducing dependence on the resources of STR. Creation of SHGs will complement the goals of conservation.
17. In future, spillover population of tiger may move to other adjoining areas. Hence, the TR needs to develop a plan to deal with the anticipated growing population. A Corridor Plan that includes suitable tiger habitats, their consolidation efforts and connectivity issues should be prepared.
18. The park management should support research on lesser-known animals (small mammals, vultures, hyaena, mongoose, star tortoise, pangolin, etc.,), which presently is minimal.
19. Disease surveillance and monitoring programmes should be initiated to understand future threats arising from disease outbreaks. Especially with the outbreak of lumpy skin disease in cattle, the park authorities have to be on guard even though no case of outbreak of the disease has been reported in wild ungulates.
11. Strengthening of boundaries besides intensive monitoring should be carried out to check poaching/encroachment issues.

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TAMIL NADU

ANAMALAI TIGER RESERVE

36

MEE SCORE **91.67%**

Date of Evaluation
22-25 August 2022

Evaluators' Names
Sh. S.S. Srivastava
Sh. M.S. Negi
Sh. Ravi Kant Sinha
Sh. Alok Kumar
Dr. Vishnupriya Kolipakam

INTRODUCTION

Anamalai Tiger Reserve (1479.87 km^2) includes Critical Tiger Habitat or core zone of extent 521.28 km^2 and a buffer with an extent of 958.59 km^2 within one of the largest forest tracts available for endemic, endangered and rare wildlife species. This tiger reserve is important for the ecological and food security of the region and is a vital link between forested areas in the west and the plains to the east. Anamalai Tiger Reserve falls within the Western Ghats mountain chain of south-west India, a region designated as Global Biodiversity Hotspot.

Management Strengths

1. Anamalai Tiger Reserve is contiguous and well buffered with seven forest divisions and wildlife reserves except on the northern side, which gets effective protection from the Kerala State Forest Department.
2. Due to various climatic factors, the tiger reserve harbours a rich floral and faunal biodiversity.
3. To guard against poachers, smugglers and illicit timber cutters, the staff of the tiger reserve receives valuable information from tribal people residing in and around the reserve.
4. The reserve is endowed with many perennial and seasonal streams and reservoirs that provide water and support bigger animals like elephants, tigers, panthers, gaur and sambar even during the dry season.
5. In the upper plateau of the tiger reserve, in Valparai, Manambolly and Ulandy, there are a number of perennial rivers and streams that provide water throughout the year.
6. Because abundant water is available from the reservoirs at the foothills of the reserve, agriculture (coconut farming, paddy cultivation, etc.) has flourished, and most of the people are not dependent on forest resources for their livelihood. Similarly, the tribal people in the Valparai and Manambolly ranges are employed by coffee and tea plantations in the Valparai region.
7. As the people are aware of the need for conservation of forests and wild animals, hunting of animals is reported to have drastically come down.
8. All the ranges have been provided with vehicles and communication equipment, weapons and housing facilities to contribute to effective protection.
9. A total of 85 young, agile tribal people are camping round the clock in anti-poaching camps established at 23 vulnerable points. They are perambulating to protect the animals from poaching and the sandalwood and other valuable trees from being felled.
10. Sufficient numbers of NGOs and voluntary organizations are working for the cause of conservation in co-ordination with the tiger reserve management.

11. The tiger reserve management has very effectively created trust and faith among the local villagers by providing them good school facilities and buses for school- and college-going students. The management has also taken special care to develop the skills of educated youth in townships near the tiger reserve.
12. Management has also engaged a number of villages for providing a range eco-tourism services with regular and assured remuneration. Although low income but assured, has created a vast impact on the villagers The villagers see the management as their real well-wisher and in turn they are committed to the protection of the forests and wildlife within the tiger reserve.
13. The management has taken the right step of rewilding of one orphaned tiger cub at Manthirimattam Camp, which is going to further enhance the skills of the field staff in managing the tiger population.

Management Weaknesses

1. Perambulation of the entire reserve poses difficulties due to the very steep and undulating terrain.
2. The threats from poaching, smuggling of timber and encroachment within the tiger reserve are well recognised and documented. Patrolling during the day time by the field staff, including the anti-poaching staff, is well organised and recorded through the M-STrIPES app. But the patrolling at night was found to be not as effective and organised.
3. Due to the extensive network of roads, pipelines, power lines, major reservoirs, contour canals, hydroelectric projects and tea and coffee plantations inside the reserve, the habitats of elephants and other major animals have become fragmented. Some of the movement paths of elephants have also been blocked.
4. Due to large-scale bamboo flowering within the tiger reserve and adjoining areas, the dried bamboo clumps and bamboo culms that have fallen on the ground are serious fire hazards and have become threats to the conservation of the flora and fauna of the tiger reserve.
5. As this reserve shares a substantial inter-state boundary with Kerala, protection against sandalwood smuggling, ganja cultivation, and animal poaching poses threats to the park management.
6. Established tourists spots like Topslip, Amaravathy, Thirumoorthymalai and Monkey Falls add to the fire hazards and pollution problems during summer, festivals and vacations.
7. The 33 tribal settlements in the core area of the tiger reserve (enclaved villages) dilute the status of the core area as tribal people occupy large areas of forest in these settlements and use the resources of the adjoining forest. They are a source of disturbance in the wildlife habitat.
8. Due to late release and shortage of funds, difficulties are experienced in carrying out essential and timely operations for effective management of the tiger reserve, including patrolling.
9. Frequent transfers at short intervals of senior-level officers of the tiger reserve are reducing the capacity for effective management.
10. The headquarters of the Field Director have been shifted from Pollachi to Coimbatore, which is quite far from the tiger reserve. As a result, Anamalai Tiger Reserve is deprived of the Field Director's timely and regular supervision as well as guidance, which it deserves.

Immediate Actionable Points

On the basis of discussions with officers of the tiger reserve, members of the field staff, local villagers and NGOs, as well as observations of the Committee, the followings actionable points are recommended:

1. Since villagers within the tiger reserve in 33 settlements are very much dependent on the TR and do not want to be relocated from Tiger Reserve so Management need to adopt strategy of sending the youth to outside Tiger reserve for coaching, skill development and higher education so that they get some employment and do not return to Tiger Reserve. This needs to be pursued vigorously to make the core area inviolate.

2. As nights are more vulnerable to poaching and smuggling, night patrolling needs to be strengthened.
3. Forest Guards and Foresters also need to stay in anti-poaching camps under their jurisdiction and accompany the staff during patrolling. This was observed to be lacking.
4. Range Forest Officers and above also need to make frequent visits to anti-poaching camps and assess the availability of basic necessities like medicines, first-aid kits, drinking water, torches and cells.
5. The management needs to make concerted efforts to acquire the lands under tea and coffee plantations on priority to acquire leased forest lands for providing corridors to wild animals through these gardens to check man–animal conflicts.
6. Management needs to take effective steps to save the flora and fauna of the reserve from fire threats posed by bamboos that have flowered by adopting suitable fire protection strategy with adequate funds and by removing dried bamboo as per the provisions in the TCP, subject to the prevailing guidelines of NTCA.
7. Since one of the objectives of the management is to relocate the villages from the core area in the course of time, the traditional knowledge and skills with the villagers used in conservation of biodiversity need to be documented. Gradually the management needs to switch over to management practices that will not be dependent on such traditional knowledge and skills.
8. To achieve the goals of the management within the tiger reserve in a time-bound manner, it is essential that officers at senior level in the tiger reserve not be transferred frequently. The Chief Wildlife Warden and the Government of Tamil Nadu to consider this issue in the larger interest of conservation of the biodiversity within the tiger reserve.
9. The entire process of re-wilding the orphaned tiger cub at Manthirimattam needs to be documented and a proper log book of the tiger cub's activity maintained for future guidance.
10. Anamalai Tiger Reserve is contiguous to Parambikulam Tiger Reserve of Kerala state. The field staff of Anamalai Tiger Reserve often feels demoralized when comparing themselves with the staff of Parambikulam Tiger Reserve as far as their designation, pay scale and status are concerned. After the visit of the Committee to Parambikulam Tiger Reserve, it was noticed that Parambikulam Tiger Reserve of Kerala has returned to an old organizational structure. Now there is no difference compared with Tamil Nadu. The management of Anamalai Tiger Reserve may look into this and find out from their counterparts in Parambikulam Tiger Reserve the actual status and take necessary remedial measures.

Shibu Nair

KALAKAD-MUNDANTHURAI TIGER RESERVE, TAMIL NADU

40

MEE SCORE 83.33%

Date of Evaluation
27-29 October 2022

Evaluators' Names
Sh. S.S. Srivastava
Sh. M.S. Negi
Sh. Ravi Kant Sinha
Sh. Alok Kumar
Dr. Vishnupriya Kolipakam

INTRODUCTION

KMTR is the first tiger reserve in the state of Tamil Nadu and the 17th tiger reserve in the country. It was declared in 1988. It is the southernmost habitat of tigers in the country. KMTR is located in Tirunelveli and Kanyakumari districts of Tamil Nadu.

It is one of the five tiger reserves in Tamil Nadu. It is situated at the southern end of the Western Ghats, in the Ashambu Hills. It has an extent of 1601.542 km^2, including a pristine core area of extent 895 km^2, a forested buffer of extent 236.64 km^2 and a 469.90 km^2 eco-development buffer on the eastern side. It consists of four sanctuaries, namely, Kalakad Sanctuary, Mundanthurai Sanctuary and a part of Kanyakumari Wildlife Sanctuary as well as a part of Nellai Wildlife Sanctuary. It also forms part of the interstate Agasthiyar Malai Biosphere Reserve. KMTR has connectivity with Periyar Tiger Reserve, and the two Tiger Conservation Units form a part of the Agasthiyar Malai Landscape.

There are 13 enclaves without any habitations, four tribal settlements, three Electricity Board establishments and colonies and a leased-out area (BBTC) located within the core area of the tiger reserve. Tribals are very dependent on the tiger reserve for their livelihood.

The Tiger Conservation Plan has been approved and is valid up to 2024–25.

Management Strengths

1. Large, contiguous habitat. KMTR consists of large contiguous patches of forest and is thus a suitable habitat for wildlife. Along with Kanyakumari Wildlife Sanctuary, Nellai Wildlife Sanctuary and Periyar Tiger Reserve, it forms part of the interstate Agasthiyar Malai Biosphere Reserve.
2. Area with rich biodiversity. Kalakad Mundanthurai Tiger Reserve, being part of the Western Ghats, has been recognized as one of the three mega-centres of endemism in India and one of the two global hotspots of biodiversity in India. The reserve has 11 forest types with multiple habitats. This reserve has been identified as among the Type-1 Tiger Conservation Units (TCU) representing the tropical moist evergreen forests worldwide.
3. Excellent water regime. KMTR has three major watershed areas: Upper Kodayar, Manimuthar and Thamirabarani. The Upper Kodayar Plateau, which receives around 5000 mm of rainfall. There are as many as 14 rivers flowing through the sanctuary and meeting the irrigation and drinking water needs of Kanayakumari, Tirunelveli and Tuticorin districts and the drinking water needs of part of Virudhunagar District. The reserve has seven dams, and hydroelectric power production is carried out in three dams. Due to the perennial flow of water in the River Thamirabarani and presence of 13 other rivers, the reserve is called the "River Sanctuary", and fortunately the major portion of the catchment areas is situated in the inaccessible sholas and thick evergreen forests in the higher reaches.
4. Low threat of habitat fragmentation. There is a single-road network, and a considerable part of KMTR, especially the core, is inaccessible. There are no national highways/state highways cutting across the reserve and linking the major towns or cities outside the reserve. Most of the roads are for approaching habitations within the tiger reserve. Therefore the scope for fragmentation of the habitat due to the demand for widening of national and state highways is relatively low.
5. Suitable for 'vantage-point' monitoring. The TR area is hilly and undulating. The hills and high mountain tops, with a commanding view of the surrounding area, are suitable for look-out/vantage points for monitoring the movements of wild animals as well as humans.
6. Low threat of habitat modification due to invasive species. Invasive species could not find their way into KMTR, and therefore they are not a major threat except in the Mundanthurai plateau.

7. Low human–wildlife conflict. There are not many human–wildlife conflicts in the core area. However a few human–wildlife conflicts have been reported mainly due to crop depredation by wild elephants, wild boars and other herbivores. Leopard attacks on livestock have been reported.
8. Strong participatory management network. With 263 well-established eco-development/village forest committees in villages around the eco-development buffer zone of the tiger reserve, participatory management has taken roots in KMTR. Involvement of EDC/VFC members in various activities of protection, conservation and habitat management and improvement has had a positive impact on the effectiveness of the tiger reserve management.

Management Weaknesses

1. Presence of human and other biotic interference, There are 13 uninhabited enclaves, four tribal settlements with a low population density, three Electricity Board establishments and one area leased out (to BBTC) on a lease of 50 years, which expires in 2028, located within the tiger reserve. Tribal people from four settlements are still dependent on the tiger reserve for their livelihood, fuel, fodder and MFP collection and grazing. There are 241 hamlets of 55 revenue villages which are located at 5 km from the reserve boundary. They are involved in various agricultural practices, making the fringe area vulnerable to human–wildlife conflict, largely in the form of crop depredation by elephants, gaur and other wild animals. Due to legal complications, there is a delay in dealing with removal of private enclaves and encroachments from the core area.
2. Impact of invasive species. Mundanthurai plateau is infested with exotic weeds such as *Lantana camara* and *Eupatorium* species. They are invading the grasslands. An unpalatable thick growth of lemon grass (*Cymbopogon flexuosus*) is also a bottleneck in the restoration of the grasslands of Mundanthurai plateau.
3. Encroachment of grassland by forest species. The grasslands have also been encroached by forestry species in Mundanthurai Plateau as well as in the lowest slopes of Sengaltheri, thereby affecting the populations of many wild animals including the spotted deer.
4. Low population density of tigers. The 2010 estimation indicates a minimum population 3.0 ± 1.1 tigers/100 km^2 though the projected carrying capacity in the KMTR habitat is approximately 12.61 tigers/100 km^2. This may be due to many negative factors like disappearing grasslands, human disturbances and inadequate protection.
5. Relatively less stable position of manpower resources. The TR management is relatively less stable, especially the top-level management. The tenure of the FD is found to be on average less than 1 year during last 4 years. Similarly two divisions of the TR have seen five Dy Directors in this period of 4 years. Fast changes of managers/officers have adverse impacts on the execution of the TCP prescriptions, especially when almost all the Range Officers of the seven ranges are new in service.
6. Poor patrolling in inaccessible areas. Part of the tiger reserve area has been declared as inaccessible, where there is no road network and no patrolling. Such areas are quite vulnerable to poaching and smuggling of wild animals.
7. Lack of wildlife management-trained staff. :Most of the field staff do not have any formal training in wildlife management.
8. Monitoring of implementation of TCP. The TCP of the reserve is under execution since 2015–16. As per discussions with the management, though the TCP is in its eighth year of implementation, neither has the mid-term review been carried out nor has the exercise for revision been started.

Immediate Actionable Points

1. Restoration of grasslands. Immediate efforts are required to restore the grasslands of Mundanthurai plateau not only by way of weed removal but also by restricting the encroachment of the grasslands by trees. A specific action plan needs to be prepared for restoring the grasslands of Mundanthurai plateau along with a strategy to execute it. It should form part of the revised TCP for the period from 2025–26 to 2034–35.
2. Protection in inaccessible areas. Since a road network has not been created all over the tiger reserve, areas devoid of a road network have been declared inaccessible. But these areas are accessible to poachers and smugglers of the region, and so patrolling by the field staff in such areas on foot is required. They should camp in such areas in temporary establishments like machans on tree tops or by pitching portable tents, etc. for better protection against poaching and smuggling of sandalwood, other timber species and NTFP.
3. Inadequacy of modern technology tools. The protection in the inaccessible areas could be strengthened by using technology in monitoring and habitat improvement. The use of drones and high-resolution cameras in inaccessible areas could ease the problem of management.
4. More anti-poaching camps (APCs). Keeping in view the large area of Kalakad Mundanthurai Tiger Reserve, extending over 1601.542 km2, the number of existing APCs (39) is quite inadequate. More camps at strategic locations need to be provided immediately with adequate infrastructure.
5. Expeditious disposal of legal case for removal of enclaves. The ongoing efforts to acquire the land of enclaved villages and declaring it as forest land needs to be pursued vigorously for the improvement of the habitat. The state government to make special efforts to ensure expeditious disposal of court cases.
6. Strengthening EDCs. The good work of the Eco-Development Division of KMTR with good financial resources, as done in Mylar Kanikudieruppa EDC, needs to be adopted in other EDCs also, especially in the tribal settlements in the core area of KMTR. The main focus must be on education and skill development so that the younger generation get employment outside KMTR and the dependence on the forest is reduced.
7. Stability in management tenure. The Government of Tamil Nadu and CWLW Tamil Nadu to kindly ensure that officers at the Field Director, Dy Director and even at range level have relatively stable tenures of a minimum 3 years' duration so that consistency in directions given to the field staff is maintained for better management and implementation of TCP prescriptions.
8. Formal wildlife management training. The state government should make efforts to ensure that at least one officer among the Field Director and Dy Directors of division has got formal basic training in wildlife management at the Wildlife Institute of India. Similarly, at least an officer at the field level, viz, Range Officer or Forester, in the tiger reserve is formally trained (viz, 3-month course at WII) in wildlife management.
9. Enhancing adventure eco-tourism: The TR management should revisit its eco-tourism plan and plan for adventure and nature tourism so that eco-tourism with the minimal road network and vehicular movement can be encouraged.

Shibu Nair

MUDUMALAI TIGER RESERVE, TAMIL NADU

41

MEE SCORE 90.15%

Date of Evaluation
19-22 September 2022

Evaluators' Names
Sh. S.S. Srivastava
Sh. M.S. Negi
Sh. Ravi Kant Sinha
Sh. Alok Kumar
Dr. Vishnupriya Kolipakam

INTRODUCTION

Mudumalai Tiger Reserve lies on the north-eastern and north-western slopes of the Nilgiris region, descending to the Mysore plateau. Precipitously placed at the tri-junction of Kerala, Karnataka and Tamil Nadu, it forms a very important conservation unit in the country. The reserve is situated in Gudalur, Udhagai and Pandalur taluks of Nilgiris District, Tamil Nadu. The entire area of 321 km^2 of the tiger reserve was declared the core/Critical Tiger Habitat (vide G.O. Ms. No. 145, Environment & Forests (FR-5) Department, dated 28 December 2007 of the Government of Tamil Nadu). The area of Mudumalai Tiger Reserve has been reorganized with the notification of a buffer zone of area 367.586 km^2 as per G.O. Ms. No. 200, Environment and Forests (FR-V) Department, dated 13 August 2012 to include the buffer area. Accordingly, the area of Mudumalai Tiger Reserve is 688.586 km^2, with a core/Critical Tiger Habitat of extent 321 km^2 and a buffer area of extent 367.586 km^2.

Management Strengths

1. Mudumalai Tiger Reserve (MTR) supports an intact assemblage of prey species which supports three large carnivores. MTR is one of India's few "high density" tiger reserves (15.4 tigers per 100 km^2 in the core area during 2016).
2. An organized and skilled patrolling system against poaching is in place for the past few decades, supported by a newly introduced smart patrolling system (M-STrIPES/Suvadu) to ensure better results.
3. MTR is blessed with numerous perennial water holes, rivers and streams which fulfil the needs of the wildlife. It also receives sufficient showers during both the south-west and north-east monsoons.
4. MTR is part of the Nilgiri Biosphere Reserve and spreads across three states. It has rich biodiversity and has a relatively small interface with human land use.
5. The well-equipped Advanced Wildlife Management Training Centre at Theppakadu enhances the capacity of the staff in various management aspects and maintains a very good database of the training and trainees.
6. MTR has a sizeable scientific database on diverse themes of biodiversity and wildlife management accumulated through field research and study made by efforts of various individuals and institutions. This database can be a backbone for enhanced and efficient management in the future,
7. The strategic location of Mudumalai Tiger Reserve within the Nilgiri Biosphere Reserve provides a corridor between the Eastern Ghats and Western Ghats for the spread of tigers to various landscapes.
8. There has been positive support from the judiciary as well as the local people due to the outreach of the TR management. The TR foundation is now also handling the human–elephant conflict of the neighbouring Gudalur Division, generating goodwill among the fringe population.

9. The tiger reserve has a cadre of comparatively young frontline field staff, which is an assurance of better and effective management.
10. The relatively gentle terrain and good network of forest roads afford greater accessibility to all parts of MTR for better management.

Management Weaknesses

1. A total of 30 hamlets with about 2000 people and their livestock within the core area of MTR dilute the management efforts.
2. Heavy traffic on the 15.55 km stretch of Mysore–Gudalur NH 766/NH 181 and the 14.3 km of state highways linking Theppakadu, Masinagudi and Ooty passing through the tiger reserve is the biggest source of disturbance in the tiger reserve and cause of fragmentation of forests. It creates obstacles to the movements of wild animals.
3. The summer months (February–May) remain dry almost every year. In a rain-deficient year, the situation is aggravated and affects the management efficiency.
4. The remote areas of the reserve, especially the tri-junction area, are porous and susceptible to poachers and smugglers.
5. Inordinate delays in the release of central funds and inadequacy of funds for habitat improvement are a cause of concern.
6. The tiger reserve is heavily infested with exotic/invasive weeds like *Lantana, Eupatorium* and *Opuntia*. Now it getting affected by *Senna spectabilis*.
7. Mushrooming of ecologically incompatible private resorts around MTR.
8. Extensive TNEB infrastructure, including high-tension cables, flume channel (originating from Singara), settlements and power-generation unit are sources of constant disturbances.

Immediate Actionable Points

1. The 30 hamlets located within the core area need to be relocated immediately. The relocation process which has been started by the management needs to be implemented without further delay.
2. Chief Wildlife Warden should pursue for approval the Tiger Conservation Plan for the period from 2020–21 to 2029–30 which has been submitted by the Field Director.
3. Heavy traffic on the 15.55 km stretch of Mysore–Gudalur NH 766/NH 181 and the 14.3 km of state highways linking Thepakadu, Masinagudi and Ooty passing through the tiger reserve is the biggest source of disturbance. Primarily, these roads have fragmented the habitat and create obstacles to the movements of wild animals during the major part of the day. Besides, the vehicles passing through frequently throw garbage, plastics and waste food. They are also a source of major fires set off through carelessly thrown cigarettes. Also, there is an increasing number of macaques waiting and begging for food from passing vehicles. Since Mudumalai TR is part of a very large forested landscape, if animals cannot move freely in this landscape, the very purpose of establishing a tiger reserve is diluted. Therefore a road over-bridge needs to be constructed so that the movements of wild animals are not affected. NHAI have the expertise to construct such roads. This initiative needs to start immediately as the traffic will further multiply in the future creating more problems.
4. Electric line passing through the core area need to be taken underground or insulated for the safety of wild animals.
5. Since there is a constant threat of poaching and smuggling, which mostly takes place during night hours, patrolling during night time needs to be strengthened and organised as is being done during the daytime.
6. The state government should review its transfer policy (transferring frontline staff every 3 years). The period of 3 years is too small to contribute significantly. By the time the staff are acquainted with the terrain, they are transferred. The tiger reserve is thus deprived of their experience and knowledge and exposed to a new set of staff with little knowledge about the tiger reserve.

7. The mushroom growth of tourist hotels and resorts at the periphery of the tiger reserve need to be checked to have a disturbance-free corridor of wild animals as well to reduce pressure on the tiger reserve.
8. Establishing three more anti-poaching camps on the interstate border needs to be expedited for improved protection of the tiger reserve. This is mentioned in the TCP and was highlighted during the field visit of the committee.
9. Removal of weeds like *Lantana, Eupatorium, Opuntia* and *Senna spp*. needs to be taken up on priority. Removal of *Lantana* is being done in the tiger reserve as per the order of the Hon'ble High Court of Chennai. A similar order also exists for *Senna* spp., and so its removal along with *Opuntia* to be taken up on priority.
10. Since the anti-poaching staff also conduct joint patrolling with the anti-poaching staff of Kerala and Karnataka along the interstate boundary, the wages of the Tamil Nadu staff, Rs.12,500 plus rations, needs to be made on par with the wages in Kerala, i.e., Rs.18,000 plus rations. The tiger reserve management to please look into this disparity and rationalise the wages of the anti-poaching staff to keep their morale high.
11. The Government of India needs to take special care for the timely release of the CSP Fund under Project Tiger so that grassroots workers like watchers get their wages on time and the management is able to execute all the planned work in time.

Shibu Nair

SATHYAMANGALAM TIGER RESERVE, TAMIL NADU

42

MEE SCORE 84.85%

Date of Evaluation
22-24 September 2022

Evaluators' Names
Sh. S.S. Srivastava
Sh. M.S. Negi
Sh. Ravi Kant Sinha
Sh. Alok Kumar
Dr. Vishnupriya Kolipakam

INTRODUCTION

Sathyamangalam Tiger Reserve is located at the strategic confluence of the Western Ghats and Eastern Ghats. It shares its eastern boundary with Erode Forest Division, its north-western boundary with MM Hills Wildlife Sanctuary (erstwhile Kollegal Forest Division) and northern boundary with Biligiri Rangasamy Tiger Reserve. Nilgiri North and Coimbatore divisions are on the southern side, separated by the perennial River Moyar, which runs along the Moyar gorge.

An area of 1,40,924 ha was declared Sathyamangalam Tiger Reserve from the erstwhile wildlife sanctuary (vide Govt. Order (Ms). No. 45 Environment & Forests Dept. Dated 15 March 2013). The core zone has an extent of 79,349.331 ha, and 61,491.21 ha has been declared the buffer zone of the tiger reserve. The buffer zone is interspersed within the core area, except the reserve forest patch in T.N. Palayam Range, which is completely under the buffer zone. There are 11 tribal revenue villages, seven tribal forest villages and 16 revenue non-tribal villages located within the core area. According to the Field Director, the total area of the tiger reserve is 1,40,840.541 ha whereas an area of 1,40,924 ha is mentioned in the TCP.

The TCP of Satyamangalam Tiger Reserve, Tamil Nadu from 2019–20 to 2029–30 has been approved by NTCA (vide letter dated 18 February 2020).

Management Strengths

1. Affinity towards wildlife amongst tribal people.
2. Large contiguous patches of forests and Great Moyar Valley provide landscape connectivity.
3. The buffer has the status of a wildlife sanctuary.
4. The landscape connectivity between rich tiger habitats offering genetic exchange and genetic contiguity and dispersal opportunities to tigers and other wild animals.
5. Rich species diversity across various diversified ecosystems.
6. Eco-system diversity within the tiger reserve and adjoining areas.
7. Perennial rivers and reservoirs/dams are present within the tiger reserve.
8. Satyamangalam Tiger Reserve has a rich conservation history.
9. Low incidences of human–wildlife conflicts (per unit area)
10. The tiger reserve has a rich cultural heritage

Management Weaknesses

1. Anthropogenic activities within the tiger reserve and resource dependence on the fringes
2. Linear intrusions like National Highway 209, state highways and other major roads are causing fragmentation of forests and restricting the movement of wild animals within the tiger reserve.
3. Wildlife-centric centric management infrastructure
4. Land degradation and water scarcity within the tiger reserve are concerns.
5. Invasive weeds are affecting the habitat of the wildlife.
6. Lack of awareness among communities about protected area management aspects

7. Religious activities cause disturbances.
8. Summer weather has long pinch period
9. Inadequate database on past wildlife interactions with the habitats
10. Poor eco-tourism infrastructure
11. Waterspread area of Bhavanisagar Dam provides scope for illegal cultivation
12. Vacancies in the cadre of frontline staff and lack of a homogenous blend of experienced and young staff are cause of concern for better protection and management of Tiger Reserve.
13. Vacancy in the cadre of Field Director. The present Field Director is holding the additional charge of Sathyamangalam Tiger Reserve along with the original charge of Anamalai Tiger Reserve. Both the posts are important and full of problems and need the constant presence of FD in the tiger reserve.
14. Lack of database on wildlife dynamics, flora and human dimensions
15. Presence of larger number of enclave villages
16. NTFP collection and encroachment are other challenges within the tiger reserve.

Immediate Actionable Points

1. The 34 hamlets/villages/settlements located within the core area need to be relocated, for which necessary action should be initiated.
2. There are certain encroachments in the core area that are being processed under the Forest Rights Act 1996. The management should take steps to make the core area inviolate.
3. There are certain discrepancies in the TCP about the extent of the core and buffer and total area of the tiger reserve as well as about the number of villages/settlements within the core area. The area and number are varying from one chapter to another chapter of the plan. Further, the plan mostly refers to the number of tribal settlements and not the other villages located within the core boundary. This should be taken care of during the mid-term plan review.
4. Satyamangalam Tiger Reserve was constituted during 2013. The Government of Tamil Nadu and NTCA should provide necessary resources for development of infrastructure and manpower and improvement of the habitat.
5. The electric line passing through the core area need to be taken underground or insulated for the safety of the wild animals. The wild animal casualty, especially elephants, is heavy.
6. Traffic movements on NH 209, passing through the core area needs to be stopped as an alternative road is availableor flyovers and underpasses may be provided for wild animals not only on the national highway but also on other roads. The Hon'ble High Court Madras has also issued directions regarding this.
7. Since there is constant threat of poaching and smuggling which mostly takes place during night hours, patrolling during the night needs to be strengthened and organised as is being done during the daytime.
8. The state government should review its policy of transferring the frontline staff every 3 years. The period of 3 years is too a small period to contribute significantly. By the time the staff are acquainted with the terrain, they are transferred. The tiger reserve is thus deprived of their experience and knowledge and exposed to a new set of staff with little knowledge about the reserve.
9. Raising of various commercial crops like banana and areca nut within the enclaved villages by absentee landlords needs to be discouraged and regulated. In these farm houses the landlords are running tourist lodges and home stays.
10. Removing weeds like *Lantana, Eupatorium* and *Senna spp*. needs to be taken up on priority for improving the habitat of wild animals. Further, the removal of *Senna spectabilis* should be closely monitored at least for 5 years, and the findings should be properly documented.
11. The germination of the grass *Cenchrus ciliaris* near the bank of the Moyar River in Peerkadam Beat under Bhawani Sagar Range should be protected from deer grazing by fencing using uprooted thorny *Prosopis* trees/shrubs to ensure that the grasses quickly take over and suppress the possible regermination of *Prosopis sp*.

12. The eco-tourism activities need to be started immediately, especially day tourism, as there is poor infrastructure for promoting eco-tourism. This will help create awareness among the local people, which will subsequently contribute to the protection and development of the tiger Reserve.
13. The minimum number of APCs are to be maintained, and three more anti-poaching camps need to be established for ensuring the protection of the TR.
14. The existing provision of 70 litres of POL per month for protection purposes is meagre. It needs to be enhanced to a minimum of 200 litres per month for effective movement of the staff and APC workers for protection work.
15. There is a severe shortage of uniformed frontline staff. Vacancies at the level of FG and Forester need to be filled up on priority.
16. The existing anti-poaching camps need to be provided with uniform minimum facilities like drinking water, utensils, cots, first-aid kits, torches and cells and mosquito nets.
17. The field staff of Satyamangalam Tiger Reserve are not getting a hill allowance although the average altitude of the TR is more thean 700 m. They feel discriminated as other TRs of the state with lower altitudes are getting hill allowances. The state government may kindly consider the issue and sanction the hill allowance as applicable.
18. The Government of India should take special care for timely release of CSP funds under Project Tiger so that grassroots workers like watchers get their wages on time and the management is able to execute all the planned work in time. For the last 3 years, the TR has not got second instalment of the sanctioned funds.
19. The veterinary unit at Karachikorai is well established with an experienced doctor and support staff. The unit needs a boundary wall all around the campus, an OT with the required implements, a paddock with a squeeze cage, a vehicle for carrying instruments an a dedicated vehicle for the veterinary doctor, who has to move not only in Satyamangalam TR but also in other TRs of the state. NTCA and the Government of Tamil Nadu to provide the necessary support to make the unit fully functional.
20. One Field Director needs to be posted immediately exclusively for Sathyamangalam Tiger Reserve for providing leadership and guidance to the field staff and supervising the work of this tiger reserve on a regular basis.

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SRIVILLIPUTHUR–MEGAMALAI TIGER RESERVE, TAMIL NADU

43

MEE SCORE 60.94%

Date of Evaluation
30 October to 2 November 2022

Evaluators' Names
Sh. S.S. Srivastava
Sh. M.S. Negi
Sh. Ravi Kant Siha
Sh. Alok Kumar
Dr. Vishnupriya Kolipakam

INTRODUCTION

India's 51st tiger reserve, Srivilliputhur–Megamalai Tiger Reserve of Tamil Nadu was declared through a notification dated 8 February 2021. It spreads over an area of 1016.57 km^2 , with a core of extent 641.86 km^2 and a buffer of extent 374.70 km^2. The tiger reserve is located in Virudhunagar, Theni and Madurai districts. It has been declared a tiger reserve by upgrading the existing Srivilliputhur Grizzled Giant Squirrel Wildlife Sanctuary and Megamalai Wildlife Sanctuary. These two sanctuaries form the core area of the tiger reserve. The Srivilliputhur–Megamalai landscape is situated in vital southern-eastern projections of the Western Ghats, in south-central Tamil Nadu, abutting Kerala's Periyar Tiger Reserve in the south-west direction and having spatial connectivity to the Anamalai Tiger Landscape in the north-western direction and to Tamil Nadu's Kalakadu Mundanthurai Tiger Reserve, which is linked to the Kanyakumari Hills in the very south of the country. Tigers from the neighbouring Periyar Tiger Reserve and from near Anamalai Tiger Reserve find significant habitats and breeding and home ranges in the highly undulating terrain of Srivilliputhur and in the hilly tracts of Megamalai. The forested habitats of the Srivilliputhur region, which are largely uninhabited and undisturbed, provide excellent buffering grounds to the tigers of Periyar Tiger Reserve and excellent genetic exchange grounds for the tigers of the Anamalai region.

Management Strengths

1. Srivilliputhur Tiger Reserve is endowed with a large number of endemic species, like the LTM, Nilgiri tahr, giant grizzled squirrel and slender loris. and with interspersing Shola forests and grasslands, the entire landscape when integrated through corridors and physical linkages paves way for a very healthy genetic dispersal of the elephants, tigers and their co-predators.
2. It is the important catchment of the Vaigai River and the Periyar River, on which nearly 10 million people depend today. Many more will continue to depend on it for sustenance of life and health.
3. Unexplored forests with rich floral and faunal diversity with excellent scope for scientific research. For eco-tourists this tiger reserve is an ideal place as it is full of biological diversity, scenic views, wildlife sightings, trekking, etc.
4. The eco-sensitive zones of both the sanctuaries forming the core of the tiger reserve have been notified.

Management Weaknesses

1. SMTR, established as a new tiger reserve on 8 February 2021 during the peak COVID-19 period, lacks the basic infrastructure of anti-poaching camps, roads, buildings (both for residences and for offices) and a VHF network. There is a shortage of regular and daily wagers for want of adequate funds. There is a shortage of vehicles and camera traps for regular monitoring of tigers and other wild animals.
2. The Tiger Conservation Plan has not yet been prepared. As a result, the present management of the tiger reserve is not focused.
3. The tiger reserve has inherited a large chunk of forest land encroached by cotton silk mafias sitting in big cities like Chennai and Madurai.

4. Large-scale cultivation of tea, coffee, cardamom and other cash crops has fragmented the contiguous patches of forests, leading to loss of biodiversity, especially the endemic species.
5. The tiger reserve is badly infested with weeds like *Lantana, Euporatium* and *Senna* species.
6. Only four EDCs out of 53 are active.
7. It is infested with the grazing cattle owned by absentee landlords for meat, etc.
8. Ganja cultivation is quite rampant within the tiger reserve.
9. Tribal people living in hamlets, viz., Ayyanarkoil, Shenbagathoppu, Athikoil, Thaniparai, Vinobanagar and Valliammai Nagar, have been assigned 4955 ha of reserve forest (core area, 1089.32 ha; buffer area, 3865.68 ha) for collection of minor forest produce for their bona fide purposes according to the resolution passed in the District Level Committee as per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. (Central Act 2 of 2007).
10. Rampant violation of the Forest Conservation Act by distributing land pattas for forest land is a cause of concern.
11. The large networks of roads (national highway, state highways and other roads) fragment the forests. Vehicular movement on these roads is a cause of disturbance for wild animals.
12. Due to a shortage of funds and the non-existence of the Tiger Conservation Foundation, the management has not been able to provide adequate rations to anti-poaching watchers over the years..

Immediate Actionable Points

1. The management plan needs to be completed immediately. The preparation of the management plan has been assigned to Global Tiger Forum (GTF), a Delhi-based organisation. As per field officers, the experts of GTF are not visiting the field to have first-hand information on various aspects of SMTR. GTF experts need to camp in SMTR, and they should finish the preparation of the plan in a time-bound manner with cooperation and support from field officers. The plan should incorporate the views of the stakeholders. It should be completed with the participation of all stakeholders.
2. CWLW Tamil Nadu needs to initiate steps for the creation of Tiger Conservation Foundation and provide funds for this Foundation from the neighbouring tiger reserves of Tamil Nadu as well as from the adjoining Eco Development Division to sustain the anti-poaching camp labourers of SMTR and essential infrastructure.
3. As reported in the field, the revenue department has granted pattas for a large chunk of forest land which was declared RF/RL under the Tamil Nadu Forest Act prior to 1980. This needs to be examined, and action needs to be taken to cancel the illegal pattas. Other actions need to be taken as per the provisions of the FC Act, 1980.
4. Since the core area is a wildlife sanctuary, steps may be taken to declare the core area the Critical Wildlife Habitat. Community rights granted in the core area under the Forest Rights Act may be cancelled.
5. The 49 defunct eco-developmental committees need to be activated immediately to support the management in the absence of an adequate number of field staff members and APC labourers.
6. Since there is a severe resource crunch in this tiger reserve, the CWLW Tamil Nadu to please arrange for an adequate number of camera traps and smart phones for M- STrIPES patrolling in SMTR.
7. Since the core area (both sanctuaries) has a notified ESZ, many destructive activities like grazing by sheep and goats of absentee owners need to be regulated in this region.
8. The sanctioned staff strength of SMTR needs to be revisited. The actual number of staff members needed to manage the increased workload needs to be redefined and sanctioned.
9. The state government and NTCA to provide adequate funds to strengthen the management of the TR. The non-availability of the TCP should not be the bottleneck for sanction of funds.
10. Since SMTR is a new tiger reserve, the management needs to focus attention on it. An independent Field Director is needed in contrast to the present situation with a Field Director in an additional charge.

11. The Government of Tamil Nadu to acquire the abandoned estate immediately. The process should be initiated to acquire other estates for having a disturbance-free habitat for wildlife.
12. In the tea estates, the use of chemicals is quite rampant. It is polluting the water bodies and is quite harmful to the health and lives of wild animals. The tiger reserve management must take steps to ensure that the use of chemicals is stopped by the tea estates.
13. The large penstocks of the hydroelectric power station are fragmenting the habitat at a number of places within the tiger reserve. Their size is so large that a large number of wild animals including elephants cannot cross them. As a result, they have to change their migratory route or be confined in small habitats. So the hydroelectric power generation company should provide in consultation with the Field Director a series of ramps across the penstocks at places the safe movement of wild animals.

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TELANGANA

AMRABAD TIGER RESERVE

44

MEE SCORE 78.79%

Date of Evaluation
11-13 November 2022

Evaluators' Names
Sh. D.N.S. Suman
Dr. R K. Singh
Sh. Nitin Kakodkar

INTRODUCTION

As one of the largest TRs in India (area 2611 sq. km.), the Amrabad Tiger Reserve (ATR) is a compact and large landscape with one of the finest bamboo forests in the Eastern Ghats. It is contiguous with the Nagarjunasagar Srisailam Tiger Reserve of Andhra Pradesh, separated by the Krishna River over a 160 Km boundary. The amazingly rich floral diversity encompasses rare, endangered and medicinal plants with a good percentage of endemism. The recorded faunal diversity includes 50 species of mammals, 305 species of birds, 54 species of reptiles, 18 species of amphibians, 55 species of fish, 89 species of butterflies, 57 species of moths, 30 odonates species amongst many others. The reserve has two large fresh water reservoirs formed by the Dams at Srisailam and Nagarjunasagar, both on the Krishna River, which protect the habitat of indigenous aquatic fauna, including a good population of the Smooth Coated Otter. The forests of the tiger Reserve are an important catchment for the Krishna River. Many ancient Hindu temples and caves are located inside ATR, endowing it high heritage value. These temples and their surrounds have unique geological formations which along with the beautiful river systems and their well-forested watersheds, offer great opportunities for ecotourism by involving local communities, the Chenchus and the Lambadas. However, the temples located in the core area of ATR as well as in the adjoining areas, attract a large number of pilgrims from all over the country creating a lot of pressure in the form of disturbance to the habitat and to the wild animals, vehicle traffic, littering of waste and forest fires, posing a challenge for the management.

Management Strengths

1. As one of the largest TRs in India (area 2611 km^2, including 2166.37 km^2 of core), Amrabad Tiger Reserve (ATR) is a compact and large landscape with one of the finest bamboo forests in the Eastern Ghats. It is contiguous with Nagarjunasagar Srisailam Tiger Reserve of Andhra Pradesh, from which it is separated by the Krishna River over a 160 km stretch.
2. ATR is endowed with a diverse flora and fauna. The amazingly rich floral diversity encompasses rare, endangered and medicinal plants with a good level of endemism. The major species within the tiger reserve are *Dendrocalamus strictus, Terminalia tomentosa, Terminalia alata, Boswellia serrata* and *Ficus spp*. The recorded faunal diversity includes 50 species of mammal, 305 species of bird, 54 species of reptile, 18 species of amphibian, 55 species of fish, 89 species of butterfly, 57 species of moth and 30 odonate species. ATR has all four species of antelopes found in India and the endangered Indian wolf.
3. The reserve has two large fresh water reservoirs formed by the dams at Srisailam and Nagarjunasagar, both on the Krishna River, which protect the habitat of the indigenous aquatic fauna of the River Krishna, including a good population of the Smooth Coated Otter. The forests of the tiger reserve are an important catchment for the Krishna River.
4. Many ancient Hindu temples and caves, such as the Saileshwaram, Uma Maheshwaram, Maddimadugu, Akkamahadevi Caves, Kadilivanam and Mallela Theertham temples, are located inside ATR, endowing it high heritage value. These temples and their surrounds have unique geological formations which offer great opportunities for eco-tourism.

5. The scenic beauty of the TR is enhanced by the undulating and mountainous terrain, the two large water reservoirs and strategically located view points (Octopus Point, for example), and it is visited by large numbers of tourists.
6. The deployment of the ethnic tribals (Chenchus) as base camp protection watchers and tiger trackers for wildlife monitoring and for ecotourism by the ATR management is commendable. This has addressed the livelihood issues of forest-dependent communities, motivating support for conservation, reducing human–wildlife conflict and retaliation and reducing other anthropogenic pressures to a certain extent. New anti-poaching camps with improved structures are being established. The frontline staff have been provided with Android phones and wireless communication.
7. The introduction of the River Patrol using speed boats is helping in controlling the illegal fishing along the Krishna River. Fishing camps have been repeatedly removed, and a stretch of about 60 km out of a total of 160 km is presently under control.
8. Habitat improvement measures (increasing the area under grassland development, weed eradication (3663 ha In the past 4 years), augmenting the water availability through percolation tanks, water hole development, creation of gabion structures and check dams) have been taken up by the TR management.
9. The ATR Tiger Conservation Foundation earns most of its revenue through entry fee collection from the 60 km stretch of highway passing through the core. The revenue is used for implementing protection and management strategies.
10. Efforts have been made for the reintroduction of the endangered mouse deer in a closed area in ATR, and this is an excellent initiative towards the recovery of the population of the species in its former distributional range.
11. Community-based ecotourism (CBET) and the Environment Education Centre (EEC), at Mannanur, provide good eco-tourism facilities for visitors. Similarly, the Tiger Calling Study Tour for School Children, supported by ATR and the newly introduced Tiger Stay Package, is very effective in raising awareness amongst nature enthusiasts and school children and motivating them towards conservation.
12. The TR is taking extra efforts towards collaborating with research institutions, nature enthusiasts, NGOs and hospitals to intensify monitoring and increase the participation of stakeholders. The health care of the staff and local villagers is being attended to in a big way.
13. The garbage collection being done on a daily basis along a 60 km stretch and the further segregation and baling for recycling is an initiative worth emulating in other areas.
14. Aerial bunching of power cables is being done in a phased manner along the 40 km stretch of NH 765.

Management Weaknesses

1. ATR is facing severe anthropogenic pressures due to a number of human settlements inside the core (26 villages with about 93,000 people and 1.2 lakh cattle). In addition to the local cattle, there is a large ingress of seasonal migratory cattle from the adjoining districts. Many Chenchu tribals reside in smaller hamlets called *pentas* within the core area.
2. Famous temples located in the core area of ATR as well as in the adjoining areas attract a large number of pilgrims from all over the country who visit these temples, creating a lot of pressure in the form of disturbances to the habitat and to the wild animals, vehicular traffic, littering and forest fires, posing a challenge for the management.
3. A number of fishermen have settled illegally on a semi-permanent basis and practice fishing over the 160 km stretch along the boundary of the Krishna River inside the core of the TR. They also introduce fingerlings of exotic carps, thus threatening the population dynamics of the indigenous fishes of the River Krishna. Although a stretch of about 60 km has been substantially controlled, the threat continues over the rest of the stretch.
4. The other threats include the passing of National Highway 765 through the area (60 km in the core and 13 km in the buffer), invasive species (*Lantana, Cassia tora, Eupatorium*), a hydroelectric power project, erection of high-voltage power lines and criss-crossing electric

lines for electrification of villages and heavy pilgrimage tourism. Plans to widen the highway may pose a greater challenge in the near future for the ATR management.

5. Although some measures have been taken to control the traffic on the NH 765, road kills of wild animals are a regular feature on this stretch, apart from the high disturbance levels.
6. The number of base camps (23 at present) is inadequate for protection considering the vastness of the area and the hilly terrain.
7. Though the position of vacant posts amongst the frontline staff has improved over the past few years, even now, out of a sanctioned strength of 370 frontline staff (Range Officers, Section Officers and Beat Officers), only 196 are in place, and 174 posts are vacant. Moreover there are continuous requests for resignation from the newly recruited staff as they look for newer avenues of employment, considering their improved educational qualifications and aspirations. There is thus a need for motivating the frontline staff through continuous and specialized training programmes.
8. Since ATR was notified after the formation of Telangana in 2014, there is a shortage of residential accommodation as well as other infrastructure for the management of the vast area of the tiger reserve.
9. The rescue and rehabilitation facility, conflict mitigation strategy and veterinary services are inadequate.
10. The eco-development committees are largely non functional except in a few villages.

Immediate Actionable Points

1. **Rehabilitation of villages:** The rehabilitation process of four villages, which is at an advanced stage, needs to be completed in a time-bound manner. Two villages by June 2023 and another two by June 24 should be targeted for total rehabilitation. Considering the vastness of the area, the other villages identified so far (10 more) should also be rehabilitated in a phased manner over the next 5 years.
2. **Rehabilitation of Chenchus and institutionalization of people's participation:** There is a large population of Chenchus living inside the ATR who are heavily dependent on forest resources for their livelihoods. The Chenchus need to be involved in various ecodevelopment (EDC) activities, ecotourism, etc. to reduce their dependence on ATR. The EDCs need to be activated, and varied livelihood opportunities need to be created through the involvement of and funding from the Tribal Development Department.
3. **Stopping illegal fishing:** Measures to control illegal fishing over the remaining 100 km stretch of the Krishna River passing through the core need to be put in place. The River Patrol may be strengthened further for ensuring this. The inter-state meetings that have been initiated should be continued. They should be held periodically at various levels.
4. Coordination with the district authorities for rehabilitation of villages, provision of employment opportunities, livelihood development, controlling encroachment and placing further restrictions over the traffic on NH 765 would be required.
5. **Strengthening of infrastructure:** The inadequacy of the infrastructure such as buildings must be addressed immediately and arms must be provided to the staff and officers.
6. **Vacancy position and capacity building:** Recruitment and redeployment of staff should be done so that the vacancy position improves further. The newly recruited frontline staff should be urgently trained through special wildlife conservation courses. The Training Need Assessment (TNA) of the key stakeholders should be conducted periodically to set learning objectives for future training courses and preparation of the Annual Training Plan.
7. **Adequate rescue and conflict mitigation capability:** Presently the TR lacks veterinary services for rescue and rehabilitation. It is recommended that a mobile veterinary service unit be established by enlisting the services of a dedicated veterinary doctor to deal with wildlife-related rescue emergencies in the TR.
8. **Fire protection:** In view of the mountainous terrain and the vastness, the fire protection measures need to be strengthened greatly. The number of base camps has to be increased, and these camps can also be used as fire watch towers.

9. The STPF needs to be constituted and put in place at the earliest. It had been approved by the NTCA in 2015, when 100% financing was available.
10. **Ecotourism:** ATR, with its beautiful river systems and their well-forested watersheds, has immense tourism potential. Important streams, springs and water falls in the core area of ATR, in Nagarkurnool District, are excellent eco-tourism destinations. It is recommended that the ATR management promote effective ecotourism by involving local communities, the Chenchus and the Lambadas, in accordance with the guidelines of the NTCA.
11. **Extending the area of the buffer:** ATR has an opportunity to increase the buffer area towards Achampet Forest Division and in the Kollapur Region, beyond the TR boundary. It is recommended that the western boundary be expanded up to the entire Achampet Division as an extended buffer under ATR. The eco-sensitive zone (ESZ) needs to be notified and the Zonal Management Plan for the same should be prepared.
12. Research collaborations with universities and other institutions need to be strengthened. This would assist with monitoring and documenting the floral and faunal wealth of the Eastern Ghats.
13. The website of the ATR should be altered to ensure compliance with the latest edition of the Guidelines for Indian Government Websites, prepared by the National Informatics Centre (NIC). The research studies and reports and learning resources of the reserve should be uploaded on the website.
14. There are wide variations among states in compensation policies for depredation by wild animals. An amount of Rs.20 lakhs is paid on account of the death of a human being in Maharashtra as against Rs.5 lakhs in Telangana. It would be appropriate for the state government to periodically review the compensation policy taking into cognizance changes made in other states.

Samrat Godambe

KAWAL TIGER RESERVE, TELANGANA

45

MEE SCORE 74.24%

Date of Evaluation
6-10 November 2022

Evaluators' Names
Sh. D.N.S. Suman
Dr. R.K. Singh
Sh. Nitin Kakodkar

INTRODUCTION

Kawal Tiger Reserve is now an active Tiger Corridor for surplus tigers from the Tadoba-Kanhargaon Landscape as well as the Tipeshwar Sanctuary - Adilabad landscape. It can further connect with the larger habitat linked with lndravati Tiger Reserve through the Kagaznagar - Pranhita Sanctuary- Kolamarka Conservation Reserve. The area of Kawal Tiger Reserve has good teak dominated tiger habitat and is responding well to good and systematically planned management practices such as watershed, water hole and grassland management over 1200 Ha. and invasive weed control over about 11000 Ha. This is evident from the presence of Chital and Wild boar in scattered pockets in the core areas. This is bound to help in increasing the prey base for supporting a good population of tigers. Excellent habitat restoration work in the active Corridors, through plantations and water augmentation, has been done on lands (over 250 Ha.) which were hitherto under encroachment. Funding support for Habitat improvement and protection activities should continue as is being done, exceptionally well, under CAMPA. State funding support needs to be augmented considering the potential of Kawal TR. The number of adequately well equipped Base camps has been significantly increased to 65 and the improved use of the MSTriPES has increased the protection status.

Management Strengths

1. Kawal Tiger Reserve is now an active corridor for tigers moving from the Tadoba–Kanhargaon Landscape as well as the Tipeshwar Sanctuary–Adilabad Landscape. It can further connect with the larger habitat linked with lndravati Tiger Reserve through the Kagaznagar–Pranhita Sanctuary–Kolamarka Conservation Reserve link.
2. Kawal Tiger Reserve has a good teak-dominated tiger habitat and is responding well to good and systematically planned management practices such as watershed and grassland management in a total area of 1200 ha and invasive weed control in about 11,000 ha.
3. Scientific management of weeds such as *Hyptis suaveolens* and *Cassia tora* is aiding in habitat restoration for herbivores. This is evident from the presence of chital and wild boar in scattered pockets in the core areas. This is bound to help in increasing the prey base for supporting a good population of tigers.
4. The development of percolation tanks and other water bodies to aggressively augment the moisture regime has improved the availability of water in the TR even in the summer months to a large extent.
5. Not only the core and buffer but also most of the areas which are active and identified corridors of KTR are now under the unified control of the Field Director since the formation of the special Kawal Tiger Reserve Circle.
6. The process of rehabilitation of two villages, viz. Maisampet and Rampur, is at an advanced stage and is expected to be completed by June 23. This should trigger the rehabilitation process, not only in the other two villages which are also eager to get rehabilitated but also some more of the remaining villages inside the core of KTR (presently 37).
7. The support of the villagers towards the TR management is being garnered by providing employment to local villagers (mostly tribals) for work in base camps for general patrolling and anti-poaching activities.
8. The measures to restrict and also control the vehicular traffic on the 40 km stretch of state highway through the core of the TR will not only reduce the road kills but also make people aware that they are passing through a tiger reserve. These measures are also generating some revenue for the Tiger Conservation Foundation.

9. Excellent habitat restoration work in the active corridors, through plantations and water augmentation, has been done on lands (over 250 ha) which were hitherto under encroachment. This needs to be continued further and is worthy of emulation in other TRs.
10. Active monitoring of tigers in the corridors, by engaging local people as animal trackers (72 at present) has helped in reducing instances of sudden encounters in areas where people are not used to tiger presence.
11. The number of adequately well-equipped base camps has been significantly increased to 65, and the improved use of M-STrIPES has increased the protection status.
12. Grazing is being controlled through restriction of cattle presence to parts of some compartments, keeping the rest of the area inviolate.
13. Increased public awareness activities (bird festivals, camps for students) are helping get media attention and support for the KTR management.

Management Weaknesses

1. There are 37 villages and 67 other smaller settlements in the core area and 267 villages in the buffer. Their dependence on forest resources for grazing, NTFP collection, timber and firewood collection, encroachment and to a smaller extent killing of wild animals for meat are adversely affecting the habitat for the wild animals.
2. Considering the predominance of teak in most areas and the resultant leaf fall, the area is extremely fire prone, and extensive areas are still vulnerable to fire.
3. The inherent shortfall in the wild herbivore population is thus taking a longer time to build up.
4. Shortage of field staff: Though the recent recruitment has improved the number of FBOs who are in position (177/229), even now about 52 posts of Beat Officer are vacant.
5. Van Sanrakshan Samitis (VSSs), which were created earlier, have now mostly become inactive. Around 91 VSSs have been converted into eco-development committees, but their participation is very low.
6. Existing and proposed linear projects in the form of NH 44, NH 63, three broad gauge lines and irrigation projects (near Ada, in Asifabad District, and the Chanaka Korta barrage, across the Painganga River) are impediments to free tiger movement into Kawal TR.
7. Rescue, rehabilitation and human–wildlife conflict mitigation: The KTR management has inadequate strength to manage rescue and rehabilitation and human–wildlife conflict mitigation capabilities and infrastructure, including dedicated veterinary services.
8. Research collaboration with universities and other institutions as well as in-house research capabilities are found to be lacking.
9. Eco-tourism and involvement of locals in generating livelihood activities is restricted to a few places.
10. Residential quarters for frontline staff and officers are limited.

Immediate Actionable Points

1. The Tiger Conservation Plan needs to be taken up for revision immediately.
2. Existing vacant posts of the frontline staff should be filled on priority considering the importance and potential of KTR as a future source population of tigers in the surrounding landscape.
3. The Special Tiger Protection Force needs to be constituted urgently to strengthen the protection.
4. Plans for mitigation measures of the proposed linear projects and retrofitting measures of existing projects need be made and implemented in a phased manner.
5. Rehabilitation of two villages, viz. Rampur and Maisampet, should be completed by June 23, and two morevillages should be rehabilitated by June 24. It is recommended that the state

government submit the proposal to the NTCA for financial support for the rehabilitation after due scrutiny and approval.

6. Funding support for habitat improvement and protection activities should continue as is being done, exceptionally well, under CAMPA. State funding support needs to be augmented considering the potential of Kawal TR. The state share of CSS needs to be expedited.
7. Sirpur Kagaznagar has become an active corridor. Resident tigers are also being reported from the area. Considering this, an appropriate area of the division needs to be notified as a protected area (PA).
8. Encroachment removal and restoration needs to be planned in a phased manner, as is being done successfully.
9. Bidi patta (tendu) units in KTR need to be denotified.
10. Eco-sensitive zone notification around KTR needs to be pursued, and once the ESZ is notified, the Zonal Management Plan for the ESZ should be formulated urgently.
11. Wireless communication in all base camps should be made mandatory. This requirement may be appropriately incorporated in the TCP of the TR. If required, the NTCA may provide financial assistance for the purpose. Provision of arms to selected personnel needs to be done.
12. Animal rescue and conflict mitigation capability: Presently the TR has a mobile animal rescue vehicle, but no regular veterinary staff members of the FD are available to man the rescue vehicle. It is recommended that a mobile veterinary service unit be established to deal with wildlife-related rescue emergencies in the TR by enlisting the services of a veterinarian and one veterinary assistant. This is important to gain the support of the local people in view of the potential increase in human–wildlife interactions.
13. Funding support under CSR needs to be pursued not only to supplement the inputs but more to spread awareness regarding the importance of tiger conservation in the context of larger tiger landscapes of Central India.
14. The availability of residential units for the frontline staff and the officers needs to be improved.
15. Reintroduction of tigers in KTR: As per the existing TCP, after 5 years, if breeding females do not establish themselves in the reserve, the possibilities of reintroduction from the surplus population of Tadoba must be explored. The TCP was made in 2012, and females have possibly not covered the long distance of 130 km due to an absence of good cover in the corridors. Hence, after the relocation of five villages, an inviolate area of around 200 km2 would be available in a single stretch. The excellent habitat development works that have been done in the recent past are also showing good results. The reintroduction plan may be prepared in consultation with the NTCA and WII. It is also recommended that a security audit of the TR be conducted before the reintroduction.
16. KTR should collaborate with reputed research/academic institutions to promote research activities as this would help in periodically assessing various values of the reserve and filling the gaps in knowledge.
17. KTR, in collaboration with the district administration and civil society organizations, should actively support the EDCs in promoting livelihoods and other income-generating activities in the zone of influence. It should also take necessary steps to improve the participation of local tribal communities in ecotourism.
18. The newly recruited frontline staff should be urgently trained through special wildlife conservation courses. The Training Need Assessment (TNA) of the key stakeholders should be conducted periodically to set learning objectives for future training courses and preparation of the Annual Training Plan.
19. The current pandemic has brought wider recognition of the problems posed by the diseases caused by multi-host pathogens (MHP). Hence, continuous health monitoring and surveillance of wild animals, proper diagnosis, and timely veterinary interventions are essential for the effective conservation of wild animals and the control of zoonoses. An adequate number of trained wildlife health professionals are required for wildlife health management, and disease monitoring & surveillance to prevent spilling over MHP to

humans and domestic animals. As per the recommendation of the National Wildlife Action Plan (2017–31), the tiger reserves were expected to establish well-equipped wildlife rehabilitation cum disease surveillance centres supervised by trained wildlife veterinarians by 2023. Efforts should be made to establish the centre in KTR and create posts for a veterinary doctor and a compounder.

20. The website of KTR should be altered to ensure compliance with the latest edition of the Guidelines for Indian Government Websites, prepared by the National Informatics Centre (NIC). The research studies and reports and learning resources of the reserve should be uploaded on the website.

21. There are wide variations among states in compensation policies for depredation by wild animals. An amount of Rs.20 lakhs is paid on account of the death of a human being in Maharashtra as against Rs.5 lakhs in Telangana. It would be appropriate for the state government to periodically review the compensation policy taking into cognizance changes made in the other states.

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UTTAR PRADESH

DUDHWA TIGER RESERVE

46

MEE SCORE 81.82%

Date of Evaluation
18-21 October 2022

Evaluators' Names
Sh. Brij Kishore Singh
Sh. Surendra Kumar
Dr. Anup Kumar Nayak
Dr. Salvador Lyngdoh

INTRODUCTION

Dudhwa Tiger Reserve, a typical representative of the terai eco-system, is the only place in the country to hold a potentially viable population of the nominate sub-species of the northern swamp deer (*Rucervus duvaucelii duvaucelii*). Of the seven species of deer found in the country, five occur in this reserve. It is also home to sizeable tiger and elephant populations. Some critically endangered species, such as the Bengal florican (*Houbaropsis bengalensis*) and hispid hare (*Caprolagus hispidus*) find a home here. Dudhwa is the only reserve in northern India having the great Indian one–horned rhinoceros, which was successfully reintroduced here in the year 1984. Thirteen species of mammal, nine species of bird and 11 species of reptile and amphibian found here are considered to be endangered and are listed under Schedule–I of the Wild Life (Protection) Act, 1972.

Dudhwa Tiger Reserve, comprising of three protected areas, i.e., Dudhwa National Park, Kishanpur Wildlife Sanctuary and Katerniaghat Wildlife Sanctuary, stands out as the primary protected area complex of the terai.

Dudhwa National Park is located on the Indo-Nepal border in Palia and Nighasen tehsils of Lakhimpur-Kheri District and lies between latitudes 28° 18' N and 28° 42' N and between longitudes 80° 28' E and 80° 57' E. The total area of Dudhwa National Park is 49029.19 ha. Reserve forest area of 12401.39 ha serves as its northern buffer and an area of 6602.32 ha serves as its southern buffer. The area which constitute Dudhwa National Park and its buffer were once part of North Kheri Forest Division. The state government declared its intent to create a national park by a notification in the official gazette in October 1975. Upon completion of settlement proceedings, the park was finally notified (vide the Govt. of U.P., Forest Department, Notification number 6991/14-3-1/74, dated 21 January 1977) and got established on 1 February 1977.

Kishanpur Wildlife Sanctuary straddles Gola Tehsil of Lakhimpur District and Powayan Tehsil of Shahjahanpur District. It lies between the latitudes 28° 14' N and 28° 30' N and between the longitudes 80° 18' E and 80° 30' E and has an extent of 20341.00 ha. It was established on 1 January 1973 in continuation of orders issued through Government of UP notification no. 111/14-3-31/1972 dated 7 October 1972. The total area of Kishanpur Wildlife Sanctuary is 20341 ha. The area was once part of South Kheri Forest Division.

Katerniaghat Wildlife Sanctuary is located in Motipur (Mihipurwa) Tehsil of Bahraich District. The Indo-Nepal border constitutes the northern boundary of the sanctuary. The entire area, totalling 40009.35 ha, is situated between latitudes 28° 06' N and 28° 24' N and between longitudes 81° 02' E and 80° 19' E. Consequent upon Government of UP notification no. 388/14-3-32/1976 dated 31 May 1976, this forest got constituted as a wildlife sanctuary. An adjoining 15,002.75 ha extent of reserve forest, which serves as the buffer, constitutes one ecological and administrative unit with the said sanctuary.

The area of the national park and sanctuaries plays a vital role in the maintenance of the water and climatic regime of the region, which in turn is vital for agriculture and other allied activities. It also performs a host of other functions which, though not fully understood, are nevertheless critical for the continued well-being and existence of humanity.

Management Strengths

1. The Pilibhit, Kishenganj, Dudhwa and Kartiniaghat protected areas are a more or less contiguous patch of habitat in continuity with the terai arc landscape of Uttarakhand. It provides an important corridor along the terai between Uttarakhand and the eastern terai forests in Behraich, Balrampur and Maharajganj in Uttar Pradesh and up to Valmikinagar TR of Bihar.
2. The area's soil and water conservation is supported by the site, which is the catchment area for a number of rivers and tributaries. The very good tree cover and grasslands in the ecosystem prevent the rivers in the terai belt from shifting course. For the villages in the command area, the Sharada barrage has significant irrigation and electrical potential.

3. EDC members in Parseya village drove out 300 families who migrated from Gonda, Jampur and Behraich districts and tried to clear tree growth in Dudhawa National Park and settle there. The engagement of the management with communities through the revival of EDCs has become a strength. The people in Parseya village have developed skills in making woven carpets and several handicraft articles to earn additional incomes. The product has marketing linkage through the forest department outlet. It is a village of the Tharu tribe.
4. The village has also participated in Pradhan Mantri Swachh Bharat Abhiyan. With the help of the Nature Environment Wildlife Society (NEWS) portable toilets have been set up in some villages. The MEE team visited Amba village, where three such toilets were set up.
5. The TR has planned and started implementing the removal of Jatropha from many areas. The MEE team visited the Sadar and Bichhiya beats of Katerniaghat Range, where the work was implemented. It has aided the development of grasses in the area.
6. The TR has the support of many national NGOs.

Management Weaknesses

1. While the northern boundary of Pilibhit TR abuts Shukla Phanta National Park of Nepal, the northern boundary of Dudhawa TR abuts human areas of Nepal. The forests suffer the real threat from the porous boundary along Nepal and are subject to poaching and hunting by miscreants from across the international border.
2. There are 13 villages in Katarniaghat Sanctuary, one in Dudhawa NP and two villages in Kisenpur WLS. In addition, there are a number of villages on the fringes of each PA. Moreover, there is no connectivity between the three PAs of the TR. The international border along the northern boundary is highly porous, which can cause significant damage to the flora and fauna.
3. There are vacancies in the permanent staff cadre (Foresters and Forest Guards). These observations were made in the IV cycle of MEE, and nothing substantial has been done to recruit and train more staff members to fill up the vacant posts.
4. A total of 146 EDCs were established in 2017, but all of them did not function. The present management of Dudhwa TR has made 11 of them fully functional, and another 23 are under revival. The three PAs of the TR are separated by human areas, and it is necessary to make the EDCs function so that the corridors are made more secure.
5. During the visit to the Badraula and Chhota Palia areas in Dudhawa National Park, it was observed that a large number of sal trees have been uprooted and have fallen on the ground. Many of these trees are young. It may be quite alarming to maintain the integrity of the habitat if the sal trees are lost at this rate.
6. The forests along the village areas have not been properly demarcated. When a line is straight, boundary stones are not put at every bend or every 100 m. The borders of the forest have a lot of locations that are concave. It is obvious that the agriculturalists have crossed the line.
7. A network of roads and a railway line without any visible retrofitting measures have fragmented the habitats, and no systematic effort has been made to record the road kills systematically.

Immediate Actionable Points

1. Relocation of villages and controlling livestock grazing, poaching and hunting from across the porous international boundary require more attention.
2. The state must organize recruitment and training of Foresters and Forest Guards to fill up all the vacant positions in the tiger reserve.
3. It is important to make the EDCs functional as the three PAs of the TR are not contiguous and are surrounded by many villages, which is impacting the conservation substantially.
4. It is suggested that a study be undertaken by ecologists/foresters and the reasons for wind-falling sal trees be ascertained. Some interventions may be necessary to slow it down.
5. Transboundary coordination meetings with Nepal need to be institutionalized following the NTCA guidelines.

PILIBHIT TIGER RESERVE, UTTAR PRADESH

47

MEE SCORE 71.97%

Date of Evaluation
15-18 October 2022

Evaluators' Names
Sh. Brij Kishore Singh
Sh. Surendra Kumar
Sh. Sanjay K. Srivastava
Dr. Salvador Lyngdoh

INTRODUCTION

Pilibhit Tiger Reserve is located in the terai region of Uttar Pradesh and consists of dense sal forests, tall alluvial grasslands, savannahs and impenetrable swamps. Tropical Moist Deciduous Forests, Tropical Dry Deciduous Forests, Seasonal Swamp Forests and Tropical Semi-evergreen Forests are the major forest types found in the reserve. The reserve is home to a rich diversity of 35 mammal species and 350 bird species. The tiger, leopard, sloth bear, swamp deer, hispid hare, honey badger, Bengal florican, Finn's weaver and swamp francolin are the major wild animals of great conservation interest. The total area of the reserve is 730 km^2, inclusive of a 602 km^2 core zone. The buffer zone amounts to 127 km^2. Pilibhit is one of the crucial parts of the Terai Arc Landscape and nestles between Terai East division in the north, Royal Shukla Phanta NP in the north-east and Dudhwa Tiger Reserve Buffer Division in the sout-heast.

The Pilibhit forests were notified and reserved in 1879, and scientific forestry was initiated for the first time in 1893. For the ensuing 120 years, the forests were managed primarily for timber production. The area was notified as a wildlife sanctuary in February 2014, which was followed by the declaration of a tiger reserve in June 2014.

Piilbhit Tiger Reserve is located in the terai region of Uttar Pradesh and consists of dense sal forests and tall alluvial grasslands, savannahs and impenetrable swamps. Tropical Moist Deciduous Forests, Tropical Dry Deciduous Forests, Seasonal Swamp Forests and Tropical Semi-evergreen Forests are the major forest types found in the reserve. The reserve is home to a rich diversity of 35 mammal species and 350 bird species. The tiger, leopard, sloth bear, swampdeer, hispid hare, honey badger, Bengal florican, Finn's weaver and swamp francolin are the major wild animals of great conservation interest. The total area of the reserve is 730 km^2, inclusive of a 602 km^2 core zone. The buffer zone amounts to 127 km^2. Pilibhit is one of the crucial parts of the Terai Arc landscape and nestles between Tarai East Division in the north, Royal Shukla Phanta NP in the north-east and Dudhwa Tiger Reserve Buffer Division in the south-east.

Management Strengths

1. The area, which helps local soil and water conservation, is the catchment region for a number of rivers and tributaries. The very good tree cover and grasslands in the ecosystem prevent the rivers in the terai belt from shifting course. For villages in the command area in Lakhimpur Kheri and Hardoi districts, the Sharada barrage has significant irrigation and electrical potential.
2. The site, which is shaped like an inverted U in the north–south alignment and has multiple villages scattered around it.

Management Weaknesses

1. The ISFR 2021 report indicates that the TR has lost more than 45 km^2 of forest cover in 10 years. Senior officers of the management suggest that the River Sharada has consumed these forest tracts. However, the perception needs to be scientifically assessed.
2. The boundary pillars to demarcate the boundary of the forests against agricultural field are either missing or have not been regularly maintained. Agriculturists on the periphery have been slowly occupying the forest lands, making the boundary concave. This could also be one of the reasons for the loss of forest cover as reported in ISFR 2021. The encroachment in Barahi Range was reportedly by 25 families in the fourth MEE cycle. Now the families are reported to be 30. If the management cannot clear the encroachment, they must at least contain it.

3. The vacancy in the frontline staff (Forest Guards and Foresters) has been lingering for a long time. The observation was also made in the fourth MEE cycle. The state should recruit and train the staff to fill up the vacancies.
4. Movements of safari vehicles and stays of tourists are organized in a core area of Tiger Reserve. The directive from NTCA is to phase out tourism from the core area; the management has not taken appropriate steps in this regard.

   In addition, there are alleged irregularities in park management and the information is sub-judiced, hence not discussed.

Immediate Actionable Points

1. Decadal change in forest cover. The decadal assessment of change in forest cover within Pilibhit Tiger Reserve (PTR)by Forest Survey of India, Dehradun during the period between IFSR 2011 (2008–09 satellite data) and IFSR 2021 (2019–20 satellite data) was carried out primarily to assess the impact of various conservation measures and management interventions carried out during the period. As per the change analysis matrix, the forest cover during IFSR 2011 was 610.45 km2 and in IFSR 2021 it was 565.20 km^2. The overall loss was 45.25 km^2 (-7.41%).

   As per the above data, without going into the details of the areas of change in the canopy class (>10%), there is an urgent need to verify the locations, where a loss of 45.25 km^2 has been reported by the acquisition of the data from FSI, and analyse the same in the spatial domain and take corrective measures. It is also relevant to mention that the loss of area due to the meandering course of 'The Sharda River' over the decade is not very significant and therefore, there is an urgent necessity to check the accuracy of the FSI data for ruling out any spread of agricultural cultivation in the recorded forest area.

   The forest consolidation could also be carried out by the construction of boundary cairns, preferably, at an interval of 50 m (at curves) or 100 m (straight boundary) by prioritizing vulnerable areas abutting villages.
2. Maintaining prey–predator relationship. As per the report titled 'Status of Tigers, Co-predators and Prey in India, 2018', the chital was found to be the most abundant ungulate, with a density of 40.71/km^2, followed by the nilgai (12.78/km^2) and wild pig (12.43/km^2). Other deer species like the sambar, hog deer and swamp deer have low densities (<1–3/km^2) in spite of the tiger reserve having nearly 11% of the area under the grasslands and marshy patches, implying that such populations within the reserve are isolated by intervening agricultural lands and the canal network within the horse-shoe shaped forestland and perhaps by the loss of connective corridors, which could also lead to local extirpation. The prey–predator relationship also becomes highly critical when the chital population exhibits an increase of 4% and the tiger population almost 160% in the last 4-year estimation cycle (2014–18).

   Therefore, for maintaining a healthy prey–predator relationship and ensuring landscape and forest spatial heterogeneity, acquisition of agricultural land in the Garah-Lalpur-Deoria corridor is essential. Propagation of tree cultivation as part of the agro-forestry component under an eco-sensitive zone is also important in such areas.

   Also, animals straying out in the agricultural lands are susceptible to poaching and therefore all efforts may be envisaged in the development of an intelligence network besides the erection of barriers (chain-link fences, solar fences) and involvement of the NGOs in wildlife protection.
3. Managing grasslands. The tall grasslands in PTR form an integral part of the forestland. Biological values and ecological functions of the grasslands including complexities of various management practices and their effects on grassland values and functions are poorly understood. However, several studies on different faunal species strongly advocate for a mosaic of habitats with cut, uncut, burned and unburned patches for the persistence of diverse faunal species.

   Therefore, experimental trials are needed to understand the effect of different burning regimes in combination with treatments viz. grass cut, grass cut and removed, grass harrowed, simple burned, and no burn (control) blocks (five such blocks of 100 m × 50 m each) specifically aimed at knowing whether there is an increase in the dry season forage for ungulates. Trials aimed at understanding whether harrowing and burning will simulate

processes which keep tall grass down when people are allowed to graze livestock and cut grass are needed. This practice may provide more palatable forage species, but it needs to be investigated.

Besides, studies on Bengal floricans reveal that the floricans start arriving in the grasslands after burning is completed in February. The breeding season extends from early March to end June, with the peaks in April–May. Thus, late burning of the grasslands and particularly harrowing of the ground grasslands during the breeding season are considered detrimental to the floricans and other nesting birds, viz., swamp partridges. Hence, staggered cutting and burning would create different patches, providing varying forage and cover conditions.

4. Managing specific habitats. There is a need to manage key wetland and grassland habitat and to recognise the importance of fruit-bearing trees in wildlife areas. There is also a necessity to recognise the ecosystem and wildlife value of defective and dead wood (snags and down logs) instead of their value in salvaging them as such trees. And snags provide key cover and foraging habitats for cavity excavating birds and secondary cavity nesters (woodpecker holes). Down logs are also key habitats for invertebrates, reptiles and small mammals. So, manipulative management practices need to be carefully considered in light of the ecology and wildlife values of PTR.

   Hence, as a management intervention, the standing eucalyptus trees in the wetlands/grasslands may be removed on priority basis; if not, the same could be manipulated into snag or den trees, with a minimum of 10 trees per hectare for enriching the wildlife habitat of PTR.

5. Strengthening *in-situ* conservation across trans-boundary landscape. Though India and Nepal share a long border in the terai belt, this area that was once forested is now largely agricultural, and the wildlife is restricted to remnant forest patches in this landscape. The habitat connectivity also has been severely compromised and the tigers exist as one wholly-connected population in the PAs of Shukla Phanta Wildlife Reserve, Nepal and Lagga-Bagga Block of Pilibhit Tiger Reserve, India. There are large differences in the tiger and prey densities within and between the sites, which could be due to the influence of habitat (forest-grassland mosaics and riparian areas) on the distribution and density of tigers and their prey and on account of anthropogenic pressures, including road development.

   Advocacy and policy interventions are required to enable conditions for maintaining corridors and connectivity in the trans-boundary landscape besides strategic restoration and management of key habitats and strengthening of protection measures. To achieve the same, periodic coordination meetings would be required between the officials of the two protected areas. This needs to be facilitated by MoEF&CC and NTCA.

6. Threats from feral cattle. Wildlife-related zones are a diverse and complex issue. The presence of feral cattle in PTR poses a grave threat to wild animals as they could be carriers of various viral, bacterial or parasitic diseases, besides competing for the limited grass resources. Foot and mouth disease (FMD) is one of the important transboundary diseases, and it is extremely difficult to control. It is suggested that preventive measures be geared towards improved disease surveillance by spatially locating such feral/domestic cattle in PTR using improved diagnostic techniques, vector control and implementation of restrictions on anthropogenic animal movement, concomitant with public enlightenment campaigns and behavioural change.

7. Strengthening ecotourism with emphasis on bird tourism. Ecotourism can be a vehicle for community-based conservation. PTR has a controlled ecotourism plan, well within the carrying capacity and the same should not be expanded any further. However, the parking lot at Chuka Ecotourism Centre can have wooden signage for sensitizing the tourists when they are embarking.

i. PTR also harbors 326 species of bird, and therefore birdwatching tourism in PTR has a high potential to improve the financial and environmental well-being of local communities, educate them about the value of biodiversity and create incentives for the successful preservation of natural areas. In this regard, birdwatchers form a large group and are, on average, well-educated and committed, making them ideal eco-tourists for community-based conservation. It is suggested that a checklist of the birds of PTR be developed and the same provided for developing birdwatching tourism. Binoculars and spotting scopes are to be developed and a library is to be developed at Chuka Centre.

ii. The conflicts with carnivores keep the management on the toe. Rescuing the animal and its release/bringing it to captivity has to be taken up fairly frequently. It is necessary to fill up frontline posts and also train and prepare them for any eventuality.

UTTARAKHAND

CORBETT TIGER RESERVE

48

MEE SCORE 78.79%

Date of Evaluation
10-13 September 2022

Evaluators' Names
Sh. Brij Kishore Singh
Sh. Surendra Kumar
Dr. Salvador Lyngdoh

INTRODUCTION

The Government of Uttarakhand issued a notification under Section 38V (1) (vide notification no. WL-05/X-2-2010-19(34)/2006 dated 26 February 2010) declaring the constitution of Corbett Tiger Reserve (CTR) in 1936. It was also the launch site for post-independent India's most prestigious conservation project, Project Tiger, on 1 April 1973. Today, after years of successful management efforts, it holds the unique distinction of having the highest density of tigers anywhere in the world

Earlier, Corbett National Park, Sona Nadi Sanctuary and the surrounding reserve forests were collectively referred to as Corbett Tiger Reserve. Subsequently under the provisions of the Wild Life Protection Act, 1972 (as amended in 2006), the Government of Uttarakhand, following the recommendation of the National Tiger Conservation Authority, notified the area as Corbett Tiger Reserve on 26 February 2010. The total area of Corbett Tiger Reserve is 1288.31 km^2.

Management Strengths

1. The TR management has been engaging with communities around the reserve. There are 44 EDCs actively restraining their entry in the TR and thereby reducing their dependence on the resources of the tiger reserve. With a big employment potential around the year, the communities have benefitted in a big way. The employment is on account of the works undertaken in the TR like physical removal of invasive species, planting of grass slips, creation and rejuvenation of water holes, maintenance of buildings and tourism infrastructure, running an open Gypsy for tourists in the tourism zone and providing guides for tourists' vehicles. Besides this, EDCs are assisted by the management to learn and upgrade the skills of the members in creating goods and services that can be marketed through souvenir shops.
2. The CTR management has been making conscious efforts to maintain the grasslands. The grasslands (locally called chaurs) are divisible into two categories: (i) riverine grasslands dominated by Saccharum spontaneum and (ii) anthropogenic grasslands from where villages (Dhara, Jhirna and Laldhang) have been relocated. The grasslands on the southern fringes of Corbett Tiger Reserve (CTR) serve as important habitats for grazing ungulates such as the chital, sambar, barking deer, hog deer, nilgai and Asian elephant. Besides, these grasslands support several other floral and faunal communities, including the flagship species of CTR, the tiger
3. TR has an electronic eye for surveillance along the southern boundary to monitor any illegal entry. The high-tech cameras installed at each of the 12 locations have a 4–5 km range and are integrated with artificial intelligence. For instance, if a camera focuses on a tiger, the camera can zoom and follow the trail of the animal and track it down.
4. The tiger reserve has adequate physical infrastructure like buildings, equipment for patrolling and vehicles. The management also receives sufficient funding from NTCA, the state government and CAMPA. Even some NGOs make in-kind contribution.
5. There are regular cleanliness drives, and several voluntary services are offered by the local guides, drivers and naturalists working on safari vehicles in support of an NGO, Waste Warrior. CTR has prepared a zero waste plan that is implemented jointly with Waste Warrior at Ramnagar.

Management Weaknesses

1. The ISFR 21 report suggests that the forest cover in Corbett TR in 2011 was VDF, 330.88 km^2; MDF, 825 km^2; and OF, 91.61 km^2 and that it has undergone changes, as found in the 2021 assessment. The report says that there has been a loss of 22 km^2 of forest cover in the TR. As per the latest report, the VDF is 437 km^2, the MDF is 693.67 km^2, and the ODF is 89.87 km^2.
2. Human–tiger conflict in the landscape is increasing, and the loss of tree cover has resulted in loss of habitat and increased conflict with humans.
3. The TR still does not have an ESZ notified. In the absence of such notification the activities in the 10 km deemed ESZ must be regulated. Building materials were found stored for remodeling private resorts along the Ramnagar–Ranikhet highway. Such activities must be regulated. The Ramnagar–Ranikhet highway is persistently acting as a barrier for many species, including the elephant. These roads have to be made eco-friendly according to guidelines, and accordingly, speed limits or time restrictions may be imposed. A detailed study on the trends and mortality regarding such infrastructure is to be made. Possible measures of overpasses and underpasses may be investigated for reducing wildlife mortality and even human causalities.
4. The MEE team could not visit the northern boundary of the TR because of logistical and time constraints. There are vacancies of Range Officers in the northern part, and it appears that these parts are far less intensively managed. However, it is learnt that conflict, poaching and smuggling cases are existent in Adnalla, Plain, Mandal and Maidawan ranges.

   In addition, there are alleged irregularities in park management and the information is sub-judiced, hence not discussed.

Immediate Actionable Points

1. The threat of tiger poaching in the landscape is real, and the TR management has to take a lead role in comprehensive investigation of all cases. like the month-old tiger skin seizure in Haridwar. The management appear to be complacent in their efforts to check illegalities on the northern periphery of the reserve.
2. No grazing is allowed in the core area. However, 57 Gujjar families still reside in the buffer area of CTR. An approximately 1000 livestock depend on the forest area of CTR for grazing. Besides this, grazing along the northern boundary of TR is also quite substantial, which has to be assessed and monitored. Easy availability of livestock in the forest might be a reason for behavioural changes in tigers—sub-adults leaving the mother after a prolonged time, lack of infighting among the tigers for territorial control and increased survival of litters. These aspects need to be investigated further to get inputs for better management of the park.
3. The present management should regenerate the patches where trees were destroyed and dismantle the ugly-looking iron enclosures on the site. The loss of 22 km^2 of forest cover has decreased the carbon sequestration potential. Moreover, no studies are taken up to periodically monitor the carbon sequestration potential. The management must initiate relevant studies.
4. Despite NTCA's directives, the management has not shown any inclination to phase out tourism from the core area of Corbett Tiger Reserve. Further forest rest houses in the core area are allotted to tourists for night halts. With hundreds of Gujjar families still remaining inside and depending on the resources of TR, no sincere attempt is seen on the part of the management to make the TR inviolate. The irrigation colony from Kalagarh is yet to be relocated completely.
5. Vacancies of RFOs and Forest Guards needed to be filled up urgently.
6. A brief interaction with EDCs gave the impression that they are starved of funds and they are unable to implement their micro plans. Elections of office bearers are not held periodically as per norms (one EDC President held office for 20 years, the MEE team was informed at the meeting). It must be ensured that elections are held on time.

RAJAJI TIGER RESERVE, UTTARAKHAND

49

MEE SCORE 68.94%

Date of Evaluation
7-9 September 2022

Evaluators' Names
Sh. Brij Kishore Singh
Sh. Surendra Kumar
Dr. Salvador Lyngdoh

INTRODUCTION

Rajaji National Park is situated along the hills and foothills of the Shiwalik ranges in the Himalayan foothills and represents the Shiwalik ecosystem. Combining three sanctuaries, namely Chilla, Motichur and Rajaji, Rajaji National Park is spread over Pauri Garhwal, Dehradun and Saharanpur districts of Uttarakhand. The Motichur and Rajaji sanctuaries are contiguous and are separated from Chilla Sanctuary to the south-east by the Ganges River and the Chilla River. Motichur and Rajaji wildlife sanctuaries lie to the north and south of the Siwalik Ridge and are dissected by many ravines carrying water which descend from the main ridge, becoming broad pebble-/boulder-filled streams in the plains. These streams remain dry for most of the year but become raging torrents during the monsoon. The area is covered with diverse forest types ranging from semi-evergreen to deciduous and from mixed broad-leaved forest to terai grassland. The area has been classified as an Indus-Ganges Monsoon Forest type. Lofty strands of sal dominate in many parts. Rajaji is home to avian species which are found in forested foothills and in open grasslands. It is a location in a transition zone between the temperate western Himalaya and central Himalaya, which enhances the species diversity and consequently the viewing prospects. Rajaji's checklist has about 400 birds species and includes birds like the greater scaup, white-naped woodpecker, great hornbill, black-bellied tern, Pallas's fish eagle, northern goshawk, black-necked stork, yellow-billed blue magpie, scaly thrush, snowy-browed flycatcher, rusty-flanked treecreeper, pale-footed bush warbler, Tytler's leaf warbler, green avadavat and reed bunting.

Management Strengths

1. The tree cover in the TR is quite useful for soil and water conservation and provides catchment for streams and tributaries of the River Ganges. The TR has good quality forests and is connected in the westernmost part of the terai.
2. Upgrading of the national highway through the TR and providing mitigation structures for the wildlife crossing have been addressed in accordance with the plan in the Chilla Motichur corridor. This should minimize the road kills of wild animals.
3. It is an important habitat for the conservation of threatened megafauna and is part of Shivalik Elephant Reserve. It is an extension of the Terai Arc Landscape.
4. The monitoring of the movement of elephants across the railway line has been strategized. Elephant kills on the rail track have come down.

Management Weaknesses

1. Economic valuation of the tiger reserve for the goods and services provided by it has not been comprehensively documented.
2. The TR has lost nearly 30 km^2 of forest cover in 10 years' time as per ISFR 2021. The management has not investigated and ascertained the reason for this. This indicates that the threat of encroachment and habitat loss is increasing.
3. 13 Gujjar families and two Tongya villages inside the TR are growing rapidly. The management should put in more effort to relocate at least the Gujjar families. Gujjar families are a real threat to the habitat and cause destruction.
4. The tiger reserve does not have a TCP, and it does not have a Tiger Foundation. Also, the core and buffer of the TR are not in unified control.

5. The assessment has found that there are 64 vacancies of Forest Guards out of the sanctioned strength of 144. The vacancies at the level of Forester, Dy RFO and RFO are insignificant. The contention of the management that the gap in the permanent staff is supported by daily wagers is not acceptable. The assessment has found that the FG vacancies need to be filled up. Without trained personnel, offence cases cannot be properly dealt with.
6. The north-eastern part of the TR has poor presence of tigers. Moreover, this part is disjointed from the eastern part owing to linear infrastructure like roads and rails as well as defence installations. While widening the road, provisions for wildlife crossing have been planned and implemented, but other disturbances continue to fragment the TR.
7. The TR is open to disturbances towards the Mohand side in the east, Haridwar Rishikesh and Haridwar Dehradun roads side in the center. The southern boundary of the TR is the hard boundary with villages and agricultural fields. The conflict with the villagers on the southern boundary is quite pronounced. The town of Bilkeshwar is under constant conflict with elephants. The north-western part of the TR is disturbed by the presence of linear infrastructure and a number of populated townships on the fringes.
8. The BHEL lands on the fringes of the TR near Haridwar town are in the ESZ and are largely remaining unutilized. Also, there is no tree growth in the said patch of land. The state can impose prohibitions on utilizing the land for buildings and infrastructure. The best course would be to use the land for growing trees.

Immediate Actionable Points

1. The management should put in more efforts to relocate 13 Gujjar families, which have already grown into more than 50 families. The Government of Uttarakhand and the TR management should offer more compensation and relocate themas the matter has been pending ever since the fourth MEE cycle was conducted for the TR.
2. The TR management was aware of the fact that the management plan of the PA was to expire in 202122. They should have taken timely action to prepare the next management plan and get it approved. They must expedite the process of finalizing the TCP.
3. Also, the Tiger Foundation should come in place early.
4. About a month prior to the MEE exercise, two tiger skins were seized at village Gandikhata, where 881 Gujjar families have been relocated from inside core area of tiger reserve. During the visit of the MEE team to this village on 9 September 2022, it was found that the lives of the relocated families have substantially improved. The villagers are still protesting for some more benefits from the administration because of the relocation to this site. The villagers have links with the forests and have the potential to aid and abet poaching and any other illegal activity. The TR management has not taken any action to compare the stripes of the seized tiger skin with the database in their possession. The interrogation of the person arrested in the tiger skin case in Haridwar Division revealed that the hunter had killed three tigers including a cub. The cub's skin has not been seized so far. The management should establish a backward linkage and take appropriate action to unearth the truth.
5. The ISFR 2021 report rings an alarm bell. The carbon sequestration potential is on the downward trajectory. The management must step in and reverse the trend.
6. There have been delays and inadequate releases of funds by NTCA and by the state government.
7. Tourists are allowed to stay in the core area of the TR and spend the night. The night halts in the core area as well as the movement of safari vehicles in the core area must be phased out.
8. The BHEL lands on the fringes of the TR near Haridwar town are in the ESZ and are largely remaining unutilized. Also, there is no tree growth in the said patch of land. The state can impose prohibitions on utilizing the land for buildings and infrastructure. The best course would be to use the land for growing trees.
9. Invasions of invasive weeds are a challenge, and the TR management should step up their efforts in weed removal and grass slip planting.

WEST BENGAL

BUXA TIGER RESERVE

50

MEE SCORE 63.64%

Date of Evaluation
17-20 October 2022

Evaluators' Names
Sh. B.K. Patnaik
Sh. G. Hari Kumar
Sh. Ajai Misra

INTRODUCTION

Buxa Tiger Reserve (BTR) was established during the year 1983 under Project Tiger and became the 15th tiger reserve of the country. In accordance with Sub-section (4) of Section 38 V of the Wild Life (Protection) Act, 1972, an area of 390.58 km^2 was notified as the core or Critical Tiger Habitat, and an area of 370.28 km^2 was notified as the buffer area of Buxa Tiger Reserve (vide the Government of West Bengal notification no. 3051-For/11M-28/07, dated 6 August 2009). The total area of the Reserve is 760.87 km^2, of which 390.58 km^2 constitutes Buxa Wildlife Sanctuary and Buxa National Park. The balance (370.29 km^2) area is reserved forests and other protected forests.

Buxa Tiger Reserve (BTR) is situated in Alipurduar Sub-division of Jalpaiguri District of West Bengal. It comprises the entire erstwhile Buxa Forest Division (702.44 km^2) and a part of the erstwhile Cooch Behar Forest Division (now known as Wildlife III Division, 58.43 km^2), which was added subsequently. The reserve lies between latitudes 26° 30' N and 26° 55' N and between longitudes 89° 20' E and 89° 55' E. The headquarters of BTR are located at Alipurduar Town. The nearest broad-gauge railway stations are Alipurduar Junction and New Alipurduar. The nearest airport is at Bagdogra, near Siliguri (175 km away).

Along with the floral diversity, Buxa Tiger Reserve has a wide faunal diversity. There are 68 species of mammal, 41 species of reptile, 246 species of bird, four species of amphibian and 103 species of fish that have been identified within the reserve. There are 20 species of mammal in Schedule-I (Wild Life Protection Act, 1972), seven bird species and 10 reptile species that are also included within the endangered lists. A study on the entomofauna of BTR listed 500 species of insect belonging to 13 orders, 65 families and 229 genera.

Key species identified in BTR include the tiger (*Panthera tigris tigris*), leopard (*Panthera pardus*), elephant (*Elephas maximus*), gaur (*Bos gaurus*) and clouded leopard (*Neofelis nebulosa*). The endemic Indo-Malayan species like the Chinese pangolin, and reticulated python have also been reported in BTR along with the rare marbled cat, black-necked crane, etc. (some of the endemic species of the North-east). Other important species found in the TR are the bear, hispid hare, monitor lizard, Bengal florican and great Indian pied hornbill.

A minimum of 12 tigers were reported to exist on the basis of the results of the tiger census, 2007. A DNA-based analysis conducted in 2010 revealed that there were a minimum of 15 tigers. A 2011 DNA-based analysis revealed the presence of 20 tigers with a very skewed sex ratio of 16 males and 4 females. During the 2018 AITE, the presence of tigers was not recorded in BTR. In December 2021, an adult male tiger was recorded on a camera trap, in East Damanpur Range of BTR. The tiger population is showing a declining trend. Anthropogenic pressures coupled with a reduced prey population is the reason for the low tiger density. Actions taken to reverse the trend inter-alia are creation of grasslands by canopy opening/sowing of grass seeds releasing 690 chital (*Cervus axis*) to augment the prey base.

The Vulture Conservation Breeding Centre (VCBC) was been set up during 2006, at Rajabhatkhawa, within BTR in collaboration with BNHS. VCBC has successfully released 20 captive bred white-backed vultures (*Gyps bengalensis*) in the wild.

In consideration of the continuous distribution and ranging of wild animals, e.g., elephants, tigers and gaurs, in the reserve and in its vicinity, the identified corridors are Buxa–Titi Corridor, Chilapata (Buxa–Chilapata) Corridor and Buxa–Ripu at Sankosh Corridor. The corridors provide crucial linkages for dispersal of wildlife to various protected areas like Buxa, Manas Tiger Reserve Phipsoo Wildlife Sanctuary in Bhutan. Tiger-centric management is in place in the recorded territory of the tiger in adjoining protected areas like Jaldapara NP and Gorumara NP.

There are 63 JFMC in BTR in accordance with government orders, and they work as EDCs. The JFMC receives 40% of the earning from the TCF, with the Beat Officer being the Member Secretary of the JFMC.

Management Strengths

1. BTR lies at the confluence of three major bio-geographic zones, viz., Lower Gangetic Plains (7B), Central Himalayas (2C) and Brahmaputra Valley (8A), support a spectrum of diverse species. 352 species of tree, 133 species of shrub, 189 species of herb, 108 species of climber, 144 species of orchid, 43 species of grass, 16 species of sedge, four species of bamboo and six species of canes have already been documented. Among the fauna, 70 species of mammal, 425 species of bird, 41 species of reptile, 33 species of fish and 408 species of butterfly have been recorded here.
2. The eco-sensitive zone (583.15 kms^2) was notified around BTR on 7 September 2020. A district-level monitoring committee has been notified by the government to monitor regulated, allowed and prohibited activities around BTR.
3. Anthropogenic disturbances inside the habitats are controlled through intense patrolling and monitoring through watch towers and through drone surveillance. 48 beats form the fulcrum of the M-STrIPES patrolling. A Protection Monitoring Protocol (PMC) is in place. Three sniffer Dogs are pressed into service for crime prevention and detection. To reduce fuel and firewood collection, LPG is being distributed. The lack of a good prey population is being addressed with the creation of grasslands and by augmentation of the prey base.
4. As part of the species recovery programme, the Vulture Conservation Breeding Centre (VCBC) was set up in 2006, at Rajabhatkhawa, within BTR in collaboration with BNHS. VCBC has successfully released 20 captive-bred white-backed vultures (*Gyps bengalensis*) in the wild. Project Hornbill, in collaboration with NCF and Nature Mates NGO, is in place to assess the density, abundance, nesting and roost site monitoring of all the four species of hornbill found in BTR. Butterfly Conservatory at Rajabhatkhawa does research and augmentation of different host and nectar plants, besides identification of butterfly species in BTR.
5. The average time for an *ex-gratia* payment varies from immediate relief to 6 months. In case of human injury, immediate relief is given for medical attention. In the unfortunate event of death, 75% of Rs.5 lakhs is given within 48 hours, and the rest of the *ex-gratia* payment is made after getting the death certificate. Major hotspots of wild animal straying are identified, and SOPs are in place for managing the straying cases. An early warning system through bulk SMS is active to relay information regarding the movements/presence of elephants.
6. To address the shortage of staff, 109 Ban Sahayak and 170 Aranya Sathi have been engaged. Further, 48 daily labourers are hired through a security agency for protection purposes at river camps during the monsoon. Ban Sahayaks and Aranya Sathis are mainly deployed in protection, conservation, plantation, management of man–animal conflict and eco-tourism.
7. Buxa Bird Festival is being organized in BTR since 2017, between 6 and 9 January. The festival intends to bring together eminent ornithologists, researchers and bird enthusiasts from across the region. The ecotourism being conducted in BTR is praiseworthy and non-intrusive. The safari ride is the main attraction of the BTR ecotourism. Further, seven watch towers beckon to tourists to experience panoramic views of the forests.
8. Departmental insurance coverage is provided for members of the permanent staff, from Forest Guards to Range Officers, and insurance coverage for Ban Sahayaks is provided by TCF.

Management Weaknesses

1. Proximity of BTR to the international borders i.e. Bhutan, Nepal and Bangladesh renders it highly vulnerable both as a poaching route and as a poaching destination. In addition, parts of BTR have suffered from insurgency problems. Further, weaknesses emanate from regional developmental activities such as forest concessions, industrial pollution, highway development, extensive high-value farming etc.
2. In BTR, no tigers (*Panthera tigris*) were detected by camera traps till late 2021, which is suggestive of at best a small, non-viable tiger population. As per All India Tiger estimation 2018, tigers were not recorded in BTR. However, in, December 2021 an adult male tiger was recorded on a camera trap, in the East Damanpur Range of BTR. Current tiger abundance as estimated by the camera trap-based monitoring exercise` is much below the carrying capacity of BTR.

3. BTR is ribbed with 46 fringe villages, 34 tea gardens, 37 forest villages and 4 Fixed demand holdings within and around it. Forest villagers and FD holders are totally dependent on BTR for meeting their requirement of fuelwood, small timber and other non-wood forest products and also for grazing. To add to the woes of BTR is the lack of an adequate prey base. Anthropogenic pressures inclusive of hunting and poaching, encroachment, illicit felling and fuel and firewood collection are rampant threats.
4. Inordinate delay is noticed in the release of funds under Project Tiger for all the preceding three years. During 2019-20, an amount of Rs 285.504 lakhs (NTCA funds of Rs 158.88 lakhs released on 04/12/19 & State Government funds of Rs 126.624 lakhs) reached BTR authorities only during fourth quarter of the year i.e., on the 27/01/20. During 2020-21, the NTCA allotment was Rs 130. 279 lakhs and the State Government fund was Rs 97.874 lakhs. The funds reached BTR authorities only on 16.09.2020 & 03.02.2021. During 2021-22, the NTCA allotment was Rs 121. 13 lakhs and State Government funds were Rs 107. 031 lakhs. The funds reached BTR authorities only on 03/02/22. Delay in the release of funds has resulted in partial utilization with resultant relegation of priority activities like upkeep of watch towers, plantation activities, procurement of essential articles, and wages for camp staff etc.
5. Sanctioned strength of permanent staff in BTR is 481, and no. of staff in position is 212, which is tantamount to 56% of permanent posts lying vacant. The status of the front-line cadre of Forest guards to Forest Ranger is more precarious, wherein the vacancy is 59% (209 vacancies in a cadre strength of 356).
6. Developing special thematic in-house training modules for internal training of protective staff at BTR has not been done. A record of pieces of training is not maintained. Staff Development Plan is not prepared. Casual workers are not included in the e-ashram and Ayushman yojana.
7. There are 15 forest villages in the core of BTR. To date, no forest villages have been relocated. Community Development and Eco-Development were relegated to the backseat without any allotment either in Non-Plan or in State Development Plan in the preceding three years. Further, LAC is not formed at the BTR level to ensure stakeholder participation.
8. Other management weaknesses noticed are (i) data on the complaint disposal system is lacking, (ii) TCP and SOPs are not available in vernacular language, (iii) disaster risk management plan and fire management plan are not in place, (iv) BTR does not have an independent web site (v) no online booking facilities. Entry ticket booking is done manually from the NIC, Rajabhatkhawa, and (vi) Security Audit is not done.

Immediate Actionable Points

1. Inordinate delay is noticed in the release of funds under the Project Tiger/State Development Plan. A considered decision is mandated to ensure appropriate management intervention/implementation of seasonal activities at the proper time. Hence, it is recommended that CWW/State Government should evolve a mechanism/protocol to ensure on-time submission of prioritized APO and timely release and full utilization of funds.
2. There are 15 forest villages in the core of BTR. To date, no forest villages have been relocated. After due consultations, a relocation proposal for 246 families was made for Bhutia Basti in Buxa Tiger Reserve East, and Gangutia in Buxa Tiger Reserve West. The relocation proposal from the core needs to be expedited.
3. As per TCP, the JFMCs that are already formed and established will prepare micro plans envisaging the needs of development, problems, and solutions and accordingly these proposals shall be included in the community development programmes by BTR management and by line departments. But micro plans are yet to be prepared. Eco-Development Programme should be implemented on top priority in all 63 JFMCs after the due process of micro-planning and signing up of MoU. JFMC members can be roped in for regular patrolling/protection and management, as part of a quid-pro-quo commitment.
4. Allotment of funds should be provided to implement programmes identified in micro-plans.
5. LAC should be constituted, as envisaged by NTCA; and operationalised to ensure implement eco-tourism properly.
6. Sanctioned strength of permanent staff in BTR is 481, and no. of staff in position is 212, which is tantamount to 56% of permanent posts lying vacant. The status of the front-line

cadre of Forest guards to Forest Ranger is more precarious, wherein the vacancy is 59% (209 vacancies in a cadre strength of 356). Expedient action is required at the State level to recruit staff for filling up vacancy positions.

7. Implementing action plans for securing Buxa - Titi (via Beech & Bharnobari tea estates) and Rydak- Jayanti corridors, to facilitate the free movement of elephant herds without harming villagers and their cultivation needs to be taken up on priority. Additionally, corridors will provide crucial linkages for the dispersal of tigers and other wildlife in between protected areas like Manas Tiger Reserve, Phipsoo wildlife sanctuary in Bhutan, and Jaldapara wildlife sanctuary. Bhutan has reported the presence of tigers and similarly, there have been reports of tiger movement between Jaldapara and Buxa. All efforts for expediting approval and allocation of funds for the creation of corridors should be made on a priority basis.
8. Clouded leopard (*Neofelis nebulosa*) is one of the key species of BTR. A proposal has been prepared in the recent past for providing special protection and research on the species. The major activities in the proposal *inter-alia* include habitat improvement through enrichment plantations, the creation of water holes, and infrastructure for monitoring & research The proposal should be implemented on a fast track.
9. The tourism property of West Bengal Tourism Development Corporation in the core has been handed over to BTR. It is essential that the assets/infrastructure be put to use optimally, by authorities for better management of BTR.
10. Certain actions within the purview of BTR authorities such as (1) developing special thematic in-house training modules for internal training of protective staff, (2) maintaining a record of pieces of training, (3) preparation of staff development plan and (4) including casual workers in e-shram and Ayushman yojana should be taken up as priority actions.

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SUNDARBANS TIGER RESERVE, WEST BENGAL

51

MEE SCORE 75.76%

Date of Evaluation
13-16 October 2022

Evaluators' Names
Sh. B.K. Patnaik
Sh. G. Hari Kumar
Sh. Ajai Misra

INTRODUCTION

Sundarban Tiger Reserve (STR) is one of the initial nine tiger reserves declared during 1973 under "Project Tiger" and encompasses a total area of 2584.89 km^2, of which 1699.62 km^2 has been declared the Critical Tiger Habitat (core area) and 885.27 km^2 has been declared the buffer area. The tiger reserve comprises Sajnekhali Wildlife Sanctuary (362.40 km^2), Sundarban National Park (1330.10 km^2) and reserve forest area (892.43 km^2). Under the provision of Wildlife (Protection) Act, the Critical Tiger Habitat CTH was notified vide West Bengal Govt. GO no. 6028-For, Dt 18.12.07.

STR is located in the state of West Bengal in South 24-Parganas and North 24-Parganas districts. The reserve lies between the latitudes 21° 31' N and 22° 31' N and between longitudes 88° 10' E and 89° 51' E. There are fringe villages all along the northern boundary of the Tiger Reserve. On the eastern boundary lies Bangladesh separated by the rivers Kalindi, Raimangal and Harinbhanga. On the western boundary lies the territorial Division of 24-Parganas South and towards the south lies Bay of Bengal. The headquarters of Sundarban Tiger Reserve are located at Canning Town, South 24-Parganas District. The Sealdah South Suburban Rail station is 46 km. from Canning. The Reserve can be approached by road from the nearest airport Kolkata up to embarkment points at Dhamakhali (80 km), Sonakhali (90 km), Godkhali ((120 km), and Jharkhali (100 km). From these points, the Reserve is approachable by waterway only.

Sundarban is the largest mangrove delta of the world and encompasses over hundreds of islands, with a maze of innumerable rivers, rivulets, and creeks. The name 'Sundarban' means "beautiful forest" and it is believed to be derived from a mangrove tree species 'Sundari' (*Heritiera fomes*). The Indian Sundarban (consisting of STR and part of 24 South Pragana Division) is the southernmost part of the estuarine delta formed by the River Ganges and Brahmaputra, bordering the Bay of Bengal. It is a part of global recognized Sundarban Biosphere Reserve declared in the year 1989. It constitutes over 60% of the total mangrove forest area in the entire county and has 90% of the total Indian mangrove species. These comprise of true mangroves or major elements, minor elements of mangroves or and mangrove associates, back mangrove trees and shrubs, non-halophytic non-mangrove associates in the area, halophytic herbs, shrubs, and weeds and epiphytic and parasitic plants. The mangrove forests act as a natural shelter belt and protect the hinterland from storms, cyclones, tidal surges, sea water seepage and intrusion. The mangroves serve as nurseries to shell fish and fin-fishes and sustain the coastal fisheries of the entire eastern coast. The National Park area of the STR is a Natural "World Heritage Property" of UNESCO declared in the year 1985.

As per the 2018 AITE the tiger numbers in STR is 87. The principal prey species of the tiger are spotted deer, wild boar, and Rhesus macaque who also swim across the streams and water channels. In addition, it also feeds upon fish, crab and water monitor. The Tiger Reserve is also home to a large number of endangered and globally threatened species like the fishing cat (Prionailurus viverrinus) and estuarine crocodile (*Crocodilus porosus*), Gangetic (*Platanista gangetica*) and Irrawady (*Oracella brevirostris*) Dolphin, King cobra (*Ophiophagus hannah*), water monitor lizard (*Varanus salvator*) etc. It harbours significant population of River Terrapin (*Batagar baska*) and provides the nesting ground of Olive Ridley Turtle (*Lepidochelys olivacea*), Green Sea Turtle (*Chelonia mydas*) and Hawksbill Turtle (*Eretmochelys imbricata*). There is a very good diversity of avian fauna. It is known as a kingfisher's paradise as out of the 12 species of kingfishers found in the country eight species are found here. Two species of horse shoe crabs (*Tachypleus gigas* and *Carcinoscorpius rotundicauda*) out of the four species found in the world are found here.

South 24 Pragana Division has good tiger population having similar mangrove Tiger Habitat, comprised of 3 tiger bearing ranges, namely Raidighi, Ramganga and Matla. The Matla river is the boundary with STR and tigers move both ways across the river. This along with Bangladesh

forms the Sundarbans land scape, which has been classified as a Tiger Conservation Landscape of global priority. It supports a significant tiger population. STR as well as the adjacent South 24 Parganas Forest Division have received International CATS (Conservation Assured Tiger Standards) accreditation.

The eco-tourism in STR is confined to Basirhat Range and parts of SWLS Range and NPW Range, in a total area of 911.96 km^2. Over the years there has been an exponential rise in the number of people visiting the TR. More than 2-3 lakhs people visit the STR annually.

Management Strengths

1. Sundarbans Tiger Reserve (STR), a part of Sundarbans Biosphere Reserve, a World Natural Heritage Site of UNESCO and a Ramsar Site is a unique landscape and is the only TR, with mangrove habitat.
2. STR's core and buffer area is completely free from human settlements and provides an excellent inviolate space for tiger conservation.
3. A network of well-equipped land-based/floating forest protection camps with watercraft, use of technology and good coordination with other law enforcement agencies have ensured the STR free from any poaching incident in the past four years.
4. Compliance with NTCA guidelines, community participation, online booking and proximity to Kolkata has made ecotourism viable and well-managed.
5. Conservation breeding program of critically endangered brackish water-dwelling Northern River Terrapin (*Batagur baska*) and its release with satellite telemetry devices to understand their behaviour and ecology, with an objective to re-wilding them, is an important ecological intervention by STR.
6. Erecting the nylon mesh fencing, towards the northern boundary of STR having an interface with villages in a stretch of 90 km. out of 106 km., is an important initiative, which has checked the HWC, especially with tigers considerably.
7. STR landscape is free from invasive weeds and therefore provides a healthy habitat for wildlife conservation.

Management Weaknesses

1. More than 50 % of the staff vacancies continue to be there and age group distribution of staff indicates more than 50 % of the staff have the age of 50 years or above. Working conditions in the STR are tough and challenging and therefore sufficient staff is required. It is imperative to go for special recruitment without further delay.
2. Training-wise and staff-wise detailed information/database for all the training given to the personnel of TR is not available.
3. Documents/records on the detailed assessment of threats, preparation of score cards and mapping are not been properly archived and analyzed.
4. Despite the human-tiger conflict mitigation measures, cases of tiger straying are being reported in some areas, causing panic among the local people. Reasons for every such incident should be analyzed to understand the possible causes leading to them.
5. Though there is coordination between the paramilitary forces of India and Bangladesh on international boundary matters, a similar arrangement is needed between the forest departments of the two sides for the issues of forest and wildlife protection & management. There is already a proposal in this regard, the same may be followed up further by NTCA/MoEF with Home Department.
6. There are 26 JMFCs (EDCs) in villages abutting the buffer area of STR. These committees are active and conducting AGMs regularly but presently do not have any micro plans in force. As various livelihood issues dominate in the area, micro plans may be prepared/revised, early by involving the line departments and village panchayats. It will help in holistically addressing the interests of local communities and ensuring their willing support for the cause of conservation.

7. Generally, the life of nylon nets, used for erecting the fencing along the interface areas of the HWC is reported to be three years. But in the absence of any system in place, to retrieve and dispose of the worn out/decomposed/disused nylon nets, such plastic wastes may cause pollution/threat to aquatic/marine fauna.
8. To cover all the creeks and the entire periphery in the STR, patrolling efficiency of frontline staff should be strengthened by increasing floating camps and providing boats. Infrastructure in sensitive areas should be strengthened. For monitoring/mapping of such areas, drones may be used.
9. STR landscape is very productive and highly dynamic. Lack of multi-disciplinary institutional framework, with concerned organizations/institutions to monitor and evaluate the various climatic, morphological, and ecological parameters like erosion of islands, formation of mud flats (char areas), increasing salinity/sea level, succession process/pattern of plants and communities etc. and to document it constantly, needs attention.
10. Present system of complaints and their processing in the public domain needs to be more responsive to achieve the management objectives.
11. There are a large number of private resorts around the STR but to encourage, eco-friendly and local community-friendly best practices (like having green infrastructure, supporting the local community for livelihood, following STR rules etc.) their access to eco-tourism in STR may be linked/incentivized to their compliance/follow-up to such practices. A system of scoring in matrix form and evaluation may be worked out as per the local requirement.

Immediate Actionable Points

1. Staff recruitment is a major issue and has been pending for a long time. The same may be taken up on top priority at least for existing vacancies in the STR.
2. As training-wise and staff wise detailed information/database for all the pieces of training given to the personnel of TR is not available. it is essential to immediately prepare a staff-wise database of each and every staff as well as every training program conducted in the STR.
3. Documents/records on the detailed assessment of threats, preparation of score cards and mapping need to be properly archived and analyzed continuously/at regular intervals.
4. The reason for tiger straying needs to be investigated.. Mapping of all such spots needs to be taken up and data to be analyzed.
5. In view of the security concerns in STR, the existing proposal for constituting special Tiger Protection in STR may be followed up.
6. Action may be taken to retrieve/remove and scientifically dispose of, of decomposed/worn out/disused nylon net from the islands.
7. Action may be taken to include all casual workers in e-ashram and Ayushman Yojana.
8. Important research project of TCF for developing a voluntary carbon market for STR to estimate average annual carbon reduction with TERI and NTCA, may be taken up as per the MoU.
9. As the Security audit is due, the same may be taken up.
10. Exercise of completing the micro plans of JMFCs by involving line departments and village panchayats may be completed in a time-bound manner.
11. A responsive system, in the public domain, needs to be in place with periodic submission of reports/returns on receipt of complaints/its processing/action taken and review. This will help in achieving the management objectives.
12. As flagged earlier, NTCA/MoEF & CC, may follow up on the matter with the Home Department for arranging the Forest Department level regular contact/meeting between the two countries (with Bangladesh) for the protection of forests and wildlife. It will strengthen the existing measures including the sharing of information across the international border.
13. As tourism is growing rapidly, there is a number of issues related to it, like improper disposal of garbage, oil pollution, and sound pollution crowding at tourist spots, which are to be

addressed at the earliest. Infrastructure like roads, electricity, drinking water and jetties also have to be developed additionally to cater to the increased need for tourism.

14. A survey on the socio-economic impact of the interventions made by the forest department in the JMFCs and SHGs under STR is done by IBRAD in 2019. The STR should act upon the findings and recommendations of the Survey.

15. Although on the official website of the STR number of various past offence cases and seizures etc. of Sundarbans Tiger Reserve has been uploaded from 2010-11 to 2016-17, yet the information for the current period from 2017-18 to 2021-22 is not available. Not only do these data have to be uploaded immediately, but also all information in the site should be updated continuously.

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The Kunming-Montreal Global Biodiversity (GBP) Framework adopted in December 2022, includes 23 targets aimed at reversing habitat and species loss, including the reduction of environmentally harmful subsidies, committing to quantifiable funding targets, and protecting 30% of the planet by 2030. Target 3, known colloquially as "30x30," calls for 30% of the world's terrestrial, inland water, and of coastal and marine areas, to be in effective protection and management by 2030. MEE exercises of Tiger Reserves have clearly demonstrated that our Tiger Reserves, are in consonance with 30x30 target, are effectively being conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognizing indigenous and traditional territories, where applicable, and integrated into wider landscapes.

The Tiger Reserves are natural heritage, which have been valued in the past; the present and their core values should be passed down to the future generations. Therefore, emphasis must be given in documenting their natural heritage values both in the Tiger Conservation Plans (TCPs), and in the MEE exercise.

The headline indicator: 'carbon capture and climate change' has received the lowest score in the current cycle, the reason being, there is no mandate in the TCPs for it. All the Tiger Reserves play a significant role in carbon sequestration and climate change mitigation. Therefore, a separate climate change plan section needs to included in the TCP.

In the current cycle, element 'Input' has received the lowest score. Decline in 'input' is a matter of concern; as in the long run it can affect the elements 'Process', 'Output' and 'Outcomes'. Attention must be given to 'Input', so that it remains steady in all the Tiger Reserves, thereby aiding in their efficient management.

MEE of Tiger Reserves shows that they are a perfect example of effectively managed landscapes. The best scoring Tiger Reserves can be considered for green listing under IUCN Greenlist Programme. The process of MEE for assessment of Tiger Reserves in the country provides valuable insights into the management processes and practices and India should take a lead to extend this management tool to other Asian countries for effective management of their protected areas/tiger reserves.

THE WAY AHEAD

05

CONCLUSION

The 5th Cycle of MEE of Tiger Reserves has provided excellent insights into the operations of Tiger Reserve Network (TRN) in the country, both in qualitative as well as quantitative terms.

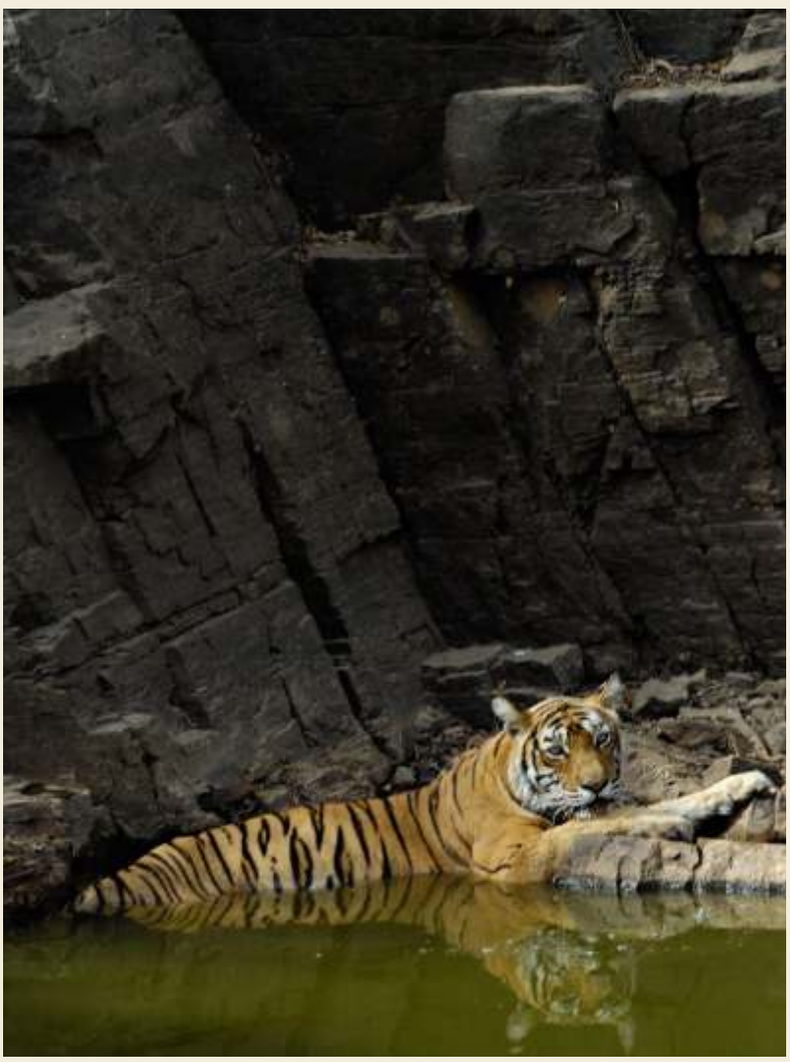
The TRN has multiple 'Strengths' which need to be maintained and even enhanced to a higher trajectory of excellence.

The 'Weaknesses' of the TRN indicated in the evaluation have to be effectively addressed in a time sensitive manner.

The 'Immediate Actionable Points have to be acted upon, for which both NTCA head quarter and its regional offices have to play an important role.

There is a need to initiate TRN - wide actions on the following aspects:

1. Development and implementation of 'Capacity Enhancement and HR Development Plan for the Frontline Staff including enhancement of Manpower Resources'.
2. Assessment of carbon sequestration potential of TRN and implementation of activities to promote carbon - neutrality.
3. Development and Implementation of Habitat Enhancement Plan with a focus on Invasive Alien Species, Water Conservation and Fire Management.
4. Prevention, Control and Management of Zoonotic Diseases and Development of Wildlife Health Infrastructure.



Rathika Ramasamy

Dinerstein, E. et al. 2007, The Fate of Wild Tigers, BioScience, 57(6), 508-514.

Ervin, J. 2003. WWF Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology. Gland, Switzerland: WWF.

Hockings, M., and Phillips, A. 1999. How well are we doing: some thoughts on the effectiveness of protected areas. Parks, 9, 5–14.

Hockings, M., James, R., Stolton, S., Dudley, N., Mathur, V., Makombo, J., Courrau, J., Parrish, J., and Patry, M. 2008. Enhancing Our Heritage Toolkit: Assessing Management Effectiveness of Natural World Heritage Sites. World Heritage Paper 23. Paris: UNESCO World Heritage Centre.

Hockings, M., Stolton, S., and Dudley, N. 2000. Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas. Gland, Switzerland and Cambridge, UK: IUCN. x + 121 pp.

Hockings, M., Stolton, S., Courrau, J., Dudley, N., Parrish, J., James, R., Mathur, V., and Makombo, J. 2007. The World Heritage Management Effectiveness Workbook: 2007 Edition. UNESCO, IUCN, University of Queensland, The Nature Conservancy.

https://ntca.gov.in/) National Tiger Conservation Authority. Ministry of Environment, Forest and Climate Change, Government of India.

Karanth K.U. and Nichols J.D. (eds.) 2017. Methods for Monitoring Tiger and Prey Populations, DOI 10.1007/978-981-10-5436-5_1

Karanth K.U. 2001. The way of the tiger: natural history and conservation of the endangered big cat. Voyageur Press, Inc, Stillwater

Mathur, V.B. 2008. Management Effectiveness Evaluation (MEE) of Protected Areas Network in India: Recent Experiences. Implementation of the CBD Programme of Work on Protected Areas: Progress and Perspectives. Abstracts of poster presentations at the second meeting of the Ad Hoc Open-Ended Working Group on Protected Areas, 11–15 February 2008 in Rome, Italy. Technical Series No. 35, 106 pages. Secretariat of the Convention on Biological Diversity.

Sanderson E, Forrest J, Loucks C, Ginsberg J, Dinerstein E, et al. (2006) Setting Priorities for the Conservation and Recovery of Wild Tigers: 2005–2015, The

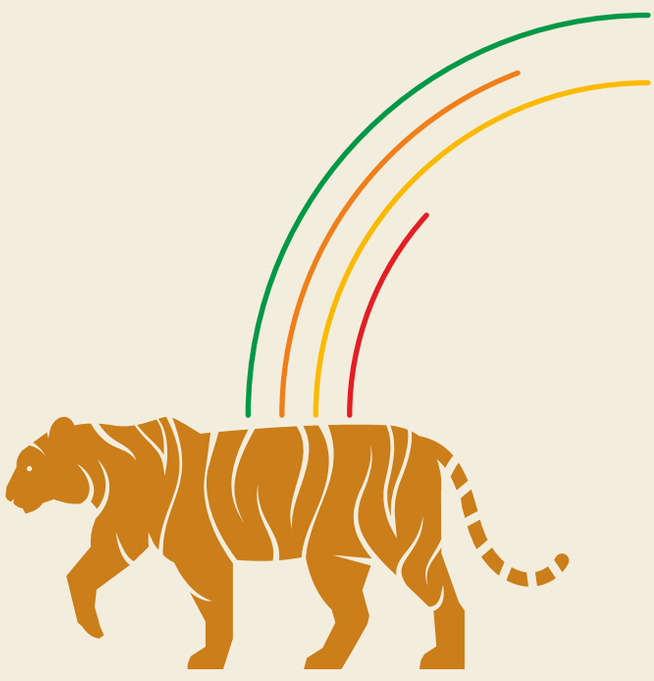
Technical Assessment. Available: http://www.worldwildlife.org/species/finder/tigers/publications.html.

WII ENVIS 2023. National Wildlife Database Centre, Wildlife Institute of India. wiienvis.nic.in/Database/Protected_Area_854.aspx (accessed on 25 March 2023).

Yadav, S.P., Mallick, A., Garawad, R., Sultan, S. and Singh, H. (eds) 2022. Technical Manual, Management Effectiveness Evaluation (MEE) of Tiger Reserves in India. National Tiger Conservation Authority, Government of India, New Delhi.

Shibu Nair

REFERENCES



Notes

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