



Integrated Biodiversity Management A case study of Melghat Tiger reserve as a protected area, India

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Abstract

Recognizing the need to protect tiger, government initiated several measures aimed at conservation and protection of the species. Significant among them were project tiger, a centrally sponsored scheme launched in April 1973 and the India eco-development project (October 1997- June 2004) funded by external agencies. Besides, efforts were made to prevent illegal wildlife trade to ensure a viable population of tiger in India. The main activities of project tiger include wildlife management, protection measure, and specific eco-development activities. Twenty eight tiger reserve were created in 17 states between 1973-74 and 1999-2000. The project tiger directorate (PTD) in the ministry of environment and forests (MoEF) at New Delhi is responsible for providing technical guidance, budgetary support, coordination, monitoring, and evolution of project tiger while the management and implementation of the project rests with the state government concerned. The India eco-development project (IEDP) was a pilot project initiated with the assistance of the World Bank and the global environment facility to conserve biodiversity through eco-development. The project addressed both the impact of the local population on the protected areas and the impact of the protected areas on the local population and envisaged to improve the capacity of the protected area management to effectively conserve biodiversity and support collaboration between the states and the local communities in and around ecologically vulnerable areas. Melghat tiger reserve, as a protected area in the state of Maharashtra with the potential to hold viable population of the tiger. It is located in the central high land biotic province of the deccan bio-geographic zone, a largest and oldest tiger reserve in the state supports typical dry teak forest of the central India. All protected areas in the country are subject to anthropogenic pressures of various types. The present paper is based on the groundwork of melghat tiger project reserve and secondary data collection with objectives, need for monitoring tiger and its prey population for assessing the impacts of management interventions of protected areas as an effective tool for biodiversity conservation.

Keywords: Conservation, bio-geographic, management, anthropogenic.

Introduction

Project tiger is a wildlife conservation project initiated in India in 1972 to protect the Bengal tigers. It was launched on April 1, 1973 and has become one of the most successful wildlife conservation ventures. The project aims at tiger conservation in specially constituted tiger reserves representative of various bio-geographical regions throughout India. It strives to maintain a viable tiger population in their natural environment.

In 2007, there were more than 40 project tiger wildlife reserves covering an area of 37,761 km². Project tiger helped increase the population of these tigers from 1,200 in the 1970s to 3,500 in 1990s. However, a 2008 census held by government of India revealed that the tiger population had dropped to 1,411. Since then the government has pledged US\$ 153 million¹ to further fund the project, set-up a Tiger Protection Force to combat poachers, and has relocated more than 200,000 villages to minimize human-tiger interaction. The efforts did pay-off when in July 2010, the Sariska Tiger Reserve, whose tiger population was nearly wiped out in

2005, had a recorded tiger population of and according to census 2010, the total population of this big cat in India is 1750 as increased

The Study Area: Melghat tiger reserve is located on southern offshoot of the Satpura hill range in central India, also called Gavilgarh hills. The high ridge running east-west which has highest point at Vairat (1178m above MSL) forms the south western boundary of the reserve. It is a prime habitat of tiger. The forest is tropical dry deciduous in nature, dominated by teak (*Tectona grandis*).

The area is catchment to the five major rivers viz Khndu, Khapra, Sipna, Gadga and Dolar, all of which are tributaries of the river Tapi. The north-eastern boundary of the reserve is marked by river Tapi. Melghat is prime biodiversity repository of the Maharashtra state².

Nature has offered protection to Melghat in the form of rugged topography with only few entry points. The Makhala, Chikhaldara, Chiladari, Patulda and Gugamal are the large plateau amidst rugged terrain. Continuity of forests in

Satpura Hill Range, guarantees long term conservation potential of the area³.

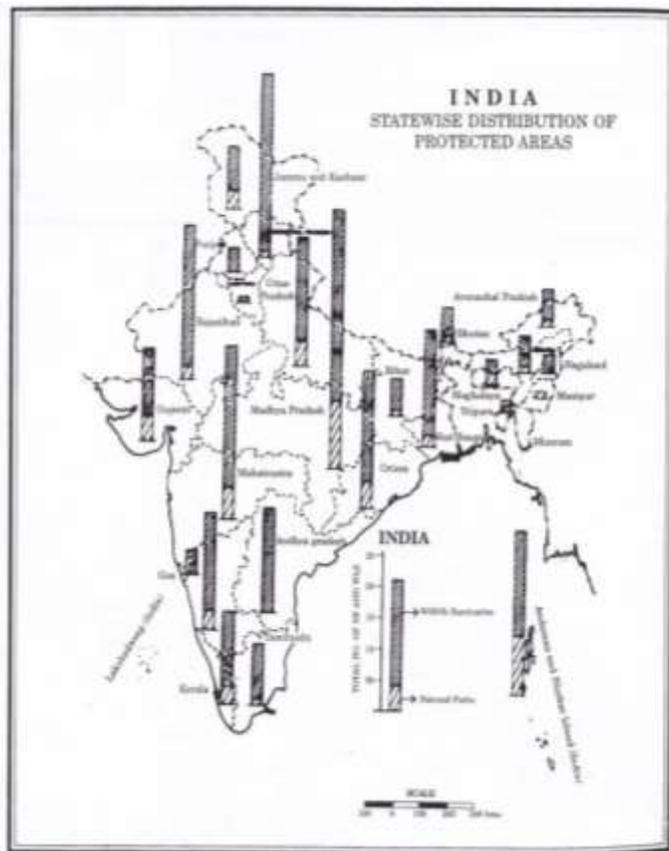


Figure – 1
India: State-wise Distribution of Protected Areas

Melghat area was declared a tiger reserve in 1974, presently, the total area of the reserve is 1676.93 sq.km. The core area of the reserve, the Gugarnal National Park with an area of 361.28 sq.km. and buffer area of the reserve, the Melghat tiger sanctuary with an area of 788.28 sq. km. (of which 21.39 sq.km. is non-forest) were together re-notified by the state government in 1994 as Melghat sanctuary. The remaining area is management as 'multiple use area'. previously, Melghat tiger sanctuary was created in 1985 with an area of 1,59,7.23 sq.km. Gugarnal National Park was carved out of this sanctuary in 1987⁴.

Aims and objectives: At the turn of 20th century, one estimate of the tiger population in India placed the figure at 45,000. The first ever all-India tiger census was conducted in 1972 which revealed the existence of only 1872 tigers⁵. A recent report published by the national tiger conservation authority estimates only 1411 adult tigers in existence in India (plus uncensored tigers in the Sunderbans). The project was launched in 1973, and various tiger reserves were created in the country based on a 'core-buffer' strategy. Management plans were drawn up for each reserve based on

the principles outlined below. Elimination of all forms of human exploitation and biotic disturbance from the core area and rationalization of activities in the buffer zone. Restricting the habitat management only to repair the damages done to the eco-system by human and other interferences so as to facilitate recovery of the eco-system to its natural state. Monitoring the faunal and floral changes over time and carrying out research about wildlife.

The project tiger was meant to identify the limiting factors and to mitigate them by suitable management. The damages done to the habitat were to be rectified so as to facilitate the recovery of the ecosystem to the maximum possible extent.

Hypothesis: conservation of tigers and their prey species faces challenges from the need for income, lack of awareness, and lack of land use policy in landscapes having tiger reserves. These landscapes should be viewed as a mosaic of different land use patterns, viz. tiger conservation and preservation, forestry, sustainable use and development, besides socio-economic growth.

Material and Methodology

A tiger atlas of India and a tiger habitat and population evaluation system for the country is being developed using state-of-the-art technology. This involves: mapping, data acquisition and GIS modeling. Field data collection and validation. Data maintenance, dissemination and use.

Satellite data is being used and classified into vegetation and land use maps on a 1:50,000 scale, with digitized data relating to contour, villages, road, drainage, administrative boundaries and soil. The spatial layers would be attached with attribute data, viz. human population, livestock population, meteorological data, agricultural information and field pertaining to wildlife, habitat for evolving regional protocols to monitor tiger and its habitat.

Review of Literature: Botanical Survey of India (BSI) was involved in preparation flora of Melghat. Zoological survey of India (ZSI) has completed a 3- year survey of the area. The survey documentation is in progress. Medicinal plant conservation area has been established with the help of foundation for revitalization of local health traditions (FRLHT,) Bangalore. Wildlife institute of India (WII) has completed 3-year research project on management of biodiversity in central India. Another project on integrated bio-diversity management in Satpura hill range has been initiated. few research works regarding the bio geographical studies done by the scholar of Amravati university and Bombay natural history society on Melghat tiger reserve has referred.

Conservation History: Melghat area was declared a tiger reserve in 1974, presently; the total area of the Reserve is

1976.93 sq.km. The core area of the reserve, the Guarnal national park with an area of 361.28 sq.km., and buffer area of the Reserve, the Melghat Tiger Sanctuary with an area of 788.28 sq.km. (of which 21.39 sq.km. is non-forest) were together re-notified by the state government in 1974 as Melghat Sanctuary. The remaining area is management as 'multiple use area'. Previously, Melghat Tiger Sanctuary was created in 1985 with an area of 1597.23 sq.km. Gugarnal National Park was carved out of this Sanctuary in 1987. The Gavilghar fort on the Chikhaldara plateau and Narnala fort abetting South Eastern part of Melghat Tiger Reserve add to the aesthetic values of the area. The visitors to these archeological monuments enjoy serene forests in the backdrop.

Table- 1
Animal Census

Sr.No.	Animal	2001	2004	2007	2010
1	Tiger	71	71	72	74
2	Leopard	57	57	69	82
3	Gaur	2973	2139	1528	1765
4	Sambar	2791	2796	2793	2517
5	Chousinga	132	142	138	144
6	Nilgai	254	268	285	236
7	Barking Deer	1565	1672	1119	1342
8	Wild boar	3988	3356	2178	2032
9	Monkey	4995	5089	658	758
10	Sloth bear	136	185	201	198
11	Cheetal	265	238	421	321
12	Wild dog	139	202	296	294
13	Hyena	50	42	49	37
14	Jackal	97	51	95	61

Major flora and Fauna: More than 700 naturalized plant species have been enlisted in Flora of Melghat. These species belong to about 400 genera representing as many as 97 families. There are 90 tree spp., 66 shrubs spp., 316 herbs spp., 56 climbers, 23 sedges and 99 grass species along with 60-70 newly identified species. Teak is the predominant tree species. The common associated are Lagerstroemia parviflora, Lannea coromandelica, Emblica officinalis, Terminalia tomentosa, Anogeissus Latifolia and Oujenia oojeinesis, Bamboo (Dendrocalamus strictus) is wide spread. Mammals: Tiger, Leopard, Sloth bear, Wild dog, Jackal, Sambar, Gaur, Barking deer, Nilgai, Cheetal, Chousinga, Ratel, Flying Squirrel, Wild boar, Langur, Rhesus monkey, Porcupine, Pangolin, Mouse deer Python, Otter, Black napped hare.

Management and Initiatives: Protection and habitat management are the main inputs. Issues related to high

degree of man-animal conflict are tackled on priority basis⁶. The reserve area has been divided into three zones for management and to strike a balance between the biodiversity conservation and ecologically sustainable community development, through this there are certain achievements- Canopy of forest has improved to a great extent. The population of various wild animals has increased. All forest exploitation activities like timber harvesting, fuel wood harvesting, strict protection from poaching and strict fire control. The database on faunal and floral attributes and other wildlife related activities have been created. More than 50 publications. Staff and laborers have been trained in activities like population estimation of animals, wildlife management and other activities.

Eco-development activities on pilot basis were taken up. The encouraging success was followed up with Eco-development planning under guidance of WII and Nations Development Programmed (UNDP). The response of local people is encouraging. Village Forest Protection Committee has been established in village Gullarghat, which has taken up the responsibility of Medicinal Plant Conservation. Similar committees will be established soon in few other villages. During monsoon special protection squads carry foot patrolling, to curb hunting of sambar and wild boar by local people. Similar squads are established during summer, for fire protection works. A Nature education and interpretation centre has been established at Semadoh. Around 50 thousand people visit this centre annually. Two orientation centers at Akot and Harisal, and an interpretation centre at Amravati are also working.

Discussion

Certain constraints and conflicts found in the impact assessment of this Protected Area⁷. There are no villages in the core area. There are 61 villages in the Reserve- 22 villages in the buffer zone and 39 villages in the Multiple Use Area. The human population in buffer zone and MUA is 9160 and 15506 respectively as per 1991 census. The inhabitants are mainly tribal, largely Korku tribe (80%) and others like Gond, Nihal, Balai, Gaolan, Gawali, Halbi, Wanjari etc. The livestock population of 22 villages in the buffer zones is 11024 and that of 39 villages in Multiple Use Area is 15642 as per census. There is gregarious spread of Lantana Camara and Hyptis suaveolens. Lantana is found in almost all valleys and village surroundings, where constant takes place. However it is absent on slopes. Lantana and hyptis have spread to roughly 30 per cent and 20 per cent of the area respectively. No grazing exists in the core area. The remaining area is burdened with grazing pressures of 25 to 30 thousand livestock heads. However the grazing is intense around villages and in broad valleys which are also better habitats for wild herbivores as they are the only sites with water availability. There are few incidences (on an average 12 cases per annum) of fire in the core area, affecting 10 per

cent of the area. Fires in the buffer and multiple use area of the reserve are frequent. The grassy tops of the hills (locally called 'ballas') are prone to fire. The rugged terrain makes the fire protection a difficult job. Almost 20 per cent of the gets burns annually. Poaching is rare in the core. Hunting of sambar and wild boar is done by local people. Collection of medicinal plants like Musli (*Chlorophyllum tuberosum*) is also noticed. Tiger prey base in Melghat includes gaur, Sambar, Barking deer, Wild boar, Cheetal and Chousinga⁸.

However Gaur and Sambar are in low densities. Chital, is found in few pockets and does not contribute much to the prey base Thus, the domestic cattle substantially contribute towards the prey base, 400-500 cattle are kills by tiger and leopard annually. Quite naturally, this is a matter of conflict. Injuries and killing of human beings by tiger, leopard and sloth bears is another conflict. The magnitude is indicated by the following statistics.

Table-2

Sr. No.	Year	No. of persons injured	No. of persons dead
1	2010	07 (3 Tigers, 4 Sloth Bear)	02 (Tiger)
2	2007	09 (2 Tiger, 7 Sloth Bear)	01 (Tiger)
3	2004	06 (1Tiger,5Sloth Bear)	-

People set fire to the forest to facilitate collection of NTFP, use destructive methods of harvesting gums, honey, fruits, flower, roots, tubers, medicinal plants etc. The local people have almost free access for firewood, small timber, bamboo and grasses. All this dependence is not quantified; presently the dependence on forest produce is not causing any evident impact on the forest.

Conclusion

Wildlife protection and crime risk management in the present scenario requires a widely distributed Information Network, using state-of-the-art information and communication technology⁹. This becomes all the more important to ensure the desired level of protection in field formations to safeguard the impressive gains of a focused project like 'Project Tiger'. The important elements in Wildlife protection and control are: Mapping/Plotting the risk factors, sensitivity categorization, crime mapping and immediate action for apprehending the offenders based on effective networking and communication. Space technology has shown the interconnectivity of natural and anthropogenic phenomena occurring anywhere on earth. Several Tiger Reserves are being liked with the Project Tiger Directorate in the GIS domain for Wildlife Crime Risk Management. Tiger habitats exist in environment of thousands of indigenous communities that depend on them. Therefore we cannot view these protected areas in isolation from the surrounding socio-economic realities and developmental priorities of the

Government. This calls for a cross-sector and cross-disciplinary approach.

Tiger now need a "preservationist" approach. Regional planning is important around Tiger Reserve to foster ecological connectivity between protected areas through restorative inputs with integrated land use planning¹⁰. The management plan of a Tiger Reserve, therefore, needs to be integrated in larger regional management plans. Apart from this, certain suggestions are maybe the core outcome of this assessment of the Protected Area in conservation of biodiversity- Finalization of legal status of core and buffer area as National Park and Wildlife Sanctuary respectively. Establishment of strike force to strengthen protection. Rehabilitation of few villages from buffer on priority, Eco-development in villages in the Multiple Use Area., Joint Forest Management., Staff orientation and training to improve the management capabilities and to provide them adequate essentialities to get their commitment. Building up of research and monitoring database to support conservation activities.

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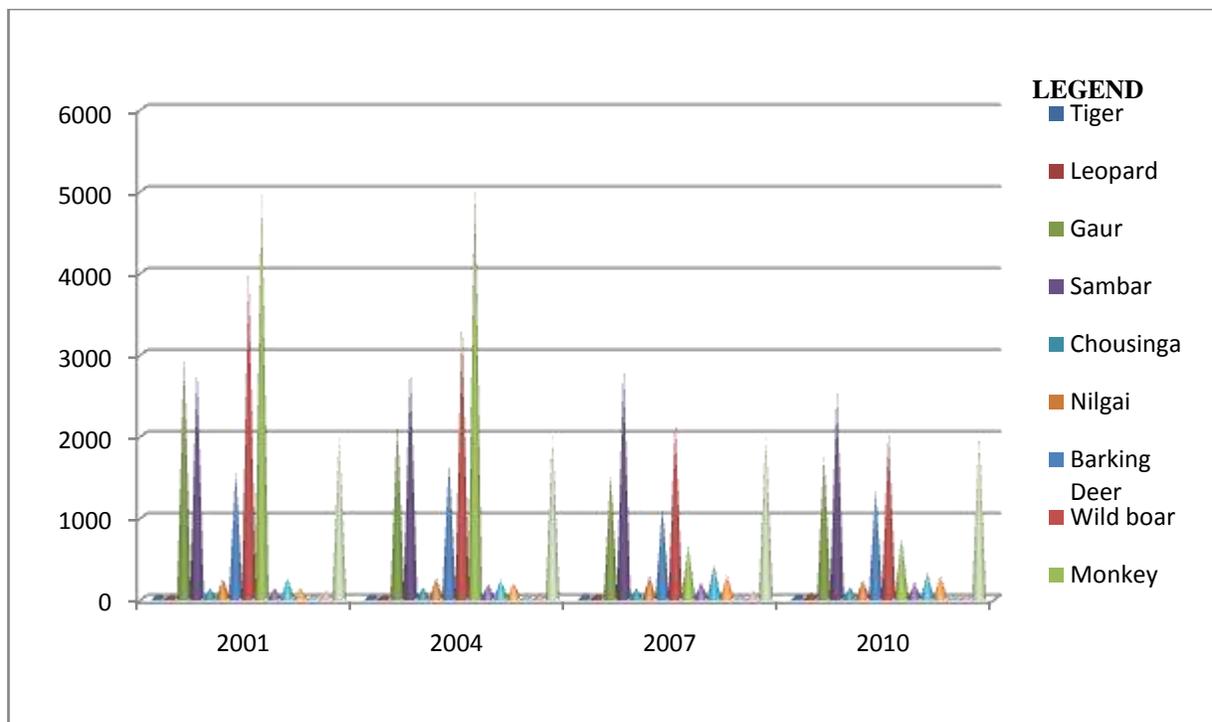


Figure-2
Animal Census, Growth Trend