

# Management Effectiveness Evaluation (MEE) of Tiger Reserves in India: *Process and Outcomes* 2010-2011



भारतीय वन्यजीव संस्थान  
Wildlife Institute of India

July, 2011



# **Management Effectiveness Evaluation (MEE) of Tiger Reserves in India: *Process and Outcomes***



# The Team

## ***National Tiger Conservation Authority***

Dr. Rajesh Gopal  
S.P. Yadav

## ***Wildlife Institute of India***

P.R. Sinha  
Dr. V.B. Mathur  
Dr. Y.V. Jhala  
Qamar Qureshi  
Dr. V.K. Melkani  
V.K. Uniyal  
P.C. Tyagi  
Dr. A.K. Bhardwaj  
S. Sen

## **Independent Experts**

<b>Landscape Cluster</b>	<b>Chairperson</b>	<b>Members</b>
I	Dr. P.C Kotwal	Ajay Desai Dr. Jamal A. Khan
II	V. B. Sawarkar	Dr. Erach Bharucha Rajeev Sharma
III	Dr. R.L. Singh	R.K. Dogra Ms. Prerna S. Bindra
IV	C.K. Sreedharan	Dr. Yogesh Dubey Dr. E.A Jayson
V	H.K. Choudhury	Dr. D.S. Srivastava Dr. P.S. Easa

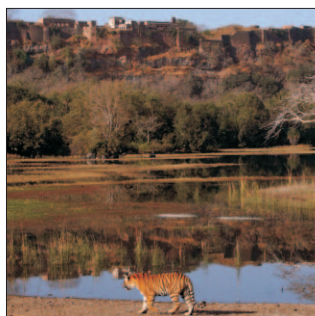




# Contents

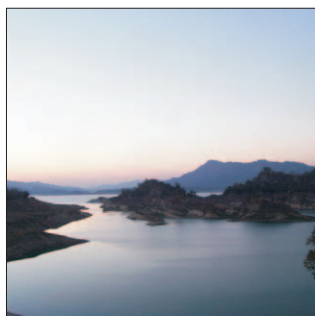
## *Foreword*

# 1



<b>1</b>	<b>Management Effectiveness Evaluation</b>	<b>1</b>
1.1	Introduction	3
1.2	Management Effectiveness	3
1.3	What is a Management Effectiveness Assessment?	4
1.4	The WCPA Framework for Assessing Management Effectiveness	4
1.5	Assessment Process	5
1.6	Assessment Criteria	5
1.7	MEE Score Card	18
1.8	References	18

# 2



<b>2</b>	<b>Management Effectiveness Evaluation Results: At a Glance</b>	<b>19</b>
----------	---	-----------

# 3



<b>3</b>	<b>Strengths, Weaknesses, Actionable Points of Clusters</b>	<b>25</b>
4.1	Cluster-I	27
4.2	Cluster-II	45
4.3	Cluster-III	55
4.4	Cluster-IV	65
4.5	Cluster-V	74

# 4



## 4 The Way Forward

91

ANNEXURE-I:	Landscape Clusters for Independent Management Effectiveness Evaluation of Tiger Reserves	94
ANNEXURE-II:	Committees for Independent Management Effectiveness Evaluation of Tiger Reserves	95
ANNEXURE-III:	WII Faculty for Technical Backstopping of Independent Management Effectiveness Evaluation of Tiger Reserves	96
ANNEXURE-IV:	Assessment Criteria for addressing issues relating to Climate Change & Carbon capture in the Tiger Reserves (TRs)	97

***N.B.: The Site Evaluation Reports of all 39 Tiger Reserves are in a separate document but enclosed in a CD Jacket attached to inside back cover.***

**Citation:** Mathur, V.B., Gopal, R., Yadav, S.P. and P.R. Sinha 2011.  
Management Effectiveness Evaluation (MEE) of Tiger Reserves in India: Process and Outcomes.  
National Tiger Conservation Authority, Government of India, p 97 <http://projecttiger.nic.in/>





जयंती नटराजन  
Jayanthi Natarajan



राज्य मंत्री (स्वतंत्र प्रभार)  
पर्यावरण एवं वन मंत्रालय  
भारत सरकार  
नई दिल्ली-110 003  
MINISTER OF STATE (INDEPENDENT CHARGE)  
ENVIRONMENT & FORESTS  
GOVERNMENT OF INDIA  
NEW DELHI-110 003

22<sup>th</sup> July, 2011

## FOREWORD

The Management Effectiveness Evaluation (MEE) process is a global framework to evaluate the performance of protected areas. I am happy to note, that India is among the select countries in the world that has institutionalized the MEE process for its network of protected areas. India has not only independently assessed the effectiveness of 28 tiger reserves in 2005-2006, but has taken this process forward, by extending this evaluation in 2010-11 to all 39 tiger reserves. The outcomes of this assessment are encouraging and despite all odds, our park managers and front-line staff are putting up a valiant effort to conserve our natural heritage. I understand that better protection is required for the five tiger reserves, located in the 'Red Corridor'. This is a daunting task, and I urge all sections of society to cooperate with us and support our forest and field staff.

I hope that field managers, across all parks closely monitor the performance of the 30 'headline indicators' tailored around the conservation needs of India, to ensure the long-term conservation of our magnificent tigers and the biological diversity that tiger reserves harbour.

I take this opportunity to compliment the National Tiger Conservation Authority (NTCA), Wildlife Institute of India (WII), Chief Wildlife Wardens of all Tiger Range States and above all the park managers and the front-line staff for their valuable contribution in securing the conservation of our national animal.

*Jayanthi Natarajan*  
(Jayanthi Natarajan)

# 1

# Management Effectiveness Evaluation









## 1.1 Introduction

Protected Areas (PAs) face many challenges to their integrity which, unless addressed can undermine the very objectives for which they were established. Those responsible for the conservation and management of PAs have the complex task of anticipating and dealing with these challenges, most often in an environment of limited financial and organizational capacity. It is therefore important that we invest in the efforts in the most critical areas to ensure that available resources are applied to their maximum effectiveness.

## 1.2 Management Effectiveness

In recent years there has been a growing concern amongst protected area professionals and the public that many protected areas are failing to achieve their objectives and, in some cases, are actually losing the values for which they were established (Hockings *et al* 2008). As a result, improving the effectiveness of protected area management has become a priority throughout the conservation community. One important step in this process is the carrying out of an assessment of current status and management of the protected area, to understand better what is and what is not working, and to plan any necessary changes as efficiently as possible. Assessment of management effectiveness has emerged as a key tool for protected area managers and is increasingly being required by governments and international bodies. For example, the Convention on Biological Diversity (CBD) Programme

of Work for Protected Areas (agreed in February 2004) calls on all State Parties to implement management effectiveness assessments for at least 30% of their protected areas by 2010.

In response to these initiatives, work on management effectiveness assessment has become an increasingly common component of protected area management worldwide. India has also made a beginning in evaluating the management effectiveness of its national parks, wildlife sanctuaries and tiger reserves (Mathur, 2008). The Project Tiger had conducted the management effectiveness assessment of 28 tiger reserves in 2006 ([http://projecttiger.nic.in/Report-2\\_EvaluationReportsofTRinIndia.pdf](http://projecttiger.nic.in/Report-2_EvaluationReportsofTRinIndia.pdf)) and the results of this assessment were peer-reviewed by the IUCN ([http://projecttiger.nic.in/Report-1\\_ReviewofTRAssessmentReport.pdf](http://projecttiger.nic.in/Report-1_ReviewofTRAssessmentReport.pdf)). Evaluations have now been undertaken in over 6,000 protected areas and the pace of this work is accelerating (Fiona Leverington *et al*, 2008). International organizations working with protected areas such as IUCN and its World Commission on Protected Areas (WCPA), the World Bank, the Global Environment Facility as well as NGOs such as WWF and The Nature Conservancy have taken a lead in both promoting the importance of management effectiveness as an issue, and in providing the technical development and support needed to underpin this effort.

Assessments should not primarily be about reporting on or judging either their managers and/or the frontline staff. As important as reporting requirements are, the assessment of



management effectiveness should primarily be used to assist managers to work as effectively as possible.

Monitoring threats and activities affecting a PA and using the results to manage for challenges, threats and pressures is increasingly seen as being at the core of good PA management. Assessments help managers and stakeholders reflect on their experience, allocate resources efficiently, and plan for effective management in relation to potential threats and opportunities.

### **1.3 What is a Management Effectiveness Assessment?**

Protected area management effectiveness evaluation is defined as the assessment of how well protected areas are being managed – primarily, whether they are protecting their values and achieving agreed goals and objectives. The term 'management effectiveness' reflects three main themes of protected area management:

- Design issues relating to both individual sites and protected area systems;
- Adequacy and appropriateness of management systems and processes;
- Delivery of protected area objectives including conservation of values.

The precise methodology used to assess effectiveness differs between protected areas, and depends on factors such as the time and resources available, the importance of the site,

data quality and stakeholder pressures. The differing situations and needs for protected areas thus require different methods of assessment. As a result, a number of assessment tools have been developed to guide and record changes in management practices.

A uniform theme to these assessments has been provided by the IUCN World Commission on Protected Areas (WCPA) Framework for Assessing the Management Effectiveness of Protected Areas (see Figure 1 for more information), which aims both to give overall guidance in the development of assessment systems and to encourage basic standards for assessment and reporting.

### **1.4 The WCPA Framework for Assessing Management Effectiveness**

The WCPA Framework sees management as a process or cycle with six distinct stages, or elements:

- it begins with establishing the context of existing values and threats
- progresses through planning
- allocation of resources (inputs)
- as a result of management actions (process)
- eventually produces goods and services (outputs)
- that result in impacts or outcomes.

Of these elements, the outcomes most clearly indicate whether the site is maintaining its core values, but

outcomes can also be the most difficult element to measure accurately. However, the other elements of the framework are all also important for helping to identify particular areas where management might need to be adapted or improved.



**Figure 1: The WCPA Framework for Assessing Management Effectiveness.**

**Note:** For more information on the WCPA framework see: Hockings, M., Stolton, S., Leverington, F., Dudley, N. and Courrau, J. 2006. *Evaluating Effectiveness: A framework for assessing management of protected areas, (2nd edn) World Commission on Protected Areas, IUCN, Gland, Switzerland. The framework can be downloaded from: <http://www.iucn.org/themes/wcpa/pubs/guidelines.htm#effect2>*

## 1.5 Assessment Process

All 39 Tiger Reserves (TRs) were grouped in 7 landscape clusters for MEE process (Annexure-I). In order to ensure credibility of the assessment process, 5 Independent Expert MEE Committees were constituted (Annexure-II). A Technical Manual '*Management Effectiveness Evaluation (MEE) of Tigers Reserves in India*' was prepared (Mathur *et al*, 2010) to guide the MEE process. A Wildlife Institute of India (WII) team provided technical

backstopping to the MEE process (Annexure-III). Considering the growing importance of addressing issues relating to Climate Change, Carbon Capture, Preventing Carbon Loss and Encouraging further Carbon Capture in Tiger Reserves two additional criteria were developed (Annexure-IV). These criteria have not been included in the formal MEE of TRs but the information gathered will be used to sensitize the conservation community about the significance of these issues and to plan next steps for addressing them.

The Independent Expert MEE teams visited all the 39 TRs for conducting MEE as per the prescribed assessment criteria and completed the MEE Score Card.

The outcomes of the MEE process were discussed in a meeting with the Field Directors of Tiger Reserves on 17-18<sup>th</sup> February, 2011 in New Delhi and again in the meeting with Chief Wildlife Wardens of 17 Tiger Range States on 9-10<sup>th</sup> May, 2011 in New Delhi.

## 1.6 Assessment Criteria

For assessment of each of the six elements of the MEE Framework, 30 criteria (headline indicators) were developed for MEE of tiger reserves in India. Explanatory notes, wherever needed, were provided to guide the assessment process. The scores along with observations (remarks) that qualify such scores provide a better understanding of the field situation.

## 1. 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			

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

### 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 or assessed.	Poor			
Threats generally identified but not systematically assessed.	Fair			
Most threats systematically identified and assessed.	Good			
All threats systematically identified and assessed.	Very good			

+This assessment should be based on number, nature and extent of threats

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

### 1.3 Is the 'Core Area' of TR free from human and biotic interference?

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 of 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.

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

#### 1.4 Has the TR complied with the four statutory\* requirements?

Assessment criteria				
Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
None of the four statutory requirements met	Poor			
One of the four statutory requirements met	Fair			
Two/three of the four statutory requirements met	Good			
All four statutory requirements met	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**

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

## 2. 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	Very good			

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

#### 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**

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



### 2.3 Are stakeholders given an opportunity to participate in planning process?

<b>Assessment criteria*</b>				
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 result of participation must show in the field and not merely reported as a routine exercise.

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

### 2.4 Are habitat management programmes systematically planned, relevant and monitored?

<b>Assessment criteria*</b>				
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. Have these been addressed? Is their a planning process in place?

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

### 2.5 Does the TR has an effective protection strategy\*?

<b>Assessment criteria*</b>				
Condition	Category*	(Tick ✓)	Reference document(s)	Remarks
TR has little or no protection strategy.	Poor			
TR has an adhoc protection strategy.	Fair			
TR has a generally relevant protection strategy but is not very effective.	Good			
TR has a comprehensive and very effective protection strategy.	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.

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

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

<b>Assessment criteria*</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

**+Judgment needs to consider staff training, capabilities, equipment, logistics, local attitude and politics (negatively aided and/or abetted), assistance of relevant agencies (e.g. police. Local administration, local people themselves) PR, follow-up actions and monitoring**

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

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

<b>Assessment criteria*</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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?**

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

### 3. 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)

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

#### 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			

+Assessment: 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.

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

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

<b>Assessment criteria*</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

**+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 funds and their mitigation.**

**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?**

<b>Assessment criteria*</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

**+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 funds and their mitigation.**



### 3.5 What level of resources are provided by NGOs?

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

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

## 4. Process

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

<b>Assessment criteria*</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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 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.

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

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

<b>Assessment criteria</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

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

<b>Assessment criteria</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

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

<b>Assessment criteria</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

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

<b>Assessment criteria</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

**4.6 Has the TR planned and implemented the voluntary 'Village Relocation' from the core areas?**

<b>Assessment criteria*</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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	Very good			

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

**+Assessment will look into the village relocation planning process including availability of manpower, financial resources and NGO support, if any.**

**5. Output**

**5.1 Is adequate information on TR management publicly available?**

<b>Assessment criteria</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

## 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 feed back on the quality of wilderness experience.*

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

## 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.*

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

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

<b>Assessment criteria</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

**6. Outcomes**

**6.1 Are populations of threatened species especially tiger populations declining, stable or increasing?**

<b>Assessment criteria*</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
Threatened/ endangered species especially tiger populations 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

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

<b>Assessment criteria</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

## 6.3 Are the expectations of visitors generally met or exceeded?

<b>Assessment criteria</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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			

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

## 6.4 Are local communities supportive of TR management?

<b>Assessment criteria*</b>				
<b>Condition</b>	<b>Category*</b>	<b>(Tick ✓)</b>	<b>Reference document(s)</b>	<b>Remarks</b>
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.*

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

## 1.7 MEE Score Card

Framework Element Number	Framework Element Name	Number of Criteria (a)	Maximum Mark per question (b)	Total (a x b)	Marks obtained for the Element	Overall MEE Score and % age
1.	Context	04	10	40		
2.	Planning	07	10	70		
3.	Inputs	05	10	50		
4.	Process	06	10	60		
5.	Outputs	04	10	40		
6.	Outcomes	04	10	40		
<b>Total</b>		<b>30</b>		<b>300</b>		

## 1.8 References

**Fiona Leverington, Marc Hockings and Katia Lemos Costa, 2008.**

Management effectiveness evaluation in protected areas: Report for the project 'Global study into management effectiveness evaluation of protected areas', The University of Queensland, Gatton, IUCN W C P A , T N C , W W F , AUSTRALIA.

**Marc Hockings, Robyn James, Sue Stolton, Nigel Dudley, Vinod Mathur, John Makombo, Jose Courrau, Jeffrey Parrish and Marc Patry, 2008.** *Enhancing Our Heritage Toolkit: Assessing Management Effectiveness of Natural World Heritage Sites.* World Heritage Paper 23. UNESCO World Heritage Centre, Paris.

**Mathur, V.B. 2008.** *Management Effectiveness Evaluation (MEE) of Protected Areas Network in India: Recent Experiences.* Secretariat of the Convention on Biological Diversity (2008). 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.

**Mathur, V.B., R. Gopal, S.P. Yadav and P.R. Sinha 2010.** Management Effectiveness Evaluation (MEE) of Tigers Reserves in India. Technical Manual No. WII-NTCA/01/2010 pp 21.



# 2

## **Management Effectiveness Evaluation Results: *At a Glance***





## Evaluation Results

The 39 tiger reserves in 17 States of the country were grouped in five '*Landscape Clusters*'. Their average MEE score (in %age) is given in **Table-1**. The overall MEE score is 65% with a range from 33% to 88%. The Central India-Eastern Ghats Landscape Cluster has achieved the highest MEE score (79%), while the Shivalik Gangetic Plains-Eastern Ghats Landscape cluster, falling in the '*Red Corridor*' has achieved the lowest score (42%).

## Effectiveness of Individual Tiger Reserves

The outcomes of the MEE process (2010-11) are given Tables **2a**, **2b** and **2c**. Of the 39 tiger reserves that were evaluated, 5 falling in the '*Red Corridor*' have been categorized separately (**Table-2b**). Similarly, two tiger reserves viz. Sariska and Panna, which had lost all tigers in recent past, and in which the tigers have been re-introduced have also been categorized separately in this evaluation (**Table-2c**).

**Table-1: MEE Score (% age) of Landscape Clusters (2010-11)**

Cluster Number	Cluster Name	States	No. of Tiger Reserves	Mean MEE Score%	MEE Score Range %
I	Shivalik- Gangetic Plain Landscape Complex and Central Indian Landscape Complex and Eastern Ghats Landscape Complex	Uttar Pradesh, Uttarakhand, Rajasthan, Maharashtra	8	64	56-73
II	Central Indian Landscape Complex and Eastern Ghats Landscape Complex	Madhya Pradesh	6	79	56-88
III	Shivalik-Gangetic Plain Landscape Complex and Central Indian Landscape Complex and Eastern Ghats Landscape Complex	Bihar, Chattishgarh, Orissa, Andhra Pradesh, Jharkhand	8	42	33-63
IV	Western Ghats Landscape Complex	Karnataka, Kerala, Tamil Nadu	9	75	63-80
V	North East Hills & Brahmaputra Flood Plains and Sundarbans	Arunachal Pradesh, Assam, Mizoram, West Bengal	8	66	56-77
Total			39	65	33-88

**Table-2(a): Category-wise outcome of MEE Process (2010-11)**

S. No.	Category	Name of Tiger Reserve
1	Very Good	Annamalai, Bandhavgarh, Bandipur , Bhadra, Dandeli-Anshi, Kalakad-Mundanthurai, Kanha, Kaziranga, Mudumalai, Parambikulam, Pench (Madhya Pradesh), Periyar, Satpura, Sundarbans
2	Good	Buxa, Corbett, Dampa, Dudhwa, Manas, Melghat, Nagarhole, Pakke, Pench (Maharashtra), Ranthambhore, Tadoba-Andhari
3	Satisfactory	Achanakmar, Nameri, Namdapha, Sanjay, Sayadari, Valmiki
4	Poor	Satkosia

**Table-2 (b): Category-wise outcome of MEE Process (2010-11) of Tiger Reserves falling in the 'Red Corridor'**

S. No.	Category	Name of Tiger Reserve
1	Very Good	---
2	Good	Nagarjunsagar-Srisaillam
3	Satisfactory	Simlipal
4	Poor	Indravati, Palamau, Udanti-Sitanadi

**Table-2 (c): Category-wise outcome of MEE Process (2010-11) of Tiger Reserves, which had recently lost all tigers**

S. No.	Category	Name of Tiger Reserve
1	Very Good	Panna
2	Good	---
3	Satisfactory	Sariska
4	Poor	---

### Summary of MEE Process of Tiger Reserves

Rating	Number of Tiger Reserves	Percentage
Very Good	15	38
Good	12	31
Satisfactory	8	21
Poor	4	10
<b>Total</b>	<b>39</b>	

### Comparison with 2005-06 evaluation

In 2005-06, 28 tiger reserves were evaluated and the MEE Rating achieved by them in 2010-11 is given in **Table-3**.

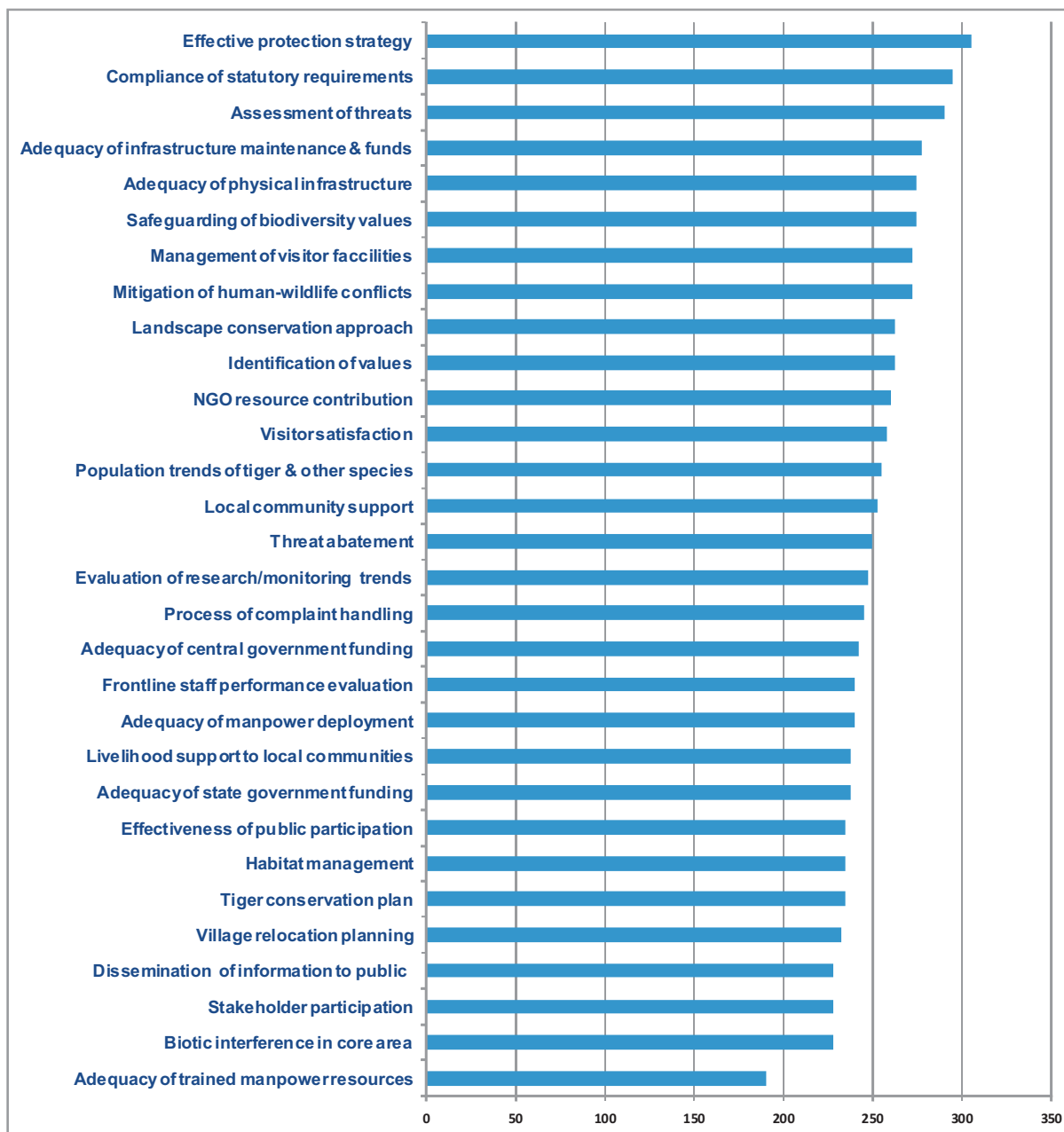
**Table-3: Comparison of MEE Rating of Tiger Reserves in 2005-06 and 2010-11**

Category	2005-06	%	2010-11	%
Very Good	09	32	10	36
Good	10	36	11	39
Satisfactory	07	25	05	18
Poor	02	07	02	07
<b>Total</b>	<b>28</b>		<b>28</b>	

### Performance of Headline Criteria/ Indicators

The MEE Assessment 2010-11 indicates that all tiger reserves have an effective protection strategy, have largely complied with statutory requirements and have done a good assessment of their threats. However, many tiger reserves have inadequate trained manpower, disseminate inadequate information to public, still have biotic interference in the core area and have inadequate stakeholder participation. The relative performance of 30 headline criteria/ indicators across all 39 tiger reserves is given in **Table-4**.

**Table-4: Performance of Headline Criteria/ Indicators**



# 3

## **Strengths, Weaknesses, Actionable Points of Clusters**







#### 4.1 Cluster-I (Corbett, Dudhwa, Ranthambhore, Sariska, Melghat, Pench (Maharashtra), Sahayadri and Tadoba-Andheri)

##### General Comments on Tiger Reserves

These are general comments and applicable to all or most TRs in Cluster-I. They indicate issues and problems that reduce the effectiveness of TRs and are put here just to highlight the issues and are not a detailed assessment of the issues nor are remedies given as that is beyond the scope of this assessment. It was felt that this would be helpful and hence they have been put here.

##### Tiger Conservation Plan

While the objective behind this was good however by and large implementation (preparation of the plan) has been extremely poor. An extremely general approach has been taken in most cases using broad or general terms/approaches to identifying issues and planning for them. It is very critical to get the TCPs right as they need to be approved by the State Government and the NTCA making both these party to the plan and also committed to these plans as these plans will be in place for 10 years. These are just a couple of points made to point to the shortfall in the approach to TCPs.

- **Approach:** Urgency in the need to have the plan has resulted in plans being prepared hurriedly paying little attention to details and processes. The process of planning using existing data and acquiring additional required data, effective and structured consultation process, peer inputs/reviews has not been done or only superficially done. Authorship (unsurprisingly) has also lead to poor involvement of people even within the TR (this can be overcome by eliminating authorship altogether!).
- **A problem assessment and target driven approach is lacking:** This would allow a problem or issue to be assessed in all its dimensions (impact to mitigation). For example, weeds are generally identified as a problem. What their impact is or what priority needs to be given, which are priority areas for removal, how much can be done and how it is to be done, how long the effort needs to be sustained, what are the resource needs and resource availability, what monitoring mechanisms are needed, etc. are not addressed. So implementation allows an ad hoc and un-monitored approach to be taken negating the very need for planning. Clear goals well defined and measurable targets are not set for management inputs. This again allows an ad hoc approach to be taken. For example, addressing water requirements in the TR requires assessing water

availability and distribution followed by an analysis of water deficiency in a species specific manner and clear management justification for the need to implement expansion of water distribution. This would set up clear objectives and clear measurable goals for example long-term or final requirements of 5 waterholes in 5 pre-identified locations. This can be executed over the period of one year or over the plan period or the next two plans (subject to resource availability, prioritization or a time bound implementation period). Progress can be easily monitored and when supported by monitoring to assess the impact of the waterholes. It will answer questions about the waterholes achieving the desired management objective. Given the fact that TRs are the premium conservation areas in the country they need to step up to this level of conservation management especially when we have had over a quarter a century of learning behind us on TRs and we are still virtually living with the same tiger population as we did when we started TRs.

### **Insufficient staff and capacity**

By and large most TRs retain the same sanctioned staff strength which was probably identified decades ago. The challenges and problems today are far greater and consequently there is an

extremely urgent need to increase staff strength in all TRs. Capacity building is abysmal, today's problems and challenges call for experts with experience and we generally entrust non-professionals or amateurs with no experience to execute these tasks.

- Some TRs have over 35 km<sup>2</sup> of beat size which is impossible for a beat team to effectively patrol. Additionally, administrative problems have generated problems which result in very old staff being posted into TRs consequently they are not physically fit to do intensive patrolling. Some TRs suffer from staff going on leave as the workload or work conditions are difficult. This adds to the problem of already low staff strength.
- Resettlement – this is a complex and sensitive issue. The issues involved are social, economic, psychological and political and within that there is a need for understanding community relationships, understand employment/income needs which range from simple services (labour) to agriculture to entrepreneurship. They also require communicating skills, financial skills and the ability to multitask with various government line agencies. Often an ACF rank officer or a ranger is deputed (often in addition to his regular duties) to undertake the initial process of resettlement planning. Where does he acquire these skills?



## **Funding constraints**

A major constraint with funding was the delay in the funding process which resulted in the TR being made to implement works in a hurried manner at the year end (when funds become available) rather than systematically over the year. Inadequate funds were also a problem.

## **Engagement of local communities**

A critical management requirement in most TRs was reducing/stopping anthropogenic pressure on the TR and also addressing the human-wildlife conflict. This calls for providing alternate sources of income to the communities and also generating direct benefit for them from the TR. Community based ecotourism provides one of the best avenues to address this problem and some TRs are actively pursuing this. However, in several TRs private enterprise has cornered the bulk of tourist revenue and this is particularly worrying in high profile TRs where these revenues are huge. Locals feel the pinch of the regulations, restrictions and conflict that the TR imposes on them and see rich getting richer at their expense through tourism. This generates a negative attitude towards the TR and needs to change. As mentioned earlier, this is an important task and one that requires special skills as engagement of communities goes beyond tourism. Involvement of local communities in tourism will also free TR staff from tourist duties and allow them to give greater attention to protection and management as has been done in some TRs.

## **Management at the landscape level**

At present there is only talk of landscape level conservation planning, the TR managers are not empowered to address issues beyond their jurisdiction nor is there a formal framework through which they can achieve the same. It is now largely left to the whims of individuals and also to inter-personal relationships they have with managers of other areas in the landscape. Corridors and landscape management will remain on paper unless suitable changes that facilitate assessment, planning and management of such areas are not brought about.

## **Lack of dedicated research**

By and large research has taken a backseat despite research being made a component of TRs from the very beginning. By and large research has been done on an adhoc basis by individuals, NGOs and institutes. Although these have generated useful and important data, there is need for significantly increasing research by encouraging research in TRs and by funding dedicated research work needed for the TR. There is also a need to understand that all research is beneficial and can be used constructively by the TR is the management has the capacity to do so. Additionally, the impacts of all management inputs need to be monitored to assess effectiveness and allow for adaptive management approaches.

## **Tiger Foundation**

Tiger Foundation is a great concept and can resolve numerous problems faced by TRs. However this will be possible

only if these foundations function effectively rather than just go through the motions. At present none of the TRs had functioning Foundations. Attention will need to be given to the formation and functioning of these Foundations to ensure that they deliver rather than become another non-functional arm of conservation.

## **Corbett Tiger Reserve**

### **Strengths**

Corbett Tiger Reserve has a high profile, significant patronage and huge tourism revenues/support, all these can be channelized into generating significant support and resources for the TR. It has a well developed and supported protection plan and force so after further strengthening its protection force it can afford look at conservation planning beyond its immediate boundary. This also gives it the opportunity to engage in more proactive conservation planning within its boundaries by developing species specific conservation planning. Its location within the Terai Arc landscape makes it a part of significant tiger conservation landscape which can possibly support a large enough tiger population which will be genetically viable for long-term conservation. The park has a reputation in resolving man-eating problems in a pro-active way.

### **Weaknesses**

The park and its buffer still face anthropogenic pressures from settlements and gujar deras. Human wildlife conflict is significant in and around the buffer area. There is little or no involvement of stakeholder in the PA or significant involvement in its tourism revenue (community related as

opposed to private enterprise). Engagement of local communities through efficient and functional EDCs and other means is generally poor or lacking. Staff strength needs to be upgraded and increased wildlife training is also needed. Weeds are a significant problem. Long-term studies on key values/species are lacking and limited research in a TR of such significance is not a good sign and hence management cannot really move beyond basic protection and generalized habitat management. Too much time and manpower is involved in managing tourism and tourist facilities which takes away from the primary tasks of the TR staff. More community participation would resolve that and would also generate significant support from all local communities. The TR is not actively engaged in planning or facilitating landscape level conservation (including corridors), although these may be outside the administrative boundary of the TR its support for research, for the concept and also its involvement in facilitation action through the department would contribute significantly towards achieving landscape level goals which will benefit it directly and tiger/wildlife conservation generally.

### **Actionable Points**

- Human-wildlife conflict in the buffer zone is very severe and there is a need for a systematic plan to address this
- EDCs in the buffer are largely non-functional or poorly functional and park management's interaction with the people is poor. There is a need to change this situation

especially considering the high level of human-wildlife conflict. There is great opportunity to divert a significant part of the tourist revenue towards community based eco-tourism (currently private enterprise is cornering the bulk of this revenue).

- There is a need to resettle the Gujar Deras (181 families) from the core area and also address the biotic pressures created by the 21 villages and 15 Gujar Deras in the Buffer.
- Manpower, capacity and resource needs have to be upgraded. There is a need for increase in staff strength, need for more wildlife trained staff and increase in supporting infrastructure. There is a clear need to stop/reduce departmental involvement in tourism related activities and divert the manpower and energies towards protection and management.
- Weeds are widespread and a serious problem and this needs to be addressed in meaningful way.
- At the landscape level, critical corridors are being fragmented and there is a need for the TR to plan for securing and managing these corridors (through the state and interstate action).
- Investment in research is generally poor and with wildlife populations fluctuating (tigers increasing and gharial and hog deer declining), human-wildlife conflict being severe,

anthropogenic and other biotic (weeds) pressures prevailing in the buffer and core, and a need to shift to landscape level planning and conservation there is a clear need for increased research for scientific management.

Corbett TR cannot be viewed as just another TR as it is one of the oldest TRs in the country and has a very high profile, significant funding, public and political support and huge tourism revenues (not just departmental). As such the TR has to be exemplary and set the benchmark for tiger conservation, just limiting a review to protection is meaningless. Once adequate protection has been achieved a park of this stature needs to move beyond mere protection into advanced proactive and science based conservation. This would require the TR to have not only theme based plans for addressing various threats/problem related issues but also plans for species specific conservation for key threatened species. These plans would have clear goals/objectives defined and clear steps and processes through which they are to be achieved. They would also have clearly defined and measurable goals which could be monitored and measured; allowing for an adaptive management approach. The TR should look at landscape level issues beyond its core area by focusing on corridors and buffer areas. It should proactively engage local communities within and around the core and buffer, bringing in participatory management, making them significant (if not exclusive) shareholders in the tourism revenue stream and actively working with them to reduce anthropogenic

pressures, address issues of human-wildlife conflict, reducing other biotic pressure like weeds etc. The TR should be actively engaged in capacity building and in fact should have been a centre for capacity building by now. The TR needs to have staff from the field level to the top managers highly trained in their respective fields of operation and also clear understanding of modern conservation. The TR should develop funding from various sources (like the Tiger Foundation, inputs from community run eco-tourism, visitor support for the TR, etc.) in addition to state and central funds. To bring in such changes many of which require research and monitoring the TR should develop, through encouragement and funding, systematic links with various research institutes, NGOs, competent individuals and even international research institutes and NGOs. The TR should facilitate pioneering of cutting edge research to face the demanding conservation challenges of the 21<sup>st</sup> century.

## **Dudhwa Tiger Reserve**

### **Strengths**

This TR is the only representative of Terai-bhabar Biogeographic subdivision of the Upper Gangetic Plains (7a) Biogeographic Province. It is also unique in supporting 5 of the 7 species of deer found in India and also endangered species like the Bengal florican and hispid hare. The great Indian one horned rhinoceros has been successfully re-introduced into the TR. All these can be effectively leveraged to generate significant conservation support for this TR. There is some NGO involvement in helping the TR especially with infrastructure. EDCs have been formed and are working to

provide alternate sources of income for communities dependent on resources in the TR.

### **Weaknesses**

There are settlements in the Core and Buffer which need to be resettled. The three PAs (core areas) are fragmented and separated by agricultural lands and rivers with some encroachments in the corridor areas. There is an urgent need to secure landscape integrity. The porous international border with Nepal brings in special problems of illegal entry, poaching and wildlife trade and needs increased effort to secure. Human wildlife conflict is a major problem and multiple species contribute to this conflict so a comprehensive plan is needed to address this problem. Roads and a railway line through the TR pose problems for wildlife movement and also increased mortality due to road and rail accidents. The current and potential future threats due to roads and railway need to be assessed and mitigation planned for. Staff shortages due to vacancies and also insufficient sanctioned staff strength are a problem; as is the lack of suitably wildlife trained staff. Research and monitoring are inadequate given the diversity of endangered species, infrastructural (roads/railways) intrusions in the park and its porous international boundary, human-wildlife conflict, etc. This needs to be changed quickly if science based management is to be brought in.

### **Actionable Points**

- There is a need to secure the TR by resettling the village within the core and also focus on ensuring that the connectivity between the three PAs. There is



a need for focusing on clearing the encroachments in the corridor areas.

- The porous international border with Nepal, the threat of wildlife trade from across the border, intruders illegally entering the TR from Nepal, etc. requires increased vigilance, filling in of all vacant staff post, capacity building and also more protection infrastructure. There is also a need for greater coordination between the three PAs.
- Human wildlife conflict is significant as migratory elephants cause conflict; cattle kills by large carnivores and wild pig depredations add to the problems. There is a need to resolve such conflict if the TR is to generate support for conservation.
- There is a need to address the problems raised by the public roads (including an international road) and railway line through the TR. A study would be needed to assess the impacts and to identify appropriate/suitable mechanisms to overcome these problems.
- Community participation is limited however EDCs have been formed and are addressing some of the livelihood needs. Tourism is very limited but there is potential to develop it effectively to address the livelihood needs of the local communities.

- There is little attention given to research for a park that faces significant problems in terms of biotic pressures, road/railway intrusions, huge biodiversity with multiple endangered species with diverse habitat requirements and human-wildlife conflict. There is a need to upgrade monitoring and research by encouraging and funding it.
- All these issues need comprehensive and systematic planning with clearly defined goals/objectives, proposed actions/activities and measurable targets that allow effective monitoring of implementation. A high quality TCP is a priority.

Dudhwa TR is very rich in biodiversity and is critical for the conservation of several species and for the Terai-bhabar Biogeographic subdivision of the Upper Gangetic Plains (7a) Biogeographic Province. The TR deserves far greater importance and inputs than is given at present. A precursor to such focused upgrading would be a well developed plan that is based on a systematic study of the conservation requirements of contained biodiversity and other natural features, an assessment of current and future threats and problems. This would have species specific management plans and also take a thematic approach to addressing threats and problems. It would have clear and measurable steps for achieving these objectives and have a systematic monitoring process. The TR needs to engage local communities more effectively and ensure that local

communities derive significant value from its presence. Although this may mean upgrading tourism it still needs to be done. Given the low tourist inflow and the limited private facilities (relative to some other TRs) it is best that growth in tourism is channelized through community based tourism rather than through private enterprise. Human-wildlife conflict in this TR comes from multiple sources and as such the TR can develop strategies to address these problems and these can then be suitably adapted to other PAs and TRs. The porous international border creates a special and serious protection problem. It would require increased man-power and infrastructure along with a multi-agency approach and political support to secure this border. The TR needs to generate public and political support to ensure that its values are not undermined and that it get the resources and support needed to make it one of the best TRs in the country. Like Corbett TR, Dudhwa TR too cannot be viewed as just another TR and it needs to be a trend setter and not competing with the overall TRs in the country.

## **Ranthambore Tiger Reserve**

### **Strengths**

This TR has an extremely good protection strategy that involves multiple departments. This TR is one of the few in the country that has engaged the other line departments in a significant way in supporting the functioning and management of threats to the TR. The response of the Revenue and Police Departments is very good and beneficial to the TR. NGO support and involvement with the TR is good. The lessons learned from experimental

translocation of tigers from this TR to Sariska TR will form the basis of meta-population management in future for all such insular TRs. It also has a very high profile and attracts a lot of tourists and this can be leverage to generate support for the TR and also generate significant revenue to the local communities. Local people are already benefiting and supportive of the TR. But there is a need to move towards community based ecotourism and ensure that private enterprise does not siphon off the bulk of the tourism revenues. Wildlife populations are doing well. Staff have significant training in wildlife management. Tourism is almost entirely managed by private and community based facilities and this leaves the TR staff free for protection and management duties.

### **Weaknesses**

The TR is largely a habitat island with limited potential for connectivity to a larger landscape. As this TR largely represents an insular population it may not be able to support a genetically viable population suitable for long-term conservation. It will have to be managed as meta-population in conjunction with other such areas. There are a large number of settlements within the core and these along with villages on the periphery exert a lot of biotic pressure on the TR and also require significant protection inputs and resources from the TR to contain them.

### **Actionable Points**

- The landscape is largely a habitat island with very limited connectivity. And there are a large number of villages in the Core area which exert huge

cattle grazing pressures on the TR. Resettlement of villages will secure undisturbed habitat within the TR.

- Anthropogenic pressure from settlements within the TR and from the surrounding villages is a significant management problem and needs to be resolved on a lasting basis.
- Human-wildlife conflict is an issue and needs to be addressed.
- There is scope for increased community participation and sharing in tourism based revenues.

Ranthambhore TR has a high profile and is a major tourist destination. The TR has leveraged this position to generate significant public and government support for its management. The TR is largely a habitat island and at the landscape level this area cannot independently support tiger populations that can be considered genetically viable in the long term. As such the TR needs to be optimized for supporting the largest tiger possible by shifting settlements out of the core and buffer and also significantly reducing anthropogenic pressures. The TR is planning this and the plans would be better served if they tie in with generating alternate income for local communities. This can be done through EDCs which have already been formed but there is significant scope for improvement in this area. Also the park can work towards ensuring that community based tourism receives a greater share of the huge income that is going to private enterprises.

Communities need to be more direct beneficiaries from tourism. The other aspect that needs looking into is the option of using meta-population management for the smaller TRs. And a positive step in this direction has been taken in this TR which is now sending tigers to Sariska TR. While this is an attempt at reintroduction of tigers it still provides an insight into operations that would look at shifting tigers into habitats which already have these big cats. Human-wildlife conflict also needs to be addressed in a more comprehensive manner to generate local support for conservation among the affected communities. As these TRs have been facing significant poaching pressures in the past, vigilance will have to be sustained without allow for complacency (now that tiger numbers have increased) to ensure that poaching does not take roots here again. Many TRs have been going through ups and downs in population and this shows tightening and loosening of protection. Such cycles should be broken by ensuring that complacency does not set in.

## **Sariska Tiger Reserve**

### **Strengths**

The TR has a window of time in which it will remain in the forefront of conservation effort due the loss and subsequent reintroduction of tigers. It needs to leverage this period to optimize all aspects of management including resettlement of villages, regulation of anthropogenic pressures, engaging the local communities effectively through EDCs and bringing in quality science based conservation planning. This window will not remain open indefinitely and the present

political will to bring about change will give way to complacency and apathy. The biological value of the TR is a significant strength as we do not have significant areas of this within our PA network and thus the effective functioning of this PA becomes critical to conservation. The TR staff are not involved in tourism directly and as such they are focused on protection and management.

### **Weaknesses**

The TR is highly fragmented and extremely poorly shaped which ensures that the bulk of the TR is exposed to anthropogenic pressures as no area is far from human settlements and disturbances. The large number of settlements in the core area and the roads that cut through the TR add significantly to the problem. Religious tourism adds to the problem. Cattle grazing is widespread and with the problem of fires during the dry season. There is mining activity just outside the TR. Weeds are becoming a serious problem in the grassland areas which are used by herbivores for grazing. The TR has not engaged the local communities and monitoring of human-wildlife conflict is poor. So communities do not see value in the TR and only see it as a liability due to the restrictions it imposes on them and also due to the human-wildlife conflicts. Public participation and improvement of livelihood through EDCs is minimal so there is not much support for conservation despite local communities not having adverse views towards wildlife in general. There are limited trained (wildlife) staff and also a shortage of staff. Despite its high profile (earlier) the TR has failed to leverage

this to its advantage, Wildlife Institute of India conducts regular training programs in this TR for the trainees who attend various courses. They carry out field exercises which could have easily been turned into monitoring exercise over the years but this has not been done nor has the presence of WII been used effectively in research or the existing research material used for planning. The TR is a classic example of what complacency and absence of effective monitoring can do.

### **Actionable Points**

- There is a need to rationalize the TR boundaries so that fringe projections which do not really support wildlife due to their poor shape and exposure to disturbance should be eliminated from the TR as they take disproportionately greater resources and time to protect and manage than the main tiger habitat. They will also be sources for serious conflict for the surrounding communities.
- There are a huge number of settlements, people and cattle in the TR exerting very serious pressure on the habitat; resettlement will be a challenge especially as land prices are high and not all people seem to see value in it. Containing anthropogenic pressures will also be a serious challenge and needs significant inputs and proactive approach from the TR.
- Weeds are becoming a serious problem and need to be addressed if grazing areas are to be maintained. Lantana is only just beginning to spread in a few

areas and it is best to curb its spread at this stage.

- The TR needs significant improvement in its habitat (removal of anthropogenic pressures and weeds) if it is to support a good tiger population. This is essential as the TR is insular and in the long-term would need to be managed as a part of a meta-population.
- Poaching was the reason for the local extinction of tigers and although the protection has been significantly improved there is a need to further strengthen this effort as other problems like grazing still remain and need to be regulated. There is a need to increase staff strength, capacity and infrastructure.

Sariska TR needs to move rapidly towards improvement when the political will is there to support it. The attention given to the TCP and the follow up actions do not indicate an approach geared towards leveraging the present advantage. While the focus has been on hard patrolling, other aspects of management have taken a backseat. The most important component, i.e. engaging local communities effectively has not been done. The one village we were taken to did not recognize the TR officers and staff and also pointed to the significant cattle lifting problem by the reintroduced tiger (which was not recorded by the TR as it was apparently happening outside the TR). Given the scale of resettlement and stoppage of other anthropogenic pressures needed

there is a need for dedicated staff with suitable capacity and a dedicated effort to engage the people effectively and bring about the changes needed. Significant emphasis needs to be put on reducing anthropogenic pressures and also containing weeds. Staff strength and capacity are a severe limiting factor and these needs to be rectified. WII is a major player in this TR and its interaction with the TR in terms of data for planning and monitoring of the TR seems very limited. There is great opportunity to induct a systematic data collection and monitoring process through the WII and its various training programs that are run in this TR. The present expansion of the TR seem based on including all connected land into the TR with the objective of increasing the net area of the TR. Several such inclusions do not make conservation sense as they represent narrow peninsular like projections from the TR into a sea of human habitations. These areas are exposed to degradation and disturbance which will be hard to contain given this narrow width. At the same time these areas will be the source of significant human-wildlife conflict. A restructuring or rationalizing of the TR boundary would be in order here so as to channelize staff and resources to the more conservable areas in the TR. There is a need to accelerate the tiger reintroduction process and back it with a more systematic and effective compensation scheme and also ensure that proactive interventions take place when these tigers move outside the TR or come into conflict with local communities.



## Melghat Tiger Reserve

### Strengths

This is a large TR and has great potential for long-term conservation of tigers. The protection mechanism has been revamped and is very systematic despite shortage of trained and good staff; management has motivated and got the staff organized into an effective patrolling unit. This needs to be continued and supplemented. Villages within the core are willing to resettle outside. The park has significant reasonable support and this can be further enhanced with increased interaction with local people and through improved tourism. The TR is (in the process) handing over tourism management to the communities and this will significantly help in improving livelihoods and thus increasing public support. This will also allow departmental staff to focus on protection and management (instead of running tourist facilities). Malnutrition deaths in the largely tribal area have generated significant government funding of tribal schemes thus making them less dependent on the TR. This is an opportunity for the TR to provide guidance which will make them independent of the TR and also have back up plans if such schemes are withdrawn by the government.

### Weaknesses

There are a large number of villages in the TR and these need to be resettled so as to reduce biotic pressure. The road network within the TR will see reduced traffic if the villages are resettled outside the park. However there will be some traffic as these roads also connect areas outside the TR and there will have to be additional mitigation efforts to ensure that these roads do not form a serious threat to the TR. Inadequate

staff strength and lack of wildlife training are a problem. Due to difficult terrain and living conditions staff do not opt for this posting and when posted they tend to go on leave. Human-wildlife conflict is a significant problem and needs to be addressed effectively.

### Actionable Points

- Resettlement of villages from the core will be critical as these village areas have the potential of becoming excellent habitats for herbivores and will significantly increase the carrying capacity of the TR.
- There is a need to improve staff strength and capacity; there is also a need for upgrading and increasing infrastructure for improved protection (which is already good) and management. The terrain and living conditions make this area a very difficult place to patrol and also live in. As such special funding is needed to give extra incentives to staff, improve living conditions for the staff and their families, bring in extra staff to allow adequate rest for frontline staff through a quick rotation of field shifts.
- Human wildlife conflict needs to be addressed in an effective manner.
- Continue with the engagement of local communities in protection and tourism which will generate greater support for the TR.
- Research is supported and several studies have been conducted in this TR and this

trend needs to be continued and more research and monitoring encouraged.

- A quality TCP needs to be upgraded so that more effective and adaptive management with adequate monitoring can be implemented.

At the onset it would be important to mention that despite lack of formal training in wildlife management the officers of the TR were a very good example of quality needed to manage and protect a TR. Given all the staff constraints (aged, untrained, understaffed and people going on leave) protection had not suffered as a very rigorous and systematic patrolling mechanism had been evolved and implemented.

Melghat TR has a large number of settlements within the core area and these are located in critical wildlife habitat areas. If resettled these areas will provide excellent habitat for wildlife and significantly enhance the carrying capacity. Resettlement would also reduce the human-wildlife conflict and give these communities better opportunities and access to mainstream society. The terrain and living conditions make serving in this area difficult and as such there is a need to overcome this problem through providing better incentives to staff if the area is to be effectively protected.

## **Pench (Maharashtra) Tiger Reserve**

### **Strengths**

There is only one village in the core area and there is very little direct anthropogenic pressure on the TR. Pench TR is largely enclosed in a large buffer and hence is quite well

protected. Pench is relatively free from weed but lantana is present and needs to be tackled when the problem is relatively small. This TR has connectivity to Pench TR in MP and onwards to Kanha TR so it exists in a relatively large tiger conservation landscape. The TR has already initiated efforts to shift management of tourism facilities to community based enterprise. This will positively engage the local communities and generate support for the TR and provide alternate income sources for the local communities.

### **Weaknesses**

The buffer area has a large number of villages and forests here are under tremendous anthropogenic pressures. There is human-wildlife conflict in the buffer but the TR is not addressing these at present as there is no clarity about management of the buffer. Staff strength is insufficient and needs to be augmented. Capacity building with a focus on wildlife protection and management is required urgently. At the landscape level there has been no serious attempt to identify corridors to the east (to the north it is secure) and this appears to be the most fragmented area.

### **Actionable Points**

- The single village in the core needs to be resettled immediately and options for shifting villages in the buffer (at least those close to the TR Core area) also need to be considered.
- There is an urgent need to increase staff strength, capacity and protection infrastructure. Vehicles for patrolling and other

activities are insufficient. There is also a need for other field equipment.

- Buffer area management needs to be planned well as there are significant problems in the buffer and these will require significant inputs (money and effort) if they are to be resolved and the buffer made suitable for conservation of tigers.
- There has been some past research in the TR and ideally the TR should encourage additional research that will support planning and monitoring of management inputs.
- There is a need to re-evaluate the corridors/connectivity to the east.

Pench TR (Maharashtra) is one of the few TRs that is largely insulated from the outside world. Protection is not a serious problem but needs to be enhanced taking into account the increasing demand for wildlife products. Anthropogenic pressures are minimal; other than the single village and the staff manning the dam and irrigation facilities there is not much human presence in the TR. The buffer areas take the brunt of the anthropogenic pressures with the large number of villages and their cattle and dependence of forests. Addressing these within the buffer will be a major challenge if the tigers range is to be effectively increased in this area. The TR even though small is directly connected to Pench TR in MP and from there onwards till Kanha TR (the intervening corridors need to be secured) hence it lies within a much

larger tiger conservation landscape. However, connectivity to the east to other forest patches is very fragile at best and only paper based and rudimentary assessments have been made of this connectivity. This needs to change and a thorough and practicable assessment needs to be done so that effective steps can be taken to secure it if needed. Despite the lack of trained wildlife managers the efforts made are very good and it would help significantly if capacity building is undertaken and additional staff and infrastructure are provided.

## **Sahayadri Tiger Reserve**

### **Strengths**

The TR has a large assemblage of flora and fauna of conservation interest and as such it makes a valuable addition to the TR network. This is a newly declared TR. A large number of villages (48) have been shifted out of the area when the dams for irrigation and hydro-electricity were built in this area. This TR has forest connectivity to Dandeli TR and further beyond all the way to the Nilgiri's Eastern Ghats Landscape (Mudumalai TR, Bandipur TR and many PAs). Much of the link is through the crest line forest and this connectivity needs to be maintained collectively by all TR and PAs in this large landscape.

### **Weaknesses**

There are 15 villages in the Core and additional anthropogenic pressure from the surrounding villages is also there. Mining outside the TR is a major source of disturbance and pollution to the TR. Setting up of windmills also damages the landscape. Malki lands (private forests) pose a special threat as the loss of these areas will cause disturbance to

those wildlife species still occupying these forests. There is felling in these Malki land. Kumri cultivation is another threat to the landscape. Staff strength and capacity is poor and needs to be strengthened urgently. There is some resentment towards the TR, apparently due to new regulations. However it is likely that the mining and windmills companies/agencies are primarily driving this agenda as the creation of a TR and its regulations are primarily affecting them and their plans to exploit this area.

### **Actionable Points**

- Notification of the Core and Buffer needs to be done at the earliest and a comprehensive TCP needs to be prepared.
- Resettlement of villages in the core needs to be addressed on a priority basis.
- Mitigating anthropogenic pressures from the surrounding villages needs to be planned for and handled sensitively as the local people are apprehensive about the TR.
- Awareness building, formation of EDCs, involving communities in ecotourism and other livelihood improvement activities should be taken on a priority basis so that local support for the TR is generated.
- Functioning of buffer areas needs to be clearly planned for and its implications and regulations clearly explained to communities so that there are no misunderstandings or misguided apprehensions.
- Mining close to the TR is a major

source of disturbance to the park. Suitable Ecologically Sensitive Area (ESA) should be demarcated around the TR so that these activities are contained beyond that zone. In addition, windmills pose a new threat.

- Tree felling in Malki lands (private forest) reduces habitat and also generates disturbance, In addition wood from this area can help facilitate illegal felling in the RFs and TR. Illegal removal of medicinal plants also poses a problem.
- Staff strength (including capacity) and infrastructure are inadequate and need to be augmented urgently.

This newly established TR needs to get all the notifications done in quick time. There is also need for establishing a good awareness campaign (not just posters) and participatory approach with local communities as they are generally misled about how the regulations affect them. Vested interests (mining, industry, illegal encroachers, exploiters, etc) have a field day in misleading local communities in the total absence of the effective engagement of these communities by the Forest Department. This TR has huge potential but is also beset with significant problems that would require quality staff and resources to manage them. The TCP needs to start at the grassroots by seeking inputs from research (funded by the TR if necessary) so that a clear plan of operation is established and has clear goals and measurable targets to determine progress and also

help take an adaptive approach through monitoring of impact of management actions. Given the huge conservation landscape that stretches across four States (Maharashtra, Karnataka, Tamil Nadu and Kerala) there is a need for a higher level planning to ensure that the connectivity within this landscape is not broken. Resettlement needs to be handled very delicately and only after all the communities have fully understood its functions and also their own value or benefit in it. The concept of buffer also needs to be clearly understood by local communities as there are a lot of misconceptions about it even in well established TRs and there is ample scope for vested interests to misguide local people especially in the absence of the TR taking proactive and effective communication with the local communities. Human-wildlife conflict will need to be addressed in an effective manner from the start if support for the TR is to be generated. Ecotourism involving local communities (entirely) should be taken up as a priority as this will generate meaningful revenue for them and show them that there are tangible benefits. Issues like tree felling in Malki lands need to be addressed at the state level as it may be difficult to address these state wide problems in a piecemeal manner around the TR. Given the huge developmental and infrastructural plans for the Western Ghats in Maharashtra it will be important that any regulatory mechanisms and reservation that the TR has on development in its area of influence are backed by adequate data. For this effective research will be needed within and around the TR. It would also require the TCP to be proactive and identify all proposed

developments in the area around the TR and assess their impacts so that suitable and effective recommendations can be made. This area also happens to be one where law enforcement has been undermined in the past and it would require quality staff to bring back effective protection.

## **Tadoba-Andhari Tiger Reserve**

### **Strengths**

This is a large TR with a significant tiger and other wildlife populations and still has some fragile connectivity with additional habitats. The various forest divisions around this TR function in a complementary manner to the TR (with a focus on conservation) and this supports the TR significantly. Tourism is increasingly (and significantly) directed through the community run facilities (established by the TR with state funding) and this reduces the burden of managing tourism on the TR staff who are then able to attend to protection and management duties. This is also generating significant support for the TR from the local communities and is helping to reduce the adverse impact of high level of human-wildlife conflict. NGOs actively support this TR and there has been a fair amount of research in this TR. Weeds are not a serious problem and the natural forests are very good representatives of their biome and show good regeneration.

### **Weaknesses**

There are several villages in the core of the TR and these exert significant biotic pressure on the TR. Bamboo removal by these communities and some of those outside also cause significant



disturbance. The corridors connecting this TR with other habitats are under significant pressure from mining and development. These activities are also threatening to make this TR and insular population and are also causing disturbance all around the TR. This is resulting in creation of fragmented landscape around the TR which then becomes the base for very severe human-tiger conflict when tigers disperse from this TR into the fragmented landscape around it. Other than ecotourism there is little inputs by the TR in providing or facilitating alternate sources of income for the forest dependent communities. Communities in and around the TR are not fully engaged by the TR through awareness and systematic and regular interactions, this is critical in a high conflict area.

### **Actionable Points**

- Resettlement needs to be accelerated as there is threat of this TR getting isolated from the additional habitat patches outside the TR.
- There is a severe shortage of wildlife trained staff and vehicles this needs to be rectified. Additional infrastructure to support protection and management is also needed in this TR.
- More attention is needed to ensure that the fragile corridors are secured before they are broken altogether.
- There is a need to engage the local communities more proactively and to provide or facilitate alternate sources of

income to forest dependent people.

- More research is needed to understand the human impacts on this TR as these range from grazing and bamboo cutting to mining and developmental works. Good data would be needed to support any conservation claims made by the TR especially when it comes to regulating community rights and developmental work around the TR.
- There is a need for an upgraded TCP that addresses all these issue in a systematic and measurable manner.

Tadoba-Andhari TR is one of the better managed TR's in the country. It supports a large population of tigers and prey. The forests retain a large part of their natural structure and are not weed infested like many other PAs. However, this TR is surrounded by human settlements, mining and developmental schemes which are seriously threatening to isolate it from the rest of the landscape. Unless these fragile corridors are effectively secured this TR will become insular. The healthy tiger population is also causing significant problems as there is regular and significant dispersal of tigers out of the TR and they come into severe conflict with humans when they enter the fragmented landscape outside the TR. The active involvement of the various territorial forest divisions in working with the TR significantly helps to reduce problems. But unless corridors are secured and habitat loss/degradation stopped outside the TR these conflicts will only continue to

escalate. What is urgently needed is a comprehensive study on connectivity and conflict which can provide hard data not only on identifying processes to halt this deterioration but can also justify any regulatory action needed to stop such detrimental activity. Poaching is minimized but the current inadequate staff strength may not be able to hold up if there is a serious outbreak of poaching. The resettlement of villages is urgently needed and the

TR needs to take proactive steps to engage local communities and also provide them alternate sources of income or facilitate such action. Although the TR is engaged in a limited way in such activity, it needs to be stepped up significantly given the scale of human wildlife conflict and also the wide array of threats faced by the TR.

## **4.2 Cluster-II (Bandhavgarh, Bori-Satpura, Kanha, Panna, Pench, Sanjay National Park)**

### **Introduction**

To elicit information and data from each of the tiger reserves IUCN-WCPA Framework was used. The response was varied in details. Most information was in the language of the State therefore the fastest means of using soft copies in all matters of query was not readily available. So there has been some constraint although several hard copies were also made available. Various documents including management plans, TCP/ indicative TCP as available were reviewed; (ii) In the matter of funding the sources, mechanisms of release of funds, time taken to reach the field and whether the funds were adequate in meeting the most important management objectives were considered; (iii) Discussions were held with the Field Directors (FD), the team of officers and staff in the field as the opportunities arose; (iv) Extensive traverse of the core, buffer and portions of the surrounds were undertaken. In a few cases sections of some of the corridors were visited; (v) Interactions with local communities in some of the villages from those ready for relocation, those that have been relocated and others were held and ecodevelopment work and livelihood support activities were seen; (vi) To gauge the quality of protection patrolling camps, beats,

barriers, watch towers were visited and equipment, mobility, communication efficiency, facilities and amenities to field personnel were looked into along with the security plans and other documentation; (vii) Visits to sites to assess habitat management practices, experiments and innovations and other practices were undertaken; (viii) Opportunistic sightings of wild animals, sex and age classes, group size and activities along side tracks and signs were observed and diverse plant community sites were visited.

### **1. Whether approaches in Tiger Reserve Management are sound, adequate and appropriate**

The approaches are sound, adequate and relevant. Whatever resources were available to the FDs are being put to best use. There is a strong evidence of long term vision and planning. All TRs have management plans. Except Pench and Satpura TRs, TCPs were under preparation in four reserves following submission of indicative TCPs. Obviously TCPs are a key to effective management. We are not aware of the process to vet these but would like to stress that these need to be seen in all their details to ensure uniformity of quality and relevance.

### **2. Funds allocated are being used effectively for meeting the objectives of management of Tiger Reserves as laid down in the respective Tiger Conservation Plans/Management Plans.**

For annual requirement APOs based on plans drive the funding demand. Funding for the forestry/wildlife management sector is never fully adequate but as compared to the past

the enhanced outlays provided by the NTCA are surely making a difference. The allocated funds are used to meet all the principal objectives of management. Fund flow from NTCA to the State is timely except for the year 2009-10 when this was delayed owing to late signing of the tripartite agreement. The State releases the funds every quarter when the amounts appear on the server of the treasury that includes the additional matching grants of the State. Then onward there is some delay in the funds reaching the field. It needs some follow up efforts to get the funds moving to the field. If for any reasons the State matching grants are delayed then the central funds are also held up. This affects the quantum of utilization of funds that varies from reserve to reserve and from year to year.

### **3. Process and Outcomes of long-term monitoring of the biological and socio-cultural resources of Tiger Reserves and the impact of management on local communities**

Among the six tiger reserves, Kanha TR, one of the finest reserves in the country has an advantage of strong management investments over the last 37 years in the status of a tiger reserve, while the Sanjay TR is in its infancy with just four years of existence as a tiger reserve. Panna TR lost all of its tigers a couple of years ago but outstanding leadership has firmly placed it on the path of excellent recovery. The overall results are therefore widely varied. All TRs have a strong system of biological monitoring rooted in the smallest unit of administration i.e. the beat that is strongly supported by the network of patrolling camps. Thus data on plant phenology, wildlife populations by

species, age and sex classes, group size, health indicators, activities and behaviour are strong. There is further information by tracks and signs. Most reserves have a network of PIPs that have code numbers and geographic coordinates to facilitate mapping. There are modern gadgets in use such as Personal Digital Assistants (PDAs), cameras, compasses and binoculars. Documentation, summaries and maps prepared on monthly, seasonal and annual basis provide an excellent handle on plant and animal status. However, there are problems in analysis, data cannot be related to population estimates but provides a measure of abundance and geographical distribution that serves as an effective biological pulse.

The system relies on the once in four year cycle of assessment of tigers, co-predators and prey undertaken by NTCA-WII and has dropped the annual exercise of population assessment on the steam of the TRs which is not desirable for more reasons than one. The TR does not work out its own estimates and the field staff is missing its learning opportunities as well as is at a risk of losing its field skills. The system needs to come back on the original track.

Monitoring the socio-cultural resources cannot said to be equally strong. In fact viewing current practices all over the country, there is no institutionalized system to monitor these aspects on a regular basis. There however are mechanisms via micro plans (where in existence), their progress and outcomes, interactions with and participation of villagers, the working of and support to EDCs, gram panchayats to monitor the socio-cultural resources.

All TRs are making use of these. We did not encounter any lack of support to the TR from local communities. The readiness of people in general to the idea of relocation of villages from the cores is a testament to the quantum change in the trust of local communities now being seen vested in the TR management. This is further supported by the expeditious disposal of complaints, settling *ex-gratia* payments concerning conflicts with wild animals, generating significant local employment and undertaking village development work.

While on the subject, it is necessary to consider the shortage of field personnel, in some cases unrealistic size of management units such as beats, rounds, ranges; inadequate training to frontline staff, inadequate logistics and infrastructure. The results of the above question need to be seen in context of the ground situation and what support the FDs have to make do with rather than what is ideal. We have considered these aspects and believe that the process and outcomes of long-term monitoring of the biological and socio-cultural resources of Tiger Reserves and the impact of management on local communities has been very good. All threats have been successfully addressed and contained. There is every effort to dismantle the edifice of adversity. Only that this does not happen in short order. This statement is further qualified by the status of two reserves that are special cases. Sanjay TR is a new TR, additionally we believe that it has had a history of some neglect and long term wide spread low intensity poaching. To be fair, we have no such documentary evidence for these two aspects but

given the abundance of tigers and other large mammals in recent past, at least till the late 1950s, there can only be these two possible conclusions for the current very low population of all wild animals and occasional presence of tigers, though on the bright side, the capital of habitats is excellent in the Sanjay national park and very good in portions of Dubari WLS. Secondly, there is the matter of the local extinction of tigers in Panna TR. After the re- introduction of tigers the reserve exhibits all the evidence of excellence. We believe that the dark shadow of tiger extinction ought not to be allowed to take away the credit of the last year and a half which has been a very steep but a successful climb.

## **Pench Tiger Reserve, Madhya Pradesh**

### **Strengths**

- **Protection:** comprehensive security plan. 46 patrolling camps and many temporary. Mobile surveillance units, foot and vehicular patrolling and schedules, joint patrolling with Pench (MS). Under the scanner are known offenders by *modus operandi*, other suspects, dog owners, fishermen, markets, festivals, local eateries, butcheries and deras; bus stands, railway stations, trucks and buses, foot paths, tracks, trails and roads, water ways, water holes, natural salt licks, cliffs and heronries, power lines, a network of informers, tracking court cases, strong documentation and follow up
- **Monitoring:** regimented records at beat level about plants of



conservation importance, phenology, wildlife sightings by species, sex and age classes, health status, group size, activities and events, tracks and signs, a network of coded PIPs with coordinates. Tigers monitored by pugmarks every day. Weekly, monthly and annual summaries, species distribution maps

- **Critical core:** free of habitations
- **Buffer zone:** excellent habitats, rapport with territorial divisions, supportive working plans
- **Habitats:** vegetation restoration strategies, soil and water conservation

#### Weaknesses

- **Frontline:** shortage of personnel- 14 forest guards and 6 foresters for the critical core. Majority not trained in wildlife management
- **Buffer zone:** not under the administrative control of the Field Director
- **Buffer zone:** has 107 villages, resources for ecodevelopment uncertain.
- **Crop damage:** complaints are recorded, investigated and compensation ordered by the revenue department which for them is not a priority resulting in disenchantment
- **Inter state coordination MP and Maharashtra:** needs formal strong support for patrolling and crime control

## Kanha Tiger Reserve

### Strengths

- **Protection:** A formal security plan. 118 patrolling camps in the critical core, 44 in the buffer, 10 in Phen and many seasonal temporary camps. Resolute protection and enforcement on lines described for Pench TR. All 12 ranges connected on wireless and excellent mobility.
- **Monitoring:** plants of conservation importance, wild animal populations by species on a regimented framework as described for Pench TR and monitoring change in vegetation (60 plots of 1 ha each). Tigers monitored every day by pugmarks.
- **Barasingha:** Day to day monitoring of the barasingha population across all grasslands by sex and age classes, health indicators, natality, mortality and survivorship, activities and events. Herds have returned to Kanha meadows after several years and have occupied all grasslands in Supkhar.
- **Barasingha breeding enclosure:** Old enclosure increased thrice the size to support growth of the population. Excellent initiative based on ecological tenets
- **Habitats:** weed control in woodlands and grasslands, management of water resources, restoration strategies for grasslands, use of prescribed burning

- **Kanha-Pench landscape and corridors:** excellent work in identification of assets, liabilities and opportunities with mapping. A WPO is appointed for the planning task
- **A will to experiment:** two tigresses being brought up in a large enclosure in as natural environment as possible.
- **Contribution:** reintroduction of gaur in Bandhavgarh TR

### Weaknesses

- **Critical core:** there still are 8 villages inside. Assured funding on a fast track needed for those willing for relocation.
- **Large volume tourism and stranglehold of resorts:** the former is inherited from the past. The year 2006 onward the annual visitor numbers are > 100,000. The mushrooming of resorts are quickly closing dispersal routes of the tiger, the gravest threat to the landscape and corridor planning.
- **Degrading grasslands:** The bastion of barasingha, Sonf and Rondha grasslands are of concern. Tall grass patches are reducing, reduction of palatable grasses weeds are increasing which are signatures of regression.
- **Conflicts:** complaints about crop depredation, investigation and award of compensation are through the revenue department for whom it is not a priority. The resulting disenchantment of people is a threat.

- **Buffer zone:** there are 150 villages in the buffer, the EDCs are active but for ecodevelopment activities strong support of resources is needed. Appropriate areas need to be covered under the provisions of eco-sensitive zone

## Bandhavgarh Tiger Reserve

### Strengths

- **Protection:** 92 patrolling camps, 42 barriers, 20 fixed wireless stations, 39 on vehicles, 314 hand held sets. Strategies as mentioned for Pench TR. 108 km of perimeter abutting villages and extensive non forest area chain link fenced
- **Monitoring:** plants and animal species as mentioned for Pench TR. Tigers monitored on every day basis through camps, beats and pugmarks on a network of PIPs. Prey species by 66 transects. Genotyping of tigers by scats.
- **Habitats:** control of weeds, soil, moisture and water conservation, prescribed burning in grasslands on a cycle of 3-4 years.
- **Conflict:** *ex-gratia* payment for human injuries, loss of life and livestock kills settled promptly.
- **Garnering support of NGOs:** At least 20 organizations. 4WD vehicles, an ambulance, motorcycles, bicycles, wind cheaters, caps, water bottles, binoculars, jackets, shoes, mobiles, battery chargers, solar lights, water filters, mosquito nets, tranquilizing equipment, wireless hand sets, ecodevelopment and nature awareness activities.

- **Initiative:** two sets of orphaned tiger cubs being raised in large enclosures in as natural environment as possible. Also getting ready for gaur reintroduction.

### Weaknesses

- **Buffer zone:** not under the administrative control of the Field Director
- **Visitor pressure and obstructive resorts:** annual visitor numbers since 2008 are exceeding 100000. A ring of resorts around the reserve is a threat to tiger dispersal opportunities and a source of conflicts.
- **Shortage of working strength:** 33 forest guards and 10 mahawats
- **Crop damage:** complaints have to be recorded with revenue department that investigates and decides on compensation. Not their priority. Leads to disenchantment
- **Critical core:** 14 villages are located inside the core

## Sanjay Tiger Reserve

### Strengths

- **Habitat:** The Sanjay national park area has excellent habitats as good as any that exist. Some very good patches in the Dubari sanctuary area. Excellent riparian habitats and network of streams. Weed control, husbanding sources of water, maintaining moist patches, creating very good grassland patches.

- **Monitoring:** by the regimented protocol - plants of conservation importance, phenology, wildlife populations by species, sex and age classes, group size, health status, tracks and signs at beat level. Documentation as prescribed and summaries.

- **Conflicts:** Injuries to humans, loss of life, injuries to and death of livestock due to attacks of wildlife settled promptly
- **Caring for communities:** eliciting participation, livestock immunization, wells, ponds and stop dams, health camps
- **Protection:** given the limited infrastructure and resources best possible efforts are made.

### Weaknesses

- **New Reserve (2006):** plans and strategies will need time to take off the ground.
- **Status of tiger and prey population:** prey population is very low even in the extensive excellent habitats. Since the year 2000, tiger population is recorded between 6 and 7. We saw pugmarks at two places widely separated, a female and a male as floaters.
- **Critical Core:** Notification is awaited. 47 villages in the proposed area, >30000 people and > 40000 livestock. Important actions about engaging villages in dialogue for voluntary relocation cannot be undertaken, yet tactful efforts are being made in anticipation.

- **Short on frontline working strength:** 18 forest guards, 10 foresters and 3 RFOs. Lack of wildlife training.
- **Inadequate infrastructure and resources:** two 4 WD vehicles among 7 RFOs, 11 motorcycles among 19 foresters. Binoculars, cameras, GPS pitifully few. 16 wireless stations, 7 on vehicles, 60 hand held sets are inadequate. There are 4 permanent patrolling camps thus far, need a whole lot more. Protection as the prime agenda. Need of *de novo* assessment for realistic sizes of management units and working strength.
- **Cross border cooperation:** The Guru Ghasidas national park in Chattisgarh is a continuum. Strong formal management cooperation and network at all levels needed.
- **Crop damage:** the revenue department in charge of receiving complaints, investigation and settlement of compensation. This is not their priority.

## Satpura Tiger Reserve

### Strengths

- **Protection:** 120 patrolling camps, water beats, active strike force, well equipped beats/camps and personnel. 87 wireless stations, 19 on vehicles, 182 hand held sets, 129 PDAs, 118 binoculars, 50 cameras, 58 cell phones. High rate (90%) of offence case disposal.
- **Habitats:** remarkable diversity and richness, effective weed control, excellent efforts for soil and

moisture conservation, husbanding sources of water, management of grasslands on relocated village sites, management of wetlands

- **Monitoring:** system as described and followed in Pench TR. Remarkable recovery of wildlife over the last 25 years. Tiger signs over extensive tracts.
- **Caring for communities:** includes hand pumps, bunding and leveling of fields, approach roads, village roads and culverts, wells and irrigation facilities, school buildings, community halls, PHCs, chain link fencing over 49 km to protect crops and to prevent other conflicts. Excellent rapport with local communities.
- **Conflicts:** expeditious disposal of man- animal conflicts
- **Relocation of villages:** under the new dispensation Bori is probably the finest example of resettlement in the country.

### Weaknesses

- **Critical core:** 38 villages inside. Majority are willing for relocation including the formerly hostile gaoli community. 11302 people and 3858 families. Current estimate Rs. 385.8 crore.
- **Frontline working strength:** short of 74 forest guards, 10 foresters and 2 RFOs. Much of the area is extremely hilly. Need for *de novo* assessment for reducing management unit sizes-beats, circles, ranges
- **Mobility:** RFO upward there is need for twenty 4 WD vehicles, only 12

available. Between 72 deputy rangers and foresters only 35 motorcycles. Circles in difficult terrain will need 4 WD vehicles

- **Staff training:** falls much short for the frontline
- **Crop damage:** system handled by revenue department entails significant delays.

## Panna Tiger Reserve

### Strengths

- **Monitoring reintroduced tigers:** a remarkable system based on singular example of leadership, institutionalized inclusive protocol (24X7), procedures, care, communication, documentation, analysis and reporting. Successful breeding, 5 cubs.
- **Monitoring other species:** protocols and procedures as described for Pench TR. Special efforts on vulture (6 species) roosting/breeding sites.
- **Protection:** 27 patrolling camps, 42 FG nakas, 17 barriers, 8 watch towers, 23 wireless stations, 201 hand held sets. Patrolling and protection system as described for Pench TR. Greater emphasis on the sensitive southern areas.
- **Voluntary village relocation:** Of the 16 villages in the critical core, 12 have already been relocated; the last in Panna district is ready to move. Three in Chattarpur district remain. Plan and estimates with NTCA.
- **Habitats:** weed control, grassland

management on relocated village sites, soil and moisture conservation, prescribed cool burning, husbanding sources of water

- **Care for local communities:** Livelihood support and ecodevelopment plan for the surrounding 95 villages under the 'Integrated Development of Bundelkhand Region' project at estimated cost Rs. 90.7 crore ready. 3,60,000 man days of annual employment generated.
- **Nature education:** programme for children from local villages.

### Weaknesses

- **Extinction of all tigers by 2009**
- **Buffer zone:** notification awaited
- **Difficult surrounds:** high density firearms bearing communities with traditions and proclivities for hunting. Number of villages populated by Pardhis known for poaching activities. Reassessment of sizes of beats, circles, ranges, frontline working strength, infrastructure and logistics needs working out and sustained support for livelihoods and ecodevelopment within proposed buffer. Strong working arrangements with district administration and police.
- **Mobility:** considering a vehicle each for all officers RFOs and above and 6 vehicles for patrolling, twenty four 4 WD vehicles needed as against 11 available. Need motorboats for patrolling Ken River (5 long stretches) and tributaries.



- **Communication:** Of the 99 wireless sets meant for patrolling camps and nakas only 56 are functional. Of the 331 hand held sets only 201 are functional.
- **Working strength:** shortage of 22 forest guards including 17 beats are short so are all 4 positions of mahawats and 5 out of 6 chara cutters. Given the requirement of protection and monitoring these are critical.
- **Further reintroduction of tigers:** Five cubs (a male and a female 8.5 month old each, and three 3 month old each, sex unknown) are growing with one adult male and two females. Matter needs considered thinking

#### **Immediate points of actions**

- **Landscapes and corridors:** Landscapes have been identified between Kanha and Pench (MP and MS); Satpura and Melghat; Panna-Bandhavgarh-Sanjay and Guru Ghasidas NP (Chhattisgarh); the information and data varies in strength. (i) Need fine level data and interstate agreements and mechanisms; (ii) within states mechanisms to integrate land uses with habitat integrity as the common frame of reference; (iii) application of eco sensitive zones; (iv) Corridors as legal entities?; (v) Some legal route to rein in the uncontrolled development of resorts; (vi) security for all tiger potential habitats, by Ranges and Territorial divisions. There is a steering committee but it will not be effective without mechanisms.
- **CAMPA:** The guideline for State CAMPA has ecological concerns as one of the considerations. State 'priorities' are ignoring this. Amendment is needed e.g. 35% of the kitty for conservation of wildlife habitats and wild populations. What these are may have to be spelled out.
- **Buffer zones:** the objective is to manage these for people's visible benefits which are the key to the success for conservation. There are large numbers of villages in the buffers. TCP has internalized this concern and Tiger Conservation Foundation is meant to raise resources but will this be enough? Mechanisms to prioritize the concern under District Plans by making 'security of ecosystems' a mandatory frame of reference for all departments. Programmes can be turned around without threat to individual turfs.
- **Resurrecting the position of 'Research Officer':** (i) an exclusive person with a small technical team is needed; (ii) This team is also needed to assist the FD in the office for all technical matters and correspondence. At least one person for this. English has to be the medium of communication since this is also a national and international project.
- **Population estimation:** Needs to be done every year. There is more than one reason for this.
- **Monitoring change in vegetation:** Sykes and Horrill model needs to be continued.
- **Active restoration of habitats:** Need for going beyond weed control.

- **Support from NGOs:** there is some excellent support from NGOs in terms of field vehicles (4WD, pick ups, motor cycles, and bicycles), communication equipment, support to patrolling camps/beats like solar powered lights, water filters, camp cots, mosquito nets, jackets, caps, boots, storage facilities, LPG

connections. There are NGOs helping with support to local communities etc. But these are mostly to TRs that are better known. There needs to be further outreach to enlist their support over a broad front and the FD alone cannot do this.

### **4.3 Cluster-III (Valmiki, Indravati, Achanakmar, Udanti-Sitanadi, Simlipal, Satkosia Gorge, Nagarjunsagar- Srisailem, Palamau)**

#### **Introduction**

A unique but unfortunate characteristic of Cluster III is that it falls in the 'red corridor', with some of the reserves either currently under siege by naxals i.e. Indravati and Palamau; or Udanti-Sitanadi, which has deteriorated sharply in the past year or two. Simlipal saw 25 simultaneous attacks in March 2009, and is gradually recovering, as is Nagarjunsagar Srisailem which was under the grip of naxalism for 16 years, but has shown remarkable recovery since.

These reserves must be viewed through the prism of Left Wing Extremism (LWE) which cripples every aspect of management be it protection, monitoring, habitat intervention or relations with the local communities. The reserves cannot be measured in the same perspective as one would measure other 'normal' reserves. They come from a different planet! There are no arms, no infrastructure, no communications in LWE-impacted areas. Though the forest department is apparently not the direct target, there has been tragic loss of life due to naxal attacks, and the impact goes beyond the tangible, impacting the psyche and morale of the staff who work in an

atmosphere of fear and under trying conditions. If there is an effort to protect or have anti-poaching camps in the core in the face of LWE, the effort is *much* more appreciable. The forest staff in these areas are especially vulnerable as they may be only visible government machinery in remote areas. They must be allowed and supported in their task which is the protection and conservation of ecosystem services, crucial to our very survival. A special risk allowance for staff working in LWE areas is also recommended.

What must also be said here is that not all ills can be blamed on LWE. It is not LWE that led to the abysmal situation in Udanti-Sitanadi today, nor can blame of the crisis in Palamau be blamed on LWE, which has seen the best of management even at the peak of naxal crisis. It is apathy and mismanagement that has led to the downfall of these productive tiger habitats.

A point always raised in the context of parks which are 'not doing well', or are in a precarious condition, is whether they should retain the tiger reserve status. It is strongly stressed that yes, they must remain tiger reserves, as the sanctity given is still conserving habitats that are repositories' of rich biodiversity and endangered species i.e. Asiatic Wild buffalo, barasingha, white-backed vultures, Indian grey wolf, lesser floricans etc. If protected and nurtured and given an enabling mechanism, these ailing reserves are capable of bouncing back and support rich tiger occupancy.

The four crucial actionable points for all reserves are:

- Timely release of funds, payment of wages on time. Welfare measures

for staff such as better living conditions, insurance policies; as well as capacity building, both of frontline staff, and the management. What is also recommended is 'exposure' visits of both staff and management to other tiger reserves in the country. In reserves impacted by LW, a sound insurance scheme for staff must be provided, which is advised to be funded by the centre. Also provision of veterinarian and researcher is an essential requirement for a tiger reserve.

- A focused management structure with a field directorate dedicated to the tiger reserve, with both core and buffer under his control, with supporting staff of Deputy Directors and ACFs.
- The NTCA must initiate dialogue with the state governments to make tiger conservation/reserve a priority sector.
- Delay in receiving of funds is of concern in all reserves, so it is advised to have core amount (a revolving fund) in the Tiger Conservation Foundations, which is at the disposal of the Field Director for use in contingencies and time-bound operations.
- An orientation of the concerned management when a PA is given the status of a tiger reserve, or a reserved forest is brought under the umbrella of the Project Tiger on all aspects of management and protection as per guidelines of a TR. This is critical also to inculcate a culture of conservation in new reserves

## **Nagarjunasagar Srisailem Tiger Reserve**

*The Management Effectiveness Evaluation report must be viewed in the context of the fact that NSTR was in the grip of naxalism for a period of 16 years from 1990 to 2006, and has since then shown a remarkable recovery with good leadership and management.*

### **Strengths**

- The biggest strength of NSTR is its sheer size. The reserve encompasses an area of 3,568 sq km. Additionally to the south of NSTR there is a contiguous protected area of 1,140 sq km, the Gundla Brahmeshwaram Sanctuary (GBM) that has been proposed as an extended core-critical habitat of the reserve. Remarkably, GBM is free of human settlement and will ensure a huge tract of protected area, that is a part of a larger landscape of 15,000 sq km.
- Good, committed leadership. The reserve has shown remarkable recovery in the past three years after over 15 years of naxalism, when it was believed to be a hopeless cause.
- Biodiversity values well-documented and researched
- Focus on protection, and orientation toward conservation.
- Involving local tribals and communities in protection
- Low tourism footprint, involvement of local communities in the same

### **Weaknesses**

Paucity of staff *vis-a-vis* the extent of the TR. Number of anti-poaching

camps, staff is insufficient given the area of the reserve.

Pilgrim town (Srisailem) and traffic: The temple town of Srisailem is expanding. Also of serious concern is the Mannanoor-Dornal road which cuts through prime tiger habitat. Presence of breeding tigresses with cubs has been well-documented close to this road. The irrigation township of Sundipenta in the heart of NSTR is expanding rapidly, and must be contained.

Encroachments in the Nagarjunasagar Division i.e. in the northeast extreme of NSTR have severely fragmented this part of the reserve which is already impacted by the Nagarjunasagar reservoir.

#### **Action Points**

- The region presents an extraordinary opportunity for conservation, and must be a focal landscape (NSTR, plus GBM is part of a larger mosaic of PAs and reserve forests covering about 15,000 km<sup>2</sup>) for tiger conservation as is the Terai Arc, Western Ghats and the Central Indian landscape. It is crucial to identify and protect key habitats and corridors and resolve certain key issues in the landscape.
- The state government must fasttrack the process of notifying the 1,140 km<sup>2</sup> of GBM sanctuary as the core critical habitat of NSTR
- There is a constant pressure to remove speed breakers to facilitate speedy VIP movement, and ease up night traffic ban on the Mannanoor-Dornal road. The regulations must not ease up, and the road cannot be expanded into a four-lane, as

proposed, as this will only accentuate threats to tigers and wildlife. The state government must also take steps to immediately divert all heavy vehicles to the alternate highway for Guntur-Kurnool State Highway which divides NSTR and GBM Sanctuary. This involves an additional distance of a mere 25 km. Night traffic must be stopped here.

- Immediate augmenting of staff strength, to ensure adequate protection.
- Fasttrack process of relocation from the core/critical habitat.

### **Similipal Tiger Reserve**

#### **Strengths**

- The reserve encompasses 2,750 km<sup>2</sup> which is part of the Similipal Biosphere Reserve and the Mayurbhanj Elephant Reserve which is roughly 5,560 km<sup>2</sup> and represents the largest, most viable source population of tigers in the entire Chhotanagpur Plateau. Similipal also stands as a link between flora of southern India and that of sub-Himalayan and Northeast India. Rich productive habitat with immense potential to support rich prey and predator density.
- Though wildlife has declined considerably, southern Similipal still offers tremendous scope and has a good source population of tigers, and also a sound population of elephants. This part of the core is still largely undisturbed and pretty much intact.
- Strong wildlife orientation in the Similipal core



- The park saw a naxalite attack in March 2009, but is on the recovery path with immense efforts under able leadership.
- One village Jennabil was successfully relocated which has freed a valley with a perennial water source for wildlife. Efforts are on to move the other three villages.

### **Weaknesses**

- The field director has only the 'old' core area under him—not even the entire core critical tiger habitat, while the Regional Chief Conservator of Forests at Mayurbhanj commands the buffer, and other territorial ranges around. The Field Director no longer has control over three DFOs who manage the 1,555 km<sup>2</sup> of the Buffer Zone.
- Practice of traditional mass hunting coupled with the new threat of commercial poaching of tuskers and prey species for bush meat.
- Shortage of staff: though there has been an influx of staff/casual workers post the naxal attack, there is still considerable shortage. There is also huge dependence on casual workers, who it is felt do not feel the same level of commitment.
- Delay in receiving funds
- Lack of commitment from the State which has failed to create an enabling mechanism for effective protection
- Poor relations with local communities

### **Action Points**

- The core and buffer of Similipal TR

must be brought under the unified command of the field director

- The staff shortage must be filled, and also augmented from its current strength
- There is a need for the provision of a para-military force, to work with the forest department for protection, given the kind of mass ritual hunting in the reserve, and the influx of armed poachers, and timber smugglers
- Rehabilitation of villages from the core critical habitat
- Though the park has Welfare of staff is of concern, and

## **Valmiki Tiger Reserve**

### **Strengths**

- Valmiki's contiguity with Chitwan National Park and Parsa Wildlife Sanctuary in Nepal makes this a solid chunk of 3,550 km<sup>2</sup> of rich productive tiger landscape.
- A mosaic of habitats supporting rich biodiversity
- Active support of strong NGO and less pressure of tourism
- Proactive action of the reserve officials and state to control mining bordering the reserve
- Willingness to learn and move forward for better protection and management

### **Weaknesses**

- Core/critical area not notified. Buffer not yet notified
- Lack of priority or commitment for tiger reserve on the part of the state government

- Poor protection. Weak protection infrastructure.
- Staff not sufficient, needs training in basic wildlife skills
- Dearth of grasslands
- Encroachments: The connectivity between the eastern and western part of the reserve has been encroached near Kotraha and Lakshmipur, which has all but broken connectivity to the Madanpur range (western Valmiki).
- Also the Bagha-Valmiki road and the Bagha-Chhitauni Railway Line cuts through the park.

#### **Action Points**

- Immediate notification of core critical habitat and buffer area.
- Streamlining management of the tiger reserve to ensure that there is dedicated field director, deputy director and ACF
- Timely release of funds
- Filling up staff shortages. Augmenting staff strength. There is a need for well-equipped, armed and well-trained staff to be deployed within the reserve. Local communities must be part of the protection force. Capacity building at all levels. A proper protection strategy which includes setting up patrolling camps, strengthening intelligence based protection. Wildlife monitoring must be done in a systematic basis.
- Re-establishing connectivity of Madanpur Range (increasingly isolated due to road, canal, and encroachments) with rest of the tiger reserve. This will ensure

viability of tiger population in Madanpur which is contiguous to the Sohagi Barwa Wildlife Sanctuary in Uttar Pradesh.

- Though there is informal dialogue with the SSB, this must be streamlined, so that the negative impact and disturbance is minimized and to sensitize the force on conservation issues. Efforts for better trans-boundary collaboration between India and Nepal for information sharing, joint patrol, curbing of illegal activities etc is crucial.
- Done valley, which comprises about 25 villages (and is not part of the core critical) must be included in buffer given its sensitive location in the heart of the reserve, so that it is under the administrative control of the directorate
- The state currently enjoys political stability and a proactive government, dialogue must be initiated by the centre at the highest level to ensure commitment of the state and draw in support for the tiger.

#### **Palamau Tiger Reserve**

Naxalism continues to be a threat and is one of the reasons of the crippling state of affairs in the Palamau Tiger reserve, one of the finest and most productive tiger landscapes of its time.

#### **Strengths**

- Palamau comprises a large forested tract, across the northern slopes of the Chhotanagpur plateau in Jharkhand extending upto Bandhavgarh on one side and into Orissa from another, with

connectivity also through to the forest of southern West Bengal.

- Harbours excellent tiger habitat with immense potential and biodiversity. Has a sound population of elephants, and harbours the rare grey Indian wolf.
- Has a strong conservation history and sound management over many years.

#### **Weaknesses**

- Forty per cent of the reserve out of control of administration and inaccessible to the management. General lawlessness.
- Over 80 per cent staff shortage.
- Funds delayed hugely. Daily wagers not paid for months together, nearly a year.
- The administrative structure of the park is weak and counter-productive. The field director is a CF level post and the officers assigned for the core and buffer zone working under him are also of the same level, i.e. CF
- Little wildlife orientation and focus of management on the reserve.
- Railway tracks: 20 km pass through the TR
- Political instability in the state translating to low level of priority to conservation
- Anthropogenic and grazing pressure (of nearly 1.5 lakh cattle)

#### **Action points**

- Timely release of funds. At the time of submission of report in mid-February, the funds had not yet been released by the state
- Fill staff shortages with immediate

effect. Pay daily wagers on time.

- Build and strengthen relation with local communities especially in view of the LWE threat
- Streamlining management structure. Appoint a dedicated field director along with DFOs and ACFs to enable proper systemised management.
- Identification of areas least impacted by naxalism is known, these must be focus areas with intensive protection, requisite habitat interventions and monitoring.

### **Indravati Tiger Reserve**

Has been under the grip of LWEs since the past two decades, and there has been no permanent base in Indravati for about a decade. Post 2005, with the *Salwa judum* movement, which created further unrest and terror, the staff stopped going inside the core of the park. This fact impacts every aspect of the park be it management, monitoring or protection.

#### **Strengths**

- Indravati is perhaps the last known remaining habitat supporting (a very small, believed to be about 15-20) population of the Asiatic Wild Buffalo of central India, Rich biodiversity and diverse habitat.
- It is a large reserve encompassing 2,799 km<sup>2</sup> of forest area. Indravati, and the entire Bastar region for that matter, has some of Central India's finest mixed, moist and dry deciduous tiger bearing forests. It is part of 30,000 km<sup>2</sup> of the Indravati-Navegaon Tiger Conservation Unit and there is a potential for connectivity with Tadoba Tiger

Reserve and Kanha-Pench landscape through “stepping stone” forest patches.

### **Weaknesses**

- Has been under the grip of LWEs since the past two decades. There has been no permanent base in Indravati for about a decade. Visit of frontline staff to the core area of the reserve has become rare after 2003 and almost nil after 2005. This has impacted every aspect of the reserve management.
- There is no protection (no staff presence, no patrolling) and management within the reserve.
- No infrastructure, no communication systems.
- The buffer area is not under the control of the Field Director.

### **Actionable Points**

- The buffer must be brought under the control of the Field Director, since it is the only area in which they can operate effectively. Strengthening the protection in the buffer and building relations with the people will contribute to make the habitat in the core safer.
- There must be an immediate process to identify areas which are least affected by naxalism. These areas must then become the focus, with sound habitat interventions ie weed removal, development and protection of grasslands, fire protection, availability of water and salt licks to build up prey base density and thereby encourage tiger occupancy.
- Building better relations with local communities: through livelihood opportunities, skill-building in the

buffer. Also involving villagers in wildlife monitoring, though the problem is that villagers fear to be ‘openly’ supporting the government.

- There needs to be some focus on the Asiatic Wild Buffalo population here, given that it is possibly the last known gene pool of the wild buffalo of Central India (beside Udanti-Sitanadi). It is admittedly a difficult exercise given the LWE situation but attempts must be made for period survey, better information system, monitoring with the help of and involving local communities.

## **Satkosia Tiger Reserve**

### **Strengths**

- Satkosia’s rich forests, located in the very heart of Orissa, are a crucial biodiversity ‘hub’ with direct or indirect corridors with almost every other major forest patch in the state.
- Satkosia has a unique gorge ecosystem which once had a viable population of the critically endangered gharial. It has a rich riparian forest and potential for good prey densities and thereby greater tiger occupancy. It is the only other source population of tigers in Orissa besides Similipal, along with proposed tiger reserve, Sunabeda.
- Working jointly with law enforcement officials, the forest department timber smuggling has been controlled to some extent in the reserve. This must be continued, also in tiger-bearing forests outside the reserve.

## Weaknesses

- One major failure of the reserve, and has been its failure to save the gharial, in its only non-Himalayan river system, even though this was where the Indian Crocodile Project was initiated. There are believed to be just three gharials in the sanctuary.
- Poor protection, little wildlife orientation and no monitoring.
- Faulty management structure: The CCF, Angul who has under him six territorial divisions, was given additional charge as Field Director of Satkoisa. He has under his control only *part* of the reserve i.e. Satkosia Wildlife Sanctuary. The DFOs also have additional territorial responsibilities. There is considerably greater attention and priority to territorial divisions and plantations.
- The Baissipalli Wildlife Sanctuary is very neglected with this part not given much importance by the management.
- Immense pressure with 106 villages within the tiger reserve—all of whom depend on the reserve for fuel, timber, fodder and fishing in the reserve.
- Tourism not in sync with wilderness. Uncontrolled tourist traffic, especially in the around New Year's and holidays causes tremendous disturbance to the reserve due to the movement of hundreds of vehicles.
- Staff augmentation and skill building.
- Traffic must be regulated on the PWD road from NH 42 (Cuttack-Sambalpur) to Tikarpada. It is recommended that this road be handed over to the forest department, since it terminates at the Satkosia gorge and essentially serving villagers and the tourists. Also, tourism (camping) must cease on the Mahanadi riverbank
- Rehabilitation of villages from core critical tiger habitat
- The State may consider including critical tiger breeding areas i.e. like Labangi, Tulka, crucial areas around Purunakote in core critical habitat, and include some other tiger-bearing reserve forests ie Hathidhara RF in Athmallik and Boudh divisions, Nuagarh and Balikiari RFs either in the buffer, or bring them under the management of the TR to facilitate wildlife-oriented protection. Similarly, the Narsinghpur (West) range which adjoins the TR may be handed over to Satkosia wildlife division as it very vulnerable entry point for ivory and timber smugglers.

## Udanti –Sitanadi

### Strengths

- It represents the westernmost limit of the Central Indian Tiger Landscape The Udanti-Sitanadi-Sunabeda (proposed Tiger Reserve) landscape is a single compact forest of about 3,000 km<sup>2</sup> and together represents a large rich and diverse habitat.

## Action Points

- Streamlining management structure with dedicated Field Director, Deputy Directors, ACFs.



## **Weakness**

- One of the biggest failures of the department and the State is the fact that they have failed the State animal, the Asiatic Wild Buffalo, which has now whittled down to a mere eight, four of whom are kept in captivity. The park has failed to protect its wildlife, the presence of tigers is questionable, though of late signs were reported these are yet to be verified.
- Though earlier totally accessible, in the past 18 months or so the park has come under the influence of naxals, restricting movement of staff and protection/management activity
- The Field Director of the Udanti-Sitanadi Tiger Reserve is stationed at Raipur, which is atleast four hours away from the field.
- The tiger reserve has a peculiar administrative arrangement. The Superintendent of both Udanti and Sitanadi sanctuaries supervise the fieldwork, who are under administrative control of DFOs, who in turn do not report to the Field Director, but to the Raipur Circle. The buffers are almost out of bounds for the park management.
- There is little, if any focus on the reserve, at the senior management level (DFOs) as they also command under them territorial divisions. The running of the reserve seems to be essentially at the superintendent level
- Virtually no protection strategy. Staff has little or no wildlife orientation.

## **Action points**

- Streamline management structure
- The wild buffalo is almost extinct, and one wonders if there is any point of yet another 'Conservation programme' when the recovery plan made a mockery of the exercise.
- Fill staff shortage and skill building of existing staff
- A proper assessment of tiger status is required. Areas which are least impacted by naxalism must be mapped, and concentrated conservation-oriented community works and habitat management .

## **Achanakmar Tiger Reserve**

### **Strengths**

- The park is part of Achanakmar-Amarkantak Biosphere Reserve in the Satpura landscape and is part of the Central Indian tiger landscape, it is contiguous to the rich Kanha-Pench landscape and serves as a link between Kanha and Palamau.
- Is a rich habitat, much like Kanha-Pench, with the ability to support good prey density and tigers.
- Six villages have been relocated creating inviolate tiger habitat.

### **Weaknesses**

- Lack of proper protection strategy. Though currently the habitat supports a decent prey base, there is reported to be a dramatic decline of late. Also of concern is poaching of 'game', and poisoning waterhole has also been reported.
- The Tiger Reserve does not have a Field Director and Deputy Director

and both these positions are held by Territorial CF and DFO respectively. The reserve is not being managed like a Tiger Reserve, but like a territorial division, with the same type of orientation of the staff.

- The core area has extensive human and biotic interference. There were 25 forest villages—six of which have been relocated—in the park. There is also tremendous pressure on the park from outside and the reserve has cattle camps within it.
- There appears to be a lack of commitment from the State towards tiger reserves and conservation of wildlife. The wedge between the wildlife and territorial in the state also negatively impacting wildlife management.
- Skill building of staff for wildlife orientation.
- A protection strategy and controlling grazing pressure. A systemized method of monitoring tigers and other wildlife must be inculcated.
- Streamlining management structure.
- Village relocation process needs to be closely monitored given the sensitivity of the exercise.
- Tourism must be in sync with wilderness, currently tourism infrastructure etc is in core critical habitat.

#### **Action Points**

- The alternate road proposed for the Bilaspur Amarkantak national highway dividing the park into two must be made operational with immediate effect. Till such time the alternate road is operational speed regulations, no night time traffic, must be enforced.

## **4.4 Cluster-IV (Bandipur, Nagarhole, Bhadra, Dandeli-Anshi, Periyar, Parambikulam, Kalakad- Mundathurai, Annamalai, Mudumalai)**

### **Introduction**

In our country it is generally observed that the Government of India alone is fully taking initiatives and responsibility for wildlife conservation and tiger conservation in particular. This is generally reflected in funding patterns wherein the State Governments priority in funding for wildlife conservation is quite inadequate and low. There is large scope for the state level steering committees to meet regularly in time, be much more active and really steer the Tiger Reserves with guidance and support.

### **Tiger Conservation Plan**

Legal notification and delineation of nine Tiger Reserve (TRs) falling within this Cluster have all been done appropriately. All TRs have an approved Management Plan but none of them have approved Tiger Conservation Plan. Some of the TRs have an indicative Tiger Conservation Plan (e.g. Nagarhole) whereas for some of them the formulation of Tiger Conservation plan is still in progress (e.g. Periyar). The present system of Beat, Section and Range as unit of management,

perhaps needs to be evaluated to see whether it is serving the twin major purposes of protection and implementation of developmental programmes.

### **Enforcement of Acts**

The enforcement of Wildlife Protection Act, 1972 and The Indian Forest Act / State Forest Act is done very routinely and perhaps leaves large scope for considerable improvement with better protection plans for each range for prevention, control and detection of offences. Booking of wildlife offences, filing of chargesheets and taking them to logical conclusions in a time bound manner also is absent in most of TRs. It is desirable to ensure that the patrolling of the beat areas by foot, vehicle or other means are not only intensified but monitored and controlled at appropriate levels for prevention and detection of wildlife offences. The introduction of anti-poaching camps and watcher systems mostly manned by local tribals in all TRs have definitely reinforced and further strengthened the protection but must be closely watched and controlled to prevent their likely misuse. There is an urgent need to introduce an information and intelligence gathering system and action in all TRs to make protection much more effective. Documentation and record keeping, retrieval and sharing of vital information also needs considerable improvement.

### **Personnel Management**

The staff is invariably not adequately trained to manage the TRs and most of them are transferred out frequently resulting in discontinuity of actions. There are no adequate incentives or

rewards for better performers and therefore the motivation level is not very high. There is no system in place to record the performance of staff and follow it up with adequate responses.

### **Arms, Ammunitions and Equipments**

There is lack of arms and ammunitions and efficient communication systems and other equipments (e.g. total survey stations) in most of TRs. In most of the TRs the staff is not provided the safeguards from being proceeded against like arrest by police for genuine use of firearms. Facilities for safe storage and practice of arms and ammunitions also is not seen in most TRs. Consolidation of boundaries by erection of boundary pillars and maintenance of them at regular intervals has not been done in most of the TRs resulting in poor management of encroachments.

### **Publicity and Coordination**

The inter departmental coordination and action needs to be systematized to strengthen wildlife protection. Publicity and awareness creation on wildlife offences and the likely consequences also needs to be enhanced through various media. Involving public in prevention and detection of wildlife offences through rewards and other means must be thought of. On the whole there is large scope for improving the professionalism in protecting the wildlife resources in TRs.

### **Habitat Management**

Habitat management on sound scientific principles backed up by Research and Development support would only make the TRs sustainable. Most of the TRs lack true research and

development support and therefore this gap needs to be filled up at the earliest. Research need analysis specifically for each TRs should be carried out at the earliest.

### **Capacity Building**

Most of the personnel are not trained in wildlife management in TRs. Training need analysis should be carried out for each TR and suitable training programmes designed to suit their needs should be developed. Continuity of trained staff in TR management needs to be ensured.

### **Tourism Management**

The tourism management in most of the TRs is not so well organized. Publicity, Advance booking, accommodation, food, transport, interpretation, all needs to be considerably improved. A good feedback system for visitor satisfaction is absent in most of our TRs.

### **Management of Local Communities**

Management of local communities has not received adequate attention in the TRs due to various reasons. The communities both inside and in the immediate surroundings are not still accepted as full partners in the management practices. Implementation of Forest Rights Act 2006 is quite tardy and poor in most of the TRs.

### **Resettlement and Acquisitions**

There are enclosures and settlements right inside the core areas in many TRs. A comprehensive resettlement programme would be advisable to reduce serious biotic interference.

There are good number of private estates and other properties in most TRs which should be acquired for public purposes. The corridor management around the TRs also perhaps calls for immediate attention of concerned authorities.

### **Internal Monitoring and Evaluation Systems**

There is no arrangement for an internal monitoring and evaluation of Tiger Reserves at the State level at present. The census of the Tiger and prey population is also not carried out locally and periodically. Ways and means of solving this problem may be thought of.

### **Monitoring Conservation Values**

In most TRs conservation values are generally identified and documented. However, the primary indicators for each value especially for water conservation and biodiversity need to be identified assessed and monitored periodically.

### **Tiger Foundation**

This new institution has the potential to make the TRs to perform far better in the coming future. If these are not steered right now in the proper direction for achievement of the broader objectives for which these were visualized and established, it will be difficult to undertake corrective steps later. The decentralization of managements is a big strength of these institutions and we must use these for wider financial, community support, capacity building, and research-monitoring objectives rather than only fund mobilization.

### **Climate Change and its Impact**

Climate change and its adverse impact on natural ecosystems is a reality. The adaptation strategies to cope up with the impending climate change and its impact on TRs must be thought of.

### **Stakeholder Participation**

The participation of various stake holders in management of Tiger Reserves (TRs) is just moderate. The Ecodevelopment model practiced in Periyar and Parambikulam TRs are very encouraging and worth emulating in other TRs with local variations to suit their needs. The Ecodevelopment model followed by Kalakad TR in involving the communities both inside and immediate outer periphery are also quite promising but needs considerable strengthening to ensure sustainability. We must recognize the importance of developing a Tiger-Man ecosystem in each TR with a well balanced approach to take care of both tiger and human needs in all aspects. The conservation of tiger and biodiversity in each TR is dependent upon the development of villages both inside and outer periphery of TRs. The only way to garner and elicit the active support of local community in tiger conservation is to meet all the immediate and felt needs of those villagers by the consistent effort of TRs. Therefore there is an immense need to integrate the development of villages both inside and outer periphery of TRs with conservation of Tiger and all biodiversity in the Tiger Conservation Plan. A mechanism has to be evolved for each TR to ensure active participation of Researchers, Developers, Sociologists, Planners,

Tourists, Students and Villagers in planning, management and monitoring of TR.

## **Resolution of Human Animal Conflicts**

As the herbivorous population has considerably increased in numbers in TRs they are straying into adjacent agricultural fields resulting in huge losses of agricultural crops, threatening even the livelihood options of marginal and poor farmers. Most of the damages are caused by wild boars and porcupines. It calls for active management of those populations by various means including policy level changes.

## **Delayed Release of Funds**

It is observed that there are delays invariably in release of funds by the Govt. of India which results in various deficiencies in implementation of programs. This needs to be rectified.

## **Bandipur Tiger Reserve**

### **Strengths**

- TR is part of large landscape supporting largest population of tiger in the country and has contiguity with adjoining Mudumalai TR, Nagarhole TR and Wayanad WLS.
- Core area free from human settlements.
- Good support of scientific institutions and adequate baseline information.
- Good support of NGOs
- Effective system of visitor management.

### **Weaknesses**

- Spreading invasive species particularly Lantana.
- Weak support of local communities due to weak Ecodevelopment programmes.
- Increasing Human Wildlife Conflicts in certain pockets.
- Weak component of staff training.
- Still some important corridors are outside TR.

### **Threats**

- Increasing number of private resorts around TR thereby creating more tourism pressures.
- Increasing conflicts with the local communities due to elephant depredation.
- Proposed projects and other developments in and around TR (including the future possibilities of widening of Mysore-Ooty Road).
- Likely spread of diseases to the wild animals from adjoining livestock.

### **Opportunities**

- Increasing support of government for biodiversity conservation.
- Increasing interest of researchers and other stakeholders in the area.

## **Nagarhole Tiger Reserve**

### **Strengths**

- TR has sound protection strategy in place.
- TR is part of large landscape due to adjoining Bandipur TR and Wayanad WLS and this landscape



holds biggest tiger population in the country.

- Populations of tiger are stable in the last several years.
- There is a good support of research institutions and hence good scientific baseline particularly of tiger and its prey.
- TR has experience of implementing good relocation programme

### **Weaknesses**

- Core area has settlements and resultant biotic pressures
- Weak support of local communities and NGOs and inadequate participation of stakeholders in general.
- Increasing anthropogenic pressures and weak ecodevelopment programmes for livelihood support of local people.
- Inadequate resources and allocations.
- Inadequate visitor services and information.
- Inadequate trained frontline staff. And also number of staff.
- Frequent transfer of officers.

### **Threats**

- Growing tourism.
- Growing conflicts with some stakeholders.
- Developmental projects in the adjoining areas including plantations.
- Growing human wildlife conflicts.

### **Opportunity**

- Growing interest of research institutions in the area.
- Growing support of Government for conservation.

## **Bhadra Tiger Reserve**

### **Strengths**

- Location and connectivity to adjoining areas
- Sound protection
- Sizable area free from human habitations and a rich experience of rehabilitation of villages
- Strong support of people and NGOs
- Rich habitat / water resources
- Potential tiger population and associated rich prey base
- Some long term research

### **Weaknesses**

- Inadequately maintained road network and infrastructure
- Spreading invasive species
- Still some human settlements inside
- Some pressures from fringe areas/ buffer
- Inadequate capacity of staff
- Weak baseline information and long term monitoring

### **Threats**

- Human wildlife conflicts
- Likely spread of tourism in the vicinity of TR
- Leased area to SAIL still not closed

- Proposal of raising the height of existing Bhadra Dam

### **Opportunity**

- Recently established Tiger Foundation
- Growing interest of research among institutions and individuals
- Biologically rich areas adjoining TR
- Potential of awareness raising

## **Dandeli-Anshi Tiger Reserve**

### **Strengths**

- Location and connectivity to adjoining PAs of Goa and forest areas of Karnataka
- Motivated team in place
- Good support of local people and NGOs
- Important semi evergreen habitat for tiger and associates
- Planned tourism and education facilities.

### **Weaknesses**

- 52 villages in side TR some of these well developed
- Spreading invasive species and some exotics in side TR.
- Inadequate capacity of staff
- Inadequate baseline information and long term monitoring

### **Threats**

- Increasing human wildlife conflicts
- Future pressures of tourism in and around TR if not planned
- Difficulty in relocation of well developed agriculture enclosures

### **Opportunity**

- Recently established Tiger Foundation
- Growing interest of research among institutions and individuals
- Potential of awareness raising

## **Periyar Tiger Reserve**

### **Strengths**

- Core area free from human habitations and sound connectivity to adjoining areas.
- Forming part of large Periyar-Agasthyamalai landscape.
- Sound support and involvement of communities through ongoing ecodevelopment and ecotourism programmes.
- Good scientific baseline information.
- Active Tiger Foundation.
- Emerging centre of learning for community participation in biodiversity conservation.
- Very less human wildlife conflicts.

### **Weaknesses**

- Significant area of grasslands under exotic eucalyptus plantations
- Ecodevelopment programme stagnating due to second generation problems
- Buffer zone small and yet to be notified.
- Adjoining areas of landscape yet to be brought under active wildlife management interventions.
- Shingotta gap- ongoing and proposed developments in the area.

- Inadequate systems of management of Sabarimala pilgrimage area.

#### **Threats**

- Growing tourism rush and mushrooming of tourism infrastructure in Kumali town.
- Increasing pilgrims in Sabarimala and delay in implementation of already approved Master Plan.
- Existing water disputes between two states and proposed new Mulla-Periyar dam.
- Emerging disease threat to wildlife from adjoining areas.
- Proposed developments in Periyar-Agasthyamalai landscape.

#### **Opportunity**

- Growing interest of research institutions in the area.
- Support of tourism department
- Wide possibilities of development of Periyar Foundation (both financially and academically).

### **Parambikulam Tiger Reserve**

#### **Strengths**

- Core area free from human population.
- TR has sound protection and is integrated into large landscape due to adjoining Annamalai TR and other divisions.
- Sound community support through ecodevelopment programme.
- Emerging model of community base ecotourism
- Almost no human wildlife conflicts

#### **Weaknesses**

- Large area under exotic plantations
- Inadequate trained staff
- Monitoring systems yet to be strengthened
- Inadequate incentives to attract and retain staff
- Some disturbance due to reservoirs and settlements inside TR (Buffer zone).

#### **Threats**

- Growing demand for a road through adjoining Kerala forests.
- Growing tourism rush.
- Possible water disputes between two states in future

#### **Opportunity**

- Support of tourism department
- Growing interest of research institutions in the area.

### **Kalakad-Mundathurai Tiger Reserve**

#### **Strengths**

- Connectivity to the adjoining areas linking to Periyar Landscape
- Strong support of local people, NGOs and other stakeholders
- Good scientific research information base because of involvement of different institutions and individuals.
- Strong ecodevelopment programme in place to address the livelihood concerns of local dependent communities.

- Emerging area as a learning centre for community based protected area management.

### **Weaknesses**

- Human settlements inside.
- Inadequate number and no training of the frontline staff.
- Ecodevelopment programme still needs support of TR management to deal with emerging issues of linkages between conservation of TR and community livelihoods.
- Inadequate visitor facilities and material.
- Pilgrimage pressures due to a temple inside TR

### **Threats**

- Increasing pressures of pilgrimage
- Likely spread of tourism in the vicinity of TR
- Upcoming projects around TR and private plantation areas.
- Possible pressures from interstate borders.

### **Opportunity**

- Sizable corpus available with communities.
- Recently established Tiger Foundation
- Growing interest of research among institutions and individuals
- Scope of growing awareness for conservation in the area.

## **Annamalai Tiger Reserve**

### **Strengths**

- TR part of large landscape covering a series of important habitats and rich flora and fauna with contiguity to Parambikulam TR and Chinnar WLS of Kerala, thereby providing space for migration of large mammals.
- Sound protection strategies in place.
- Adequate baseline information and support of research institutions.
- Adequate support of local people due to implementation of Ecodevelopment programme for their livelihoods.
- Good coordination with adjoining state of Kerala.

### **Weaknesses**

- Core area still has human settlements which are proposed to be shifted out.
- Increasing Human Wildlife Conflicts in certain pockets.
- Poor component of staff training.
- Still some important corridors outside TR.
- Inadequate information and facilities for visitors.
- Invasive species in certain pockets particularly around Sholas.

### **Threats**

- Increasing conflicts with the local communities due to elephant depredation.
- Increasing rush of visitors and slow preparedness to deal with the situation.

- Possible spread of diseases from adjoining livestock.

### **Opportunity**

- Increasing support of government for biodiversity conservation.
- Increasing interest of researchers and other stakeholders in the area.
- Recently established TR foundation.

## **Mudumalai Tiger Reserve**

### **Strengths**

- TR is part of large landscape along with adjoining Bandipur TR and Wayanad WLS providing space for migration of large mammals and integrated into this ecosystem.
- The protection system is good and anti-poaching strategies are in place.
- TR has good system to deal with human wildlife conflicts.
- This is a learning centre for Captive Elephant Management and their use in protection.
- There is good support of research institution which has generated adequate baseline information.

### **Weaknesses**

- There are still human habitation in side TR leading to biotic pressures in some pockets.

- Component of training of staff is inadequate.

- Some corridors have been identified but these are yet to be acquired.
- Tourism pressures due to increasing number of resorts/hotels in and around Masanagudy area.
- Visitor facilities still need more improvements.
- Weak livelihood support to the local communities through Ecodevelopment and their low level participation in TR protection.

### **Threats**

- Increasing number of hotels around TR
- Increasing conflicts with private hotels.
- Proposed developmental projects around TR.

### **Opportunity**

- Growing interests of research institutions in the area.
- Newly created TR Foundation and support of government and other agencies for TR.

## 4.5 Cluster-V (Namdapha, Pakhui, Kaziranga, Manas, Nameri, Dampa, Buxa, Sundarbans)

### Pakke Tiger Reserve

#### Strengths

- The Reserve forms a part of larger landscape with adjoining Sonai Rupai Sanctuary and Nameri Tiger Reserve and also Reserve forests such as Tenga, Doimara and Pappum. The Sessa Orchid Sanctuary and Eagle Nest Sanctuary are also adjacent, though on the other side of the river.
- The area is important in terms of watershed with several streams originating from the landscape leading to Pakke and Kameng rivers.
- The area also forms part of the Kameng Elephant Reserve.
- Excellent protection mechanism, man management and local tribe interaction and participation.
- The TR is free from human habitation and is protected by the rivers on three sides.

#### Weaknesses

- Inadequate frontline staff strength, working mostly on casual labourers.
- Inadequate funding and very late disbursement. Not enough support from Project Elephant.

- Very poor infrastructure and visitor service.
- No research and monitoring mechanism in place.
- Ethnic insurgency in the outskirts.
- No interpretation centre or any organized awareness programme.
- Perceived threat from construction of 500 MW power house at Kimi, adjacent to Pakke Tiger Reserve. The colonies of construction workers machineries and barring of the elephant movement.
- Perceived threat from construction of 24 km road along Kameng River (TR boundary)
- The fringe area communities are exerting some pressure in the form of NTFP collection and traditional tribal hunting to a limited extent.

#### Suggestions for follow up actions

- Timely fund release by the state and enhanced support for protection, eco-development and casual labour from NTCA and Project Elephant.
- Initiation of Tiger Conservation Foundation activities may be given priority
- Well planned ecodevelopment programme to be initiated
- Infrastructure support for patrolling vehicles, building repair, equipments etc.
- Support for grain for grain scheme (crop raiding compensation) from Elephant Project.
- The buffer of the TR is to be notified. It would be good if the Pappum RF in the East extending



up to Itanagar Wildlife Sanctuary is added to the area as core and part as buffer.

- A well planned research and monitoring mechanism should be in place. Habitat monitoring to be given priority.
- The DFO Pakke is in charge of both the TR and two WLSs. It is suggested to relieve him from the additional responsibilities or post at least two ACFs for the wildlife sanctuaries and one for eco-development.
- More field staff and casual labourers to make it at least 4 for each anti poaching camp and 4 each for the striking force. There should also be a few more for managing the other programmes like tourism, eco-development, HEC etc.
- More facilities for the field camps.
- A gypsy placed inside would help faster movement in case of emergencies.
- Veterinary support to be provided for the captive elephant management and for wildlife health monitoring

## **Namdapha Tiger Reserve**

### **Strengths**

- Namdapha National Park is bordered by Kamlang Wildlife Sanctuary in the north, Miao RF, Nampong RF, Diyun RF in the west, Forest areas of Kachin Province of Myanmar in south and USF areas of Gandhigram in the east.
- Very rich in biodiversity with several endemic and endangered species.

- Inaccessible area with dense vegetation and almost no road communication, valleys with watershed of Noa-Dehing river.
- Has immense ecological, educational, ethological, historical, scientific and ethnic values.

### **Weaknesses**

- Inadequate staff and most of them are not trained.
- Inadequate infra structure for staff, protection and other priority activities.
- Low priority to wildlife sector by state govt., No substantial support from civil and judiciary on control of poaching.
- No ecodevelopment or activities to seek cooperation from various ethnic communities.
- Ecotourism on meager scale.
- No buffer notified
- The encroachment by 84 families of Lishu people settled in five villages within the core.
- The road from Debang to Vijayanagar, now maintained by PWD could be helpful in protection but could be a major threat.
- Lack of check post manned by Park authorities in Gandhigram at the border of the TR.

### **Suggested follow up Actions**

- Increase the staff strength with more trained and motivated staff
- Lisu settlement in core to be resettled/removed
- The road connecting Miao to Vijay Nagar must be under the direct control of Field Director, NTR for all

purpose from maintenance to operation.

- The buffer of the Reserve to be notified
- Ecodevelopment programme to be implemented.
- A mechanism to be in place for research and monitoring of the research activities
- Habitat management measures to be taken up and monitored
- Ecotourism activities to be streamlined involving local communities

## **Kaziranga Tiger Reserve**

### **Strengths**

- Kaziranga-Karbi Anglong landscape is a part of Brahmaputra valley which is sandwiched between eastern Himalaya in the North, Garo/Khasi/Jayantia and Mikir/Cachar/Barail hills ranges in the south
- The Reserve is characterised by fifteen vegetation types including numerous swamps / Beel complexes, along with a thick vegetation cover.
- The Tiger Reserve has the only viable population of tiger in Assam with high density, world's largest population of great Indian one horned rhinoceros, a large population of Asiatic wild buffalo, last surviving population Eastern Swamp deer, a good population of elephants and significant population of endangered and vulnerable species like Gangetic river dolphin, Hoolock gibbon and capped langur. The area falls under

Kaziranga Karbi Anglong Elephant Reserve.

- The area is rich in mammals (35 spp. Excluding rodents) birds (550 spp.), reptiles (87 spp.), amphibians (24 spp.) and fishes (42 spp.)
- The core area is free from human habitation.
- Very good stakeholder participation in the planning process while preparing TCP
- One of the best protection strategies well implemented with 152 anti poaching camps and 3 mechanised floating camps, a network of roads, a number of vehicles and well connected communication system.
- Better co-ordination with adjacent areas including Karbi Anglong areas and other adjacent Forest Divisions.
- Actions initiated to secure the identified elephant corridors by forming Kaziranga Biodiversity Conservation Committee and regulations on developmental activities on the corridor made.
- Proposed Ecosensitive zone.
- Most of the areas adjacent to the Reserve are being added.
- Strong NGO support for tiger population monitoring, building up infrastructure facilities, human wildlife conflict mitigation and rescue and rehabilitation of animals.
- Wildlife trained staff better at senior level but not at the field level.
- Fifty two EDCs and microplans are being prepared. There are new

initiatives to provide opportunities for local communities to promote tourism by giving traditional food and also guidance for trekking.

- Preparedness to meet emergencies due to flash floods.
- World Heritage Site and globally recognized Biosphere Reserve.

### **Weaknesses**

- Habitat degradation due to invasives like *Mimosa invisa* and wild rose.
- Wetland degradation and blockage of natural channels by water hyacinth, choking and sedimentation.
- Lack of habitat and population monitoring mechanism
- Rapid habitat degradation in and outside the KTR
- Biotic pressures in corridor and addition areas.
- Speeding traffic along National Highway 37
- The widening of the road and increased traffic.
- Lack of co-ordination/dialogue with the adjacent tea estate management for conservation initiatives.
- Delay in release of funds.

### **Suggested follow up Actions**

- Important to initiate steps for habitat and population monitoring
- Initiate highway patrolling using vehicles in place of on foot patrolling
- Tiger Conservation Foundation to be made functional

- Compile all the research reports on the Reserve and adjacent areas.
- Promote research and initiate discussions with Research Institutions and Universities
- Periodic review of tourism activities by referring to the feed back from the visitors.

## **Nameri Tiger Reserve**

### **Strengths**

- Part of a larger landscape contiguous with Pakke TR and adjacent areas.
- Nameri Tiger Reserve is rich with elephant, tiger, gaur, White Winged Wood Duck, Great Hornbill, Rufous necked Hornbill, Wreathed Hornbill, Oriental Pied Hornbill, Assam Roofed Turtle etc.
- Core Area free of human habitations.
- The River Jia-Bhoreli, constituting the Western boundary of the National Park is the abode of the Golden Mahsheer, Silgharia etc.
- The PA is also worth for its scenic landscape

### **Weakness**

- Buffer not under the Tiger Reserve and there is no Field Director though the DFO in charge of Nameri is redesignated
- Very poor funding and the meager fund is released very late.
- Severe shortage of manpower: There is severe shortage of field staff and most of the field staff are in the age group 40-48 years.
- Lack of training to the staff: There is no one trained in wildlife

- Inadequate infrastructure in the PA and buffer area: Presently the core area is managed by one Range at Potasali. Another Range is needed at Seijosa to control the eastern flank of the area. The buffer areas do not have any presence of anti-poaching camps or the staff and thus have no protection mechanism to check the activities of unscrupulous elements.
- Degradation of the habitat especially the grass lands by *Bombax* and choking of water bodies by aquatic weeds
- Lack of a proper Tiger Conservation Plan
- Severe degradation and encroachment of buffer areas of Tiger Reserve: A major portion of the buffer areas of the Tiger Reserve has become severely degraded and encroached upon by organized groups. However, the western buffer has been taken up for plantation by the Eco-Task force
- Siltingup of water bodies due to soil erosion in the upper reaches: The river Jia-Bhareli carries high quantity of silt during rainy season which lasts for about six months. The flood waters deposit a layer of sediments in the water bodies. This reduces their water storage capacity and leads to a situation of artificial scarcity of water for mammals and birds particularly in last days of January and February.
- Manifold increase in population of Forest villages and encroachment upon adjoining forest land: Over the years the population of forest villages has multiplied several times. This has led them to encroach upon the adjoining forest land with impunity.
- Emergent law and order situation due to ethno-political upsurges: The agitation by certain ethnic groups for their conflicting demands has created an atmosphere of uncertainty.
- Passage of Balipara-Bhalukpong road through the buffer area: The Balipara-Bhalukpong road passes through the buffer area and is being widened from single lane to double lane. This will have negative impact on the corridors of elephants and will confine them to the national park.
- Very poor tourism and Ecodevelopment initiatives.

#### **Suggested Follow up Actions**

- A review of the situation by NTCA with the State authorities for addressing the immediate requirement
- Buffer area to be brought under Tiger Reserve and both under a Field Director of C.F. rank with D.F.O. for its core and buffer area with adequate field staff and ACF for monitoring and eco-development.
- Preparation of a Tiger Conservation Plan
- A mechanism in the State for timely release of funds and better State support
- Immediate funding support for anti poaching, ecodevelopment, research and monitoring, visitor facilities and staff facilities

- Identifying the habitat related issues and addressing and monitoring
- Separate funding for elephant depredation control
- Trainings on legal, modern equipment handling, format reporting and field exercises.

## Manas Tiger Reserve

### Strengths

- No human settlements inside the Core of the Reserve: Except for an area of 16.30 km<sup>2</sup> in Panbari Reserve in the fringe and 20 ha. at Betbari in North Kamrup Reserve used only for cultivation, which were encroached during 1996 (peak of ethnic strife), the core area of the Manas Tiger Reserve is free from human settlement. Relocation of these settlements is being addressed through negotiations with the local people.
- Excellent availability of water in the reserve: Manas River, which bisects the National Park into two halves, remains perennial throughout the year. There are a number of other perennial rivers and rivulets cutting across the Reserve and numerous standing water bodies, locally known as 'beels'.
- Part of a larger landscape: The Tiger Reserve is contiguous with the forests of Bhutan in the north and Buxa Tiger Reserve in the West. It also links forests of Arunachal Pradesh through Bhutan, thus becoming a significant unit in a large landscape.
- Spectacular scenery: Manas Tiger Reserve represents two major

biomes - the grassland biome and the tropical forest biome. The unique climatic and soil conditions support diverse habitats and the landscape arrangement of rivers, flood plains and forested mountains creates outstanding scenic value.

- Dynamic ecosystem: The flood plains experience a regular cycle of inundation during monsoons and receding of waters post monsoon, exhibiting high fertility quotient manifested in tremendous regeneration and self-sustaining capability of land. Post ethnic strife, the recovery of habitats and species is reported to be remarkable.
- Home of large number of Schedule I and endemic species: Manas has a wonderful collection of animal and plant species of high conservation value. Species like golden langur, pygmy hog, hispid hare, Assam roofed turtle, marbled and golden cats, clouded leopard, Bengal florican and white wing wood duck place Manas in an exclusive category of Protected Areas harbouring significant numbers of these unique species.
- World Heritage Site: The Manas Tiger Reserve was inscribed in the list of World Heritage Site in 1985 under UNESCO; as a site of outstanding universal value for its unique biological and cultural diversity. However, the present status is *World Heritage site in Danger* due to damages to the Reserve during ethnic strife that took place from 1986 to 2003. It is also globally recognized Biosphere Reserve.
- Change in attitude of local

community organizations towards conservation of Manas: Post ethnic strife, the constitution of Bodoland Terretorial Council and emergence of local organizations like Manas Maozigendri ecotourism society, AGRANG, Bhuyanpara Society, Manas Ever Welfare Society, Panbari Society etc. have helped in bringing about attitudinal change among local people in the context of conservation of Manas. There appears to be a sense of belonging and pride among local people in having Manas as a Tiger Reserve.

- Good support from NGOs: A number of NGOs are involved in infrastructure development, support of manpower, reintroduction of rhinoceros and also in monitoring tiger population and even habitat to a certain extent.

### **Weaknesses**

- Multiplicity of management in the Buffer Area: During 2008, an area of 2837.10 km<sup>2</sup> was notified as Manas Tiger Reserve. It included 500 km<sup>2</sup> of Core (Manas National Park) and 2337.10 km<sup>2</sup> of Buffer. The Buffer Area of the Reserve is spread over Kachugaon, Haltugaon and Chirang Forest Divisions in the west and Buksa and Dhansiri Forest Division in the east. Field Director of Manas has no control over administration of these areas, which causes management problems. Furthermore, the buffer area forests fall within the jurisdiction of Forest Chief of Bodoland Territorial Council, and Core area is under the control of CWLW, Assam.
- Porosity of the southern tip of the river Manas: Occasionally professional fishermen sneak into the Reserve taking advantage of unprotected southern tip of the river Manas at Narayanguri. Apart from illegal fishing, such intrusions threat protection of reintroduced Rhinoceros as well.
- Absence of forested buffer along the southern boundary: The Core area of Manas Tiger Reserve has a long southern boundary abutting private tea estates and about 60 villages. The villagers are poor and in the absence of forest areas and commons in their vicinity, they depend upon the fringe of the Core for their resource requirement, which primarily includes grazing spaces, fuel wood and small timber and NTFP collection. On the other hand, due to absence of buffer forests, the wild animals frequently enter the village lands and cause conflicts.
- Poor infrastructure: The Tiger Reserve has 38 anti poaching camps in the Core area, and none in the Buffer. The camps are inadequately equipped in terms of arms and ammunition, living facilities for the staff and communication. Similarly, interpretation and information infrastructure is lacking.
- Lack of clarity in the role of volunteers: After the cessation of hostilities and constitution of Bodoland Territorial Council, the armed rebels, who surrendered, were appointed by the BTC as volunteers. 80 of the volunteers are supported by BTC and 50 of them



are supported by Wildlife Areas Development and Welfare Trust. The Trust organized training for the volunteers they funded. The volunteers were distributed to Manas Tiger Reserve directly under the control of the Field Director, as well as through community organizations. A large number of volunteers thus assist MTR in various duties. However, they are neither trained, nor specifically made accountable. For better utilization of this force, proper deployment and trainings are required.

- Dependency of forest villages and fringe dwellers: The Bodo community, dominant in fringe villages, is traditionally linked to the forests for various kinds of forest produces. It includes cattle grazing, timber, firewood, thatch, wild vegetables and fruits, fish and occasional wild animals hunting for meat. Heavy use of forests, especially in the southern boundaries have proliferated growth of invasive plants such as *Mikania*, and *Eupatorium*. This belt forms important and crucial habitat of endangered and endemic species like pigmy hog, Bengal florican and hispid hare.
- Apprehension on Forest Right Act 2006: Inability to reconcile the FRA with WIPA, 1972 has encouraged some organization to incite villagers for encroaching in the MTR.
- Societal lack of awareness: Though there are attempts to bring in awareness by the NGOs, due to poor physical infrastructure for

communication, education, health and economics, the local people are ignorant about most of the ongoing government sponsored projects and activities and also conservation. There is high poverty in the area. The fringe area is also infested by Malaria.

- Lack of interpretational avenues: MTR has neither an equipped interpretation centre, nor effective interpretative machinery. Staff is untrained and is coming out of a very turbulent time. Confidence to move freely within the park and take school children or villagers to MTR is very low.
- There should be a proper well written Plan for all the programmes in the TR including habitat management. The absence of a well written TCP make it prone to acceptance of any programmes mooted by others.
- The state government release even the NTCA funds at the end of February.

### **Suggestions for follow up action**

- Discuss with the Forest Chief of Bodoland Territorial Council for placing buffer areas under the unified command of Field Director. The dialogue could be immediately started so as to obtain State Government's as well as Bodoland Territorial Council's concurrence too.
- Prepare a volunteer deployment programme and create administrative structure, whereby they become part of the beats and work under the supervision of regular staff.

- Provide training on ecodevelopment, ecotourism, wildlife monitoring and interpretation to staff and volunteer and build up interpretation programme to increase awareness.
- Develop habitat monitoring protocols to assess the direction of change that suggests recovery of habitats and species.
- Map the grasslands of the park and after discussion with the scientific community and NGOs, determine the minimum required grassland in MTR. Ensure that action is taken to prevent woodland encroachment in the grasslands.
- Initiate dialogue with district administration and local councils to channel funds for ecodevelopment activities. Train some of the volunteers in ecodevelopment, so that they could be the link between MTR and local villages.
- Promote relationship with the NGOs for eliciting wider support for conservation of MTR.
- The Bodoland Territorial Council and the State Government should ensure timely release of funds
- There could be a motorable road along the southern boundary for effective protection.

## **Dampa Tiger Reserve**

### **Strengths**

- Habitat for species of high conservation value: Dampa Tiger Reserve is a representative example of eastern Himalaya harbouring several species of non human primates of the north-east

Himalaya (hoolock gibbon, phayre's leaf monkey, Assamese macaque, stump-tailed macaque, pig-tailed macaque, rhesus macaque, capped langur and slow loris). Similarly, clouded leopard, marbled cat, golden cat, Malayan sun bear etc. inhabiting tropical evergreen and semi-evergreen forests accord DTR a high conservation value.

- No human settlements in the core area: There were 13 settlements in the core area at the time of notification of DTR. Beginning from 1989, all settlements, except one at Andermanik have been moved out of the core area. The relocation of the last village is under way. For a State, where the society is primarily constituted of forest dependent tribal communities, it is commendable to achieve 500 km<sup>2</sup> of undisturbed area.
- Availability of perennial water sources: Seven perennial rivers exist in and around DTR, which make water available to wildlife throughout the year.
- Legally protected: Rights of any nature have been settled and the core of the DTR is legally free from any form of human use.
- Gradual attitudinal change in the local communities supporting conservation: All around DTR, the tribal communities practice shifting cultivation and hunting. However, over the years there is substantial change in the attitude of local people to the extent that they value BTR as a conservation area. There is also support from the local community in awareness (for example, the Green Teachers)

## Weaknesses

- Poor infrastructure: DTR suffers from poor funding, including that of NTCA, which seldom reach on time. The vulnerable areas do not have appropriate infrastructure to support protection and inadequacy of arms, ammunitions, field equipments affect effective protection of BTR.
- Inadequacy of field staff: There is only a handful of regular field staff (4 Foresters and 7 Forest Guards). The field protection and even the office management is run by temporary staff (Muster Roll staff), who are inadequately trained.
- Long international border: DTR connects with Bangladesh in the west through the hills. There is always possibilities of tribal people moving into DTR from border areas, which, at a few points are protected by the Border Security Force.
- Poor connectivity: In the northern tip of the core, a poorly maintained road connects Mizoram to Tripura and similarly, there is a connecting road in the southern tip. Very few trails exist that hamper movement of staff for protection duties. On the other hand, the road connecting Tripura remain open all the time and helps people to come out to places like Aizawl.
- Shifting cultivation in the buffer area: About 19 villages exist in the buffer and the villagers traditionally practice shifting cultivation. These villages at many places are located immediately beyond the core and constantly experience wild animal damage. Because of the short jhoom cycles, the recovery of once

cultivated areas does not take place and large extent of such areas is seen under invasive plant species.

- The buffer is not under the administration of Field Director.

## Suggestions for follow up action

- The CWLW must make arrangements to ensure that funding is made to the FD timely. If possible, adequate funding to Dampa may be provided by the NTCA.
- An interpretation facility may be opened at FD's office at West Fialeng for increasing opportunities of outreach. Additionally, the existing interpretation centre at Teirei needs to be developed into a professionally designed education and awareness facility. Special funds may be procured for that.
- The park suffers from very poor infrastructure. The draft TCP proposes for a number of staff, vehicles, arms and ammunition, field equipments and physical infrastructure. On a time bound basis, the proposed facilities should be made available.
- The FD must immediately start short training courses on wildlife management, ecotourism and eco-development for the staff engaged on Muster Rolls (MR). The Reserve has very few posts of regular staff and it is protected largely by the efforts of MR staff, who mostly belong to the local tribal groups. Providing them such trainings will help the Reserve in properly allocating duties and responsibilities to them for effective management.
- The FD needs to develop proper

microplans for integrated development of villages surrounding the Reserve. A full-fledged programme on eco-development planning and implementation is called for. It is necessary that professionals are engaged to develop such plan to secure proper funding for eco-development activities.

- The park is heavily infested with Mikenia weeds, especially in areas where openings have come. There is no systematic programme of weed control and habitat management. Special efforts are needed to identify key habitats, especially in view of species of high conservation significance, identification of habitat values and a systematic monitoring programme to record changes.
- MoU with Bangladesh on regular exchange of information between forests and civil administration may be helpful in protecting the border areas and improving corridor values.
- Special interpretation programmes need to be formulated for the para-military forces for making them appreciate the values of the Reserve and assist FD in protection and conservation.
- There must be concerted efforts to locate prime localities of unique animal species, including primates and lesser cats. Once identified, these localities should be effectively monitored and protected.
- There could be a Highway Patrol along the major roads.

## **Buxa Tiger Reserve**

### **Strengths**

- Biogeographically significant location: Buxa Tiger Reserve (BTR) is located at the confluence of 3 major Bio-geographic Zones viz. Lower Gangetic plains (7B), Central Himalayas (2C), and Brahmaputra valley (8A), resulting in presence of unique and rare species. In continuity with the Phipsu wildlife sanctuary of Bhutan along the northern border and forests and protected areas of north Bengal and Assam, it is a potential site for long term conservation of not only tiger and its prey base, but also the elephant.
- Catchment conservation values: Many rivers, such as Sankosh, Rydak, Jainti, Dima originate in the hills and flow through BTR to the plains supporting lives and culture of a large number of people. The seasonal flooding of plains creates a dynamic ecosystem, which allows existence of a multiple floral and faunal regime.
- Compact forests within one administration: Surrounded by human habitations, BTR exists as thick woodland of substantial size, consisting of a range of forest types and habitats providing value as carbon sink and ecological security of the region. Both, the core and buffer are managed under the unified command of the Field Director.
- Meticulous historical records of forest management: Forest management in north Bengal is historically recognized for its

meticulousness and sound protection. There are detailed historical accounts and inventories of all compartments in BTR, which could be used for development of baseline data for management. The forests are divided and mapped along well laid out fire lines that also help in mobility of staff.

- Cultural assets: The location of Buxa fort and Mahakaal temple within BTR give it a cultural significance, which could be strength, if viewed from community-centric management of visitors to these sites. BTR supports lives and culture of *Rava*, *Dupka*, *Garó* and *Mech* tribal communities, adding value to its cultural assets.
- Financial support from the State Government: BTR receives more than 80 percent of its total budgetary requirement from the State Government. It receives State funds on time and as soon as NTCA funds are released, the management is authorized to incur expenditure immediately. The financial procedures are management friendly, which allows park authorities to take required management actions on time.

### Weaknesses

- Inadequacy of Core Area: The present core of BTR, at 390.58 km<sup>2</sup>, is grossly inadequate for a viable breeding population of tiger. The core area is also not inviolate, as there are about 9 human settlements within the core. The problem gets compounded due to frequent influx of villagers from the buffer and fringe areas to various parts of the core. The constitution

of core has left potential areas like *Raimatang* block, parts of *Adma* block, *Nimati* block and some parts of west and east *Damanpur* Range, outside the core. On the other hand, areas like *Marakata* and *Narathali* blocks, parts of south *Rydak* range, major parts of *Hamiltanganj* range are delineated as cores. Some of these areas are degraded and affected by frequent movement of humans and cattle.

- Inability of management to address resource utilization issues of the proximate societies: BTR is surrounded by numerous villages and tea gardens. There are about 30 forest villages inside the Reserve and 4 Fixed Demand holdings. Large human population for resource dependence and associated cattle grazing have cumulatively enhanced degradation of forests, which is reflected in wide spread occurrence of invasive species, such as *Mikania*, *Eupatorium* and *Ageratum* etc. and large openings. At many places, the openings created to promote grass growth have also been covered by such species. While there are Joint Forest Management Committees and Ecodevelopment Committees and whereas, BTR has undergone a reasonably long cycle of eco-development programme under India Ecodevelopment Project; the relationship between BTR management and local people has hardly improved. Notwithstanding the fact that some promising income generation programmes, especially in the area of ecotourism (such as in Poro Eco-spot) and SHG

formation (such as Chetna SHG's sale outlet at Damanpur check post) have been successfully demonstrated, such experiments are not widespread and primary problem of resource use by proximate societies have not been tackled effectively.

- Non-integration of timber management with wildlife management: BTR has prepared the Tiger Conservation Plan, but still operates in the buffer area under the prescriptions of the Working Plan. The Working Plan has completed its duration by 2009 and a Working Scheme has been submitted by BTR for management of forests in the buffer, primarily for timber harvest. Whereas, core and buffer areas and critical wildlife habitats have been notified, integrated management of BTR from the perspective of conservation of tigers, its prey base and habitats and management of proximate societies for supporting conservation have not found adequate attention so far.
- Inadequacy in habitat management: BTR has a number of water holes and artificial salt licks. In addition, there have been attempts to open canopy in the teak plantations to promote growth of palatable grasses. However, monitoring to understand their efficacy and use, impact on the habitats and evaluation protocols are absent.
- Socio-political issues: In BTR, the inability to relocate villages from within the core area could be attributed to such issues. In spite of all the statutory committees being

in place, the relocation has not taken place due to problems associated with socio-political environment. It also affects staff management, as various staff welfare organizations work within their political domain and require a certain number of frontline staff to remain at headquarters for taking up staff welfare issues with authorities, resulting in inadequacy of staff for frontline jobs.

- Inadequate staff amenities: While, BTR is relatively better than many other places in terms of providing amenities to staff, yet inadequacy of park related allowances, field equipments, arms and ammunition, communication equipments lower the moral of frontline staff. It was reported by BTR authorities that a promise made by NTCA during September 2008 to double the Project Tiger Allowance has not been fulfilled so far.
- Non functional Foundation: BTR has a notified Foundation, but remains non-functional for want of funds. There has been no attempts to innovate generation of funds for the Foundation and management feels that the funds for the Foundation should be provided by NTCA. While there are opportunities like ecotourism to generate some funds for the Foundation on regular basis, no attempt has been made to make it functional.
- Inadequacy of training in wildlife management: Most of the senior positions, including that of the Field Director are filled by persons, who have not undergone proper wildlife management training. Even



though, BTR has regular refresher courses for the front line staff, such courses remain ineffective without trained leadership steering them towards desired goal of management of a tiger reserve. For long term conservation of BTR, it would be essential to shift focus from timber harvesting oriented management to tiger habitat management. Furthermore, eco-development has to play a central role, not merely as support for rural development but as an instrument of empowerment of the fringe area communities and good governance.

### **Suggested follow up action**

- Institute dialogue with the owners of Tea Gardens to make arrangements for fuel wood production for their own labourers. The owners, managers should be made accountable for the welfare of their own people. It would be necessary to involve district administration into this activity.
- Design forestry operations for habitat management and local livelihood security. Many new plantations are full of invasive species. Such plantations in the vicinity of villages may be developed as fuel wood lots and management of such wood lots be taken up through JFMC or EDC. It would be better that all participatory committees are referred to as EDC, as they would be living in close proximity of Tiger Reserve.
- Prepare microplans for utilization of NREGS funds for watershed management, water harvesting, pasture development etc. and institute mechanisms to secure funds from local administration for this.
- Encourage initiatives such as being done by the NGO – NEWS in helping villagers to procure better breed cattle and stall feeding.
- Develop ecotourism as community centric activity and prepare community members to manage ecotourism. Discuss with State Government mechanisms to levy eco-development surcharge on entry of vehicles and tourists and place such funds in the Foundation.
- Obtain services from nearby academia, research institutions or NGOs to understand and monitor vegetation changes in areas that have been opened up, or where weed eradication is taking place.
- Work with the district administration and local Panchayths to hasten the village relocation programme.
- Compile the animal sighting records systematically and develop occupancy maps for effective monitoring of wild animals, including the tiger.
- Finalize Special Tiger Protection Force (STPF) deployment in helping management against illegal activities, especially poaching.
- There could be proper institutionalized mechanism for co-ordination with the neighbouring Bhutan for protection.

## Sundarbans Tiger Reserve

### Strengths

- A b s e n c e o f a n y villages/settlements in the Tiger Reserve.
- One of the largest standalone tiger populations in the country in a unique habitat of mangroves.
- Ecological contiguity of habitat (mangrove forests) on all three side of the area i.e. Bangladesh Sundarbans on the East, adjoining forest Division 24 Parganas South on the West and Sajnekhali Wildlife Sanctuary and adjoining Reserve Forest area in the North.
- Extremely rich in biodiversity, especially populations of many endangered animals like horse shoe crabs, estuarine crocodile, Irrawady and Gangetic dolphins, olive ridley turtles, king cobra etc.
- Largest contiguous patch of mangrove forest (along with Bangladesh) in the world and constitutes 60% of the total mangrove forest area in the country.
- A World Heritage Site and a globally recognized Biosphere Reserve.
- Compact and dense nature of forest acts as a natural shelter belt and protects the hinterland, especially Kolkata and its surrounding areas from natural calamities like tidal surges and cyclones.
- The mangrove ecosystem is highly productive, self sustaining with a high regenerative capacity and serves as nursery for the finfish and

shellfish. It also serves as the source population for the entire eastern coast fisheries.

- Pride of the Forest Department of West Bengal with adequate resources from the State and young, enthusiastic and knowledgeable team of officers and staff.
- Appreciable levels of conservation awareness among the people living around the Reserve.
- Dedicated staff trained in tranquilization to effectively deal with tiger straying emergency.

### Weaknesses

- Porous international border with Bangladesh.
- High population density coupled with poor socio- economic condition of people living in the fringe areas and proper infrastructure leading to high resource dependence.
- Inadequate number of protection camps at strategic locations, coupled with old weapons and slow moving boats.
- Absence of drinking water at most places.
- Lack of proper research and monitoring of ecological processes and population dynamics of key species.
- Inadequate inter-agency coordination.
- Unrestricted number of tourist, unplanned growth of tourist lodges in the vicinity, absence of waste management guidelines, and

inadequate number of trained tourist guides.

- Man eating propensity of the tiger within the forest areas.

### **Suggestions for follow up actions**

- Institute a system of registration of private tourist boats, so that the Reserve is aware of the number of boats and their movement within the waters of the Reserve.
- Increase the number of interpretation centers to engage the large volume of tourists that visit the Reserve.
- While the Reserve has an excellent record keeping of wildlife sighting, it is essential that the daily sighting records are converted into occupancy statements using elementary statistics.
- Improve monitoring of vegetation changes, especially the grassy blanks and also the release of the spotted deer.
- Introduce mechanisms to liaise effectively with rural development departments, revenue departments, tourism departments etc. to enhance development works in the villages surrounding the Reserve.
- While ecodevelopment efforts are fairly significant, there is need to upscale current livelihood security programmes into integrated area development programmes. Inter-agency coordination and support from professionals with sociology background will be useful in this regard.
- Scope for raising conservation

awareness among the fringe populations and tourist visiting the area.

- Work towards finalizing an MoU with Bangladesh to ensure prevention of smuggling of timber, NTFPs and wildlife articles.
- Encourage research and monitoring by local institutes, especially in the area of climate change, sea level rising and habitat changes.

### **Recommendations**

- An institutionalised mechanism for at least bi-annual meetings with officials of adjoining countries – exchange of information.
- MoUs with SSB & NTCA to control trafficking with Bangladesh, Bhutan & Myanmar.
- More inputs to make Tiger Reserve Foundation functional.
- Mechanism in the states (except West Bengal) for timely release of funds to the TRs.
- A review of the functioning of State level Steering Committee.
- Critical assessment of the TCPs to help have a proper plan.
- Close monitoring of/technical assistance by NTCA for implementation of TCPs – form a *compatible* team depending on the area and report to NTCA – include expert and good and capable NGO representative.
- Regional level meetings of TR managers to exchange ideas and discuss problems. One TR Director to co-ordinate and an observer from NTCA

- Initiation of Ecodevelopment activities involving some partner NGOs for better planning, implementation and reciprocal commitment support – An ACF exclusive for EDC
- Involving selected stake holders in planning and implementation to mitigate the threats
- Monitoring mechanisms to be in place for selected indicator species and habitat and technical support to be provided by NTCA, wherever necessary
- Crash training programmes (site level/state level/regional) on various aspects at least for the senior/field level managers
- Special recruitment drive for the TR (exclusive with no transfer) – preferably from the local/regional – experience in Dampa – brings good will and stay in place
- There are Tiger Reserves with several status (Biosphere Reserve, Elephant Reserve and World Heritage Site). Such reserve can have one composite Plan with different budget provisions.
- The landscape comprising of more than one Tiger Reserve and a number of Forest areas with different status and connectivity may be treated as a landscape and brought under common management strategy and action plan (Eg. Manas, Buxa and the adjoining forests).
- Upload a copy of the TCP on website for better transparency

# 4

## The Way Forward









## The Way Forward

The present MEE process has provided valuable insights into the management processes and practices in all tiger reserves. The 2010-11 Management Effectiveness Evaluation indicates that there has been an overall improvement in the management effectiveness of tiger reserves compared to 2005-06 assessment. The five tiger reserves falling in the 'Red Corridor' would require special measures to deal with their current situation. The Tiger Conservation Plans (TCPs) and Annual Plan of Operational (APOs) will have to be appropriately aligned to respond to the outcomes of this assessment in order to enhance the management effectiveness of tiger reserves in a time-bound manner. The APOs will also have to take into account the strengths, weaknesses and actionable points as described in Section 4 of the report.

The NTCA in collaboration with WII and Zoological Society of London (ZSL) has developed a '*Monitoring System for Tigers - Intensive Patrolling and Ecological Status (M-STrIPES)*' for managers to assess the status of protection, ecological and biotic pressures and when adaptive management is necessary. The M-STrIPES would *inter-alia* provide quantitative data/ information, which could be used in MEE process. The M-STrIPES needs to be pilot tested and then implemented in all tiger reserves so that its results can be integrated with the next cycle of MEE process.

# ANNEXURE-I

## Landscape Clusters for Independent Management Effectiveness Evaluation of Tiger Reserves

S. No.	Cluster	Name of Tiger Reserve	Name of the Landscape	State
1.	Cluster-I (8 Nos.)	Dudhwa	SG	Uttar Pradesh
2.		Corbett	SG	Uttarakhand
3.		Ranthambhore	CI & EG	Rajasthan
4.		Sariska	CI & EG	Rajasthan
5.		Melghat	CI & EG	Maharashtra
6.		Pench	CI & EG	Maharashtra
7.		Tadoba-Andhari	CI & EG	Maharashtra
8.		Sayadari	CI & EG	Maharashtra
9.	Cluster-II (6 Nos.)	Bandhavgarh	CI & EG	Madhya Pradesh
10.		Bori-Satpura	CI & EG	Madhya Pradesh
11.		Kanha	CI & EG	Madhya Pradesh
12.		Panna	CI & EG	Madhya Pradesh
13.		Pench (M.P.)	CI & EG	Madhya Pradesh
14.		Sanjay	CI & EG	Madhya Pradesh
15.	Cluster-III (8 Nos.)	Valmiki	SG	Bihar
16.		Indravati	CI & EG	Chhattishgarh
17.		Achanakmar	CI & EG	Chhattishgarh
18.		Udanti-Sitanadi	CI & EG	Chhattishgarh
19.		Simlipal	CI & EG	Orissa
20.		Satkosia	CI & EG	Orissa
21.		Nagarjunsagar-Srisaillam	CI & EG	Andhra Pradesh
22.		Palamau	CI & EG	Jharkhand
23.	Cluster-IV (9 Nos.)	Bandipur	WG	Karnataka
24.		Nagarhole	WG	Karnataka
25.		Bhadra	WG	Karnataka
26.		Dandeli-Anshi	WG	Karnataka
27.		Periyar	WG	Kerala
28.		Parambikulam	WG	Kerala
29.		Kalakad-Mundathurai	WG	Tamil Nadu
30.		Annamalai	WG	Tamil Nadu
31.		Mudumalai	WG	Tamil Nadu
32.	Cluster-V (8 Nos.)	Namdapha	NE & BF	Arunachal Pradesh
33.		Pakhui	NE & BF	Arunachal Pradesh
34.		Kaziranga	NE & BF	Assam
35.		Manas	NE & BF	Assam
36.		Nameri	NE & BF	Assam
37.		Dampa	NE & BF	Mizoram
38.		Buxa	NE & BF	West Bengal
39.		Sunderbans	Sunderbans	West Bengal

SG : Shivalik- Gangetic Plain Landscape Complex  
CI & EG : Central Indian Landscape Complex and Eastern Ghats Landscape Complex  
WG : Western Ghats Landscape Complex

## ANNEXURE-II

## Committees for Independent Management Effectiveness Evaluation of Tiger Reserves

S. No.	Cluster	Name of Tiger Reserve	Name of the Landscape	State	Chairperson	Members
1.	Cluster-I (8 Nos.)	Dudhwa	SG	Uttar Pradesh	Dr. P.C Kotwal	1. Sh. Ajay Desai 2. Dr. Jamal A. Khan
2.		Corbett	SG	Uttarakhand		
3.		Ranthambhore	CI & EG	Rajasthan		
4.		Sariska	CI & EG	Rajasthan		
5.		Melghat	CI & EG	Maharashtra		
6.		Pench	CI & EG	Maharashtra		
7.		Tadoba-Andhari	CI & EG	Maharashtra		
8.		Sayadari	CI & EG	Maharashtra		
9.	Cluster -II (6 Nos.)	Bandhavgarh	CI & EG	Madhya Pradesh	Shri V. B. Sawarkar	1. Dr. Erach Bharucha 2. Shri Rajeev Sharma
10.		Bori-Satpura	CI & EG	Madhya Pradesh		
11.		Kanha	CI & EG	Madhya Pradesh		
12.		Panna	CI & EG	Madhya Pradesh		
13.		Pench	CI & EG	Madhya Pradesh		
14.		Sanjay	CI & EG	Madhya Pradesh		
15.	Cluster -III (8 Nos.)	Valmiki	SG	Bihar	Dr. R.L. Singh	1. Shri R.K. Dogra 2. Ms. Prema S. Bindra
16.		Indravati	CI & EG	Chhattishgarh		
17.		Achanakmar	CI & EG	Chhattishgarh		
18.		Udanti	CI & EG	Chhattishgarh		
19.		Simlipal	CI & EG	Orissa		
20.		Satkosia	CI & EG	Orissa		
21.		Nagarjunsagar-Srisaillam	CI & EG	Andhra Pradesh		
22.		Palamau	CI & EG	Jharkhand		
23.	Cluster -IV (9 Nos.)	Bandipur	WG	Karnataka	Shri C.K. Sreedharan	1. Dr. Yogesh Dubey 2. Dr E.A Jayson
24.		Nagarhole	WG	Karnataka		
25.		Bhadra	WG	Karnataka		
26.		Dandeli-Anshi	WG	Karnataka		
27.		Periyar	WG	Kerala		
28.		Parambikulam	WG	Kerala		
29.		Kalakad-Mundanthurai	WG	Tamil Nadu		
30.		Annamalai	WG	Tamil Nadu		
31.		Mudumalai	WG	Tamil Nadu		
32.	Cluster -V (8 Nos.)	Namdapha	NE & BF	Arunachal Pradesh	Shri H.K. Choudhury	1. Dr. D.S. Srivastava 2. Dr. P.S. Easa
33.		Pakhui	NE & BF	Arunachal Pradesh		
34.		Kaziranga	NE & BF	Assam		
35.		Manas	NE & BF	Assam		
36.		Nameri	NE & BF	Assam		
37.		Dampa	NE & BF	Mizoram		
38.		Buxa	NE & BF	West Bengal		
39.		Sunderbans	Sunderbans	West Bengal		

SG : Shivalik- Gangetic Plain Landscape Complex

CI &amp; EG : Central Indian Landscape Complex and Eastern Ghats Landscape Complex

WG : Western Ghats Landscape Complex

## ANNEXURE-III

## WII Faculty for Technical Backstopping of Independent Management Effectiveness Evaluation of Tiger Reserves

1. Shri P.R. Sinha, Director
2. Dr. V.B. Mathur, Dean
3. Dr. Y.V. Jhala, Scientist-G
4. Shri Qamar Qureshi, Scientist-F

S. No.	Cluster	Name of Tiger Reserve	WII Faculty
1.	Cluster-I (8 Nos.)	Dudhwa	Shri P.C. Tyagi, Scientist-F
2.		Corbett	
3.		Ranthambhore	
4.		Sariska	
5.		Melghat	
6.		Pench	
7.		Tadoba-Andhari	
8.		Sayadari	
9.	Cluster -II (6 Nos.)	Bandhavgarh	Shri S. Sen, Scientist-F
10.		Bori-Satpura	
11.		Kanha	
12.		Panna	
13.		Pench (M.P.)	
14.		Sanjay	
15.	Cluster -III (8 Nos.)	Valmiki	Dr. V.K. Melkani, Scientist-F
16.		Indravati	
17.		Achanakmar	
18.		Udanti-Sitanadi	
19.		Simlipal	
20.		Satkosia	
21.		Nagarjunsagar-Srisaillam	
22.		Palamau	
23.	Cluster -IV (9 Nos.)	Bandipur	Dr. A.K. Bhardwaj, Scientist-F
24.		Nagarhole	
25.		Bhadra	
26.		Dandeli-Anshi	
27.		Periyar	
28.		Parambikulam	
29.		Kalakad-Mundathurai	
30.		Annamalai	
31.		Mudumalai	
32.	Cluster -V (8 Nos.)	Namdapha	Shri V.K. Uniyal, Scientist-F
33.		Pakhui	
34.		Kaziranga	
35.		Manas	
36.		Nameri	
37.		Dampa	
38.		Buxa	
39.		Sunderbans	

## ANNEXURE-IV

### Assessment Criteria for addressing issues relating to Climate Change & Carbon capture in the Tiger Reserves (TRs)

#### 1. **Additional Criteria on Climate Change: Is the TR being consciously managed to adapt to climate change?**

Condition	Category*	(Tick ✓)	Comment/ Explanation	Next Steps
There have been no efforts to consider adaptation to climate change in management	Poor			
Some initial thought has taken place about likely impacts of climate change, but this has yet to be translated into management plans	Fair			
Detailed plans have been drawn up 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 about how to adapt management to predicted climate change, and these are already being implemented	Very good			

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

#### 2. **Additional Criteria on Climate Change: Is the TR being consciously managed to prevent carbon loss and to encourage further carbon capture?**

Condition	Category*	(Tick ✓)	Comment/ Explanation	Next Steps
Carbon storage and carbon dioxide capture have not been considered in management of the TR	Poor			
Carbon storage and carbon dioxide capture have been considered in general terms, but has not yet been significantly reflected in management	Fair			
There are active measures in place to reduce carbon loss from the TR, but no conscious measures to increase carbon dioxide capture	Good			
There are active measures in place both to reduce carbon loss from the TR and to increase carbon dioxide capture	Very good			

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





