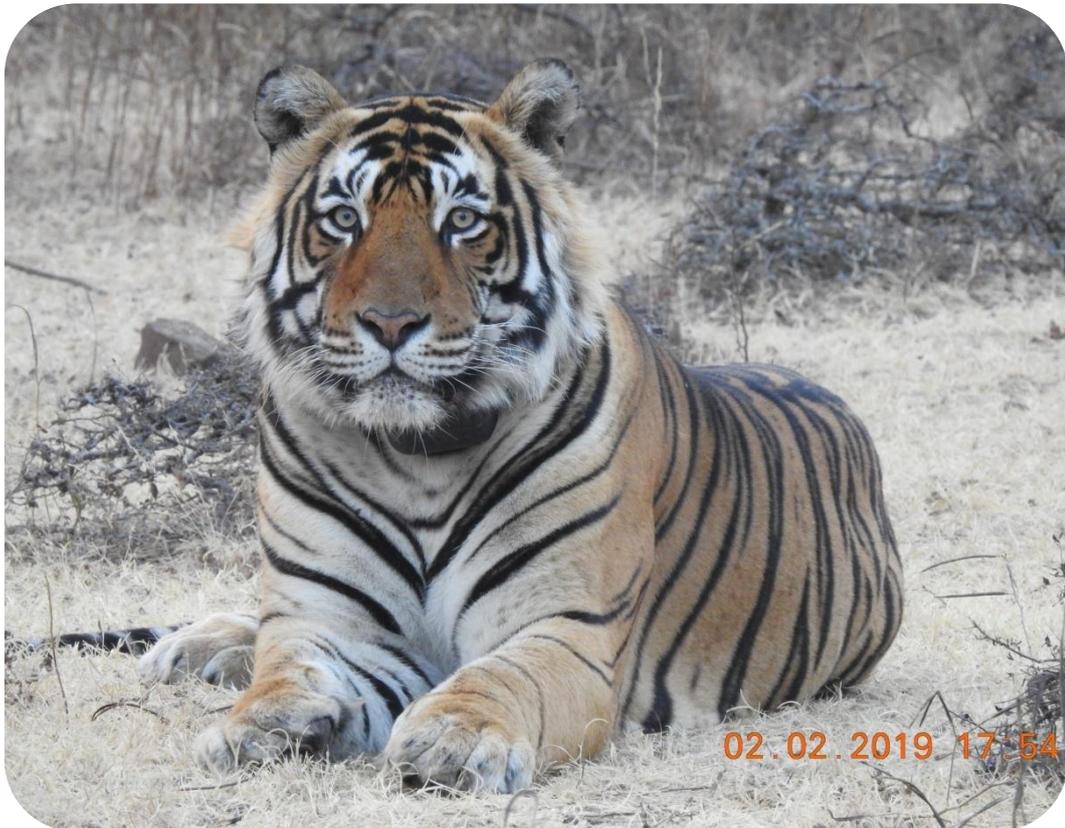




**GOVERNMENT OF RAJSTHAN
FOREST DEPARTMENT**

MUKANDRA HILLS TIGER RESERVE



TIGER CONSERVATION PLAN 2020-21 to 2029-30



GOVERNMENT OF RAJSTHAN FOREST DEPARTMENT



TIGER CONSERVATION PLAN PERIOD 2020-21 to 2029-30

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Tiger Conservation Plan – Part 1 - For CTH

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Part - A

The Existing Situation

CHAPTER - 01

INTRODUCTION OF THE AREA

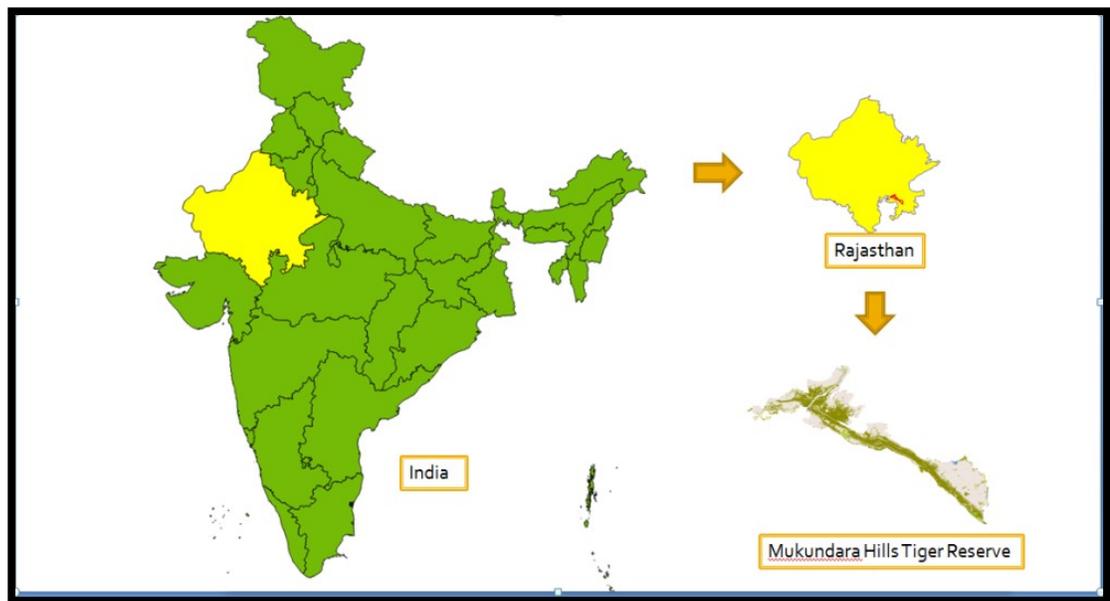
1.1 Name, Location, Constitution & Extent

1.1.1 Name:

Mukandara Hills Tiger Reserve (MHTR) is named after the Mukandara hill range which got its name from former ruler of Kota Shri Maha Rao Mukund.

1.1.2 Location:

The administrative head quarter of MHTR is situated at Kota, Rajasthan. However, this tiger reserve is spread over four districts of Rajasthan which are Kota, Bundi, Chittorgarh and Jhalawar. MHTR approximately lies between $24^{\circ} 38'$ to $25^{\circ} 7'$ N Latitude and $75^{\circ}26'$ to $76^{\circ}12'$ E Longitude.



Map 1.1.2: Location map of Mukundara Hills Tiger Reserve

1.1.3 Constitution:

Prior to the formation of the state of Rajasthan, these forests were part of the erstwhile Kota, Chittorgarh, Bundi and Jhalawar princely states and managed as hunting reserves. After independence, these forests came under the control of the

Government of Rajasthan. A part of the forest was declared as Darrah Sanctuary under Section 5 of the Rajasthan Wild Animals and Birds Protection Act 1951 vide Notification No. F 39 (2) Forest / 55 dated 07.11.1955 read with Rajasthan Entrance to the Game Sanctuaries Rules 1958 although the ex rulers retained their rights of hunting in these areas till 1971-72. Later on Jawahar Sagar Sanctuary and Mukandra National Park were notified in the years 1975 and 2007. Subsequently Mukandara Hills Tiger Reserve was notified vide S.No: F3 (8) FOREST 2012 dated 09-04-2013 which includes Mukandara National Park, Darrah Sanctuary, Jawahar Sagar Wildlife Sanctuary and part of National Gharial Sanctuary.

The 2006 amendment to the Wildlife Protection Act 1972 has defined “core” and “buffer” areas of a Tiger Reserve, the former being the critical or inviolate area and latter, the peripheral area to foster co-existence with local people for safeguarding the integrity of the core.

Some forest areas of Kota, Bundi and Chittorgarh have been transferred to administrative control of the Tiger Reserve administration which serve as multiple use area and may encompass conservation of community reserves, apart from revenue lands, private holdings, villages, towns and other production sectors.

1.1.4 Extent (Area Statement & Legal Status)

Area Statement:

The total area of Mukandara Hills Tiger Reserve is 759.99 sq km as follows:

Total Core (Critical Tiger Habitat) Area **417.17 Sq Km**

The area statements of various components are given as under:

Table-1: District wise area of MHTR Core or Critical Tiger Habitat (CTH)				
S. No.	District	Forest area (in Sq Km)	Revenue area (in Sq Km)	Total area (in Sq Km)
1	Kota	230.46	11.98	242.44
2	Bundi	97.60	0.00	97.60
3	Jhalawar	30.69	1.84	32.53
4	Chittorgarh	43.11	1.49	44.60
	Total	401.86	15.31	417.17

Table-2:Area Statement of Mukandra Hills Tiger Reserve (Core or Critical Tiger Habitat Area)

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Darrah Sanctuary	Jawaharsagar Sanctuary	National Gharial Sanctuary
1.	Chandbawri	Reserved	Kota	3132.648	3132.648	3132.648	0	0
2.	Kolipura	Reserved	Kota	458.600	458.600	458.600	0	0
3.	Rooppura	Protected	Kota	216.168	216.168	216.168	0	0
4.	Foota(Part) Compartment 23, 32	Reserved	Kota	223.40	223.40	223.40	0	0
5.	NeemKaKheda	Reserved	Kota	106.936	106.936	106.936	0	0
6.	Kala Kot	Reserved	Kota	276.168	276.168	276.168	0	0
7.	Shyodanpura	Reserved	Kota	38.296	38.296	38.296	0	0
8.	Sankad	Reserved	Kota	50.000	50.000	50.000	0	0
9.	Borkui	Reserved	Kota	284.904	284.904	284.904	0	0
10.	Bagchanch	Protected	Kota	1064.208	1064.208	1064.208	0	0
11.	KesraJhumkiya	Reserved	Kota	154.328	154.328	154.328	0	0
12.	Karondi	Reserved	Kota	100.968	100.968	100.968	0	0
13.	Kanjhar	Reserved	Kota	56.928	56.928	56.928	0	0
14.	Girdharpura	Reserved	Kota	667.304	667.304	667.304	0	0
15.	BurjwaliChouki	Reserved	Kota	1561.512	1561.512	1561.512	0	0
16.	Doliya(Part) Compartment61-68, 70-73	Reserved	Kota	1881.300	1881.300	1881.300	0	0

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Darraha Sanctuary	Jawaharsagar Sanctuary	National Gharial Sanctuary
17.	Damodarpura	Reserved	Kota	2450.488	2450.488	2450.488	0	0
18.	Darraha	Reserved	Kota	625.944	625.944	625.944	0	0
19.	Manoharpura	Reserved	Kota	1400.648	1400.648	1400.648	0	0
20.	Ghatoli	Protected	Kota	762.080	762.080	762.080	0	0
21.	Amjhar-B	Protected	Kota	45.424	45.424	45.424	0	0
22.	BurjwaliChouki-II	Protected	Kota	63.74	63.74	63.74	0	0
23.	Borabas	Reserved	Kota	3018.008	3018.008	0	3018.008	0
24.	LohDungri(Part)	Reserved	Kota	525.000	525.000	0	0	525.00
25.	Tholanpur	Reserved	Kota	635.016	635.016	0	635.016	0
26.	Mashalpura-A(Part)	Reserved	Kota	1196.184	0	1196.184	0	0
	Mashalpura-A(Part)	Reserved	Jhalawar	411.316	0	411.316	0	0
27.	Kheemuch-B(Part)	Reserved	Kota	1274.748	0	1274.748	0	0
	Kheemuch-B(Part)	Reserved	Jhalawar	181.248	0	181.248	0	0
28.	Akelgarh (Part)	Reserved	Kota	775.000	0	0	0	775.00
29.	GudhaRajpura	Reserved	Bundi	3014.528	0	0	3014.528	0
30.	Ambarani	Reserved	Bundi	6745.920	0	0	6745.920	0
31.	Mashalpura-B(Part) Compartment49,50,53,56-63	Reserved	Jhalawar	2476.600	0	2476.600	0	0
32.	KanyaTalab(Part)	Reserved	Chittorgarh	145.000	145.000	0	145.000	0

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Darrah Sanctuary	Jawaharsagar Sanctuary	National Gharial Sanctuary
33.	Peermagra(Part)	Reserved	Chittorgarh	3295.000	0	0	3295.000	0
34.	Madar Chouk	Protected	Chittorgarh	401.027	0	0	401.027	0
35.	Valapura	Protected	Chittorgarh	289.491	0	0	289.491	0
36.	Bhainsroadgarh	Protected	Chittorgarh	180.000	0	0	180.000	0
			Total (Core)	40186.078	19945.016	21162.088	17723.990	1300.00

Table-3 :Area Statement of Mukandra Hills Tiger Reserve (Revenue Village)

S.No.	Village Name	Land Type	District	Area(in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Mukundara National Park	Mukundara National Park	Mukundara National Park
1.	Kharlibawdi	Agriculture	Kota	12.79	12.79	12.79	0.00	0
2.	Rooppura	Agriculture	Kota	69.54	69.54	69.54	0.00	0
3.	Laxmipura	Agriculture	Kota	15.84	15.84	15.84	0.00	0
4.	Giridharpura	Agriculture	Kota	634.60	0	634.60	0.00	0
5.	Damodarpura	Agriculture	Kota	88.58	0	88.58	0.00	0
6.	Kolipura	Agriculture	Kota	40.57	0	40.57	0.00	0

S.No.	Village Name	Land Type	District	Area(in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Mukundara National Park	Mukundara National Park	Mukundara National Park
7.	Mukundara (Darrahgaon)	Agriculture	Kota	96.08	0	96.08	0.00	0
8.	Akhava (Bhuki)	Agriculture	Kota	165.83	0	165.83	0.00	0
9.	Ghati	Agriculture	Kota	74.00	0	74.00	0.00	0
10.	RojakaTalab		Bundi	0.00	0	0	0.00	0
11.	Jawaharsagar		Bundi	0.00	0	0	0.00	
12.	Mashalpura	Agriculture	Jhalawar	147.00	0	147.0	0.00	
13.	Narayanpura	Agriculture	Jhalawar	37.00	0	37.00	0.00	
14.	Ambarani	Agriculture	Chittorgarh	37.21	0	0	37.21	
15.	Nosera	Agriculture	Chittorgarh	29.07	0	0	29.07	
16.	Bhainsrodgarh	Agriculture	Chittorgarh	83.00	0	0	83.00	
			Total (Revenue)	1531.11	0	1381.83	149.28	



Map-1.1.4: Showing Core and buffer area of Mukandra Tiger Reserve

1.2 Notifications

Subsequently Mukandara Hills Tiger Reserve was notified vide S.No: F3(8) FOREST 2012 Dated 09-04-2013 which includes Mukandara National Park, Darrah Sanctuary, JawaharSagar Wildlife Sanctuary and part of Chambal Gharial Sanctuary.

Annexure-1

1.3 Approach and Access:

The administrative head quarter of MHTR Core is Kota which is approachable by rail and road from Jaipur and Delhi. Kota is approximately 250 km from Jaipur by road and 300 km from Delhi by rail. Kota falls on Bombay- Delhi broad gauge railway line. From Kota tourists can visit Darrah, Jawahar Sagar, Kolipura, Raontha and Gagron which are situated approximately 40-50 km away from district headquarters.

1.4 Statement of Significance:

Mukandra Hills Tiger Reserve Core displays all the intricacies of natural ecosystem in the form of various ecosystem pyramids of different producer-consumer chains, geological history, and river orientation, management of wild

habitat and watershed development and management. Beautiful Chambal gorges and unique landscape also form part of MHTR Core.

Mukundara Hills Tiger Reserve Core comprises of fairly dense forest (canopy density 0.6 to 0.7). Dhok & Khair are the predominant species. Several species of algae, fungi, bryophytes, pteridophytes and angiosperms are available here. It is also rich in tuberous plants. Valley and streams are habitat of several species of medicinal plants. A large number of them are very vital from ethno medical view. It is connected to Ranthambhore through the forests of Bundi and Kota districts.

MHTR Core was once a very good habitat of India's national animal and flagship species tiger. Besides the highly endangered Indian Tiger, the reserve also harbours a wide range of faunal species some of which figure prominently in the IUCN Red Data List. MHTR renders protection to rare and endangered fauna such as leopard, sloth bear, wolf, four horned antelope, chinkara, black buck, crocodile, smooth coated otter, Gagrani parakeet, vulture, kingfisher etc.

MHTR Core serves as catchment of rivers like Kalisindh, Ahu, Amjhar, Eru, Brahmini, and Chambal. Water bodies such as Laximpura talai, Giridharpura talav, Bewada Talai, Kadap Ka Khal and Chambal River attract lot of migratory birds. It also has some important archaeological sites such as Gargon Fort which is a UNESCO World Heritage site, Abli Meeni ka Mahal, Raontha Mahal, Badoli group of Temples etc. Some of important religious pilgrimage scenic sites are Garadia Mahadev, Gaperath, Ambarani Mataji, Nahar Singh Mataji etc.

Hence MHTR Core provides an ideal attraction to tourists. There is also a good opportunity for promotion of ecotourism which has got enhanced with reintroduction of tigers in the reserve.

A. Conservation values:

The critical tiger habitat / core area of Mukandra Hills Tiger Reserve is home to the Royal Bengal tiger (*Panthera tigris*), leopard (*Panthera pardus*) and jungle cat (*Felis chaus*). Mukandra also shelters striped hyena (*Hyena hyena*), Jackal (*Canis aureus*) and the Indian fox (*Vulpes vulpes*). The sloth bear (*Melursus ursinus*) can also be seen here in its natural environs. Mukandra is teeming with

large population of blue bull (*Boselaphustragocamelus*), chinkara (*Gazella bennettii*), spotted deer or chital (*Axis axis*) and the wild pig (*Sus scrofa*). Other animals inhabiting the forests are the wolf (*Canis lupus pallipes*), blackbuck (*Antelope cervicapra*), sambhar (*Rusa unicolor*), langur (*Semnopithecus entellus*), porcupine (*Hystrix indica*), civets, badgers, pangolin, hares and a variety of snakes, three species of mongoose and marsh crocodile. The four horned antelope (*Tetracerus quadricornis*), Gaur, mouse deer, smooth coated otter, caracal and wild dog were also known to be present here in the past.

The recently reintroduced tiger is the flagship species. The forests of the Mukandra Hills Tiger Reserve Core are one of the last intact *Acacia pendula* forests of climax type in state of Rajasthan.

B. Ecological values:

The Core acts as a multiple catchment of the low land plains adjoining to the area of reserve. All the small streams originate from the catchments and supply water to all the wells in the plains and augment water table. Without these catchments capability, low land plains would not be so productive. The area has immense value in conserving water and acts as a life line for the survival of the local people around. A few water reservoirs have been constructed to harness the rainwater flowing out of the reserve. These reservoirs maintain the water table of the area throughout the year and are also important sources of irrigation. A few water reservoirs have been constructed to harness the rain water flowing out of the reserve. A few of such reservoirs are Sawanbhado Dam, Girdharpura Talab, Laxmipura Talab, Danta Talab etc.

Besides, the forests perform the functions of carbon sequestration; providing resilience to climate change; provide clean air, healthy soil, wild foods and medicines; and conserve diverse gene pool.

C. Recreational values:

The Chambal River in the northern part and the Kali Sindh River in southern part are main tourist attraction. This part of the river Chambal flows in deep gorges of Malwa plateau on the western extreme of Vindhya. Some of these

geological formations through which this river and its tributaries flow are mesmerizing and breath-taking to watch.

D. Historical values:

It also has some important archaeological sites such as Gargon Fort which is a UNESCO World Heritage site, Abli Meeni ka Mahal, Raontha Mahal, etc which point to the rich and varied history of the area.

E. Religious values:

Garadiya Mahadev Temple and Geparnath Temple are located in and in the vicinity of Tiger Reserve. Ambarani Mataji, Nahar Singh Mataji, Badoli group of temples. Etc are the other religious places.

F. Research and Education values:

Students of Wildlife Science, University of Kota take up case studies and dissertation to study on flora and fauna of Mukandra.

G. Resource values:

The Core supports local people especially the schedule tribe and backward classes who are still living inside for fuel wood, fodder and other forest produce.

1.5 Categorization of values in special domain:

The Tiger Reserve is important site that possesses Global, National, Regional and local values.

Global value: Tiger, Medicinal plants, biological diversity, Tourism.

National: Tiger -National emblem, Tourism, Endangered plant and animal communities.

Regional: Western region tiger habitat, Chambal River System, Great boundary fault of Aravali- Vindhyan Ranges, Semi-arid Eco-system. Tourism, Natural Heritage and aesthetic

Local: Employment, Fuel wood, Fodder and Livestock grazing, water catchment area for the adjoining plains.

Chapter – 02

BACKGROUND INFORMATION AND ATTRIBUTES

2.1 Boundaries:

The notified Tiger Reserve comprises legally constituted Reserve Forests, Protected Forests and Revenue Areas; from which all rights have been extinguished. There is no boundary dispute and the National Park and Sanctuary are clearly demarcated on map and on the ground with cement concrete pillars, masonry pillars and cut and cleared boundary lines of Reserve and Protected Forests. The details of boundary description are given below:

- To the North, forests of Jawahar Sagar Wildlife Sanctuary merge with the territorial forest of Kota Division and area of National Gharial Sanctuary
- In the South, it is in continuity with forests of Chittorgarh Division
- In the East, it is connected with the forests of Division Kota and Jhalawar
- In the West, territorial forest of Bundi Division and National Gharial Sanctuary are in continuity
- In the North – West, it is linked with Ramgarh Vishdhari Sanctuary through the forest of Bundi
- In the North – East, it is connected with territorial forests of Range Ladpura, Mandana, and Kanwas
- In the South – East, it is in continuity with forest of Jhalawar Range
- On the South – West, it is connected with forest of Modak Range

2.2 Geology Rock and Soil

2.2.1 Geology:

The MHTR core is a part of Vindhyan Range system. The MHTR rock is basalt in composition and consists essentially of basic pyroclastic, pyrovolcanic and accessories in the rocks. The trap is usually fine grained and dense. The colour is black and brown. At places amygdaloidal and angular cavities are filled with zeolite, calcite, chalcedony and its varieties. The trap is hard, tough and heat resistant. Geologically the area comprises of sandstone, limestone and conglomerate rocks belonging to Vindhyan super group. The general strike of the rocks is NW – SE to WSW – ESE.

Geology of the MHTR core and the adjacent area is an admixture of complex geological formations belonging to Archaen and Purana group of Algonkian, Archean and toridenian age and consists of the upper Vindhyan systems.

2.2.2 Soil:

The soil in the core of MHTR varies from clayey to clayey loam and gravel depending upon topography. Black or gray colored soil is found in patches lying upon the older formations. On the slopes the soil is sandy-to-sandy loam, shallow and covered with stones and boulders. The soil on the plateaus and other flat areas is sandy loam mixed with gravel and boulders and is reddish in color, murrum and infertile. It is generally shallow with outcrops of parent rock. In depressions along the banks of stream and in low-lying areas, the soil is clayey loam and is fairly deep. The depth of soil varies from 20cm to 2 m at few places. Soil is mixed with pebbles and boulders.

The soil in this area is mainly formed by the disintegration of the Ganugarh Shales, Samariya Shales and the Jhiri Shales intermixed with disintegrated sand stone grain. Soil of Mukandra can be divided on basis of parent material:

A. Regur or Black Cotton Soil:

The traps give rise to either a deep brown to rich red soil or to Regur (black cotton soil). Regur is rich in plant nutrients such as lime, magnesia, iron and alkalies on which cotton and certain dry crops flourish. It has the property of swelling greatly and becoming very sticky when wetted by rain. On drying, it contracts again with the production of numerous cracks.

B. Lateritic Soil:

Another product of weathering of trap is laterite, a material from which silica, alkalies and alkaline earths have been leached away, leaving behind alumina, iron, manganese and titanium. It has vermicular or pisolitic structures and contains much water. Some laterites which are highly aluminous form deposits of bauxite. The trap scraps is the vital factor in the drainage of the area acting as watershed.

C. Sandy Soil:

Most of the area of Core Zone is covered with sandy loam soil. The soil is the result of weathering of granitic gneisses. This soil type mostly occurs on gentle slope and valleys.

D. Kankar and Saline Soil:

This soil type is found in the foothills in areas with less tree cover and forest gaps. They contain large proportion of silica and orthoclase quartz and have low water holding capacity. They are generally mineral deficient and have low productivity. They are easily eroded under insufficient vegetation cover.

E. Alluvial Soil:

Alluvial soils do not really form a definite group. They represent both transported and residual soils, which may have been re-worked to some extent by water. Most of the alluvial soils are found in valleys and nala beds.

2.3 Geomorphology:

The elevation of Vindhyan scrap lands is marked with soapstones, which appear to be separated by the slate-stones. Steep escarpments on the left bank of Chambal in the north-western parts of the region appear, thereafter, there is a scrap land, which stretches upto Dholpur and Karauli areas. The uplands of Kota and Bundi are large and stony uplands where some deposits of black soils are seen here and there in the valleys. Chambal and its tributaries like Kali-Sindh and Parvati have formed a triangular alluvial basin in Kota. The hills of Bundi and Mukandra are extended to Jhalarapatan through southwestern tracts of Kota.

The tract in the Reserve Core is mainly hilly with interspersed network of streams, nallahs and rivers. The highest peak is situated in Chandbavri forest block. The network of river system is the main characteristics of this Reserve. The river Chambal drains in the Northwest, Kalisindh in the Southeast, Ahu in the East and Amjhar in the South. Many streams like Junapani, Jhamra, Kadap Ki Khal, Damodarpura etc. originate from this Reserve and feed these rivers.

2.4 Terrain:

MHTR Core consists mainly of two continuous flat topped and almost parallel hills with the narrow central ridges, which are a part of Vindhyan Range system and extend from river Chambal to Kalisindh. They are approximately 80 km in length and 2 to 5 km in width. The tract is mainly hilly with interspersed network of streams and rivers. The rivers Chambal and Eru pass through this Reserve and flow down in northern direction. Many Nallahs pass through this area and feed water to Chambal River.

The highest peak of MHTR is situated in Chandbaori forest block, which is 517 meter above MSL. The general slope of land is from South-East to Easterly direction.

2.5 Climate:

The climate of this area is sub-tropical, characterized by three distinct seasons as given below:

<u>Table-4</u>		
Season	Duration	Peak months
Summers	Mid March to Mid June	April –May
Monsoon	Mid June to September	July – August
Winters	October to mid March	December –January

2.5.1 Rainfall, pattern and distribution:

The South-West monsoon arrives during the months of July to September. Pre-monsoon showers occur during May and June. Average rainfall is 730 mm. The rainfall during the period from June-September constitutes over 90% of the annual rainfall. There is a large variation in rainfall from year to year. One or two winter showers are also experienced. The average number of rainy days is 27.

2.5.2 Temperature:

During the summer months of March to June the temperature is on a continuous rise. May and first half of June being the hottest period of the year. The maximum temperature in May and June rises up to 46°C. In the second half of June, normally pre-monsoon showers start which bring down the temperature by 3° to 5°C. After withdrawal of monsoon by the end of second week of September, days remain

hot but the nights become progressively cooler. After mid-November both day and night temperatures drop. During the winters, January is the coldest month. The daily minimum temperature may drop down around 8°C.

2.5.3 Relative Humidity:

The relative humidity is generally low in most part of the year; it becomes as low as 10 to 15 % during summer months. However during rainy days the relative humidity goes over 60 to 80%.

2.5.4 Wind:

Winds are generally light to moderate. During the pre-monsoon period the north-westerly winds are comparatively strong with occasional dust storms. The north-easterly winds during winters are mild. In the summer season, hot winds blow from the direction between SW and NW, and are known as 'loo' and have a desiccating effect. Thunder storms occur during the period from May to September. Hail may also associate with the thunder storms during the months from February to May. During the hot season, dust storms are also not uncommon. During the month from January to March, low pressure waves moving from the west affect the area when the situation of 'cold waves' develop.

2.5.5 Drought and its periodicity:

Droughts are quite common occurrence in the region. During the drought period there is an acute shortage of fodder inside and outside the core as well as the buffer areas. All the water holes tend to dry up very early and water becomes a limiting factor. It leads to severe conflict between forest staff and the villagers for the use of whatever fodder that is available inside the reserve. During the drought periods, the survival of wildlife is at stake.

2.5.6 Frosts:

Frosts are common in the month of December and January in the valleys and depressions and adversely affect regeneration of Dhonk.

2.6 Hydrology and Water Sources:

The network of river system is the main characteristic of the core area of the MHTR. The core is mainly hilly with interspersed network of streams and rivers. The

Chambal and Eru rivers pass through the core and flow down in north direction. Many nullahs pass through the core and feed water to Chambal River. The river Chambal drains in the North West, Kalisindh in the North East, Ahu in the East and Amjhar in the South. Many streams like Junapani, Jhamra, Kadap ki khal, Damodarpura etc. originate from the core area and feed these rivers. Drainage map of the MHTR is enclosed as **Annexure-2**.

2.6.1 Natural:

Chambal, Amjhar, Ahu and Kalisindh are perennial rivers but most of them flow only on the outer boundary of MHTR. Jhamra, Junapani, Selzar etc. are some important streams but they are only seasonal and remain dry for a major part of the year. Some of the springs like Ambarani, Ambapani, Karoundi, Kanjar, Koylakui, and Devkui are perennial sources of water.

2.6.2 Artificial:

The Irrigation Department of the state has constructed two dams namely Jawahar Sagar and Rana Pratap Sagar. They serve as water facilities during pinch period especially in interior areas.

The Forest Department has constructed a few water harvesting structures (WHS) in the vicinity of the core namely Mandergarh, Jhamra, Kolipura, Laxmipura etc. They contribute largely in providing drinking water to the wildlife in the vicinity during pinch period i.e. summers, especially in interior areas. The Sanctuary management has taken up water harvesting construction works like check dams, R.R. Check dams, WHSs etc. during last few years. The management has also under taken two watershed projects Kamalpura – I and Kamalpura – II with the basic objective of conservation of soil and water in the area.

2.7 Vegetation Cover Types:

2.7.1 Floral Composition of MHTR Core:

A total number of 347 indigenous and naturalized plants species belonging to 86 families can be observed in the Reserve. There are 83 trees, 37 shrubs, 48 climbers, 127 herbs, 40 grasses, 2 epiphytes, 3 parasites and 7 Pteridophytes.

2.7.1.1 The Forest Types:

According to "Revised Forest Types of India" by Champion and Seth (1968), the forests within MHTR fall under "**II Dry Deciduous Forest**". The main economically valuable species are Dhok (*Anogeissus pendula*), Salar (*Boswellia serrata*), Khair (*Acacia catechu*), Chola (*Butea monosperma*), Khair (*Capparis decidua*), Bamboos (*Dendrocalamus strictus*), Ber (*Zizyphus mauritiana*) etc. the area is having lot of ground flora comprised of shrubs, herbs, grasses and sedges, etc. The forest, scattered and sparse over a large area on various geological and soil formations vary greatly in composition. In the valleys where better soil and moisture conditions exist, the vegetation is comparatively denser. Approximately 35 % of the forest area is either occupied by bare rocks or covered with degraded and poor type of scrub growth. The growth of the principal trees is generally slow and the height is poor. On an average the height varies from 4.5 m to 7.5 m, but trees of one-meter girth and up to 12m height are also found in favourable areas.

Anogeissus pendula is the dominant tree species, covering over 90% areas of the forests. *Boswellia serrata* and *Lannea coromandelica* grow on rocks and dry slopes. *Acacia catechu* is common in valleys, whereas *Dendrocalamus strictus* is found along well-drained reaches of the streams and moist and cooler parts of the hills.

On the basis of their composition the forest of MHTR can be classified as follows:

2.7.1.2 *Anogeissus pendula* Forest:

Anogeissus pendula (Kala Dhok) is the predominant species. It is generally a slow growing, tree, but trees of one-meter girth and up to 12 m height are also found in favourable areas. At places it can be seen in the form of a scrambling bush, which is the effect of repeated browsing. In the hankas (the forest free from grazing and browsing), the crop is over mature and has started rotting at places. Kala Dhok is mostly gregarious but is also found mixed with *Acacia catechu* (Khair), *Zizyphus mauritiana* (Ber), *Disopyros melanoxylon* (Tendu), *Flacourtia indica* (Kakan), *Acacia leucopholea* (Raunj), *Lannea coromandelica* (Gurjan), *Dichrostachy scinerea* (Goya khair), *Boswellia serrata* (Salar), *Wrightia tinctoria* (Dudhia), *Sterculia urens*, *Bauhinia racemosa* (jhinjha), *Mitragyna parvifolia* (Kalam), *Zizyphus glaberrima*, etc. On higher slopes, *Anogeissus pendula* (Kaladhi)

is replaced by *Anogeissus latifolia* (SafedDhok) mixed with *Aegle marmelos* (Bel), *Boswellia serrata* (Salar), *Miliusa tomentosa* (Uum), *Dalbergia latifolia* (shisham), etc. At places, kaladhi is found in small patches with *Butea monosperma* (Chola) and *Zizyphus mauritiana* (Ber). The regeneration of dhokis mainly by coppice, seedling regeneration is generally deficient. Reproduction from root suckers can also be seen but only in areas with rich soil cover.

2.7.1.3 *Boswellia serrata* Forest:

Boswellia serrata is another dominant tree species found at the summit of hills. *Anogeissus pendula* (Dhok) is the common tree species mixed with it upto the middle of slopes. The other common tree species found are *Acacia catechu* (Khair), *Anogeissus latifolia* (Safed Dhok), *Disopyros melanoxylon* (Tendu), *Flacourtia indica* (Kakan), *Lannea coromandelica* (Gurjan), *Sterculia urens* (Kadayo), etc. as in Borawas and Kolipura area of Darrah range.

2.7.1.4 *Acacia catechu* Forest:

Acacia catechu (Khair) is scattered on hill slopes mixed with *Anogeissus pendula* and *Boswellia serrata*. The other common species are *Bauhinia racemosa* (Jhinjha), *Capparis sepiaria* (Kanter), *Wrightia tinctoria* (Dudhia), *Aegle marmelos* (Bel) and *Diospyros melanoxylon* (Tendu). Among climbers mention may be made of *Abrus precatorius* (Ratli), *Cissam pelospaireira* (Pahod Bel), *Cocculush irsutus* (Vevdi) and *Mucuna prurita* (Kavach). As the regeneration from seed is usually deficient, the khair forests are in depleted condition.

2.7.1.5 Miscellaneous Forests:

2.7.1.5.1 *Butea monosperma* Forest:

Butea monosperma (Chola) is the dominant tree species found at the foot of the hills and plains throughout the forest. *Acacia senegal* (Kumta), *Acacia leucopholea* (Raunj), *Capparis decidua* (Ker), *Vitex negundo* (Nagod), *Tecomella undulata* (Rohida) and *Moringaoleifera* (sahjana) are the other notable species of this forest.

2.7.1.5.2 Forests along nallahs:

Dendrocalamus strictus (Bamboo) is found along the nallahs in the forest with *Anogeissus pendula* (Dhok) and *Boswellia serrata* (Salar). Along the nallahs

and in the cooler parts of the forest, *Annona squamosa* (Sitaphal), *Disopyros melanoxyton* (Tendu), *Ficus racemosa* (Umara), *Ficus religiosa* (Piplo), *Lannea coromandelica* (Godla or Gurjan), *Mitragyna parvifolia* (Kalam), *Azadirachta indica* (Neem), *Phoenix sylvestris* (Khajur), *Tamarindus indica* (Khati Imli), *Woodfordia filitica* (Dhavadi) etc are also found.

2.7.1.5.3 Scrub Forest:

There are some low, rocky areas with very little top soil in the Reserve. The vegetation here is sparse and scattered with the trees assuming stunted, bushy habit. The common species encountered in this type of forest are *Aegle marmelos* (Bel), *Butea monosperma* (Chola), *Balanitesa egyptiaca* (Hingot), *Capparis decidua* (ker), *Capparis sepiaria* (Kanter), *Dichrostachy scinerea* (Goyakhair), *Grewia tenax* (Gangeti), *Nyctanthes arbortristis* (Harsinghar), *Ziziphus globarata* and *Ziziphus mummularia* (Jharberi) with climbers like *Cocculus hirsutus* (Jaljamini), *Maerua arenaria* (Orapa), *Mucuna prurita* (Karench), *Riveahypo crateriformis* (Faug), and herbs like *Achyranthes aspera*, *Indigofera cordifolia* (Bokario), *Indigofera tinctoria* (Neel), *Lepidagathis trinervis*, *Tridax procumbens* (Ghavpatta), *Urginea indica* (Junglipiyaj), etc.

2.7.2 Ground Flora:

Since the forests of this tract come mainly under the category of dry deciduous type, the ground flora is fairly dense only during the rainy season. The common herbs and undershrubs present are *Abelmoschus manihot* (Jungle Bhindi), *Achyranthes aspera* (Chirchira), *Commelina benghalensis* (Bokhna), *Hibiscus spp.*, *Indigoferacordifolia* (Bokario), *Ipomea pestigridis*, *Justicia repens*, *Lantana indica*, *Bacopa bipinnata* (Brahmi), *Euphorbia geniculata*, etc, along with common grasses like *Cynodon dactylon* (Dub), *Echinochloa colonum* (Sarno), *Ergrostis ciliaris*, *Heteropogon controtus* (Surawala), *Melanocenchrus jacquemontii* (Phulsi), etc. The flora is listed in **Annexure-3**.

2.7.3 Parasites:

The parasites *Dendro phoethafulcata* (Vahi-Hankal), *Cuscuta teflexa* (Amarbel) and *Cuscuta hyalina* (Amarbel) are common in the Reserve.

2.8 Wild fauna, habitat and trophic niches:

Mukundara Hills Tiger Reserve Core has good vegetation cover. Different

types of habitats are available in this reserve, which meet ecological, biological and ethnological requirement of the different life forms. Different animals prefer different type of habitat for food and shelter.

2.8.1 Mammals:

A large number of mammalian species are found namely Leopard, Sloth Bear, Small Indian Civet, Toddy Cat, Jackal, Hyena, Wolf, Jungle Cat, Common Langur, Common Mongoose, Ruddy Mongoose, Pale Hedgehog, Hare, Five Striped Palm Squirrel, Indian Pangolin, Porcupine, Smooth Coated Otter, Sambhar, Nilgai, Cheetal, Blackbuck, Chinkara, Four horned antelope, Monkey, Bush Rat, etc.

Mukandara Hills Tiger Reserve Core was once famous all over the country for tigers. Tigers were distributed throughout the area from Naulav to Kheda. Selzar, Ambrani, Jhamra, Laxmipura, Karoundi Kanjar forest areas were important for tiger sighting point. While the last record of tiger presence dates back to 1978, since then this famous home of tiger is devoid of this magnificent species. In the year 2003 in the month of April, a tiger 'Broken tail' suddenly appeared in the area and stayed in Selzar, Kadap ki Khaal, Karoundi, Kanjar, Ambapani etc. areas but sadly lost its life in a fatal train accident on 15th July 2003. Tigers were reintroduced in MHTR during 2018-19 from Ranthambhore Tiger Reserve. The current prey levels and habitat conditions augur well for the recovery of the tiger. Forest and prey species even today provide sufficient food and cover for tigers.

After the reintroduction of two tigers in an 82 sq km enclosure in 2018, one male tiger RBT98 dispersed from Ranthambhore Tiger Reserve and settled in the Mashalpura grasslands. Another tigress RBT83 was later translocated to provide a mate for this male.

Until the reintroduction of tigers in the Reserve, leopard was at the peak of the ecological pyramid. Leopard prefers wooded and shrubby areas and the reserve supports a fairly good population of leopards. They quite often kill the domestic livestock as well. Due to very low density of tiger, leopard is at the apex of food pyramid and is present in the whole of the tiger reserve and in surrounding forest areas of Ambarani, Gudarajpura, Kolipura, Rawtha, Ghati Mashalpura, Bevda talai, Koylakui, Jhamra, Laxmipura, Ambapani, Karoundi, Kanjar etc. Its population is

more or less static because prey population is just sufficient to support this population, the biotic interference is high and therefore the predators have to live under stress condition adversely affecting the reproduction and survival of the species.

Sloth bear is another important species, which is present in good numbers in MHTR, especially in Jhamra - Borkui areas. Sloth Bear feeds on wild fruits, honey, flowers and underground vegetation of several species. The fruits of Tendu (*Diospyros melanoxylon*), *Lantana camera*, *Ficus glomerata*, *Phoenix sylvestris*, *Aegel marmelos* etc. are also consumed by sloth bear. Sloth bear prefers wooded and inaccessible habitat. The forest areas of Junapani, Jhamra, Koylakui, Ambapani, Laxmipura, Borkui, Karoundi, Kanjar etc. form an ideal habitat for sloth bear.

Jackal and hyenas are also found living together in similar habitat conditions. Striped hyena is a nocturnal scavenger species. It feeds on dead cattle, wild animals and remains of the panther kills. Common and Ruddy mongoose is also present in the reserve.

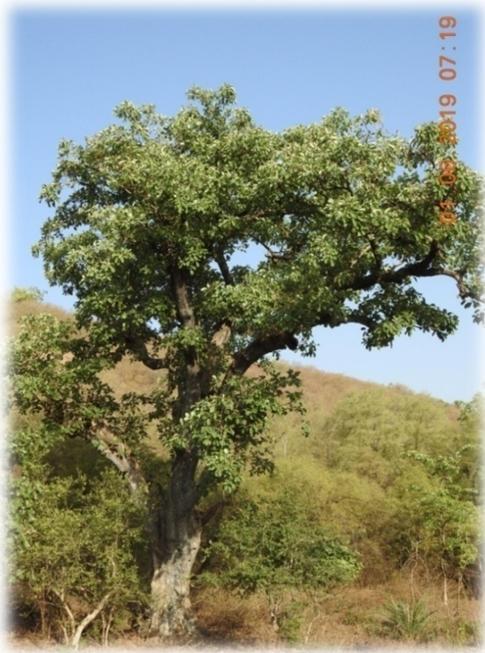
Four- Horned Antelope is a shy herbivorous animal which prefers to live in dense cover. It is locally called Bhedal. A small population of Bhedal is present here.

2.8.2 Birds

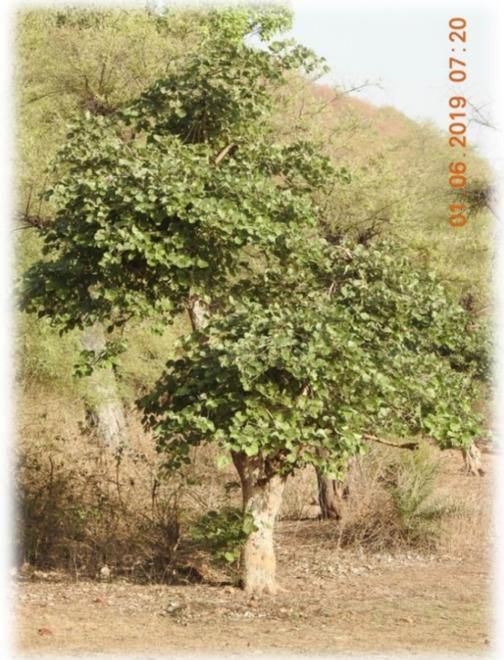
All the three types of birds namely terrestrial, arboreal and aquatic are present. Rivers on the boundaries and streams flowing within and outside the reserve along with other large water bodies like Girdharpura, Mandargarh, Ramsagar, Laxmipura and Naulav provide a variety of habitat to the avifauna. Certainly out of all the wild species, they are the least affected by the biotic pressure but for the illicit cutting of tree.

Grey jungle fowl is confined to interior areas with bushy thickets. A good number of migratory and local water fowls, Painted partridge, Grey hornbill, Blackbird, Alexandrine Parakeet, Spotted Dove, Yellow legged Green Pigeon, White-browed Fantail Flycatcher, White throated Fantail Flycatcher, Crested Tree Swift, Little Egret, Cattle Egret, Little cormorant, Small Kingfisher, Lesser Pied Kingfisher, Gagrani parakeet, Common Indian Crane, Peafowl etc. are seen quite frequently here.

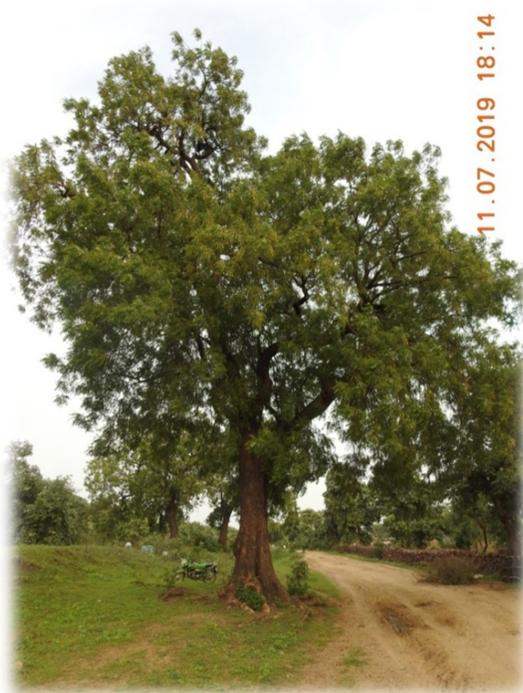
Plate1: Important Trees of MHTR



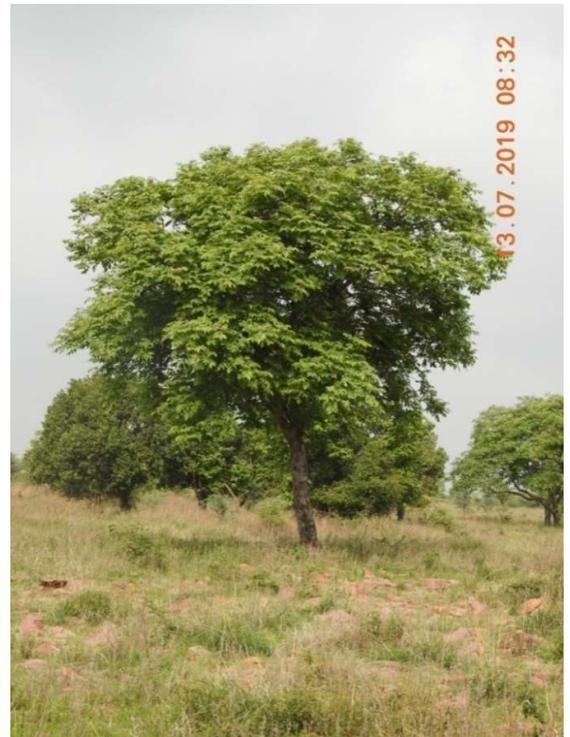
Terminalia bellirica



Butea monosperma



Azadirachta indica



Lannea coromandelica

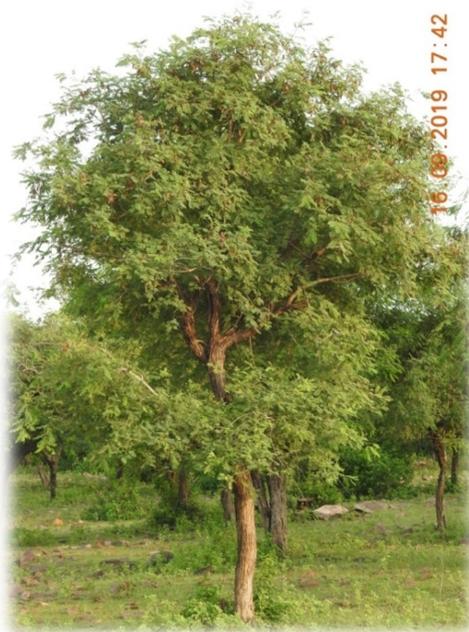
Plate2: Important trees of MHTR



Cassia fistula



Anogeissus pendula



Acacia catechu

Chambal River, Selzar, Girdharpura talav, Gaddeka mala, Bewdatalai, Gagron fort, Naulav, Laxmipura talao, Jhamra and Karoundi forest are important areas for bird watching. Grey Jungle fowl, etc. are quite common here.

Many bird species found in the area are listed in the IUCN Red data book and ZSI Reddata Book as follows:

<u>Table-5</u>			
<u>Avifauna with IUCN status</u>			
S.No.	Common Name	Latin Name	Category
1.	White-bellied Minivet	<i>Pericrocotuserthropygus</i>	Near threatened
2.	Indian Black Ibis	<i>Psendibspapillosa</i>	Near threatened
3.	Painted Stork	<i>Mycteria leucocephala</i>	Vulnerable
4.	White-winged Black Tit	<i>Parus leucomelas</i>	Vulnerable
5.	Asian Open bill	<i>Anastomus oscitans</i>	Vulnerable
6.	White-backed Vulture	<i>Gyps bengalensis</i>	Vulnerable
7.	King Vulture	<i>G.calvus</i>	Vulnerable
8.	Red-necked Falcon	<i>Falco chicquera</i>	Vulnerable
9.	Spoonbill	<i>Platalea</i>	Threatened
10.	Osprey	<i>Pandion haliaetus</i>	Threatened
11.	Common Peafowl	<i>Pavocristatus</i>	Threatened

2.8.3 Reptiles

Herpetofauna is also rich here. Python, Rat Snake, Green Whip Snake, Buff-striped Keel back, Buff-striped keelback, Green keel back, Red Sandboa, Russell's Sandboa, Trinket snake, Blind snake etc. are common non-venomous snakes of this reserve. Cobras, saw-scaled viper, Russell's viper, common Krait are the four venomous snakes. Chameleon, Common Monitor Lizard, Garden Lizard, Indian Bull Frog, Indian Balloon Frog, Indian Skipper Frog etc. are present everywhere in the reserve. Large numbers of species of non-chordates are also present here.

Fresh water crocodile and Gharial are also present in Chambal River. Starred Tortoise, Mud Flapshell etc. are quite commonly observed.

2.8.4 Amphibians

Rana tigrina, *Rana limnocharis*, *Rana breviceps*, *Rana cuanophlictus*, *Bufo andersoni*, *Bufo melanostictus*, *Microphyla ornate*, *Uperodonsystema* etc are the important amphibians here. List of major fauna found in MHTR is available at **Annexure-4**.

2.9 Conspicuous changes in the habitat since inception and Limiting Factors:

2.9.1 Climatic Factors:

2.9.1.1 Drought:

During drought conditions, natural regeneration is adversely affected. Due to heat in summers brought by hot westerly winds which blow from the mid of April to the mid of June, extreme dryness is caused throughout the forest and as the vegetation grows on rocky grounds, it gets almost baked during summer. So a large percentage of trees are stagheaded, stunted in growth and miserable in appearance. The rivers Amjhar, Ahu, Kali Sindh and Chambal mark the periphery of the tiger reserve but do not provide water and there are limited waterholes. Hence during severe drought conditions, wild animals stray out of forest area to the agriculture fields, village ponds etc. in search of water. Drought also reduces the availability of grasses and other palatable species to wild animals thus making their survival more difficult. They become weak and prone to diseases also.

2.9.1.2 Frost:

In the month of January and February, pool frost destroys young tree crop growing between the two parallel ridges of Mukundara.

2.9.1.3 Winds:

The dry hot winds sweep the area before the rains and the cyclonic gales accompanied by thunder and rain during the monsoon, cause damage, especially to the shallow rooted species like salar (*Boswellia serrata*).

2.9.2 Fires:

Fire is a great hazard to the forest. In this forest, mostly limited ground fires occur which destroy grasses, young regeneration etc. The repeated fires, year after year, have done incalculable damage to flora and fauna (especially reptile and birds). Main reasons for fire are:

1. Local hostility against the forest department.
2. Negligence of the laborers working inside the forest.
3. Graziers also set fire to obtain a fresh flush of grasses in rains.

2.9.3 Injurious plants:

There are some plants which adversely affect the forest crop in the core area. Some of these are:

2.9.3.1 Harsingar (*Nyctanthesarbortristis*):

It can be seen that in earlier felled coupes, this species has invaded the felled area like a weed by their gregarious habit and dense rapid growth. It checks natural regeneration of valuable species and thus reduces carrying capacity of the area.

2.9.3.2 Lantana camara:

It can be seen in the reserve where moisture conditions are favorable. It is a serious weed in the area and does not allow growth of the valuable species of grasses.

2.9.3.3 Insects and fungi:

Although the presence of fungi on dead refuge cannot fail to catch the eye of even a casual observer, no study seems to have been done to identify them, assess their occurrence and damage caused by them to the forest. Khair seems to suffer most from the attack of fungi.

2.9.4 Man:

Man is the worst enemy of the forest. Various kinds of damage that man is causing to the flora and fauna are:

1. Illicit felling of trees.
2. Encroachment
3. Setting of fire
4. Illegal removal of the forest produces
5. Hunting etc.

Habitat destruction in this fashion reduces the carrying capacity of the area by way of reduced supply of fodder and reduced shelter and cover for wildlife.

2.9.5 Animals:

The animals domesticated by man especially buffalo, cattle, goat, sheep, camel etc. are also enemies of the forests. Their grazing destroys young shoots and regeneration. The narrow belt of forest faces acute grazing pressure as it is surrounded by a series of villages and camps of Gurjar community.

Plate 3: Major fauna of MHTR



Panther



Sloth Bear



Black Buck



Chinkara



Sambar



Nilgai

Plate 4: Major avifauna of MHTR



Painted stork



Sarus crane



Thick knee



Sandgrouse



King vulture



Inidan roller

CHAPTER 3

STATUS OF TIGER AND CO-PREDATORS

3.1 Introduction:

A recent global analysis (Walston et al 2010) showed that 70% of wild tigers now survive in 42 “source populations” that occupy a mere 6% of the remaining habitat. Scientific studies (Karanth et al 2006) show that even though such source populations may suffer annual losses of 20% or more, if there is sufficient prey and adequate protection, the high fecundity of tigers can ensure their viability. Therefore, future efforts to reverse tiger declines must focus on reliably monitoring tiger numbers as well as survival and recruitment rates, in these threatened source populations.

Increasingly, it is being realized that the decline of large carnivores is a global conservation concern (Weber & Rabinowitz, 1996). The tiger *Panthera tigris* L. is revered as a cultural icon over much of its range and yet has been continually threatened by hunting, habitat loss, fragmentation of populations and most importantly, the depletion of its prey base (Karanth & Stith, 1999). Factors affecting prey choice in tigers differ across its distributional range, and need to be understood as it occupies diverse habitats (Sunquist & Sunquist, 1989). Such an understanding would reflect the ability of tigers to adapt to landscapes modified by human, and prove important for effective conservation planning (Bagchi et al, 2003).

3.1.1 Distribution:

The MHTR core has a good vegetation cover. Different types of habitats are available, that comes up with the biological, ecological and ethological requirements of the different life forms. The area was once famous all over the country known for tigers. Tigers were distributed throughout the area. The last roar of tiger was heard here in 2003.

Forest and prey species even today can provide sufficient food and cover for tigers (Sultana 2007). After the extinction of tigers from this area, Panther (*Panthera pardus*) became the apex species and it prefers wooded and shrubby area.

3.1.2 Re-introduction of Tiger in MHTR:

Four tigers, two male and two females have been re-introduced in MHTR. Male tiger RBT91 had strayed out from Ranthambhore Tiger Reserve and reached Ramgarh Vishdhari Wildlife Sanctuary (RWLS) in Bundi. Looking to the safety of this tiger, it was rescued from RWLS and shifted to the 82 sq km enclosure in MHTR on 3rd April 2018 and given the name MT1. Tigress RBT106 was translocated from Ranthambhore Tiger Reserve on 19th December 2018 and released in MHTR and is now known as MT2. The tigress is residing in the grassland of the 82 sq km enclosure. RBT98 male tiger had dispersed from Ranthambhore reaching Mashalpura area of MHTR, through the natural corridor along Chambal and Kalisindh River via Sultanpur. Confirmed by camera trap images on 9th February 2019, the tiger was given the name MT3 and is residing in Mashalpura area outside the 82 sq km enclosure. Tigress RBT83 from Ranthambhore Tiger Reserve was translocated to MHTR and released in the Mashalpura area of MHTR outside the 82 sq km enclosure and is known as MT4.

<u>Table-6 Re-introduction of Tigers in MHTR</u>			
S. No.	Name of Tiger	Date	Place from
1	Male MT 1 / RBT 91	03-04-2018	Translocated from Ramgarh Vishdhari Sanctuary
2	Female MT 2 / RBT 106	19-12-2018	Translocated from Ranthambhore Tiger Reserve
3	Male MT 3 / RBT 98	09-02-2019	Reached MHTR through natural corridor from Ranthambhore Tiger Reserve
4	Female MT 4 / RBT 83	12-04-2019	Translocated from Ranthambhore Tiger Reserve

3.1.3 Reproductive Capabilities:

Reproductive success is a key to survival and continued existence for any species, and understanding species' reproductive parameters (e.g., age at first reproduction, reproductive rate, litter size, interbirth interval, and breeding period) is critical to developing effective conservation strategies (Carter et al. 1999). Reproductive parameters are important to determine population turnover, potential growth rates, and are important indicators to detect the lineage persistence in a

population (i.e., lineage loss, individual fitness, population viability [Kelly 2001; Holt et al. 2003]), population viability (Kelly 2001; Balme et al. 2012), and to examine meta-population dynamics (e.g., determining the reproductive output of source populations; Smith and McDougal 1991; Chapron et al. 2008).

Reproductive data are available for some long-lived carnivores (i.e., lions *Panthera leo*; Packer et al. 1988), leopard (*Panthera pardus*); Balme et al. 2012, yet reproductive parameters of wild tiger (*Panthera tigris*) populations are sparsely available and may vary over global range (Singh et al. 2014). Tiger populations can grow rapidly if the habitat provides adequate protection, an adequate population of prey, and minimal to no poaching (Singh *et al* 2014).

Karanth (2001) reports that there is no peak in births taking place in wild tigers in India. In a study by Singh *et al* 2014 in RTR, most parturition (93%) occurred in post monsoon and winter (October - February). During the monsoon, grass biomass productivity is higher than other seasons, and prey species have maximum parturition during post-monsoon and winter (Schaller 1967; Sankar 1994). The availability of young prey species and cubs born within these periods has a higher chance of survival (Logan and Swenor 2001).

Singh *et al* 2014 suggest that there should be minimum disturbance to tigers during mating (monsoon and post-monsoon) and parturition (post monsoon and winter), and recommend the identification of dispersal corridors and restoration of connectivity that may help the long-term persistence of tigers in RTR.

Female tigers are philopatric and likely to remain in the same areas for their entire life, while males often disperse from their natal ranges (Smith *et al* 1987). Considering the gestation period of 108 days, it is assumed that females come into oestrus at about 36 months (Singh *et al* 2013).

<u>Table-7 Age of Tigers in MHTR</u>		
As on 20.03.2020		
S. No.	Name of Tiger	Age (Approx.)
1	Male MT 1 /RBT 91	72 months
2	Female MT 2 / RBT 106	42 months
3	Male MT 3 / RBT 98	47 months
4	Female MT 4 / RBT 83	78 months

3.2 Abundance Status:

Apart from the 4 tigers in Mashalpura, two inside the 82 sq km enclosure and two free ranging, the area supports fairly good population of panthers. Sloth Bear (*Melursus ursinus*) is another important species inhabiting the inaccessible habitat. The forest areas of Jawahar Sagar, Junapani, Jhamra, Koyla kui, Ambapani, Laxmipura, Borkui, Karoundi, Kanjar, etc form an ideal habitat for Sloth bear. Jhamra and Borkui are well known areas for Sloth bears.

In the herbivores mainly Sambar (*Rusa unicolor*), Cheetal (*Axis axis*) and three species of antelopes namely Nilgai (*Boselphus tragocamelus*), Chinkara (*Gazella gazella*), four horned antelope (*Tetracerus quadricornis*) are found in core. Langur (*Presbytis entellus*) is common throughout the core. Monkeys, hare, porcupine, mongoose, Indian monitor lizard are distributed throughout the reserve. Caracal (*Felis caracal*), Jungle cat (*Felis chaus*), Jackal (*Canis aureus*), Hyaena (*Hyaena hyaena*), Wolf (*Canis lupus*), Indian civet (*Viverricula indica*) and Ratel (*Mellivora capensis*) are found in core. Crocodile, Gavial, turtle and other water animals are commonly found in Chambal area of core.

3.3 Prey-Predator Relationships

3.3.1 Density and Biomass of prey species

Studies revealed that large mammalian terrestrial herbivores tend to show peak densities in grassland, grass scrub and savannah biomes, with the lowest densities found in severely arid conditions or at the other extreme in tropical evergreen forests (Eisenberg 1980), although the specific reasons are different in both cases. As a generalization, considering a rainfall gradient from low to high, e.g. from dry thorn forest to moist deciduous forests, and further to tropical evergreen forests; the mammalian biomass increases along this gradient. After a point as the forest cover becomes continuous and the forest only supports little ground cover in terms of shrubs and grass, the ungulate biomass again falls (Eisenberg & Seidensticker 1976).

For instance, the dry deciduous and scrub forest of Gir supported 383 kg/sqkm of wild mammalian herbivore biomass (Berwick 1974). Later after the formation of the National Park and under protection from grazing, Khan et al. (1996) from the same area reported a wild herbivore biomass of 2746 kg/sqkm. In

comparison, the moist semi-deciduous forests and meadows of Kanha support 1780 kg/sq km of wild herbivore biomass (Schaller 1967). The highest wild herbivore biomass of 2858 kg/sqkm has been reported from the gallery forests and alluvial flood plains of Kaziranga (Spillet 1967a). In comparison the tropical rain forest of Ujung Kulon in Java supports only about 492 kg/sqkm of ungulate biomass (Hoogerwerf 1970).

These differences are drastic enough to reflect the intrinsic differences in quality of the habitats in relation to ungulates. These differences indicate that though moisture availability is an essential factor, large herbivorous mammals in India and South-Asia attain peak densities in secondary succession forests that have an interspersion of grass, shrubs, low stature trees but not moist enough to support closed canopy woody vegetation seen in tropical evergreen forests, where most of the biomass is locked up in the trees making it inaccessible to terrestrial herbivorous mammalian forms (Eisenberg and Lockhart 1972).

Similarly density and biomass study of Ranthambhore National park reveals that the number of prey species had increased after the formation of Tiger Reserve (Management Plan). With reference to the above study, open and dry deciduous nature of the forest with a large number of trees being of low height, make the conditions more favourable for herbivorous ungulates in core. The seasonal nature of food supply also favours larger ungulate species that can build up the area to tide them over the long lean months. The area, therefore, has the potential of supporting a high ungulate biomass, but with condition that core area is made completely inviolate by human interference and all other biotic pressures. Open areas with water and relocated village sites can be used by ungulates.

Vast tracts of forested landscape formerly inhabited by the tiger *Panthera tigris* have now been lost to human habitation, causing a sharp decline in ungulate populations and confining many of the remaining tiger populations to small, isolated patches of forests (Smith et al., 1998). In India, despite 30 years of conservation efforts, an expanding human population has caused considerable reduction in the tiger's habitat and a decline in prey and tiger numbers (Seidensticker et al., 1999). With the illegal hunting of tigers for body parts accelerating the rate of local extinctions (Project Tiger, 2005), long term conservation of the tiger requires the

identification, protection and management of habitats to secure breeding populations as source pools and provide dispersal opportunities by linking habitat patches across the landscape (Johnsingh et al., 2004; Wikramanayake et al., 2004).

It has been reported by Karanth and Sunquist (1992) from Nagarhole that biomass has increased from 6,846 to 19,092 Kg/ sq km. This is because of the vast improvement in habitat quality since the inception of Project Tiger in India in 1973, and the consequent protection that these National Parks and Sanctuaries have from grazing and other related forms of biomass extraction. Hence in spite of the lower diversification of the grazers, these areas appear to be able to support equally high ungulate biomass as has been observed from the savanna of Central and East Africa. The core area is dominated by fairly open canopy, mixed forest with considerable shrub cover interspersed with small open grassy patches. Although the climatic and vegetation conditions are favorable for ungulates and other wildlife, the low number of ungulates reveals that the area is over exploited by human interference and high biotic pressure. The area is over grazed by cattle and trees are heavily lopped and pollarded. In such condition food or the competition for food with livestock becomes a limiting factor. The forest is highly degraded and do not provide shelter to wildlife. The lower breeding rates in core is due to the biotic interference that has caused serious degradation of the ecosystem, and constant presence of human and livestock has rendered areas unsuitable for herbivores and large predators.

According to Basnett (2013) in his study to estimate the population density of ungulates by using distance sampling method in Mukandara Hills National Park Core, Rajasthan, the ungulates study not only gives the result of population, biomass or prey but it also provides the types of habitat, landscape and environment. The density estimation gains added importance when viewed as a part of a long term monitoring of ungulate populations, especially in the context of the tiger reintroduction (*Jathanna 2002*). The result will serve as baseline for forthcoming Tiger project and it also provide the distribution pattern of ungulates in the Park. It will not only show the densities but will also show the present status or domination of domestic animals and human pressure on Core as well as on the ungulates. Compared to the animal densities in other protected areas (tiger reserves) with similar habitat conditions the animal density is much less, except for Nilgai.

Plate5: Re-introduction of Tigers in MHTR



MT-1 (03-04-2018)



MT-2 (19-12-2018)



MT-3 (09-02-2019)



MT-4 (12-04-2019)

If the area has to flourish as a tiger reserve there is great need to increase the population of key herbivores. This can be done through strict improvement of protection, habitat manipulation, providing water during pinch period etc.

The terrain of MHTR is highly undulating - it has hills, cliffs, rivers, grasslands and dense forest all in one landscape. The number of animals and their distribution varies as per their habitat preference and food availability. In some ranges it has been observed that animal density is very high for one species and negligible for the rest. However, missing observations on the line transects can lead to misjudged population of animals. Line transect surveys might fail to record 100% population of animals Bukland et al. (2001), Karanth et al. (2004).

<u>Table-8 Prey species showing total biomass contribution</u>				
(As per census report of 2017)				
S.No.	Prey Species	Number	Body Weight (kg)	Total Weight (kg)
1	Cheetal	244	45	10980
2	Sambar	128	125	16000
3	Nilgai	680	180	122400
4	Chinkara	221	12	2652
5	Wild Boar	924	38	35112
6	Langur	4756	8	38048

Body weights of potential prey species (kg) were taken from literature (Prater 1971; Eisenberg & Seidensticker, 1976; Karanth & Sanquist, 1995). With reference to above table, the total biomass per sq. km is 414.58 kg/sqkm.

<u>Table-9 Prey species showing total biomass contribution</u>				
(As per census report of 2018)				
S.No.	Prey Species	Number	Body Weight (kg)	Total Weight (kg)
1	Cheetal	370	45	16650
2	Sambar	115	125	14375
3	Nilgai	1032	180	185760
4	Chinkara	298	12	3576
5	Wild Boar	804	38	30552
6	Langur	4986	8	39888

Body weights of potential prey species (kg) were taken from literature (Prater 1971; Eisenberg & Seidensticker, 1976; Karanth & Sanquist, 1995). With reference to above table, the total biomass per sq. km is 670 kg/sqkm.

In a study done by Nayak, 2013 on food habits and prey selection of leopard (*Panthera pardus fusca*) in Mukandara Hills National Park, Kota, Rajasthan, India, the frequency of the percentage occurrence of prey observed in the scats of leopard through the scat analysis was 76.92% of common langur, 23.08% of jackal, 15.38% of nilgai, 7.69% of fox, 15.38% of domestic dog and 15.38% of unidentified species.

Growth of Prey Base from 2017 to 2018 estimation is mainly due to following factors.

1. Notification of National Park and abolition of grazing rights,
2. Additional protection and improved man power availability in the form of home guards.
3. Complete ban on sheep migration.
4. Translocation of herbivores from various zoos.
5. Identification of critical area like Selzar, Kharli Bavdi, Laximpura, and making them free from illegal grazing.
6. Notification of Tiger Reserve and improved awareness about the area

Limited success has been achieved however if good check posts, wireless system, barracks are constructed at critical points, considerable progress can be achieved.

3.3.2 Distance sampling:

As with any sample exercise, obtaining reliable results from a distance sampling survey depends critically on good survey design. This relies upon the fundamental sampling. This relies upon the fundamental sampling principles of replication and randomization Thomas et al. (2009). Sufficient replicate lines ensure that variation in encounter rate (number of objects detected per unit survey effort) can be adequately estimated Thomas et al. (2009). The lines should not be placed subjectively, rather a randomization scheme should be employed that gives all locations in a study region a known, non-zero probability of being covered by a transect (the 'coverage probability'). Standard analyses in Distance assume uniform coverage probability.

Field design

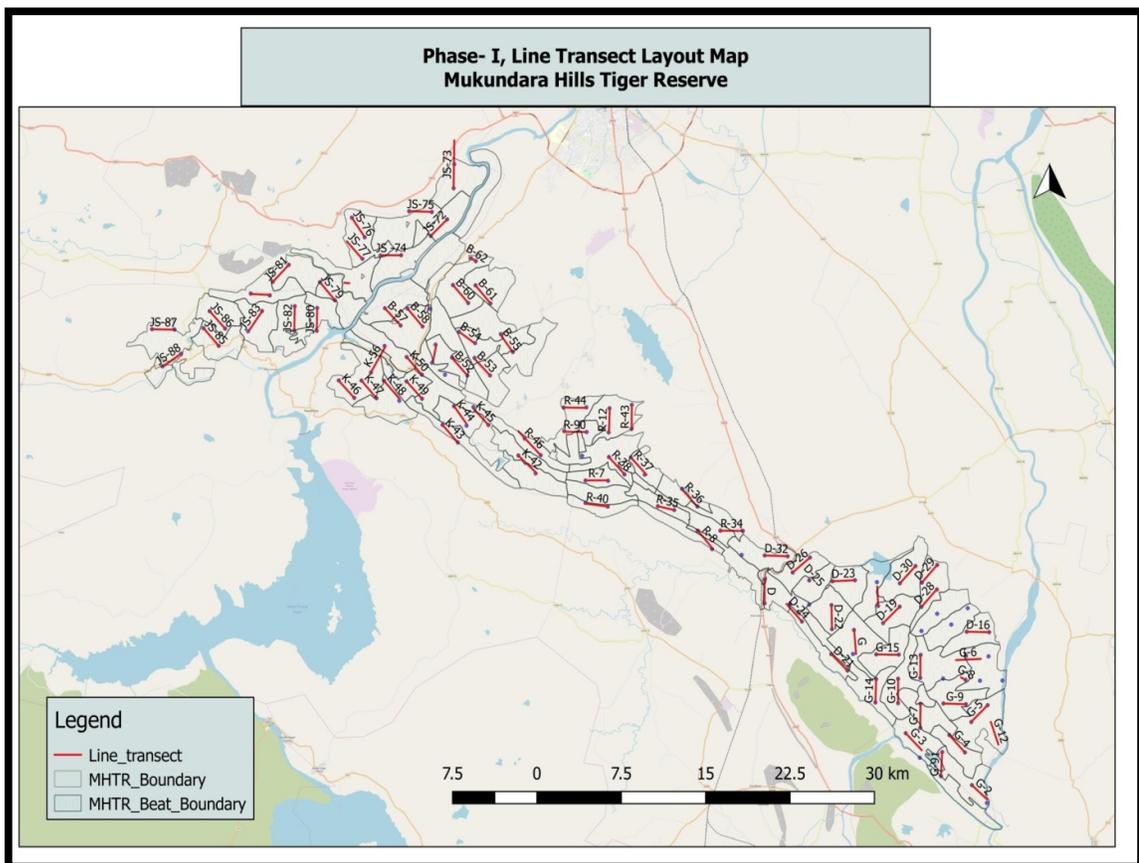
Line Transects were overlaid using stratified sampling and random sampling over MHTR map. The map of the study area shows its unique shape. Mukundara has a liner stretch in the middle part where it connects Darrah and Jawahar sagar sanctuary.

Stratified sampling

Stratified sampling is a process of identifying areas within an overall habitat, which may be very different from each other and is need to be sampled separately. Each individual area separately sampled within the overall habitat is then called a stratum. Range Kolipura, Range Borabas and part of Range Rawtha were sampled with the help of stratified sampling.

Random sampling

This is used where the habitat being sampled is fairly uniform. This is also used where large area is to be covered quickly. Random sampling was done in Range Darrah, Range Gagron and Range Jawaharsagar



Map-3.3.2: Location of Line transects in Mukundara Hills Tiger Reserve

Field work schedule:

Phase – I (Line transect and sign survey)

- Total line transects – 84
- Replicates – 3
- Vegetation plots – 6 per transect
- Total sign survey – 138
- Efforts – 5km
- Data collected through MStrIPES app and in hard copies.
- Data backup was deleted due to inbuilt third party app ‘Secure folder’ in Samsung folder. Details were forwarded to NTCA-Tiger Cell, WII.
- Manual entry of Phase –I data (Line transects and sign survey) is given in **Annexure-5**

3.3.3 Prey base density analysis:

<u>Table-10 Population parameters of Total Wild prey in Mukundara Hills Tiger Reserve (Winter 2018)</u>		
S.No.	PARAMETER	VALUE
1	TOTAL EFFORT ON THE LINE TRANSECT	504 km
2	TOTAL OBSERVATIONS	152
3	GROUP DENSITY (DS) ± STANDARD ERROR (SE)	1.5 ± 0.27
4	COEFFICIENT OF VARIATION (CV) OF GROUP DENSITY (DS)	18.23%
5	INDIVIDUAL DENSITY (D) ± STANDARD ERROR (SE)	4.2 ± 0.82
6	COEFFICIENT OF VARIATION (CV) OF INDIVIDUAL DENSITY (D)	19.40%
7	MEAN CLUSTER SIZE ± STANDARD ERROR (SE)	2.74 ± 0.19
8	EFFECTIVE STRIP WIDTH (ESW)	98 m
9	DETECTION PROBABILITY	0.38



Field staff during line transects survey 2018



Wild animal direct sighting in Mashalpura Grassland area, MHTR

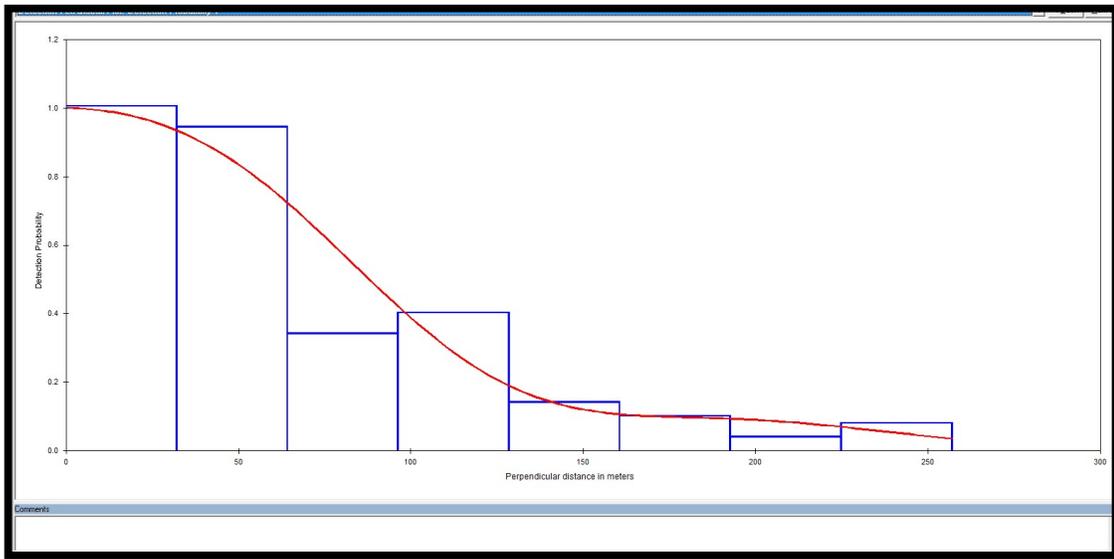


Figure 3.3.3: Detection Probability Graph for Wild prey in Mukundara Hills Tiger Reserve (Winter 2018)

Detection functions of wild prey, half normal model with cosine adjustment

3.3.4 Live stocks and feral cattle density:

MHTR Core has number of villages in and around the boundary and livestock and feral cattle has always been present.

<u>Table-11 Population parameters of livestock in Mukundara Hills Tiger Reserve during (Winter 2018)</u>		
S.No.	PARAMETER	VALUE
1	TOTAL EFFORT ON THE LINE TRANSECT	504 km
2	TOTAL OBSERVATIONS	100
3	GROUP DENSITY (DS) ± STANDARD ERROR (SE)	1.4 ± 0.33
4	COEFFICIENT OF VARIATION (CV) OF GROUP DENSITY (DS)	22.86%
5	INDIVIDUAL DENSITY (D) ± STANDARD ERROR (SE)	7.8 ± 2.0
6	COEFFICIENT OF VARIATION (CV) OF INDIVIDUAL DENSITY (D)	26.67%
7	MEAN CLUSTER SIZE ± STANDARD ERROR (SE)	8.8 ± 1.8
8	EFFECTIVE STRIP WIDTH (ESW)	66 m
9	DETECTION PROBABILITY	0.55

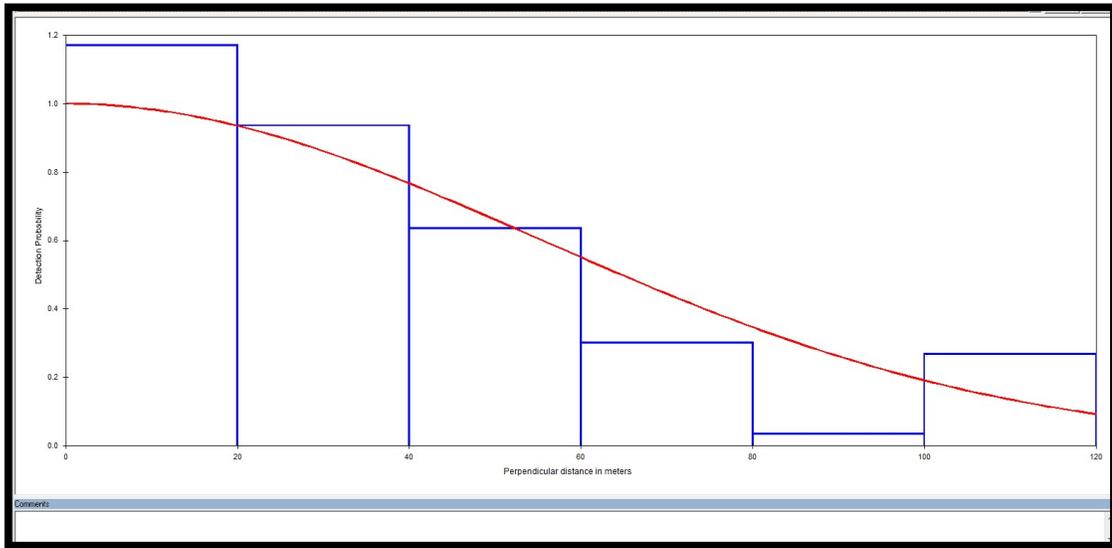


Figure 3.3.4: Detection Probability Graph for livestock in Mukundara Hills Tiger Reserve (Winter 2018)
 Detection function was of livestock half normal with cosine. Right truncation 120

Table-12 Density estimates for prey species in MHTR								
Species	Selected model	Density ± SE		Group Density ± SE		ESW ± CV		AIC
		Wild Prey	Half-normal / Cosine	4.2	0.82	1.5	0.27	
Livestock	Half-normal / Cosine	7.8	2.0	1.4	0.33	66.3	7.07	926.03

Measurement Units: Density: Numbers/Square kilometres, ESW: meters

ESW= Effective Strip Width (ESW), SE = Standard Error

AIC = Akaike Information Criterion

3.3.5 Herbivore density on the basis of direct sighting:

The overall density for the principle ungulate species was found to be low. Reason could be human presence and cattle pressure in the entire area of MHTR and vehicle movement on highways and roads keep animals away from most of the areas. Langur is the only species that has been distributed homogeneously. Nilgai is the second most sighted wild ungulate.

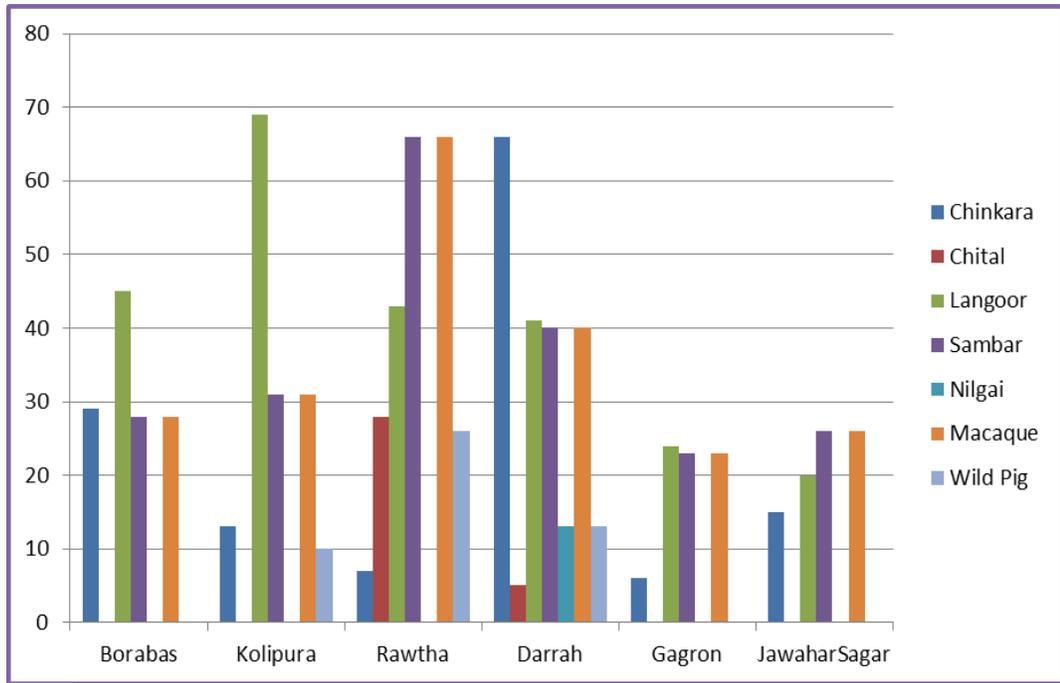


Figure 3.3.5: Herbivore density on the basis of direct sighting

3.3.6 Comparative analysis of live stock and wild prey on the basis of direct sighting:

Livestock and feral cattle is present in all six ranges and competing for habitat with wild prey. They are not only a threat to food supplements but also for water resources on summers when there is very less water in available in most of the water points.

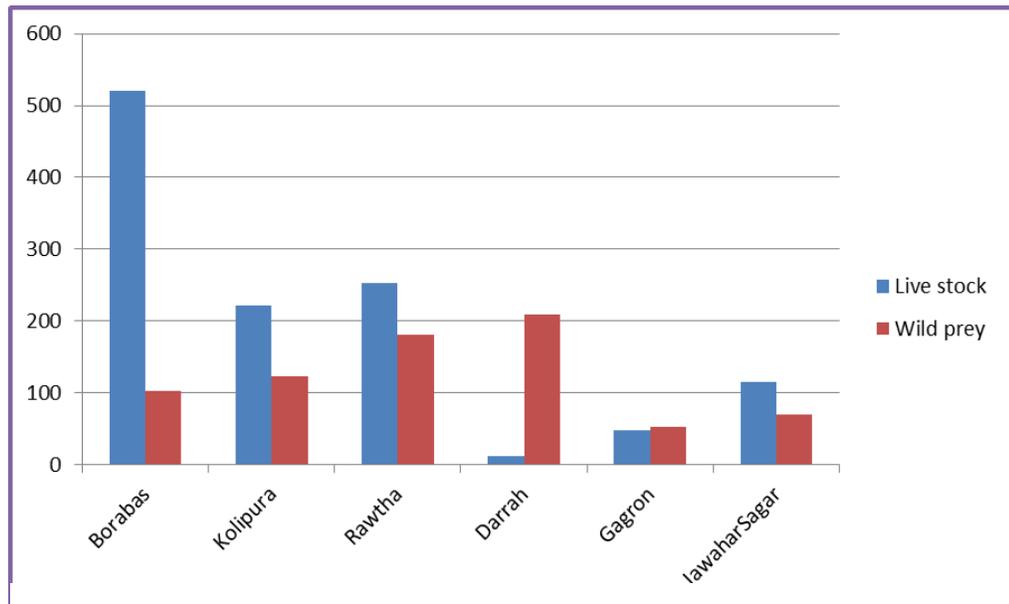


Figure 3.3.5a: Comparative analysis of live stock and wild prey, direct sightings

3.3.7 Preybase estimation:

Table-13 : Total number of prey sighted in direct sighting										
Prey base estimation										
Range	No. of Transects	Wild Prey Species							Livestock & Feral cattle	Total
		Nilgai	Chital	Chinkara	Wild Pig	Langur	Macaque	Sambar		
Borabas	B (1-9)	28	0	29	0	45	0	0	521	623
Kolipura	K (1-10)	31	0	13	10	69	0	0	221	344
Rawtha	R (1-13)	66	28	7	26	43	10	0	252	432
Darrah	D (1-18)	40	5	66	13	41	31	13	12	221
Gagron	G (1-16)	23	0	6	0	24	0	0	48	101
Jawaharsagar	J (1-19)	26	0	15	0	20	9	0	115	185
Total	85	214	33	136	49	242	50	13	1157	1894

3.3.8 Predator estimation:

There is an overall correlation between body mass of a carnivore and the mass of their most common prey. In general, carnivores weighing 21.5 kg or less feed mostly on prey that is less than 45% of their own body mass and carnivores above this size feed mostly on prey that is more than 45% of their own body mass.

This dichotomy is a consequence of mass-related energy requirements. As

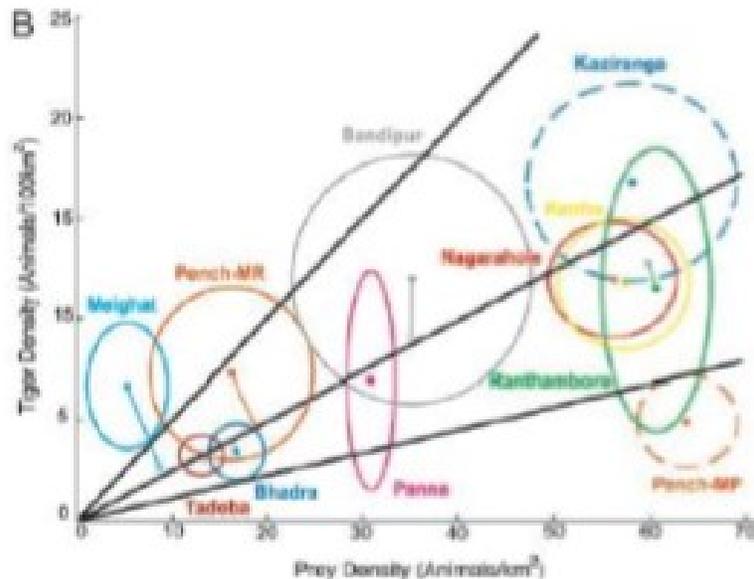


Figure 3.3.8: Relationship between prey and tiger abundance (Karanth et. al. 2004)

carnivores' mass increases, the total energy expenditure increases, and thus require more hunting time to obtain prey in order to balance the energy budget (Carbone et al 1999). The medium sized cats such as leopards (40–60 kg) feed on large prey-2 kg above their own mass and even larger.

Prey depletion lowers the tiger's encounter rates with prey. It is expected to result in lower hunting success, greater energy expenditure per kill, and increases foraging movements. These ecological consequences result in poorer nutrition, increased intraspecific competition at kills and reduced attention towards cubs. Therefore, prey depletion is likely to affect survival rates of tigers at all demographic stages. In Kaziranga this process is almost nullified owing to the absence of the factor of prey depletion and poaching. It is important to mention here that a hunt in Chitwan (Nepal) in 1935 - 36 produced 77 tigers; 3 years later 10 tigers were killed when the same area was hunted. Even in Sikhote- Alin State Biosphere Reserve (Russia) between 1963-1965 there were no tigers in the area and the first tiger appeared in 1966 and during the colonization phase, that followed (1966- 1993), records show tigers increased to 24-31 individuals (E.N.Smirnov & D.G.Miquelle). The major prey species for tigers in Sariska are cheetal (*Axis axis*), sambar (*Rusa unicolor*), nilgai (*Bosephalus tragocamalus*), domestic buffalo (*Bubalis bubalis*) and common langur (*Presbytis entellus*) (Sankar 1994, Sankar and Johnsingh 2002). Sankar and Johnsingh (2002) reported that cheetal, sambar and common langur contributed to more than 90% of the biomass of tiger diet in Sariska. MHTR core has a fairly good population of cheetal, sambar, nilgai and langur but the future of this population is highly insecure due to the immense biotic pressure caused by large human and livestock population.

Causes for decline and decimation of tiger and its prey populations are numerous. Schaller (1967) described two factors that have brought the large mammalian fauna to its present predicament, a predicament hauntingly reflected in the current state of our tiger population. Our despicable history of hunting for recreation and the indirect and less avoidable course of "habitat destruction", both of which are key elements in the declining population paradigm. Trophy hunting of large animals like in the old days has been brought under check following a series of wildlife protection laws. Nevertheless, poaching of both prey and predator continues, be it for food, oriental medicines or other illegal trade in wildlife parts

(Siedensticker, 1997). Habitat degradation, on the other hand, which is largely a function of human influence, continues to work at its own steady pace affecting both the predator and the prey. Poaching combined with degradation and fragmentation of habitats of already depressed populations is likely to have disastrous effects on their viability and future survival (Seidensitcker *et al.* 1999).

Though tigers have been known to feed on a wide variety of animals (Schaller 1976) a marked preference for medium (31-175 Kg) to large (>176 Kg) sized ungulates has been documented by studies in different habitats. Schaller (1967), Johnsingh (1983) and Karanth & Sunquist (1995) have all found that medium to large sized ungulates comprise the bulk of the tiger's diet, of which cheetal and sambar between them constitute approximately 55% – 65%.of the diet.

The tiger is the largest obligate terrestrial carnivore in any of the mammalian assemblages where it occurs and as such, preys on the largest ungulates found in these assemblages (Seidensticker 1997). Karanth & Sunquist (1992), Eisenberg & Seidensitcker (1976) and Schaller (1967) have all observed a positive correlation between tiger densities and prey biomass densities. The prey in turn depends entirely on the availability of suitable and productive habitats to maintain such viable and abundant populations.

According to Gupta (2002) the ecological role of primates as primary consumers is important for the maintenance of homeostasis (a state of equilibrium) and critical for forest regeneration and survival. A predominantly vegetarian diet allows primates to make use of the most abundant food source in their environment, justifying their higher population density (almost nine times) as compared to carnivore species (leopard, hyena, etc.) that inhabit the same geographical areas. India has 15 primates in addition to man and their role in the country's diverse ecosystems, especially tropical forests, is of great importance (Choudhary, 1988). Well adapted for both terrestrial and arboreal life, the primates are able to exploit a wide variety of foods from ground to canopy. Flexibility in their diet and adaptability are keys to their survival in both pristine and heavily-disturbed habitats. Primates are often referred to as 'wasteful feeders' as they pluck more leaves, flowers and fruits than they eat. But even this seemingly wasteful behavior plays a discreet ecologicalrole through trimming twigs, branches and roots, as well as pollination and

seed dissemination. In the present study the population of Langurs (*Presbytis entellus*) shows an increase in census figures and this may be attributed to the high adaptability of the primates. The Core supports a good population of langurs. Feeding studies on tiger food has showed that langur is also preferred as prey species.

According to the findings of Joshi et al. (2000) the dependence of mankind on the plant resources is well known since the evolution of mankind on earth. In their study they found that the local people in core area utilize plant species for a variety of purposes. 17 species are providing timber for shelter and other purposes, 11 plant species are utilized for making agricultural implements, 15 plant species are used excessively for furniture making, 32 plant species are utilized for fuel purposes, 20 plants species are providing edible fruits, 21 plant species are utilized as fodder, 20 plant species are yielding gum, resins, tannins and dyes, 26 plant species are providing some other minor forest produce and 53 plant species have medicinal value (Sultana 2007).

According to Negi (2002), panther is the second important species after tiger amongst the carnivores of Indian forests. It is found throughout India and has adapted to all types of forests and scrub jungles, from cool Himalayas to arid tract of Central India. In common parlance, panther is also called leopard. Sankar and Johnsingh (2002) have studied food habits of tiger (*Panthera Tigris*) in Sariska Tiger Reserve, Rajasthan. In core of MHTR after extinction of tigers (in seventies) from the area, panther was at the apex of food pyramid. They are present in the whole area and in surrounding forest area of Jawahar Sagar, Ghati, Mashalpura, Bebra talai, Koyla kui, Jhamra, Laxmipura, Ambapani, Karoundi, Kanjar, etc. Its population is more or less static because of prey population, which is just sufficient to support this population but the biotic interference is immense therefore the predators have to live under stress condition adversely affecting the reproduction and survival of the species. The reserve has the potential of rendering protection to tiger and other wildlife but in the absence of human disturbance and other anthropogenic activities. After re-introduction of tigers in MHTR, leopard is the main co-predator along with wolf, jackal, fox and jungle cat.

Leopard can be individually identified from their unique rosette pattern on body like flanks, limbs *etc.* Therefore, estimation of leopard density is possible by using traditional closed capture recapture models as well as likelihood based Spatially Explicit Capture Recapture (SECR) models.

Carnivore sign survey:

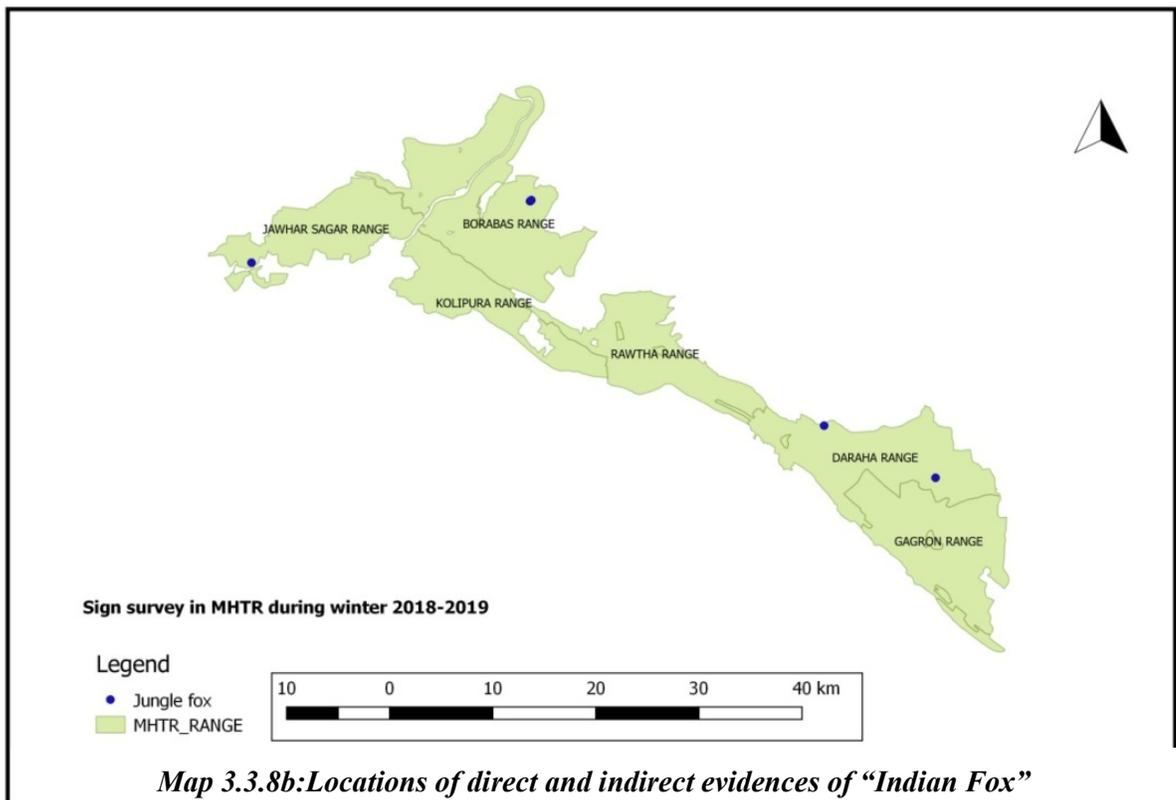
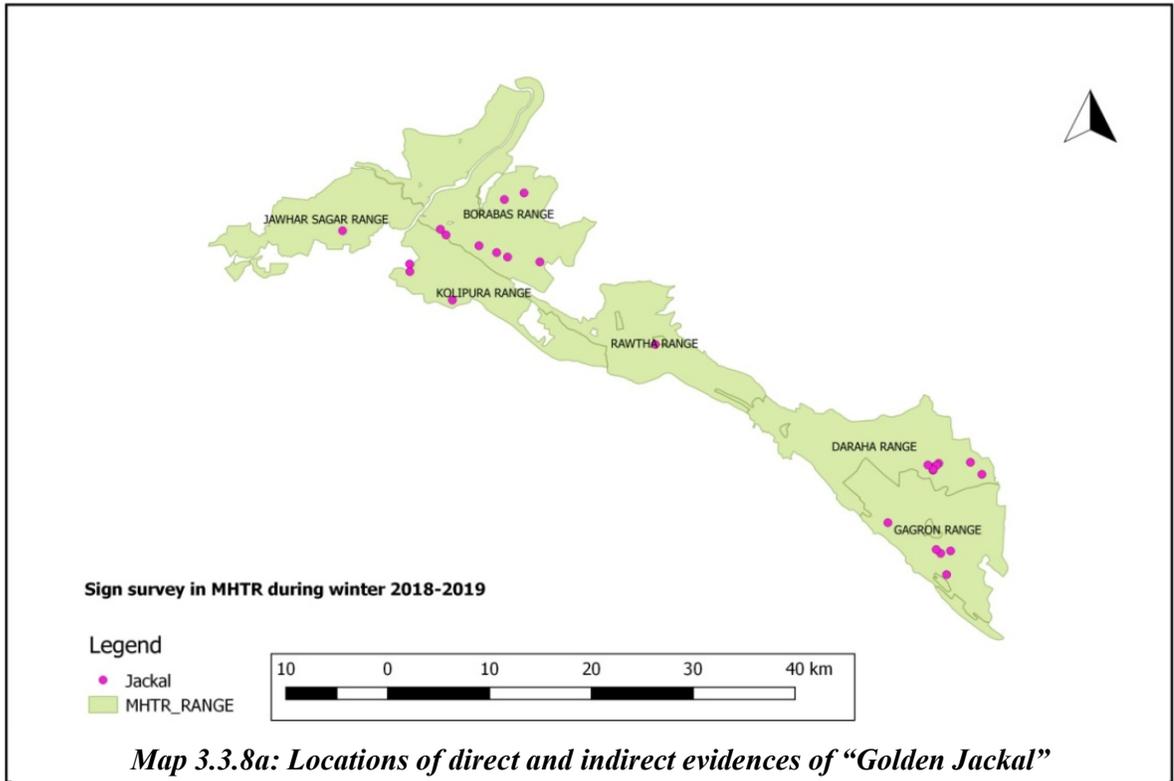
Mukundara has 84 beats and in all beats minimum two sign surveys each of 5 km were walked. Total effort of 1002.5 km in 759 sq km area was walked by the frontline staff of MHTR to record direct and indirect evidences (pugmarks, urination and scats, scrape, kill, scent marks, rake marks, vocalization *etc.*) of different carnivore species such as tiger, leopard, striped hyena, sloth bear, golden jackal, small cats, Indian fox, *etc* as given in **Annexure-6**.

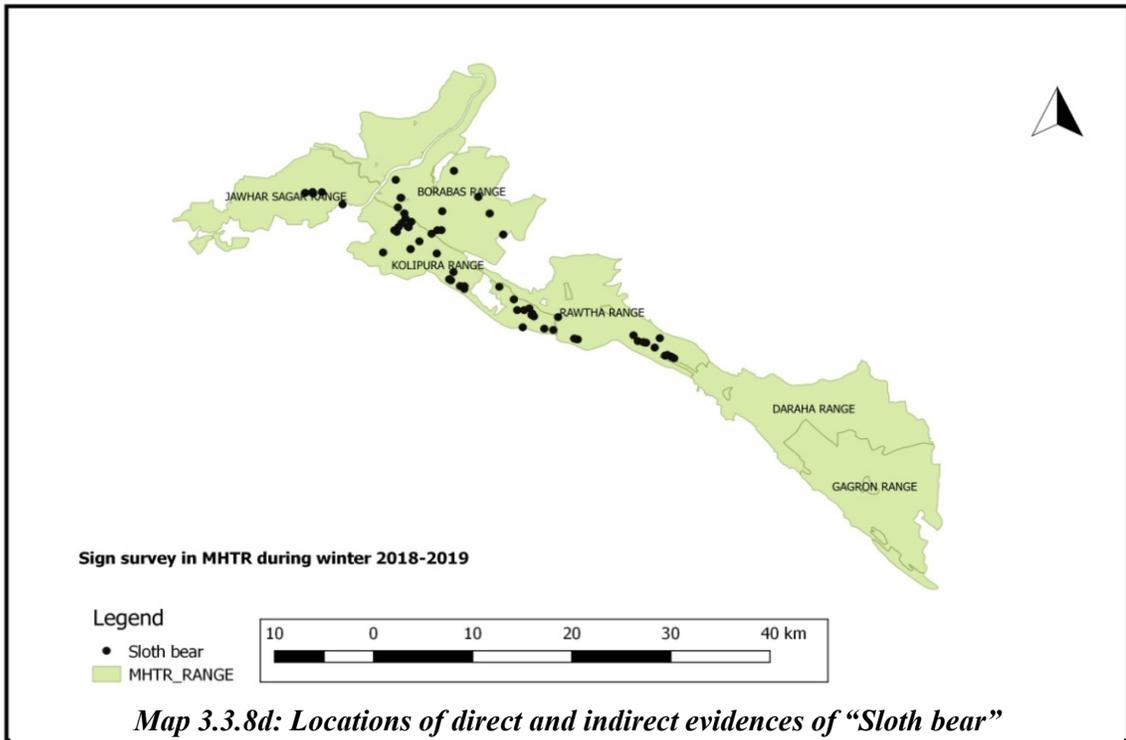
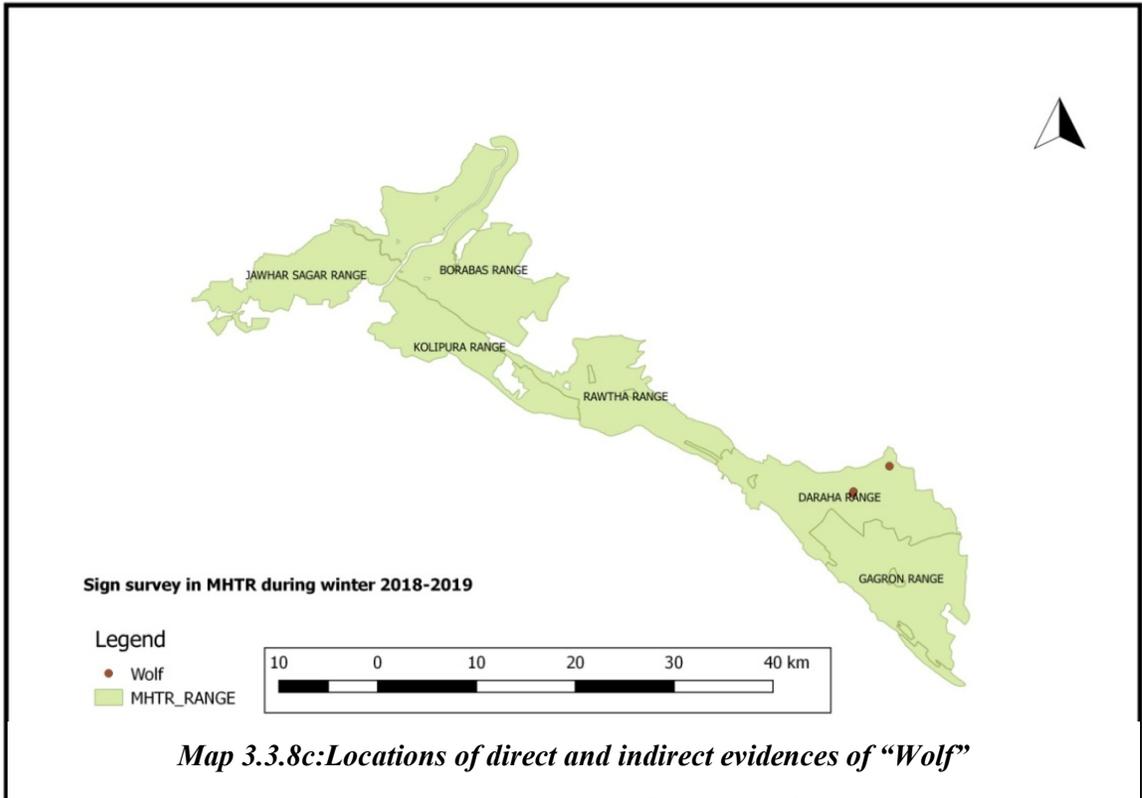
Location map of carnivore species in MHTR:

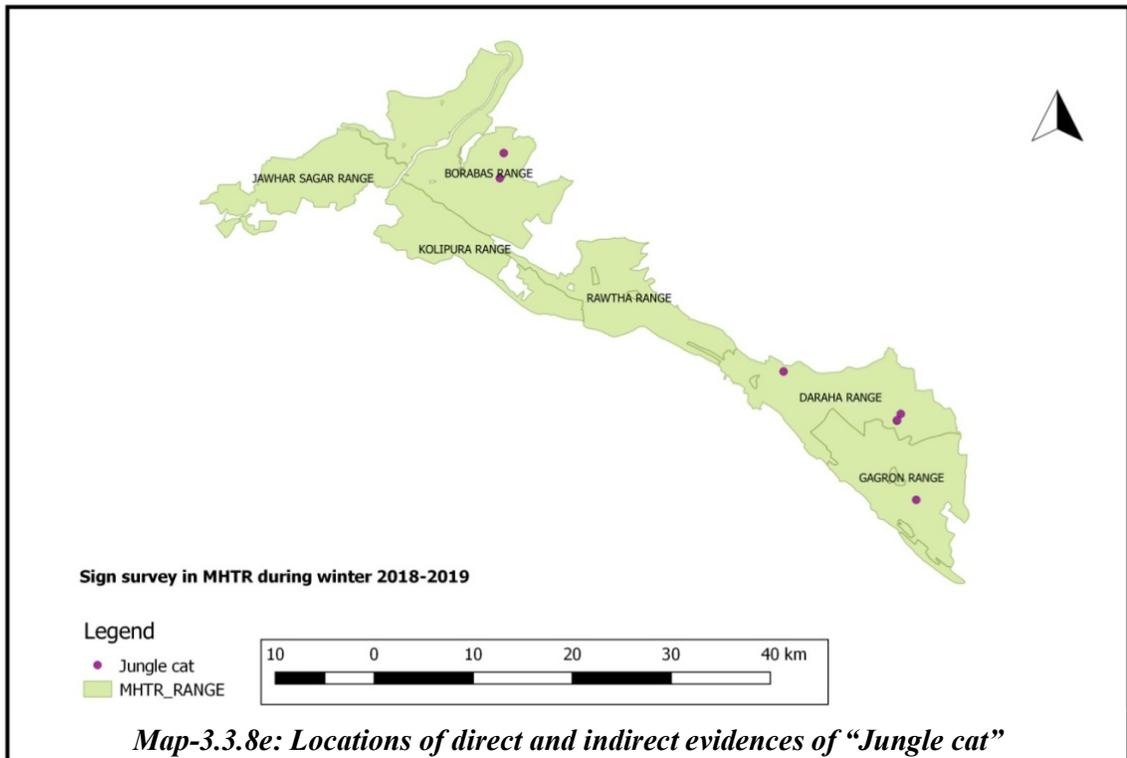
Based on the survey, the location maps of following predator species were prepared

- a. Golden Jackal,
- b. Indian Fox
- c. Wolf
- d. Sloth bear
- e. Jungle Cat
- f. Striped Hyena
- g. Leopard
- h. Tiger

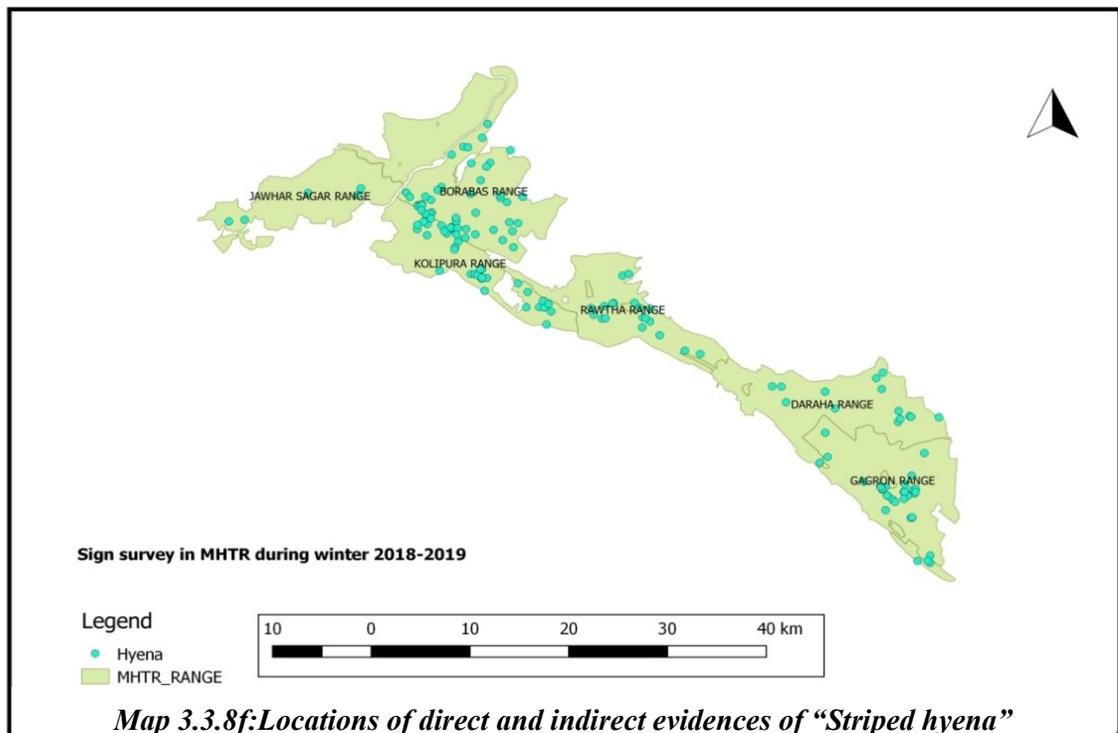




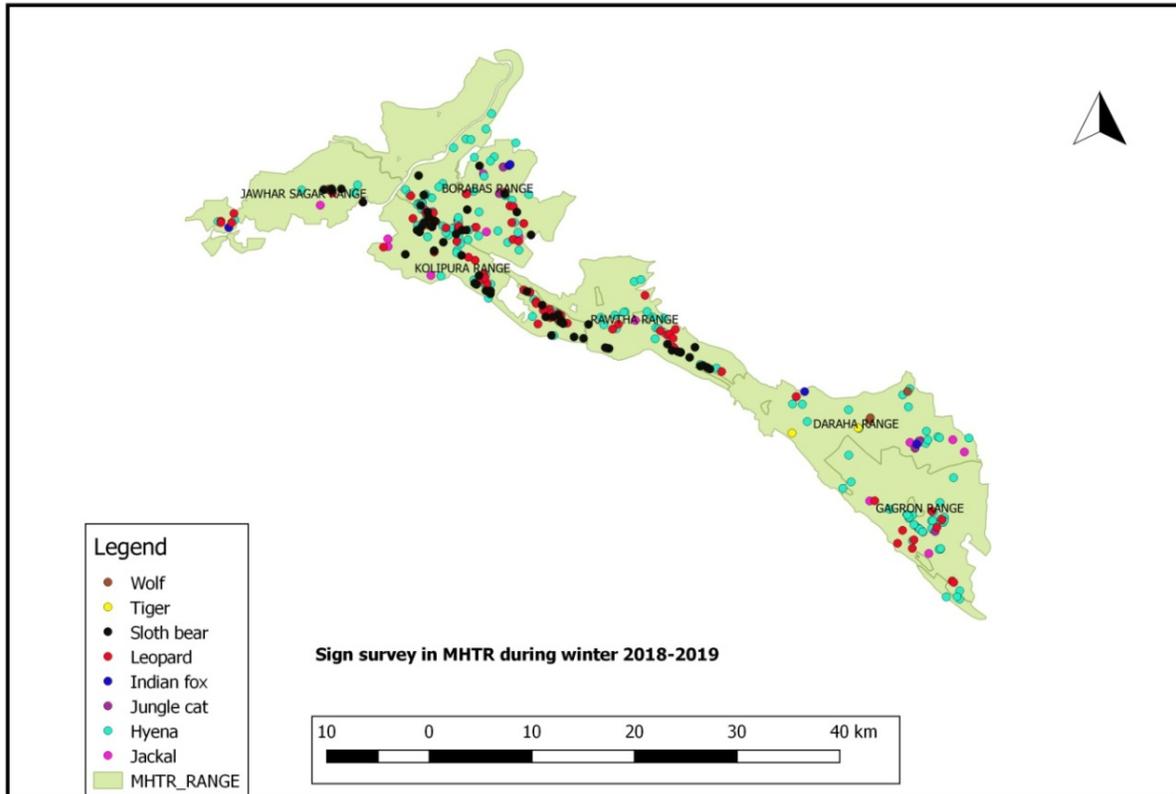




Map-3.3.8e: Locations of direct and indirect evidences of “Jungle cat” recorded in winter of 2018 in MHTR



Map 3.3.8f: Locations of direct and indirect evidences of “Striped hyena” recorded in winter of 2018 in MHTR



Map 3.3.8X: Locations of direct and indirect evidences of carnivore species distribution recorded in winter of 2018 in MHTR

Leopard Density Estimation:

In 2018, leopard density was estimated in MHTR using Camera Trap Method, total number of leopard photo captures in the camera trapping session was 74 and out of all these images 16 (14 both flanks capture, and 2 only left flanks) individual leopards were identified. Using the capture history, leopard density was estimated to be 11.22 (SE 3.14) leopards per 100 sq km.

Leopard images were trapped in good number, proving the presence and occupancy in MHTR. Other carnivore species captured in the camera trap were wolf, sloth bear, striped hyena, golden jackal, Indian fox, jungle cat, desert cat, honey badger, common palm, civet, small Indian civet, and ruddy mongoose.

3.4 Assessment of Threats

Large carnivores are among the most threatened mammals in the world (Ceballos *et al.* 2005). The decline of the tiger *Panthera tigris* L. 1758, typifies the

challenges of recovering large carnivore populations. Driven by synergistic impacts of habitat fragmentation, prey depletion and direct hunting (Karanth *et al.* 2004; Walston *et al.* 2010), tigers have suffered a range contraction of c. 93% in the past two centuries (Dinerstein *et al.* 2006). Global species recovery now depends on effective management of the remaining 42 ‘tiger source population (Walston *et al.* 2010) that occur as interconnected clusters within larger landscapes (Dinerstein *et al.* 2006; Ranganathan *et al.* 2008). Therefore, rigorous assessments of tiger populations are required at two spatial scales: protected reserves of a few hundred square kilometres each and wider landscapes of several thousand square kilometres (Karanth *et al.* 2011).

However, habitat destruction or “elimination of habitat “ (Schaller, 1967) is an ongoing process and it is here, in the cycle of events, that anthropogenic influences play a key role in modifying and often degrading the habitat by diverting a substantial quantum of the biomass towards human and livestock needs. Anthropogenic disturbances take the form of cattle grazing, lopping and cutting for fodder, fuelwood and other biomass requirements, fires, large-scale extraction of non-timber forest products (NTFPs) and drastic alterations in the physio-chemical quality of the terrain.

The direct effects of such disturbances include loss of cover, change in vegetation communities, species composition, forage abundance and quality (Dinerstein 1987); all of which have a direct effect on the ungulate habitat use (Dinerstein 1979a). The tiger, due to the obligate nature of its phylogenetic (Sunquist *et al.* 1999) and trophic position is most vulnerable to such alterations and deterioration of habitat, which affects the health of the prey populations (Karanth and Stith 1999). Karanth & Stith (1999), from modeling studies of tiger populations, have speculated that prey depletion is a major factor driving the current decline of wild tiger populations and hence a significant constraint on their recovery.

Translocation of cheetal from four different sources was taken up during the reintroduction of tiger program in MHTR. A total of 449 cheetal were translocated (Table) to maintain the prey population for the sustainability of re-introduction tigers.

Table-14 Translocation of wildlife to increase the prey base in MHTR				
S.No.	Place from where wild animals were translocated	Place of release in MHTR	Species	Numbers
1	Jaipur Zoo	Selzar	Chital	122
2	Shahpura Sanjay van	Selzar	Chital	30
3	Jodhpur Zoo	Selzar	Chital	190
4	Rashtrapati Bhawan, New Delhi	Dara	Chital	105
5	Delhi Zoo	Kishore Sagar	Black Buck	60
	Total			507

In MHTR the pressure of various anthropogenic factors are immense. Evidence of cheetal was more near a ness while sambar maintained a distance of 1-2 km. The reason for the proximity of cheetal to the nesses was the presence of water, open areas used by cheetal for yarding and the tolerance of cheetal for human settlements. Hence relocation of villages will be favourable for cheetal if the evacuated sites continue to have open areas and water.

When disturbance caused by the human is removed by resettling them more sambar, a preferred prey of tiger (Karanth & Sunquist; Sankar et al) and a disturbance sensitive species, would start using the evacuated sites which are often in prime wildlife areas. Villages like Girdharpura, Damodarpura and Laxmipura have agriculture land across the valley between Mukundara hills and hence block the movement of animals leaving the option to animals to stay on hilly slopes. Hilly slopes are not the suitable habitat preferred by ungulates. Relocation of these villages will provide open spaces which are preferred by ungulates. Abundance of large ungulate prey species and protection from human disturbance would be the key determinants of local tiger presence (Karanth et al. 2004). An ‘average tiger’ requires about 50 ungulate prey animals per year. In combination with an ecological model that predicts that tigers annually crop about 10% of available prey numbers in an area, tiger numbers can be related to prey numbers using the simple assumption of one tiger for every 500 prey animals.

CHAPTER 4
HISTORY OF PAST MANAGEMENT AND
PRESENT PRACTICES

4.1 Conservation History:

The history of past management of forest area falling within the tiger reserve comprises of the management by two princely states namely, Kota and Jhalawar district. So the management of the forest is divided in the following parts:

1. The period prior to 1948
2. The period of control by the forest department Rajasthan from 1948 to date
3. Future Management

4.1.1 The period prior to 1948:

Kota State:

The ruler of Kota region obtained the services of Rai Bahadur Sunder Das in the twentieth century for preserving the forest by systematic management. Lack of proper means of communication, lack of demand of fuel wood and non-availability of ready market helped considerably in preserving the forest.

In 1938, Rai Bahadur Sita Ram Puri wrote a tentative working plan for the forest of Kota State but did not mention compartments, blocks, and coupes for felling of trees.

In 1940, S.R. Puri and Nandan Bhargava made an attempt to lay down the coupes and Handy System for extraction of Kattha.

For hunting purpose, there was a Shikarkhana department, looked after by a Shikarkhana officer. The forests other than Shikargah were under custom department. It allowed the people to remove the forest produce for their domestic and agriculture use and for sale on the scheduled royalty from all over the forest.

Jhalawar State:

There was no separate forest department in this state and one officer was in-charge of Forest, Mining, and Customs, Fisheries and Shikarkhana department. The forests were mainly preserved for shikar. Local people enjoyed forest concessions

liberally. There was no record whether any royalty was charged from them.

Forest area of the Jawahar Sagar Sanctuary had been Shikargah (area reserved for hunting) while states of Kota and Bundi were in existence. Hunting used to take place before independence by the heads of these states. This area was rich in wildlife during that time. Tiger were reported in the area till late seventies, after enactment of Wildlife (Protection) Act. 1972, hunting has been completely banned. But with the loss of habitat, increasing biotic pressure and poaching in the past, population of wild animals has dwindled.

4.1.2 The period of control by the forest department Rajasthan from 1948 to date:

In 1948, Kota and Jhalawar state merged into the united state of Rajasthan. Soon after the merger, they issued two notifications granting liberal concessions to the local inhabitants. This resulted in an unregulated and unsystematic exploitation of forest. Large areas of the forest were released for grow more food campaign and for settlement of landless people.

The Forest Concession Rules 1955 gave liberal concessions on a large scale. No working plan or scheme was laid down, only local Range Officer and Divisional Forest Officer laid down annual fire wood charcoal and kattha coupes. The Coppice with Standard Silviculture System was adopted but due to non-protection against fire and grazing, the coppice regeneration failed.

The area was exploited for Bamboo, Tendu leaves, firewood, charcoal and Kattha not only by contractors but also by State Trading Wing of Forest Department till the management of Sanctuaries came into the hands of Wildlife wing. The NTFPs were also collected through contractors during this period.

Rajasthan Animals and Birds (Protection) Act was promulgated in 1951. Under the provisions of this Act in 1955, five areas were notified as Reserved Areas - Darrah was one of them which became a Sanctuary as per the provision 2(a) of Rajasthan Entrance to Game Sanctuaries Rules 1958.

From 1962-63 to 1978, forest blocks and compartment history were marked

on topographical sheets. Their boundaries were laid on the ground and compartment histories were prepared. Seven working circles were constituted and management was prescribed on scientific lines.

With the progressive degradation of the forest cover under mounting pressure of an increasing population and uncontrolled grazing, and destruction of wildlife due to the modern weapons in the hands of the hunters; many of the species were driven to the verge of extinction. In 1972, Wildlife (Protection) Act came into force in the state of Rajasthan vide Government of India notification F.1014/3/FIR/WLF/Dated 1stSeptember 1973. This provided more effective legal means for the protection of flora and fauna of Darrah sanctuary also.

Jawaharsagar Wildlife Sanctuary was declared on 9th October 1975 while National Gharial Sanctuary was declared on 3rd September 1983.

In 1978, an attempt was made to constitute an integrated management system of wildlife reserves, under the control of Chief Wildlife Warden, Rajasthan. The practice of dual control i.e. forest cover by territorial forest officer and wildlife by wildlife officer was stopped and the entire flora and fauna of the area was put under the control of a wildlife warden. Darrah Sanctuary was administered by a wildlife warden under Division Kota. In 1986, a new wildlife division was established at Kota administered by Deputy Conservator of Forests (Wildlife) Kota.

In 1984-85 Darrah was included in the list of selected sanctuaries for development under Centrally Sponsored Scheme. There has been regular financial assistance from the Central Government for the development of Darrah Sanctuary since then.

In 1988, a division level conference was held to know the views of the freedom fighters, senior citizens, politicians, renowned persons and Government officials at Kota, Bundi, Jhalawar, Sawaimadhopur, Chittorgarh under the chairmanship of Divisional Commissioner, Kota. It was decided unanimously that National Park should be declared to preserve the rich flora and fauna of Hadoti region covering the area of 286 sq km of Kota, 84 sq km of Bundi, 54 sq km of Jhalawar and 45 sq km of Chittorgarh. Based on these recommendations, a portion of Darrah Sanctuary was notified as Mukandara National Park in the year 2012 and

subsequently Mukandara Hills Tiger Reserve (MHTR) was notified in the year 2013 which includes Mukandara National Park, Darrah, Jawahar Sagar and part of National Gharial Sanctuary.

In the year 2012, a new division in the name of DCF (Wildlife) Mukandara National Park was created with its headquarter at Kota. Areas administered by erstwhile Deputy Conservator of Forests (Wildlife) Kota namely Darrah, Jawaharsagar, and part of National Gharial sanctuary from Kota Barrage to Rana Pratap Sagar dam was transferred to DCF (Wildlife) Mukandara National Park.

No felling is being permitted after the Park came into existence. The right holders are allowed to take dead and dried firewood and grass free or cost. Grazing is also permitted in the open forests. But with the Hon'ble Supreme Court's order dated 14-02-2010 and 28-02-2000 no forest produce is allowed to be removed out of the Protected Area. No Non-Timber Forest Produces (NTFPs) are auctioned in the Protected Areas.

4.2 Habitat Management:

The Mukandara Hills Tiger Reserve has an inbuilt potential to develop into one of the important tiger reserve in Rajasthan due to natural surroundings & sufficient forest cover to provide food and shelter to different species of wildlife. The Reserve has many rare and threatened species in sufficient numbers. If these species are provided with a complete human interference free habitat they can multiply and rebuild good population in the Reserve. This can also help in extension of these species to adjacent wildlife areas like Bhainsroadgarh Sanctuary.

For proper management of the tiger reserve certain objectives are laid down and to meet them, planning is necessary. This planning deals with biological as well as management aspects. The management aspect deals with preservation of ecosystem by effective protection and minimizing the biotic pressure. Creation of ideal conditions for food, water and shelter for wild animals is the other aspect. Conditions which would facilitate wildlife populations to survive and reproduce will be created mainly on the principles of "Let the nature take its own course with minimum biotic interferences". Of course, the degraded area will be developed through eco-restoration plantation programmes by planting indigenous fruit and

fodder plant species. Water conservation measures will be taken up to improve habitat & surface water availability to wild animals during pinch period. The prerequisites for wildlife inhabiting any area are the year round availability of food and water as well as suitable living and breeding environment. Following considerations are to be taken into account during the management review:

- (a) *Lantana camara* is invading the reserve gradually, especially in Laxmipura and Naulav area. Its invasion has dangerous impact on the habitat suitability for the floral and faunal component of the ecosystem. *Lantana camara* needs phased eradication and replacement with the local suitable species. It is necessary to check its further penetration in the core.
- (b) The degraded area inside the Core needs to be rehabilitated with suitable indigenous species.
- (c) Habitat improvement works for the food availability for the flagship species i.e. Sloth Bear, Panther, Gharial, Otters, Chinkara and Four Horned Antelope need to be carried out intensively.
- (d) Khajur groves, riverine strips, wet-nullah groves and other special habitats need special protection.
- (e) Moisture conditions need to be improved for amelioration of vegetation growth and establishment of natural regeneration.
- (f) Establishment of relocation center with intensive planting of fodder trees and grass cover improvement.
- (g) Grass cover improvement works in the plain areas are required for the sustenance of herbivore population. Phased removal of *Xanthium indicum* is needed to regenerate the grass cover especially in the valleys.
- (h) Water availability during pinch period is scarce. Repeated droughts further make the situation worse. Fresh water points with assured water supply need to be developed in various parts of the tiger reserve.
- (i) Grazing needs to be regulated.
- (j) Some threatened species of flora and fauna need protection and rehabilitation measures.
- (k) *Prosopis juliflora* to be removed in phased manner and replaced with fruit yielding trees.

4.3 Protection and Intelligence gathering:

4.3.1 Protection related issues:

There are many threats to tiger reserve such as degradation of habitat, disturbed food chain, frequent droughts, decreasing availability of water, heavy grazing pressure, lopping and cutting of trees, encroachments on forest lands. Lack of family planning, socio-economic backwardness, poverty, illiteracy etc has increased dependence of local population on the Reserve. All these factors are significant from the protection point of view.

4.3.1.1 Hunting:

Forest areas of the Reserve had been Shikargah (area reserve for hunting) of erstwhile states of Kota, Bundi and Jhalawar when they were in existence. Hunting used to take place before independence by the rulers of these states. The area was rich in wildlife during that time. Tigers were reported in the area till seventies. After enactment of Wildlife (Protection) Act 1972, hunting has been completely stopped. But due to loss of habitat, increasing biotic pressure and poaching, the population of wild animals has dwindled.

4.3.1.2 Poaching:

There is no serious problem as far as poaching is concerned. Stray cases of killing of Hare and Monitor Lizards, by Bheel and Bavariya (Tribal Communities) takes place. Illegal fishing in the waterbodies of the Reserve is also reported occasionally.

4.3.1.3 Illegal cutting of trees:

This forest area is predominantly inhabited by the tribals like Bhil, Bavariya, etc. They largely depend on forest resources for their livelihood and subsistence. Although they have rights of extraction of fallen dry woods on their head for their domestic use but sometimes illegal cutting of trees is also done by the tribal and local villagers to sell the fuel wood in the markets of nearby towns. Villagers of peripheral zone also don't have fire wood hence all the pressure is borne by the forest of the Core. Normally they use head loads and cycle loads to carry firewood to nearby areas in Jhalawar, Ramganjmandi, Kota, Guda, Bhunjar, Sripura, Rawatbhata, Bhainsroadgarh, etc. The main points where pressure of illicit felling is very high are

Guda, Bhunjar, Sripura, Rawatbhata, Bhainsroadgarh, Naulav, Mashalpura, Dara gaon, Padampura, Mandergarh, Kolipura, Borabas etc. The illicit felling not only causes damage to the forest but also disturbs the ecosystem.

4.3.1.4 Encroachment and other illegal activities:

Encroachment on forest land poses a serious threat to the tiger reserve. Every person residing in and around the tiger reserve has greed for illicit cultivation. This problem is further aggravated by involvement of some pressure groups encouraging the local people and advocating illicit cultivation as basic right of these people. The increase in population is also an important factor contributing to encroachments. These people largely depend upon illicit cutting of trees as a source of livelihood since the encroached land is mostly non-productive and unfit for agriculture. These people have large cattle population with them, which directly compete with wild animals and chances of spreading cattle borne diseases are high. Borabas, Sripura, Kolipura, Girdharpura Damodarpura, Laxmipura, Dara gaon, Naulav, Mashalpura, areas are sensitive to encroachment.

4.3.1.5 Domestic live stock grazing:

There are a large number of cows, buffaloes, sheep, goats and camels in and around the Core area who graze free of cost. As there is no system of stall feeding of cattle, almost all the cattle go for grazing inside the Core throughout the year. Maximum pressure is felt during the rainy season when the cattle are taken to upper slopes where the grazers resort to lopping and branch cutting. Incidentally this is also the time for regeneration of tree species and growth of grasses. The table given in **Annexure-7** shows number of cattle residing in and around the MHTR.

4.3.1.6 Forest Fire:

As summer approaches, the fallen leaves and dry grasses along with dry wood form an ideal material for outbreak of fire incidences. Such incidences in the tiger reserve are further aggravated by the false belief of tribal people that burning of hills (Magra) will please their "God and Goddess". Normally local people resist helping the staff in combating fire incidents.

The tribals set the fire for ground clearance which sometimes becomes uncontrolled. Negligence by illicit graziers, collectors of honey and timber also result

in fire incidences. Forest fire in the Core is of ground nature causing little harm to vegetation.

4.3.1.7 Insect attacks and Pathological problems:

During rains, breeding of butterflies and moth take a very heavy toll from the green foliage. *Ganoderma* and other fungi generally appear on dead and rotting wood material lying on the floor of the tiger reserve.

4.3.2 Basic infrastructure development and maintenance for effective protection:

4.3.2.1 Roads:

The headquarters of Range Forest Officer Darrah and Kolipura are connected with NH12 (Jaipur to Jabalpur) and Kota – Rawatbhata road respectively. NH 12 bisects the Reserve. Jawahar Sagar Range Forest Officer's headquarters is connected with Kota Rawatbhata (Chittorgarh) and Kota Dabi (Bundi) metalled roads. One road from Borabas and other via Borkui connects Jawahar Sagar.

Darrah is also well connected with Delhi – Bombay broad gauge railway track.

Besides metalled roads, some fair weather roads also exist in the Core which need regular repairs (after every rainy session) to make them motorable, so that effective patrolling by vehicles can be ensured. These roads are the main patrolling paths for effective protection. The distance between Darrah gaon to Kolipura is 38 Km and Darrah gaon to Naulav Gagron is 36 Km.

4.3.2.2 Check Post and Watch Towers:

Two check posts at Darrah gaon and one at Kolipura have been created. Beside these barriers, few more check posts need to be constructed and operated regularly for effective protection of the Reserve. Additional staff is also required to maintain these barriers.

There are some old Malas (watch towers) like Teen Manzil and Borkui inside the Core for viewing fire and wildlife which are however, not maintained. There should be more watch towers at different places as proposed earlier. In addition, proper maintenance of existing watch tower is also required.

4.3.2.3 Vehicles:

At present, there are only few serviceable vehicles. List of existing vehicles in the MHTR is enclosed as **Annexure-8**. The following vehicles are required in the MHTR to provide mobility to the protection squads and facilitate the staff in the execution of their duties:

<u>Table-15 Requirement of vehicles in MHTR</u>		
S.No.	Name of vehicle	Numbers Required
1.	Multi utility vehicle (Bolero, Canter, Camper, Gypsy)	5
2.	Jeep DI	2
3.	Motor cycles	10
4.	Tractor Trolley with tanker	2
5.	Motor Boat	2
Total		19

4.3.2.4 Protection Equipment:

Intensive patrolling with police/home guard/RAC assistance will help in curbing offences. In the border areas, help of Madhya Pradesh Forest Department needsto be sought to check pilferage of forest produce in that state. The MHTR staffneeds to be provided with protection shields, jackets, helmets and clubs

4.3.2.5 Wireless Network & Telecommunication:

In the fast changing scenario, the forest offenders are well equipped with modern modes of transport. To apprehend such offenders and to have fast communication between different nakas and patrolling parties, wireless network has to be developed. Fixed wireless and handsets will be installed at each Range, naka, chowki and vehicles. Handsets will be provided to each field staff. This will facilitate a better communication with the office at Kota and field staff. Main wireless control room is to be set up at Kota which can be operated round the clock and connections are to be established through fixed wireless sets at Sripura, Borabas, Khera, Jawahar Sagar, Teen Manzil, Kolipura Range Headquarter, Girdharpura, Chandbaori, Raontha, Damodarpura, Ghati, Laxmipura, Darrah Range HQ, Darrah gaon, Mashalpura, Naulav and Gagron. Mobile wireless sets need to be also provided in all

the vehicles. Apart from these, handsets have to be provided to the field staff for quick communication at short distances.

The details of existing installed fixed wireless sets, mobile wireless sets and handsets available in the Reserve are enclosed as **Annexure-9**.

From the protection point of view in the Core area, new barriers/ check posts and watch towers are proposed to be constructed. For these barriers also, communication system is essential for which more fixed wireless sets may be required. Some more handsets will be also required for better communication system in the area. So the provision for purchase of new wireless sets and maintenance of existing sets needs to be kept in the plan.

4.4 Tourism and Interpretation:

4.4.1 Tourism:

The forests of the Core area are dense (density 0.6 to 0.7) and along the hill slopes, they provide an ideal attraction for tourism. The rivers Chambal, Ahu, Amjhar and Kali Sindh are either at the boundary or inside the Core. At some places, there are pockets which have abundant water of good depth round the year. Such spots are ideal places for crocodile viewing. Several rare and endangered species are present here which can attract the tourists. An old forest rest house of British time, built on foot-hills is situated at Darrah Gaon. There are two important places in core area of MHTR known for tourism purposes. These two places opened for tourism before notifying the Tiger Reserve. The visiting tourist position of last 5 years of Mukandara Hills Tiger Reserve is enclosed as **Annexure-10**.

Garadia Mahadev Temple :-

Garadia Mahadev Temple is a noted shrine of Kota, located near the Chambal River. It is located near the NH-76 that leads to Dabi and Chittorgarh. It provides one of the most mesmerising views of Chambal River, gorge and the plains. The shrine can be reached by descending a few steps where you can pay your respects to Lord Shiva. The place is a tad remote and isolated from regular tourist hotspots but is worth the journey to make. Most people recount being stunned by the sheer beauty and memorable view. Nature lovers can sit here for hours, absorbing its tranquillity

and pristine beauty. Budding poets, writers and artists can count on being inspired by the still, blue waters and surrounding wilderness.

Kota Dam Boating :-

It is situated on the banks of river Chambal. This idyllic setting provides tourists with many opportunities to engage, in an array of adventurous activities. Sail on a boat is one of the many adventures that you can engross yourself on the river. This is around 13 km boat safari takes you within the Mukandra Hills Tiger Reserve. The safari will provide you with glimpses of turtles, crocodiles, otters, sloth bear, leopard, vultures, owls and also, many species of unique flora. This is soon turning into an exciting, adventurous destination, owing to its unpolluted habitat, amazing landscapes, abundant wildlife, magnificent ancient ruins and medieval temples that engulf the river.

The tourism in the core area will be based on the broad guidelines issued by Government of India vide letter dated 15.10.2012 and Government of Rajasthan ecotourism policy 2010.

The following guidelines shall be enforced:

- Tourism in the core area will remain at the current level if it is within 20% of the total geographical area of the tiger reserve.
- In a phased manner the tourism in core area should be shifted on to the periphery, so that there is enhanced protection in the buffer zone.
- Tiger reserve entry and exit timings should be regulated strictly so that there are no fatal accidents during odd hours, at the same time there is less disturbance to wildlife.
- Tourism to be promoted as an activity to promote awareness.

Hadoti is having rich heritage and bio diversity, yet it is almost neglected on the tourism map except for Bundi. The river Chambal, which is life line of this area with its stiff cliffs, variety of flora and fauna which includes rare and endangered species like Smooth Coated Otter and Crocodile, Turtles and Tortoises, not only provides value but it also provides shelter and breeding places for the above species along with most endangered species of Vultures, Storks, Owls etc. It is a great advantage to see all these while boating in this river. Similarly the Dhok, Khair forest

and big Cats of Hadoti have been attracting tourists since centuries till independence. MHTR had been the forest recluse of the royalties and was well managed by erstwhile rulers.

Classification of Tourists:

- Visitors with tour groups
- Unescorted day-use visitors
- Amateur photographers
- Religious groups/Cultural travellers from local area and outside
- School children/coaching institute students and families
- Media

4.4.2 Interpretation:

The broad array of principles set forth by Freeman Tilden laid the groundwork for the eclectic nature of Interpretation. His directives (listed below) offer fuel to the range of interpretative leaders promoting outcomes from simple awareness to visitor action regarding environmental issues:

- i) Interpretation should relate to the visitor
- ii) Interpretation should include information
- iii) Interpretation is an art
- iv) Interpretation's chief aim is to provoke
- v) Interpretation should be holistic
- vi) Interpretation for children should be different than for adults

4.4.2.1 Present status of Interpretation in the Tiger Reserve:

At present, new interpretation center is constructed near Garadiya Mahadev Temple in MHTR. A leaflet cum marker, to educate the visitor's about the biodiversity of Mukandara with the basic concept of promoting 'biodiversity centric tourism' rather than 'tiger centric tourism', is being circulated to the visitors. Do's and Don'ts and a visitor experience sharing form is also being circulated for obtaining feedback of the people.

4.5 Research and Monitoring:

Monitoring of wild animal population is done by periodic population estimation but no scientific research activities have been carried out. No database has been created and not much information is available about various parameters of

habitat, habitat changes, movement of the wild animals, and ethological aspect of the wild animals of the area.

A monitoring protocol is required to be activated and in-depth analysis of evidences collected [direct & indirect] is to be undertaken by the Reserve Management as under:

- A monitoring format will be designed and followed for recording of important data related to prey, predator and habitat
- The data will be received by the Research Section and in-depth analysis will be reported to Reserve management
- Data of number of pugmark evidences every fortnight will be compiled for 6 – 12 months and based on the trends, analysis will be done to detect *early warning signals*, if any, and appropriate measures will be undertaken
- The data received at the divisional headquarter will be compared as per seasons. Summer/ winter of previous year and also on the basis of population estimation of previous year vis a vis current year population estimation
- Field checking will be done and comments recorded in the form of directions in the tracking register
- During the monsoon season, more emphasis will be laid on to collect evidences like scats, kills, roar calls, scratches and scrapes, etc as pugmark evidences will be reduced in number

4.5.1 Beat Habitat Occupancy Maps:

- Beat maps were distributed to beat guards.
- Photocopies of beat maps will be provided in a booklet form to each beat guard termed as Beat Habitat Occupancy Map [BHOM] for predators.
- Beat guard will mark evidence of pugmarks, kills and scats on the tracks, on the photocopied beat maps.
- GPS location of the pugmark will be written with the help of the GPS.
- Range officers and Foresters will verify evidences in the field and mention it on the BHOM.
- Foresters shall compile the maps every fortnightly and send the information to research section through Range Officer.

4.6 Relocation of Villages:

Most of the villages falling inside the boundary of the MHTR are revenue villages. The presence of large number of villages has created a honey combed situation in the Reserve. Cattle and human population of these villages exert tremendous biotic pressure on the adjoining forest area. Mukandara Hills Tiger Reserve is a proper site for the rehabilitation of the tiger in the wild provided villages inside the Reserve are relocated and grazing is controlled.

4.7 Administration and Organization:

Currently, the staff position in the Reserve is as under:

Table-16 MHTR Personnel				
S. No.	Name of the Post	Sanctioned	Filled	Vacant
Office of the CCF Wildlife Kota & Field Director MHTR				
1	CCF Wildlife Kota & Field Director (ex officio) MHTR	1	1	0
2	DCF & TA to CCF Wildlife Kota & Field Director MHTR	1	1	0
3	Assistant Conservator of Forest 1. Administration, 2. Development 3. Flying Squad	3	0	3
4	Range Forest Officer – II Grade	2	0	2
5	Assistant Account Officer	1	1	0
6	Junior Accountant	1	0	1
7	Office Superintendent	1	0	1
8	Office Assistant	2	1	1
9	PA	1	1	0
10	Clerk Grade I	2	2	0
11	Clerk Grade – II	2	1	1
12	Surveyor	1	0	1
13	Driver	1	1	0
14	IV class	3	3	0
15	Chowkidar	1	1	0
	Total	23	13	10

Office of Deputy Conservator of Forest, MNP Kota				
1	Deputy Conservator of Forests Mukundara National Park	1	1	0
2	Assistant Conservator of Forests	4	3	1
3	Range Officer Grade I	2	0	2
4	Range Officer Grade II	6	6	0
5	Forester	17	15	2
6	Assistant Forester	18	18	0
7	Forest Guard	111	74	37
8	Assistant Accounts Officer	1	0	1
9	Office Assistant	1	0	1
10	Clerk grade I	2	1	1
11	Clerk Grade II	4	3	1
12	Driver	5	3	2
13	Surveyor	1	1	0
14	Veterinary Doctor	1	1	0
15	Assistant Veterinary Doctor	1	0	1
16	Class IV	2	2	0
17	STPF*	108	0	108
	Total	285	128	157

* Special Tiger Protection Force (STPF) –Memorandum of Understanding has been signed with National Tiger Conservation Authority. However, creation of posts and filling up of vacancies is pending. Meanwhile, as per the directions of Hon'ble High Court Rajasthan in 108 Border Home Guards have been deployed in lieu of STPF.

<u>Table-17 Range Jurisdiction</u>		
Range Darrah	Range Raontha	Range Gagron
4 Nakas at Dara Station (Morukalan), Sawan Bhado Dam, Daanta, Darrah Gaon	4 Nakas at Raontha, Mandargarh, Chandbaori Damodarpura,	3 Naka – Mashalpura, Naulav, Rajpura
Beat Guards	Beat Guards	Beat Guards

Range Jawahar Sagar	Range Kolipura	Range Borabas
5 Nakas at Jawahar Sagar, Sripura, Khera, Gudha, Bhainsroadgarh	3 Nakas at Kolipura, Girdharpura, Kaniya Talaab	4 Nakas at Borabas, Rath Kaankra, Bandha Dharampura, Nayagaon
Beat Guards	Beat Guards	Beat Guards

The major functions of the Administration and Organization are given below:

- Protection of the forest and wildlife from any kind of damage
- Land management including demarcations and maintenance of boundaries
- Forest development and management
- Habitat improvement, rehabilitation of degraded areas
- Maintenance of Records
- Inter departmental co ordination
- Implementation of various public welfare schemes
- Conflict management
- Nature education
- Animal resource activities
- Census operation

CHAPTER 5

LAND USE PATTERNS & CONSERVATION-MANAGEMENT ISSUES

5.1 Land use Classification

The area statement of the revenue villages falling within Dara sanctuary and within 5 kms. from the boundary of Dara sanctuary (outside sanctuary) and area statement of the revenue villages falling within Jawahar Sagar sanctuary is enclosed as **Annexure-11**.

As depicted in the charts of the revenue villages located within and on the periphery (outside) of the core rights and concessions in the form of grazing, dry fuel wood small timber for house hold and agricultural implements, collection of minor forest produce including Tendu leaves and right of way, burial, worshiping etc. were granted by the forest settlement officer at the time of formation of forest blocks. As per the Supreme Court order complete ban on these activities has been imposed.

The area is rain fed with meager irrigation facilities. Villagers practice primitive agricultural methods. Erratic rains and draughts have shaken their economy. They have smallholding and that too on undulating terrains which are mostly unfit for agricultural practices. The main kharif crops are maize, urad, moong,tuar etc. and where irrigation is possible wheat, gram, mustard etc. are grown as Rabi crops.

The zone of influence extends over the entire core of MHTR. There are revenue areas within the boundary of core occupied by villages. They largely influence the core through their agriculture and associated varied land use practices.

5.2 Socio-economic Profile of Villages

There are a large number of Villages inside and outside the PA, with various Ethnic identities, traditions, customs, having a distinct relationship with the forest.

5.3 Resource Dependence of Villages

Large numbers of villages are present in and around the tiger reserve. Local villages depend upon the forest for firewood, grazing, timber for house making and repair, wood for agriculture implements, fencing martial, NTFP like Jamun, Tendu, Ber, Bel, Kainth, Ratanjot, Sitafal, and Mahuafruits (Dolma), fodder, Medicinal plants etc. The major practices which have a negative effect on the resources are grazing, lopping and firewood collection.

Tribals still practice the old agricultural methods. Erratic rains and frequent draughts have shaken their economy. They have small holding and that too undulating which is mostly unfit for good agricultural practices. The main crops are maize, urad, moong etc. and where irrigation is possible, wheat, gram, mustard etc. are also grown as Rabi crop. No NTFPs are auctioned in the core.

Since livelihood of a large population depends on forest resources hence eco development around this P.A will be of a great help in up lifting the economic status of the neighboring population. The soil and moisture conservation works, rehabilitation of degraded areas, bamboo culture, Tendu culture and eco – development works on the adjacent forest / Panchayat / Revenue / Fallow lands will reduce the dependency of the local tribal population on the forest resources. Soil and moisture conservation will help in augmenting the ground water recharge in the tiger reserve area, which can act as a natural reservoir of water to mitigate the water scarcity of the area.

Eco –development works will reduce the water scarcity of the area and will also help in reduction of the dependency of local public on fuel wood. Pasture development activities can divert inflow of cattle from the core. The resource development will have a direct bearing on the economy of people. It will help in maintaining the fragile ecosystem & ecological equilibrium.

5.4 Human-Wildlife Conflicts

Very less number of Human Wildlife conflicts are reported owing to the fact that number of wild animal straying outside the core is very less. However once the number of wild animal population increases in the future the incidence of human animal conflict would increase. A precaution needs to be taken so that natural balance in prey predator exists so that a check on one species of wild animal increasing abruptly could be curtailed.

5.5 Assessments of Inputs of Line Agencies/ Other Departments

5.5.1 The various Departments in the District need to actively co-operate for the restoration of MHTR. In the relocation process, there has been an example of sectoral linkage by departments in the form of dovetailing of different rural

development schemes in the relocation work. The District Administration and Police support for the protection of MHTR would be vital. For further institutionalization of the process, Tiger Foundation would be formed to look in to the matters of protection and development of MHTR.

5.5.2 Tribal population of the area depends upon agriculture, forests, cattle rearing and labour oriented works. Intricate relationship of tribal with forests is remarkable. They fully depend on forests for housing, fencing material, fodder, wild fruits and agricultural implements.

Agriculture, animal husbandry, collection of NTFP, Labour work etc. are the main occupation. Irrigation facilities are properly not developed. Rabi crops are grown on a small scale along natural water courses. Traditional irrigation system called 'Haran' is practiced by plugging these water courses and by constructing a water channel at contour. Water pumps are being also used for irrigation.

Kota stone in Dara comes from Ramganjmandi area. But no industry is present in Jhalarapatan and LadpuraTeshil. Unemployment, poverty, illiteracy etc. are main problems. Most of the cattle are either dry or produce very less quantity of milk. 'Desi' poultry is reared by each family. Other vocations of people include labour at various sites of government agencies.

There are some NGOS working for environment like PFA, WWF, NHS etc. Various wings of forest Department itself like Territorial, Wildlife and project wings are functioning here to uplift the socioeconomic profile of the villages.

Employment to local people is generated in the field of agriculture, animal husbandry, collection of non –wood forest produce and labour oriented works in various, government and private sector. Economic condition of local people is pitiable. Most of the families have small land holdings. Irrigation facilities are meager. Cattle quality is poor and less productive.

Being an agrarian economy the living standard of the local community can be uplifted by improving agriculture. Since irrigation facilities are not adequate the production of Rabi crop is very poor. Construction of reservoirs may increase

irrigation there by raising local economy. Only big dams have been constructed in the vicinity of the area and irrigation facility developed from them has helped the farmers in few villages to take more agricultural production. These dams have improved water table in the surrounding villages. Development of roads and communication network has improved the marketing and access to essential facility like installation of hand pumps to reduce the drinking water problems in the area. Network of Rajiv Pathashalas and other schools have helped in increasing literacy in the area. “SwasthyaPariyojana” has reduced the ‘Naru’ menace in the area. These developmental activities are helping overall development of the area but the adverse impacts of such activities on the habitat need to be suitably mitigated.



PART – B

PROPOSED MANAGEMENT

CHAPTER- 6

VISIONS, GOALS, OBJECTIVES and PROBLEMS

6.1 Vision:

The MHTR Core is a treasure house of many rare and endangered floral and faunal species. Tiger, Panther, Sloth Bear, Chinkara etc., are notable among wild animals. A good number of rare plant species like *Ensete superbum*, epiphytic and terrestrial orchids like *Vanda tessilata*, *Aerides*, *Nervilia araguna*, tuberous plants like *Puraria tuberculata*, *Corallocarpus epigeous*, *Arisema torusum*, *Curcuma* etc are also found in the Core area.

The area in the past has been managed for short term needs of revenue realization and has been subjected to excessive human interference and biotic pressure. This has resulted in loss of biodiversity, degradation of the resources as regards to the soil cover, soil health, density and number of species, arrest of biogeochemical cycle and productivity of the resources. This has also caused imbalance of hydrological cycle at many sites, successional degeneration, and reduced carrying capacity of the resources resulting in hardship for the ecological components including the floral, faunal and tribal populations. The enormous biotic pressure and human intervention has resulted in the degradation of the productivity potential of the resource. As a result the resource needs to be managed for enhancing its carrying capacity and reaching a balanced ecosystem to make the habitat more and more suitable for the flagship species of the area e.g., tiger, panther, sloth bear, and other faunal associates. Accordingly, the vision is **“Conservation of Biodiversity in Mukandra Hills Tiger Reserve and adjoining landscape with focus on the ecological & livelihood security and maintaining a viable population of Tiger.”**

6.2 Management Goals:

- a) To develop Mukandra Hills Tiger Reserve for hosting a viable population of tigers, co-predators and prey animals without distorting the natural prey-predator ecological cycle in the habitat.

- b) To conserve the ecological integrity and interspersions of various habitats and their associated fauna so as to maintain the genetic diversity in perpetuity.
- c) To reduce the man- animal conflict.

6.3 Management Objectives:

- a) Elimination of biotic and abiotic disturbances from the Core area.
- b) Habitat development and amelioration to improve the food, cover and water availability for the wildlife.
- c) Infrastructure development for effective protection and monitoring.
- d) Reduction of dependence of local people on the forests through eco-development.
- d) Creation of sufficient awareness to conserve the Nature, Natural Resources and Natural heritage on sustainable basis.

6.4 Problems in Achieving Objectives:

Mukundara Hills Tiger Reserve is one of the most recent tiger reserves facing the problems of modern times and pressures. The biggest of these is the people residing inside the core area of the reserve. Their high dependency on forest resources for their day to day needs is putting high pressure on the forest and is bringing changes in the ecology of the area. Invasion of weeds and grazing of cattle in the reserve is putting more pressure on the herbivore population of the reserve. Understaffing and low budget has added to the woes in protecting the park from various pressures. The problems in the Core area in achieving the above mentioned objectives are:

- Villages inside the Core: The people residing inside the core area of the tiger reserve have a high dependency on forest resources for their daily needs. This is putting high pressure on limited resources and the area for wildlife to thrive is shrinking because of them. To make this space as inviolate for wildlife and for recovery of tigers, it is paramount that the villages located inside the core area should be removed on priority basis.
- High rate of degradation at periphery: The tiger reserve is surrounded on all the sides by villages which are dependent on the reserve for their day to day needs and they meet these requirements from the nearest possible distance from the reserve. Hence degradation is more on the periphery of the Reserve.

- Weed invasion: The Core area due to frequent movement of domestic cattle and grazing has become weed infested. Approximately 30% of the tiger reserve is infested with weeds like Lantana, *Cassia tora* and *Iprits spp.*
- Habitat loss: Due to high rate of degradation on the periphery by surrounding villages there is a continuous loss of habitat for wild animals.
- Forest fires are frequent in some parts of the core especially during sub – normal rain years from February to June.
- Water scarcity in the pinch period: Water is already scarce in the tiger reserve and during summers it is restricted to very few places with little pools making wild animals easy targets of poachers.
- Under staffing: The tiger reserve is under severe shortage of staff to man the area. Out of 111 sanctioned posts of forest guards only 48 are working. Same is the story with other cadres too. Strengthening of staff is must for proper protection of the reserve.
- Encroachment threat is always prevalent in the Mukundara hills tiger reserve by the villages situated inside and on the periphery of the area.
- Exposed core area: The core area is not covered by buffer on all the sides. At many places it is directly exposed to agricultural fields. This increases the threat of wild animals being poisoned for destruction of crop.
- High dependency of local people on forest resources: The people residing inside the Reserve and on the periphery are highly dependent on the forests for their day to day needs. Biggest among these dependencies being for fuel wood and grazing of their domestic cattle.
- Collection of non – timber forest products: Local population residing in the villages go to the tiger reserve to collect non timber forest produce creating a lot of disturbance to wild life and habitat by their movement and activities.
- Poaching: Although poaching is not much heard of in the tiger reserve but the threat always remains there especially from nearby areas of Suket and Ramganj Mandi.
- Lack of scientific information and database: Mukundara Hills Tiger Reserve has not been a centre of attraction for research
- Lack of knowledge and skills among staff for protected area management: The staff deployed in MHTR is grossly inadequately trained to handle wildlife issues. Continuous trainings are required to sensitize them to the nature of work.

- Staff amenities: The available staff amenities are short of expectations. Staff needs to be given proper amenities to motivate them to do good work.

6.5 Strengths – Weakness – Opportunities- Threats (SWOT Analysis):

Mukandara Hills Tiger Reserve is one of the most disturbed protected areas owing to several factors. The PA is open from all sides and entry to the sensitive areas is easy option if the forests are not tracked or monitored effectively and systematically.

<p>STRENGTHS</p>	<ul style="list-style-type: none"> • Mukandara is link between Gandhi Sagar Sanctuary Madhya Pradesh and Ranthambhore Tiger Reserve in Chambal river tiger landscape. • Beautiful stretch of Chambal river and its deep gorges gives it a unique landscape • The Mukandara Tiger Reserve, nestled in the Vindhayan mountain ranges – is a repository of serene dense forests, wide valleys and sprawling plateaus. Mukandara is natural grandeur housing over 400 plant species, 200 bird species in an area of 759.99 sqkms. • The Tiger Reserve has a unique assemblage of high biodiversity • The habitat in 200 sqkms is compact and with good vegetation of Dhok.
<p>WEAKNESSES</p>	<ul style="list-style-type: none"> • Linear nature of the Tiger reserve with more perimeter to area ratio leading to longer protection perimeter • Delhi Mumbai Railway track and National Highway 12 passing through the core area act as a barrier to free movement of wildlife. • Mining activities next to core area in Bundi district for sandstone mining and Kota stone mining in Kota. • Biotic disturbance in the PA owing to presence of huge cattle population and many villages in and around MHTR boundary. • Heavy biomass extraction in peripheral areas to the impact zone of villages and zone of influence of

	<p>villages situated inside the Tiger Reserve.</p> <ul style="list-style-type: none"> • Open from all sides resulting in illegal entry from all sides. • The temples in the Mukandara are visited by devotees/visitors throughout the year creating lot of polythene and other sorts of pollution. • Road from Kota to Jhalawar (national highways), Kota -Rawatbhata road and Mumbai Delhi railway line run through the park. A large no of vehicles and trains run creating lot of disturbance to wild animals • No proper infrastructure (vehicles, Range Office staff, telephone facility) to the foresters and Range Officers. • Dhabas on revenue/non forest lands within the Tiger Reserve creating nexus with the local people for illicit timber for fuel wood. • Poor water retentivity in the Tiger Reserve owing to less number of large water bodies. • No Interpretation facility for enriching visitor's experience. • Growth of Kota, Rawatbhata and Bhainsroadgarh towns and industrial areas near core area. • Inadequate strength of the foresters and forest guards and limited staff capabilities in a tough terrain.
OPPORTUNITIES	<ul style="list-style-type: none"> • In an effort to revive Mukandara, the Tiger Reserve offers a great opportunity to reintroduce the Tiger. • Corridor connectivity development by inclusion in the Tiger Reserve to serve as potential habitat to host spill over population from the Ranthambho Tiger Reserve. • The tiger reserve has been notified covering area in four districts i. e. Kota Bundi, Jhalawar and Chittorgarh with support of local population. • Readily available research support from Kota University
	<ul style="list-style-type: none"> • Owing to a large number of entry points, especially

THREATS	<p>from the peripheral areas, illegal entry of suspected person and poachers is a continuous threat.</p> <ul style="list-style-type: none">• Due to high biomass extraction, habitat degradation is a big threat.• Annual sheep migration and local cattle camps.
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CHAPTER - 7

MANAGEMENT STRATEGIES

7.1 Delineation of Critical Tiger Habitat and Inviolate Areas:

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

Man is a product of the systematic evolution in nature. Prior to the advent of the agrarian - pastoral and modern industrial societies, he was very much the part of the ecosystem and his survival was the success of that ecosystem. Man has now modified almost all the eco-systems and the earth surface is now being used by human beings in a destructive and unsustainable manner. It is our prime duty to protect our life supporting system i.e. entire earth systems. The creation of the protected area is part of our strategy to revive our lost paradise. For the survival of human race, it is becoming essential to increase the area under the protected area network.

The conservation of the flagship species i.e. the top predator of an eco-system ultimately conserves the entire eco-system and biodiversity. Tiger is a territorial animal, which advertises its presence in an area and maintains a territory. It is a well known fact that partial overlaps of resident male territories in an area do occur. However, the degree of overlap increases lethal internecine combats. Several female territories do occur in an overlapping manner within the territory of a male tiger. The tiger land tenure dynamics ensures presence of prime adults in a habitat, which act as source populations, being periodically replaced during old age by young adults from nearby forest areas.

The ongoing study (Tiger, its co-predators, prey base and their habitat by NTCA and WII) and analysis of available research data on tiger ecology indicate that the

minimum population of tigresses in breeding age, which are needed to maintain a viable population of 80-100 tigers (in and around core areas) require an inviolate space of 800 -1200 sq km (the detail is given in following "Simulation Results for Viable Tiger Population"). Tiger being an “umbrella species”, this will also ensure viable populations of other wild animals (co-predators, prey) and forest, thereby ensuring the ecological viability of the entire area / habitat. Therefore, buffer areas with forest connectivity are imperative for tiger dynamics, since such areas foster sub-adults, young adults, transients and old members of the population. The young adults in an ongoing manner replace the resident ageing males and females from the source population area.

The buffer area absorbs the “shock” of poaching pressure and other anthropogenic pressures on population of tiger and other wild animals. In case of severe habitat depletion in buffer areas, the source population would get targeted and eventually decimate.

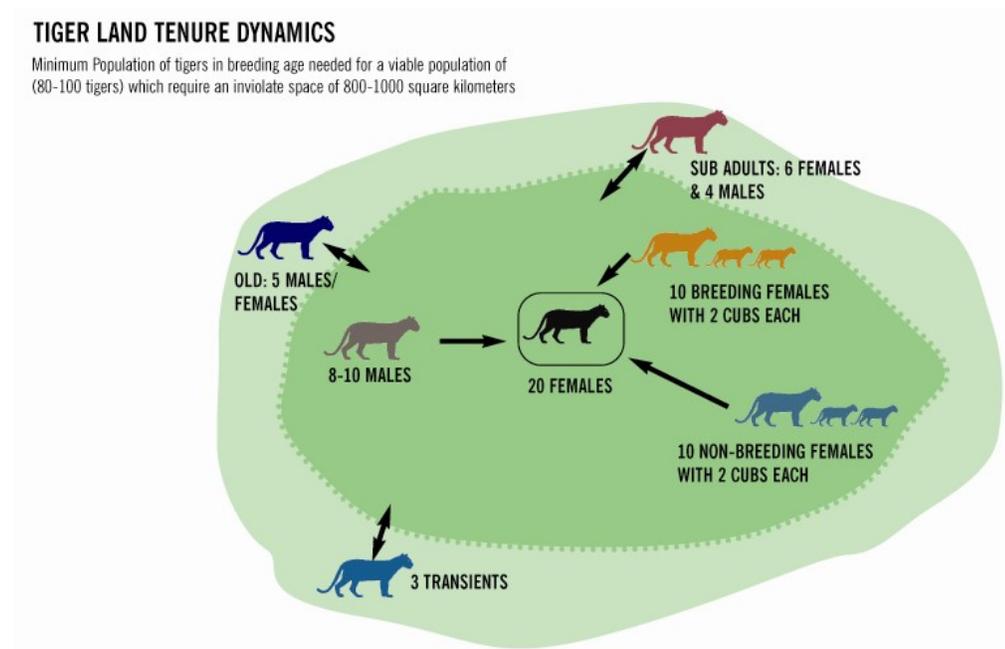


Figure 7.1 :Simulation Results for Viable Tiger Population (given by WII)

To decide the size of critical areas needed for achieving the objectives of tiger conservation published data on tiger ecology, demography, and those available to the NTCA were used.

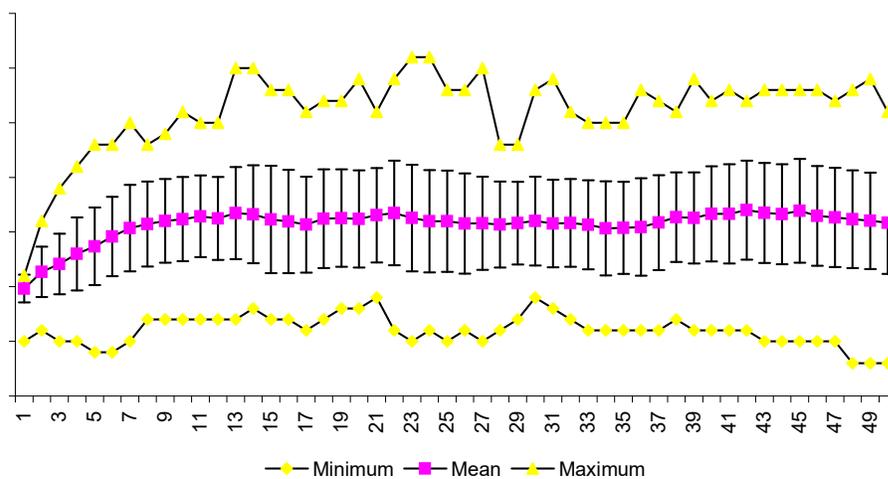
Data from the all India tiger status monitoring exercise jointly taken up by NTCA along with State Forest Departments and the Wild Life Institute of India wherein all potential tiger bearing forests were extensively surveyed with a systematic sampling design between November 2006 and March 2006 was used to map tiger occupancy and relative abundance, prey abundance indices, anthropogenic pressure indices and habitat quality across 17 states known to harbour tiger populations. A team of 50 researcher's simultaneously estimated absolute abundance of tigers and prey by double sampling in a stratified sample of different tiger sign abundance. Relationship between indices and absolute abundance were evaluated and calibrated for predicting tiger densities. This research has demonstrated that tiger occupancy of forests were dependent on availability of wild prey and low human impact on the habitat. Tiger densities declined with increase in human use of the forests. Good source populations of tigers were found in areas devoid of human settlements and least human impact. Thus, to ensure perpetuation of the above goals it is essential to have an inviolate area for a minimum viable source population of tigers. A minimum of two such populations should be ensured in each bioregion so as to preserve the unique behavioural, ecological and genetic adaptations of the tiger. Based on the demographic parameters and life history traits of tigers population (Box 7.1) simulation models suggest that if a core area having territories of 20 breeding tigresses were made inviolate, the resultant tiger population with an adequate buffer (multiple use area with eco-sensitive land use) has a very low probability of extinction (< 5% in 100 years, See Box 7.1a). Tigress's territories are determined by prey availability which in turn is dependent on the productivity of the area. The size of this inviolate area depends on the average territory size of tigresses. These range between 40 to 60 km² within most of the tiger areas in the sub-continent. Thus, for a population of 20 breeding tigresses we need an inviolate area of 800-1200 km². An ecological sensitise zone (buffer, co-existence area, multiple use area) around this inviolate space is needed for sustenance of dispersal age tigers, surplus breeding age tigers and old displaced tigers of 1000-3000 km². This buffer and the tiger population within it is essential to make the core of 20 breeding females viable for long term, since it sustains the dynamics of source and sink. Such a tiger reserve will sustain a population of 75-100 tigers (Box 7.1b).

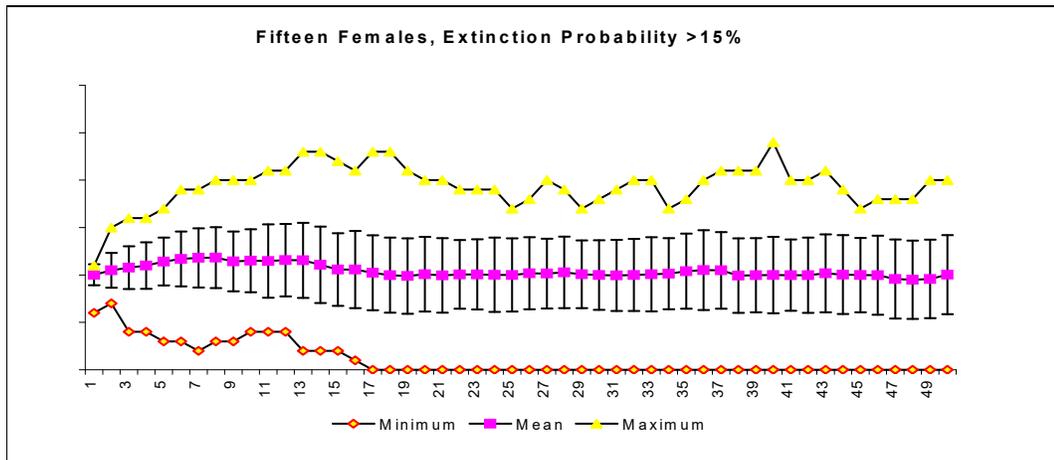
Box 7.1 Demographic Parameters of Tigers used for Simulation Models

- Adult sex ratio: 2.4 tigresses: 1 male tiger
- Birth Interval: 20 – 28 months
- Sex ratio at birth: 50:50
- Survival of Cubs up to 1 Year: 50%, 40-80% Range
- Survival of 1 Year Old: 70% (CV 15%)
- Survival of 1-2 Year Old: 85% (CV 15%)
- Survival of >2 Year Old: 95% (CV 10%)
- Fecundity / litter size: Average 2.4, range 1 to 5

Box 7.1a: Results of the Simulation of female population

Twenty Tigresses, Extinction Probability < 5%





Box 7.1b: Expected Tiger Population in an Typical Tiger Reserve

For 20 breeding Tigresses

Core Area Required (Inviolata): 800-1000 km²

Total Population in the Core (inviolata):

Male Tigers: 8-10

Cubs < 1 Year: 10 -15

Cubs 1-2 Year: 10 -15

Buffer (Co-Existence Area with eco-sensitive land use) :

Area Required: 1000-3000 km²

2-3 Year old tigers (recent dispersers): 10 -15

3-4 Year old tigers (older dispersers): 10 -15

Old tigers & Surplus breeding age tigers: 10-15

Total Tiger Population in the Tiger reserve: 75 – 100 Tigers

Mukandara National Park, Darrah, JawaharSagar and National Ghariyal Sanctuary (part), has been included in the Core of tiger reserve and few forest blocks of Kota, Jhalawar and Chittorgarh division as buffer of the tiger reserve. MHTR consists of 417.17 km² as core area and 342.82 km² as buffer area with a total area of 759.99 km².

Once a village inside the core is relocated successfully then sufficient inviolate area is created for the wildlife to breed and establish so that their biomass is improved and it can establish as an ideal habitat for tiger.

7.2 Zone and Theme Approach to Management Strategies:

The “Zone” and “Theme” approaches have been adopted in the proposed management strategies of Mukandra Hills Tiger Reserve. Various managerial situations and needs can be taken care of by an effective combination of the “Zone” and “Theme” plans. Under this approach, several specific objectives and problems relevant to an identified part of the PA can be recognised as a “Management Zone”. This management zone would have its own measures and strategies. Furthermore, several objectives and different problems, created by a combination of factors, can be tackled by a “Theme strategy” under which measures can be prescribed for the entire area.

7.2.1 Zone Plans:

The CTH/ Core area shall be divided into the following zones:

- a. Zone Plan for Habitat Management
- b. Zone Plan for Voluntary Village Relocation
- c. Zone plan for ecotourism

7.2.1.1 Zone plan for Habitat Management:

Mukandra Hills Tiger Reserve displays all the intricacies of natural ecosystem in the form of various ecosystem pyramids of different producer-consumer chains, geological history, river orientation, management of wild habitat and watershed development and management. Besides the highly endangered Indian Tiger, the reserve also harbors a wide range of faunal species some of which figure

prominently in the IUCN Red List like *Vulpes benghalensis*, *Melursus ursinus*, *Lutra perspicillata*, *Panthera pardus*, *Python molurus*, *Tetracerus quadricornis*, etc.

Habitat management implies the creation and maintenance of the desired ecological niche in which the area tends towards a climax community of the food web with well-distributed food sources for every stage of the food chain. A suitable living and breeding environment for the wildlife is needed for conservation of the ecosystem. The prerequisites of the wildlife of the area are well-dispersed water sources, well-distributed food sources and hiding and predating conditions.

The food habits and the living environment of various faunal species are different. The Sloth Bear depends upon the fruits and berries, honey from the beehives and the white ants. Well-distributed food sources and water points are of prime importance for sustenance of Sloth Bear. The Panther needs herbivore population for predation. The herbivore population once abounding the area is now scarce and the panthers have to resort to killing of domestic cattle, Langur and peafowl for the food.

Fruit bats play an important role in pollination and seed dispersal of many forest trees like *Bahera*, *Butea*, *Ficus sp.* etc. To maintain the Bat -Tree relationship, it is necessary to protect the trees as well as food suitable for frugivorous bats.

Birds have specific liking for various plant species and different canopy density conditions for feeding, nesting and roosting. Different species of birds prefer different plants for nesting and breeding ranging from small shrubs to tall trees including few snags. The *Ficus* species are of utmost significance for sustenance of birds. Honeybees also depend on flowering trees, shrubs and herbs. A number of flowers – birds also depend on flower spectrum of the local plants.

Well-distributed availability of water is another factor governing the habitat suitability. River viz. Chambal, Amjhar, Ahu, KaliSindh, Brahmini, Eru, etc derive water from the tiger reserve but do not feed much of their water to the Reserve. The waterholes in the core spill over during rainy season but repeated droughts have made water a scarce commodity. The area being drought prone, availability of water

is not perennial, the pinch periods are quite long and the wild animals have to travel long distance in search of water.

Keeping above points into consideration the following measures will be taken up with a view to improve overall habitat condition:

- (a) Improving availability of food for wild animals by grassland management
- (b) Development of watershed for soil & moisture conservation.
- (c) Removal of *Lantana*, *Xanthium* and other undesirable species.

A. Improving Availability of Food:

The development of the area with well-dispersed food sources is the first prerequisite for the sustenance of wild animals in the area. The fruit species like Tendu, Jamun, Ber, Akol, Lisoda, Amaltash, Gular, Khajur, Karonda etc. constitute food for sloth bear. Honey is another preferred food of this flagship species. In order to improve the food availability for the herbivore population in general and the Sloth Bear in particular, the following measures will be taken.

Improvement of grass & bush cover & browsable species:

The area has been traditionally a good deer and sambar habitat. The area once abounding in herbivore population is now reduced of herbivores at different tropic levels. To re-establish them once again in the area we need to establish a proper food chain. In order to sustain and propagate the much needed grass and bush cover gradual removal of *Lantana*, *Xanthium* and *Cassia tora* is needed. The weed eradication will be done during plan period, so that grasses and other browsable species may come up.

7.2.1.2 Zone plan for Village relocation

The Wild Life (Protection) Act, 1972, as well as the Scheduled Tribes and Other traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, require that rights of people (Scheduled Tribes and other traditional forest dwellers) recognized in forest areas within core/critical tiger/wildlife habitats of tiger reserves/protected areas may be modified and resettled for providing inviolate spaces to tiger/wild animals. This requires payment of compensation (rights settlement in addition to the relocation package offered under the CSS at present). Chapter IV of the Wild Life (Protection) Act, 1972 (Section 24) provides for acquisition of rights in

or over the land declared by the State Government under Section 18 (for constituting a Sanctuary) or Section 35 (for constituting a National Park). Sub-section 2 of Section 24 of the Wild Life (Protection) Act, authorizes the Collector to acquire such land or rights. Therefore, payment of compensation for the immovable property of people forms part of modifying / settling their rights which is a statutory requirement.

7.2.1.2.1 Objectives:

1. To conserve the habitat & create inviolate space for the long term survival of source population of tiger & other wild animals.
2. To create grassland areas on the vacated sides for wild ungulates and cover for other wild life.
3. To provide good living conditions to the residing villages through relocation.

7.2.1.2.2 Process of Relocation

Relocation of villages involves resettlement and rehabilitation of the socio-economic life styles of the affected person. It envisages -

1. Identification of village for relocation.
2. To motivate people of selected villages to undertake voluntary relocation.
3. Resettlement of displaced families through support for development of agricultural land, provision for adequate compensation for property.
4. Socio-economic rehabilitation providing necessary infrastructure, e.g. approach road, drinking water facility, cattle ponds, fodder and fuelwood.

It is essential to have a minimum inviolate area (forming the core of the Tiger Reserve) capable of supporting 10 breeding tigers. On an average, a tigress requires 40-60 km² of territory for successful breeding. Pressure of human habitation is detrimental in sustaining high density breeding tiger populations. Settlements, therefore, need to be re-habilitated from the core area of a tiger reserve. The translocations/ rehabilitation package should be such that people should readily be willing to relocate. The relocation site should be so chosen so as not to compromise the conservation value of the Tiger Reserve i.e. it should be as far away from the core as possible and not located in connecting habitat corridors. Networking with local institutions and NGO's should be established so that post relocation assistance is provided to the relocated population for some time atleast. Effort should be made

to wean the resettled population away from dependence on forest resources. This would be possible by providing assistance (both technically and financially) in developing alternative livelihood options.



7.2.1.2.3 Need for Village relocation:

To improve the condition of the Park and provide a safe haven for the animals, villages inside the core area of Tiger Reserve are to be relocated because -

1. The cattle belonging to these villages graze in the core area and compete with the ungulates.
2. The core area surrounding the villages is highly degraded.
3. There is threat of diseases spreading from domestic cattle to wild ungulates.
4. Spread of weeds to the degraded areas.
5. Loss of habitat for wild animals.
6. Disturbance to the movement of animals to the adjoining core.

7.2.1.2.4 The villagers are facing problem because of:

- Severe crop degradation by the wild animals.
- Constant cattle lifting by wild animals.
- Because of the existing forest laws particularly Wildlife Protection Act and Forest Conservation Act, very few development activities could be taken up. The villages are deprived of all developmental activities.
- The villages are situated deep inside the forests not properly connected to outside world. There is less scope for the development.

- Because of the poor connectivity, the villagers cannot get immediate medical relief when there is emergency.
- Because of remoteness, very few teachers are willing to serve in the villages. The educational standards are very poor.
- There is growing social problem because of remoteness. Most of the youth (boys) are bachelors. “Brides” are not available for the boys of the villages.

7.2.1.2.5 Relocation Strategy

The strategy would be:

- To hold series of village level meetings with villagers to discuss about the rehabilitation package and convince them and clarify all the doubts.
- To conduct survey of movable and immovable property.
- Identify proper land for rehabilitation preferably revenue land at one place. If revenue land is not available according by suitable forest land should be identified and get dereserved as per 1980 forest conservation act.
- Detailed rehabilitation plan should be prepared and get it approved before implementation, people should be involved at every stage of implementation.
- All villagers should be relocated nearer to Kota so that villages get maximum facilities.

There are 16 villages which are located inside the core of tiger reserve. Map showing Location of villages in core zone of notified Tiger Reserve is enclosed as **Annexure-12**. Most of the villages have large cattle, sheep and goat population. These have caused serious grazing problem as they are sharing the entire grass fields as well as water holes. Since the villagers residing in these villages are to a great extent dependent upon cattle rearing therefore no amount of advice can keep them away from core grazing grounds. During the rainy season they even bring the cattle of their relatives living in the core areas. If stopped they are always ready to fight with the tiger reserve staff. This problem can not be solved totally but partly it can be tackled by shifting some villages. In the beginning efforts should be made to shift Laxmipura, Kharli Baodi, Kolipura Rupura, Girdharpura villages. For this proposal is being prepared after documenting the land / Building / wells etc. holdings of the

individuals. Forest / revenue area have to be identified for rehabilitation of these villages.

7.2.1.2.6 NTCA Guidelines for voluntary village relocation :

The Guidelines for village relocation has been issued by NTCA vide the letter No. 3-1/2003-PT Dated 26-2-08.

1. Based on the recommendations of a Professional Agency, a package for village relocation/rehabilitation has been sanctioned, with the following options/ norms, which adequately covers the “National Rehabilitation and Resettlement Policy, 2007” while taking into consideration the difficulties/ imperatives involved in relocating people living in forest areas:
2. The proposed package has two options:
 - 2.1 **Option I** – Payment of the entire package amount (Rs. 10 lakhs per family) to the family in case the family opts so, without involving any rehabilitation/ relocation process by the Forest Department.
 - 2.2 **Option II** – Carrying out relocation/ rehabilitation of village from protected area/ tiger reserve by the Forest Department.

2.2.1 In case of option I, a monitoring process involving the District Magistrate of concerned District would be ensured so that the villagers rehabilitate themselves with the package money provided to them. In this regard, a mechanism involving handholding, preferably by external agencies should also be ensured, while depositing a considerable portion of the amount in the name of the beneficiary in a nationalized bank for obtaining income through interest generated.

2.2.2 In case of option II, the following package (per family) is sanctioned at the rate of Rs. 10 lakhs per family:

Table-18 Sanctioned relocation package :-

(a)	Agriculture land procurement (2 hectare) and development	:	35% of the total package
(b)	Settlement of rights	:	30% of the total package
(c)	Homestead land and house construction	:	20% of the total package
(d)	Incentive	:	5% of the total package

(e)	Community facilities commuted by the family (access road, irrigation, drinking water, sanitation, electricity, telecommunication, community center, religious places of worship, burial/cremation ground)	:	10% of the total package
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The relocation process would be monitored/ implemented by the following two committees:

(State level Monitoring Committee)

- (a) Chief Secretary of the State - Chairman
- (b) Secretaries of related departments - Members
- (c) State Principal Chief Conservator of Forests - Members
- (d) Non-official members of respective Tiger Conservation Foundation - Members
- (e) Chief Wildlife Warden - MemberSecretary

(District level Implementing Committee for ensuring convergence of other sectors)

- (a) District Collector - Chairman
- (b) CEO - Member
- (c) Representative officials from: - Member
PWD, Social Welfare, Tribal Department,
Health Department, Agriculture Department,
Education Department, Power and Irrigation
Departments
- (d) Deputy Director of the Tiger Reserve/PA - Member Secretary

3. The above cost norms are indicative in nature to facilitate flexibility for State/site specific situation, and may be modified to allow inter component as well as inter family adjustments by respective State Governments as per site specific requirements.

4. The relocated village would be taken up on a priority basis for eco development as well as local development through convergence of District level schemes.
 - 4.1. The labour oriented works involved in the relocation process would be preferably implemented through the villagers who are being relocated, so that they derive benefits out of the same apart from ensuring the field implementation to their satisfaction.
 - 4.2. In case resettlement has been done on a forest land, the new settlement will be eligible for access to forest resources for their bonafide use through the village level committee and Gram Sabhas.
 - 4.3. The District Administration would facilitate fair price shop, education, health center close to the relocated site.
 - 4.4. “Handholding” after relocation would be ensured through the forest department with ongoing ecodevelopmental inputs through central assistance and district administration involving convergence of schemes. In this effort help of competent independent agencies may be sought wherever available.
 - 4.5. The relocated villagers would be given priority for livelihood options emanating from the protected area.
 - 4.6. In case the cost of relocation including settlement of rights per family exceeds Rs. 10 lakhs, the State Government has to meet the extra cost.
 - 4.7. The relocation process would be an open ended one, since the progress of relocation process would depend on performance by States.
5. The funding support for village relocation from the core/critical tiger habitats in the Tiger Reserves would be provided through the Annual Plan of Operations, based on the reserve-specific Tiger Conservation Plan, on a case-to-case basis.
6. The provisions contained in Section 38V of the Wildlife (Protection) Act, 1972, as amended in 2006, should be strictly complied with during the relocation process.

Further National Tiger Conservation Authority Govt. of India New Delhi vide File no. 3-1/2003-PT dated 27th February, 2008 issued guidelines as follows regarding relocation of villages:

- 1- The centrality of Panchayati Raj Institution should be ensured through consultation during the village relocation.
- 2- The Tribal Councils should be consulted on the rehabilitation/welfare package to ensure that such tribal people are provided with livelihood options as well as health care, education and housing facilities, vis-à-vis the statutory

provisions contained in the Wildlife (Protection) Act, 1972 as amended in 2006.

- 3- Zilla Parishad should be involved in monitoring the payment and utilization of the compensation package whether under option-I or option-II.
- 4- In case of option II, relocation/rehabilitation from the protected area/tiger reserve by the Forest Department should be done in consultation with the Gram Sabha.
- 5- Zilla Parishad Chairperson should be a member of the District level Implementing Committee for ensuring convergence with other sectors.
- 6- Implementation and monitoring of district level schemes in the relocated village should be done through Gram Panchayat/Gram Sabha.
- 7- Gram Panchayat/Gram Sabha should be involved in identifying labour oriented works relating to the relocation process, ensuring that the relocated villagers get adequate remuneration for their labour.
- 8- In case of re-settlement on forest land, the new settlement should be eligible to access forest resources based on their traditional forest rights as certified by the Gram Sabha.
- 9- Recommendations of Gram Panchayat/Gram Sabha should be taken while deciding the site for fair price shops, schools, health centre etc. close to the relocated village.
- 10- Gram Panchayat/Gram Sabha should be consulted in the identification of services, activities and personnel involved in ecotourism.

National Tiger Conservation Authority, New Delhi letter no.3-1/2003-PT dated 25th Feb., 2008 and 19th March, 2008 defined an eligible family as follows:

“Family” includes a person, his or her spouse, minor sons, unmarried daughters, minor brothers, unmarried sisters, father, mother and other relative residing with him or her dependent on him or her for their livelihood ; and includes “nuclear family” consisting of a person’ his or her spouse and minor children.

State Government of Rajasthan has already constituted a committee regarding planning and execution of voluntary relocation of villages under the chairmanship of District collector.

- | | | | |
|----|--------------------|---|----------|
| 1- | District Collector | - | Chairman |
| 2- | Project Director | - | Member |
| 3- | SDM/Tehsildar | - | Member |

- | | | | |
|----|---------------------------------------|---|------------------|
| 4- | District Agricultural Officer | - | Member |
| 5- | Dy. Director Animal Husbandry | - | Member |
| 6- | One or Two NGO working in
The area | - | Member |
| 7- | 2 Villagers | - | Member |
| 8- | Concerned DCF | - | Member Secretary |

Nominations of 6 and 7 would be done on recommendation of chairman or Ministry Incharge.

Committee will have following functions:-

- Committee would approve proposals submitted by concerned DCF regarding village relocation.
- Committee will also resolve and find solution to the problems and suggestions of concerned villages.
- Committee will ensure timely implication relocation programmes.
- To ensure relocations as per master plan of area.

Forest Department would be the administrative Department of the Committee and committee would be functional till further orders.

Table-19 Proposed Relocation Plan of Villages Situated In Core of MHTR

Sr.No.	Year of relocation	Name of Village
1	2019-20	Laximpura, Kharli Bavdi, Ghati,
2	2020-21	Mashalpura, Damodarpura and ghati
3	2021-22	Damodarpura, Girdharpura
4	2022-23	Girdharpura, Narayanpura, Dara Gaon
5	2023-24	Ruppura, Kolipura
6	2024-29	Amba, Rojya Ka Talab, Bhuki Akkahawa, Nosera,

A separate detailed plan will be prepared and presented to NTCA through State Govt.

Table-20 Progress of Village Relocation (as on 31.03.2020)

S.N.	Name of village	No. of families	Consent given			Relocated families	Under progress	Remain
			OpI	OpII	DLC			
1	Laxmipura	30	2	-	26	10	18	2
2	Kharli Bawari	24	-	-	17	17	-	7
3	Ghati Gaon	58	23	-	-	14	9	35

7.2.1.3 Zone plan for ecotourism

This is an overlapping activity within the core area. Tourism has emerged as a key sector in the National parks and sanctuaries over the past decade. Eco tourism is generally described as tourism associated with protected areas. Eco tourism aims at providing nature tourism opportunities and also aims at generating economic returns to strengthen protected areas and augment economic benefits for the local people.

Hadoti is having rich heritage and bio diversity, yet it is neglected on the tourism map except for Bundi. The river Chambal, which is the life line of this area with its vertical cliffs, variety of flora and fauna which includes rare and endangered species like Ghariyal and Crocodile, River Dolphin, Turtles and Tortoises, not only provides value but also provides shelter and breeding places for the above species along with most endangered species of Vultures, Storks, Owls etc. It is a great advantage to see all these while boating in this river. Similarly Dhok, Khair forest and big Cats of Hadoti have been attracting tourists since centuries till independence. MHTR had been the forest recluse of the royal families and was well managed by erstwhile rulers. The remains of Shikari Malas, Raontha Mahal, Bewra talai, Jhamra- Kui etc are its witness which can still cater to wildlife lovers if care is taken towards their maintenance and up keep with their advertisement. This can be done easily by integrating efforts of forest deptt, Tourism deptt, media and the Tour operators. This will display forest, wildlife, Historical places like Gagron fort, Raontha Mahal, Abli Meeni Mahal, Hunting Malas, water points like RamSagar, Mandargarh Talab remains of Mandargarh temples and rock paintings of stoneage as an attraction to tourists.

7.2.1.4 Objectives

- to create nature awareness in the public.
- to promote conservation and protection awareness in public.

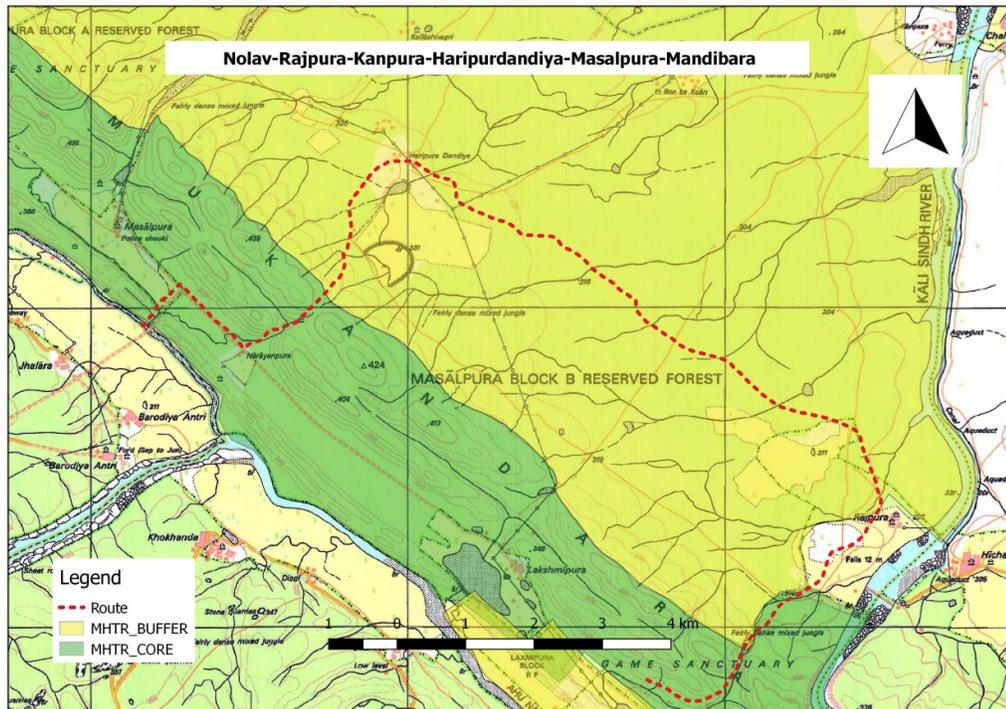
-to provide livelihood to the public so that a positive outlook towards conservation is created.

-to involve locals in protection and conservation by using tourism as a tool.

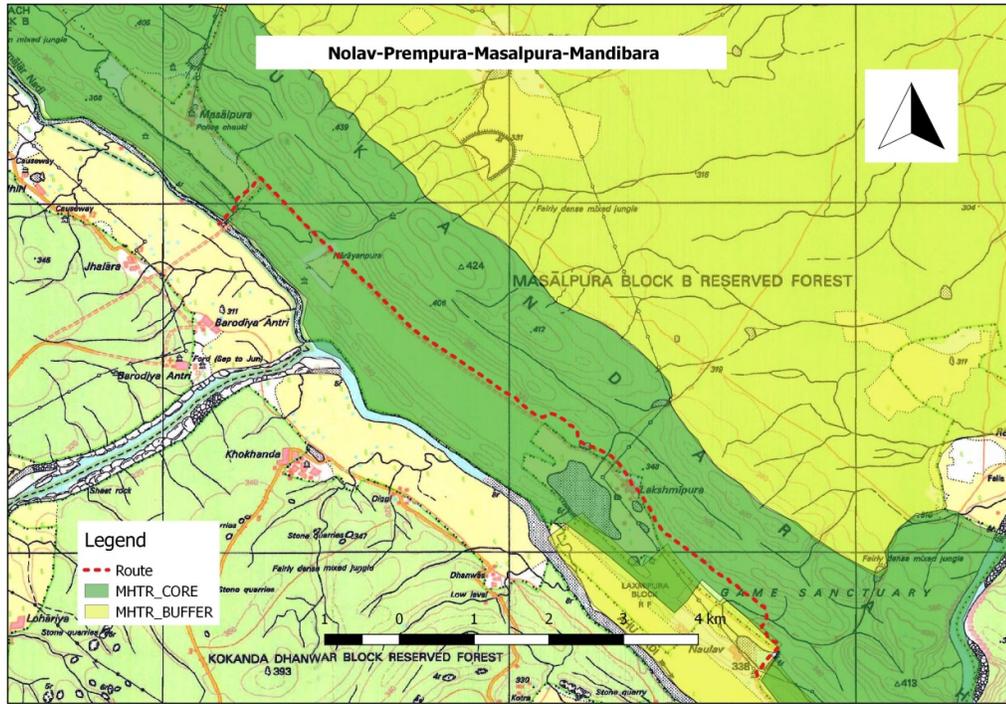
7.2.1.5 Strategies

To promote Eco Tourism, following tour circuits which will cover an average of 10-20 Km route distance and two boating routes which already exists are proposed so that the tourists can enjoy all above with least disturbance to the wildlife –

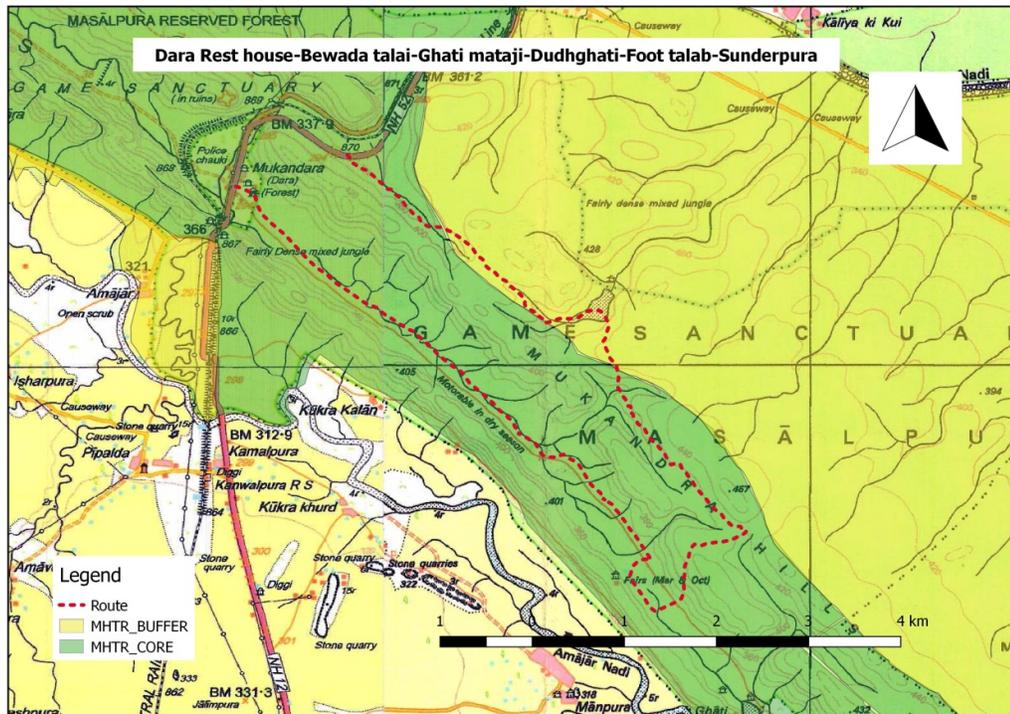
1. Navlav-Prempura-Masalpura-Mandibara.
2. Navlav-Rajpura-Khanpura-Haripuradandiya-Masalpura-Mandibara
3. Dara gaon(Darra FRH)-Bevda talai-Dooth ghati-Phoot talab-Sunderpura
4. Dara gaon-Gadde Ka Mala- Jhamra- Laxmipura & back.
5. Raontha -RamSagar- Mandargarh.
6. Kolipura,-Girdharpura--Chand baori- Teen – Manzil.
7. Selzar-Selzar watch tower-Teen manzil
8. Jawahar Sagar-Tappukuda – Ambarani
9. Borawas-Dobiya khan-Selzar watch tower-Lachanbawoari-Narsingmata
10. Ratkangara-Gebernath-Jawarsagar view point-Borawas
11. Boating at Kishorpura to Garadia mahadev and Jawahar Sagar dam to titanic island



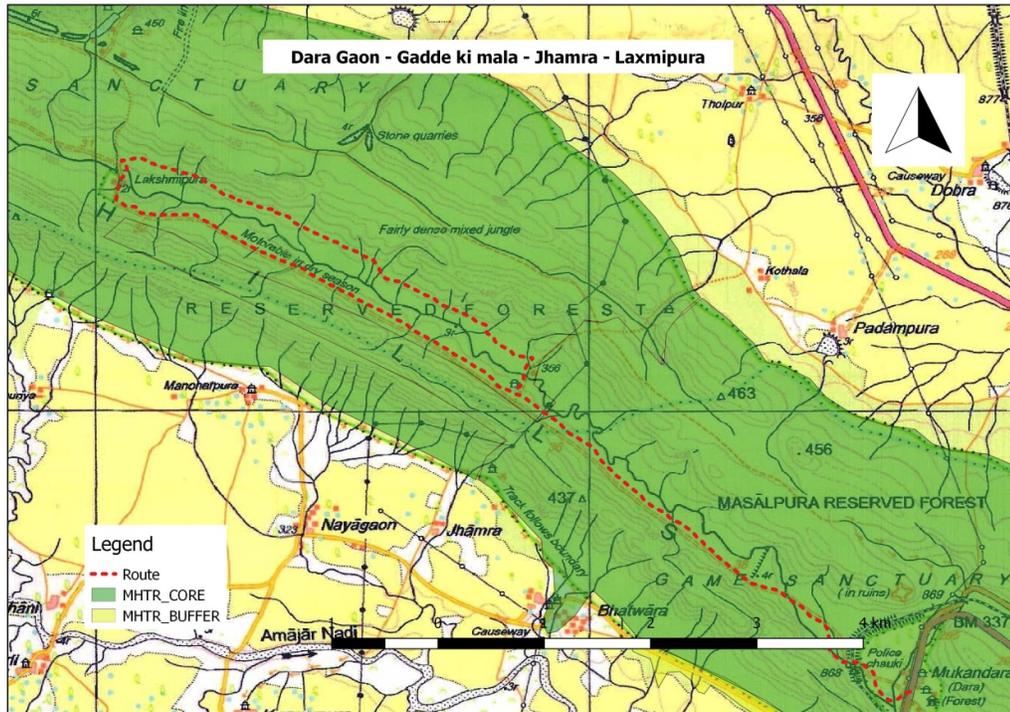
01 Nalav-Rajpura-Kanpura-Haripuradandiya-Masalpura-Mandibara



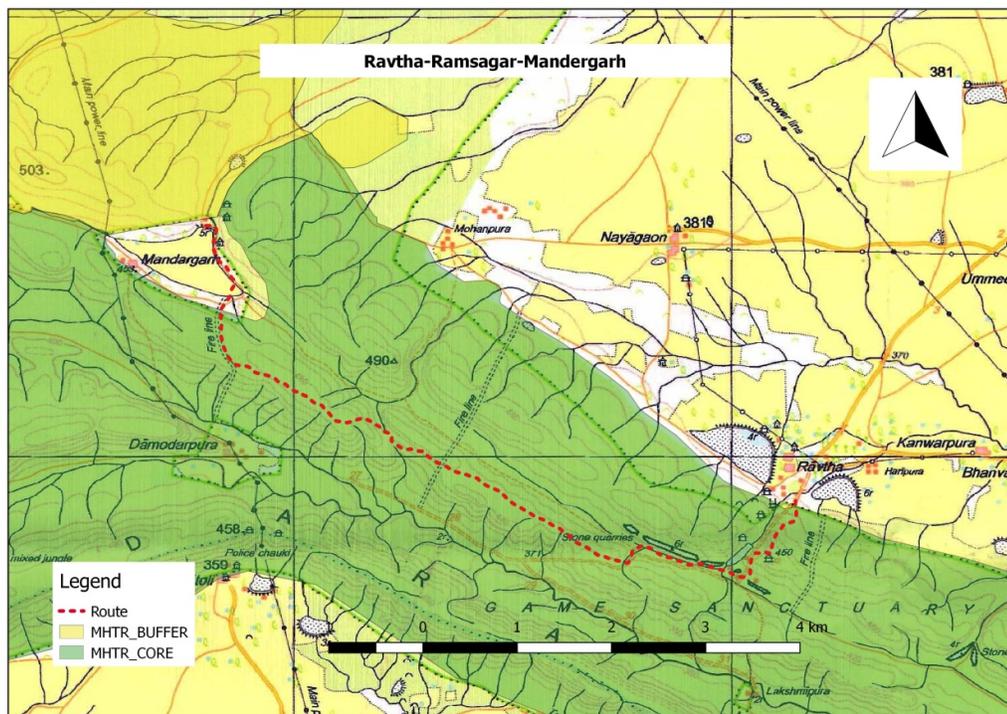
02 Nolvav-Prempura-Masalpura-Mandibara



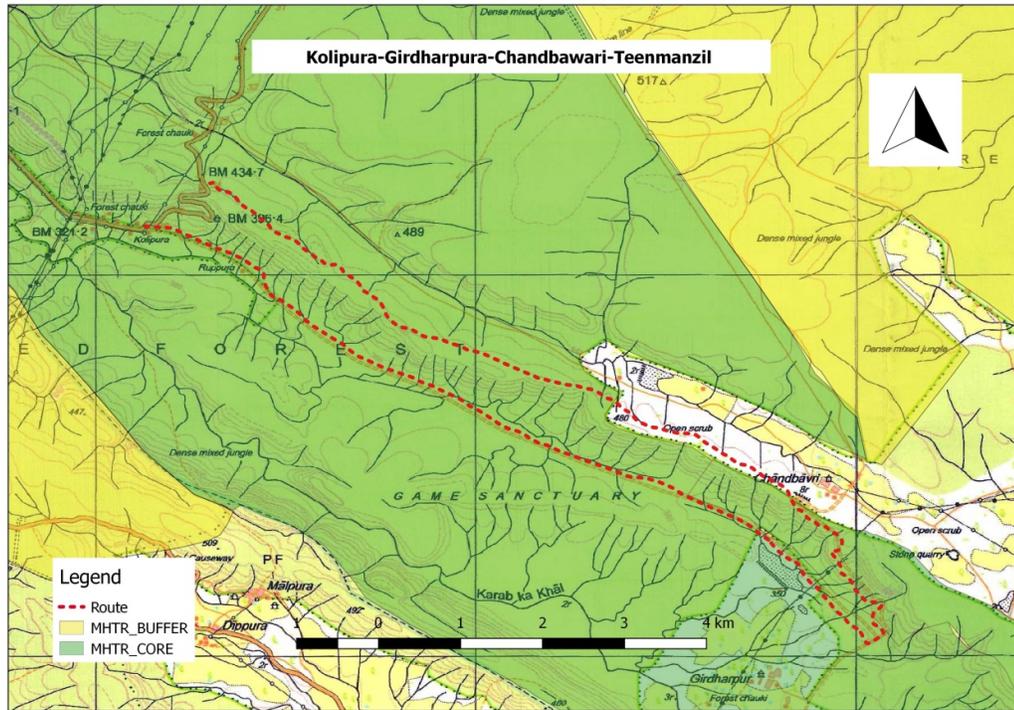
03 Dara Rest house-Bewada talai-Ghati mataji-Dudhghati-Foot talab-Sunderpura



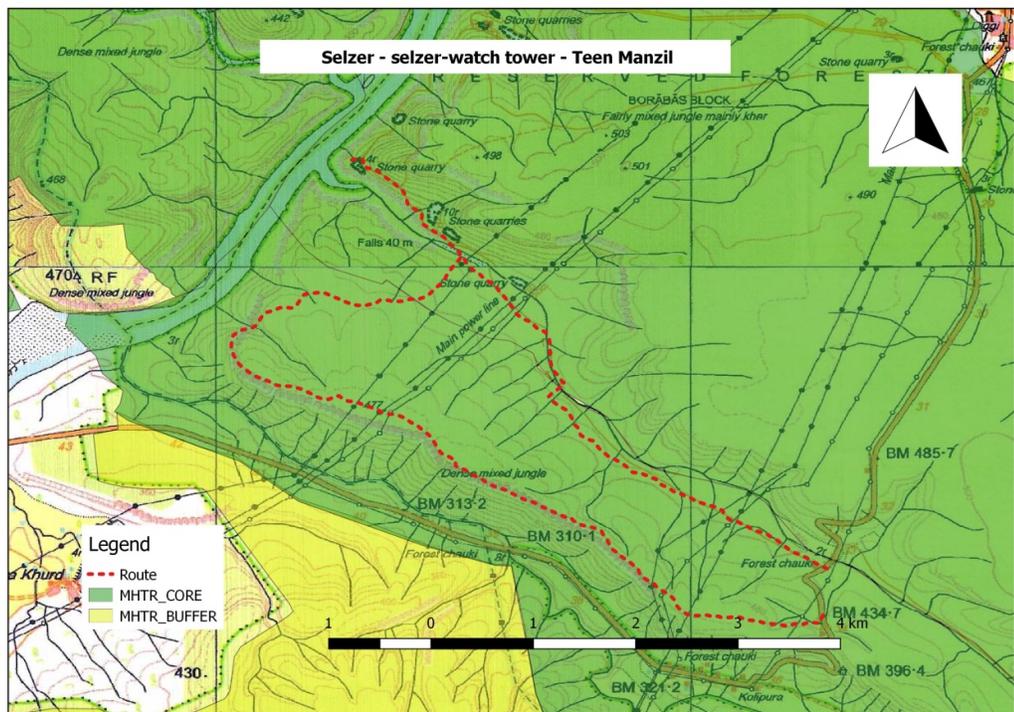
04 Dara Gaon - Gadde ki mala - Jhamra – Laxmipura



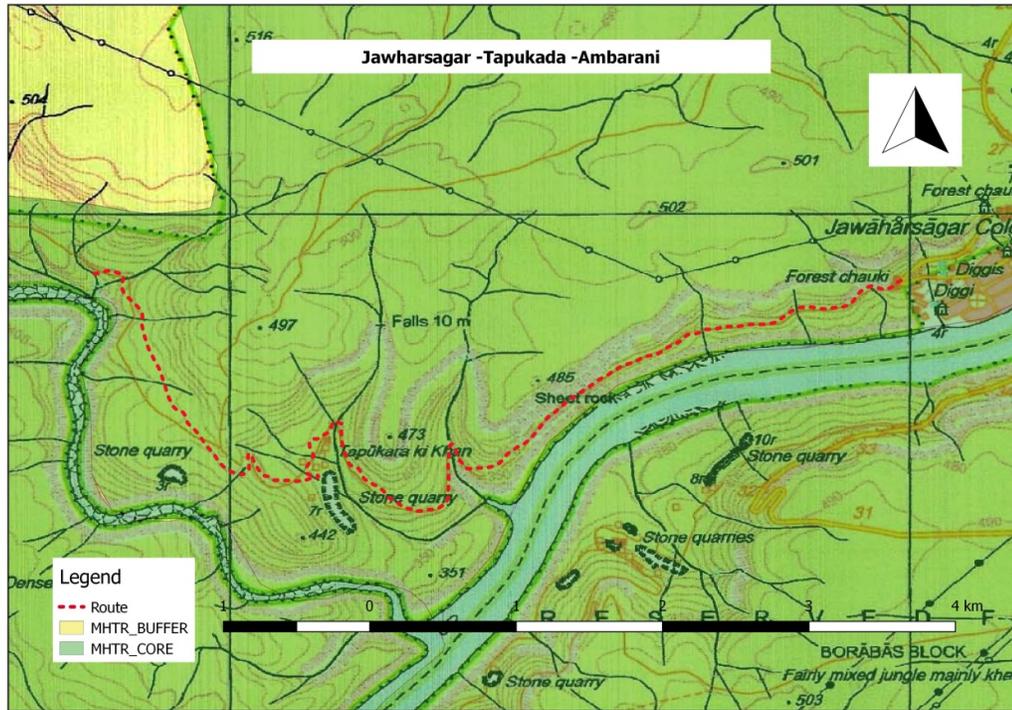
05 Ravtha-Ramsagar-Mandergarh



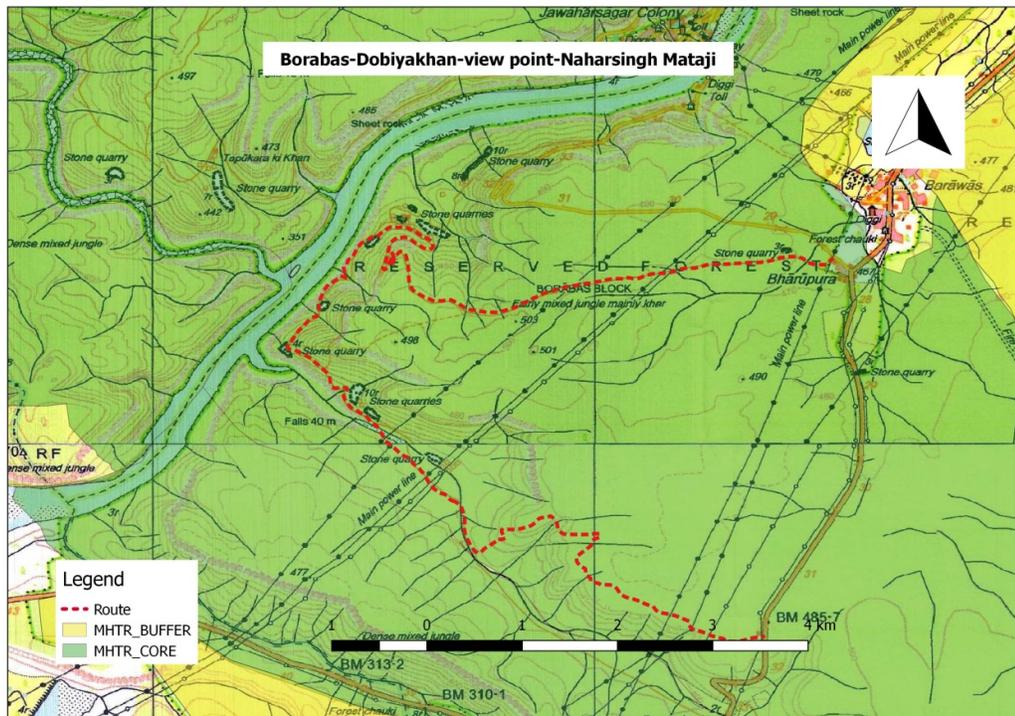
06 Kolipura-Girdharpura-Chandbawari-Teenmanzil



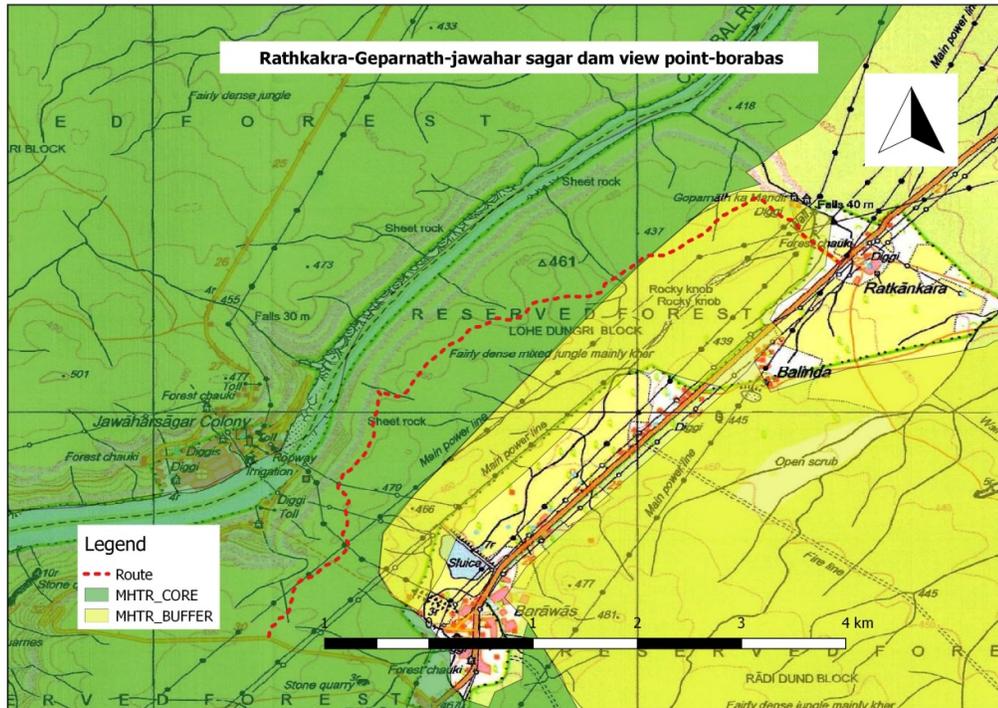
07 Selzer - selzer-watch tower - Teen Manzil



08 Jawharsagar -Tapukada –Ambarani



09 Borabas-Dobiyakhan-Selzer watch tower-Lachan Bawri-Naharsingh Mataji



10 Rathkakra-Geparnath-jawahar sagar dam view point-borabas

To attract tourists apart from renovating historical malas, facilities will be developed at following places from where tourists can watch wildlife and beautiful landscape.

1	Laxmipura	5	Kolipura
2	Ram Sagar	6	Raontha Mahal
3	Mandargarh	7	Dara gaon
4	Gagron	8	Selzar

The financial provision for the above will be made in the budget to meet growing tourism demand in Hadoti area which in due course will help preserving wildlife and eliminating offences through frequent visits of the area.

To create awareness about the conservation of flora & fauna and to follow ethics while visiting the reserve, eco friendly roadside signage's, are proposed to be erected. Besides this posters will be prepared and displayed at various hotel premises in Kota, Jhalawar and around the MHTR, highlighting the flora & fauna. A brochure of tiger reserve will be prepared containing the information about MHTR. One

interpretation centre will also be constructed at suitable location based on survey study.

A. Signages –

- (1) Proper signages will be put up inside the reserve to give the details of flora, fauna, historical sites, details of medicinal plants and maps to show track path.
- (2) Hordings will be put up on the highways to publicize camping and trekking facilities available in the area.
- (3) Hordings mentioning Do's and Dont's will be put up on each camping site and at the starting point of the trekking routes.

B. Publicity –

- (1) Colorful information brochures and folders will be brought out focusing on eco tourism at each specific area, maps and Do's and Don'ts to be put in.
- (2) An audio visual show will be prepared highlighting the features of the area.
- (3) Trees and shrubs will be labeled, painting of birds/animals will be put up in the protected area where there is a chance of sighting them.
- (4) Integrated approach through various departments like Tourism, Devasthan Archeology, Railways and Roadways will be carried out for publicity.

The tourism in the core area will be based on the broad guidelines issued by Government of India vide letter dated 15.10.2012 and Government of Rajasthan ecotourism policy 2010. The following guidelines shall be enforced:

- Tourism in the core area will remain at the current level if it is within 20% of the total geographical area of the tiger reserve.
- In a phased manner tourism in the core area will be shifted on to the periphery, so that there is enhanced protection of the buffer zone as well.
- Tiger reserve entry and exit timings will be regulated strictly so that there are no fatal accidents during odd hours, at the same time there is less disturbance to wildlife.
- Tourism will be promoted as an activity to promote awareness.

7.2.2 THEME PLANS

Management strategies sometimes can not be confined to a particular zone and they cut across two or more zones. Various themes, which are applicable for entire CTH of Sariska Tiger Reserve, have been developed as follows.

- **Theme plan for water management during pinch period**
- **Theme Plan for movement of Pilgrims**
- **Theme Plan for Retrofitting/Mitigation of Impact due to National Highway and Railway Line**
- **Theme plan for Disaster Management**
- **Theme plan for prey species augmentation**

7.2.2.1 Theme plan for water management during pinch period

Make a plan for water availability at approx. 2km x 2km grid or similar parameter. List and map out available and planned water points

Watershed management

The core area falls in drought prone zone and watershed health of the area in general is poor. In order to improve the ground water status and for steady enrichment of moisture, the strategy will be “catch the water where it falls”. The construction of Talais, Check dams, and silt detention dam and nullah bunding will not only help in providing drinking water but also increase the water percolation by reducing the run off waste. The following mechanical & Geological measures will be taken up for development of watershed.

Water harvesting by constructing Anicuts and mini Water ponds in the area is proposed. This will ascertain continuous & regular supply of water for wild animals and increase the moisture regime of the area. It is proposed to construct Anicuts less than 2m height every year in tiger reserve area. Besides this, the existing anicuts in the reserve area constructed previously need de-silting & maintenance every year. The area of the reserve has criss – crossed network of nullahs. Intensive construction of check dams in these nullahs can help in improvement of water regime.

The core area falls in a water scarce zone. Good rainy season is observed once in every three or four years. Most of the nullahs go dry within three or four months after rains.

The habitat quality of the area needs to be improved by creating artificial water holes, well dispersed throughout the Sanctuary. Construction of such water holes will be planned in such a way so that the distance between two water points does not exceed 5 Km. The Check dams and Anicuts constructed will also serve as water points to curtail the pinch period during summer.

Since the geography of the core area does not permit installation of hand pumps or tube wells easily, it is proposed to construct artificial water holes and guzzeler tanks at suitable location for providing better opportunity for the wildlife to drink water safely. Such structures will receive rain water flowing through the nallahs in rainy season and manually filled during pinch period. Guzzelers tank system will also be used for continuous filling of water in the water holes created in the interior areas.

- **Anicuts:**

Since area is drought prone hence to increase availability of water for wild animals, it is proposed to construct anicuts in following blocks: This will not only ensure water availability of the core but will also help in the improvement of water table in the adjacent villages. These activities must be taken up with the help of EDC so that people living in and around the MHTR will get employment which can inturn support the livelihood of villagers.

- **Streams and Nullahs**

These are areas where water flows and remains for a longer period of time than other areas. These constitute the drainage of water sheds and are continuous in nature in MHTR. In these areas, even in the hot summer when other areas are dry and hardly have any natural water, some small pools are available and are characterised by a belt of green trees in the summer and this network of riparian belts are the life line of wildlife in this dry deciduous area.

- **Valley: -**

The terrain of MHTR is hilly and there are many valleys in the area. These areas lie between two hills with almost flat bottom and rich soil and as a result the vegetation is good. Some water remains in the nullahs in small water pools and provide sustenance to wildlife during hot dry summer.

- **Wetlands-Marshes:** -

These are sizeable areas where water remains standing throughout the year. Due to the presence of water these areas become the centre of activity of animals both wild and domestic. These water bodies contain a variety of aquatic fauna and flora, according to the depth of the water body. The main wetland area of MHTR is Girdharpura talab, kadap ka Khal, Jhamra talab, Bevda talai, Laximpura-Narayapura talai etc.

- **Threats:-**

Since water is a limiting factor in MHTR permanent as well as artificial water points used to be more visited by wild animals, particularly in dry season. In summer months, hunters and poachers use these places as their shelter due to presence of suitable hiding places. These areas, due to inaccessibility, are beyond the scope of daily patrolling done by forest staffs of nearby chawkis. Due to this reason, these restricted water points and habitats become an easy target for hunters and commercial poachers, as animal movements in these points become certain. Other than these, cultivation in riverine patches in dry season and sand mining in Amjhar, kalisindh are potential threats to the wildlife and their habitats. These activities create obstacles in natural movement of wild animals. In summer months, natural water points near periphery are regularly visited by domestic livestock, which could spread diseases (as domestic livestock are potential carrier of various diseases).

Strategies:

- Dedicated teams (group of efficient and experienced forest staffs) will be made for intensive patrolling (in regular interval) in these vulnerable areas.
- Keep a regular surveillance at the water points to collect evidences on presence of undesirable activities from those areas.
- Control river bed cultivation and sand mining from wildlife habitat with the help of local administration.
- Control on entry of domestic livestock inside the wildlife habitat.
- Regular monitoring of permanent water sources to check the quality and hygiene of the water sources.

Pinch period management

The MHTR is situated in dry tropical zone receiving less rainfall. It receives about 700 m.m. of rainfall and the number of rainy days is very few. The summers are very harsh with intense heat temperatures reaching more than 48⁰ c. Due to low rainfall the geomorphologic features allow very little retention of water in the sub soil. Droughts are frequent which make the water situation worse. Water scarcity becomes a limiting factor for the full potential growth of wildlife in MHTR. Shortage of water, results in the migration wild animals to outside areas in search of water and there are chances of being killed in accidents or being poached. Therefore, water management during pinch period becomes very important aspect of wildlife management. (Map of water holes to be **Annexure-13**)

STRATEGIES:

- To provide at least one water hole in every 5 sq. k.m. area round the year. For this new water holes are being proposed looking into the requirement of water in different habitats and ensuring proper dispersal of animals and utilization of grasses in the whole area.
- In case of famine years the situation may still worsen resulting into drying of most of the water holes. For this separate contingency plan after the assessing the situation should be prepared and implemented strictly.
- Bore wells should be installed at appropriate places to ensure drinking water for wild animals. In the areas where bore wells are not successful open wells may be dug. For such bore wells and wells ground water recharging should be done to ensure sustainable supply of drinking water. All wells should be covered from the top for the safety of wild animals.
- Transportation of water through tankers should be done only if no other water source is available. Water troughs should be well designed merging with natural landscape preferably under the shades of trees to avoid evaporation losses. Water troughs should be regularly cleaned to avoid contamination of diseases.
- Deepening and maintenance of old wells should be carried out periodically. The deepening and maintenance should be completed by month of March/ April.

- Shallow wells with ramps should be constructed near nullahs to ensure water for wild animals. These shallow wells are very appropriate to combat the severe water scarcity. Since these are natural and the water is easily accessible to the animals these are frequently used by them and also they require less maintenance.

7.2.2.2 Theme Plan for movement of Pilgrims:

The places of pilgrimage in tiger reserve are listed in **Annexure-14** though there few famous temples like Garadia Mahadev Ambarani and Gapernath and also few small temple in core area have very much importance to local villagers residing in and around the core. At the time of Maha Shiv Ratri there is mela for three days on Mahadav Mandir, RamSagar. About 4-5 thousand people visit the temple during this time. One day mela is also organized at Kanjhar Mahadev on Maha Shiv Ratri with local pilgrims. The places of pilgrimage in core generally are visited by local people only. Proper management interventions are essential to reduce the negative impacts.

Strategies:

- 1- There should be minimum stay of pilgrims on such places.
- 2- Carrying of plastic polybags should be totally banned.
- 3- The speed limit for the vehicles plying inside the core should not be more than 20 km / hr.
- 4- The melas (like Shiv Ratri Mela) are the great opportunities to disseminate the messages of conservation to the maximum number of pilgrims.
- 5- On the places of pilgrimage, boards should be displayed indicating the conservation values, do's and don'ts inside the core.
- 6- In future, entry into these areas shall be restricted by entry system and even with entry ticket since most of the visitors coming are for tourism purpose.
- 7-

Plate-6: Water holes in MHTR



Bewda Talai



Jhamra



Bewda Talai



Laxmipura



Gadde Ka Mala



Ranvtha Ramsagar

7.2.2.3 Theme Plan for Retrofitting/Mitigation of Impact due to National Highway and Railway Line: -

NH 12 and Mumbai Delhi broad gauge railway line passes through core of MHTR. Incidences of accidents due to these things are very frequent. Incidentally these are very busy highway road and railway line with very high traffic load. In the month of April 2003 a tiger died in a rail accident on this Mumba-Delhi broad gauge railway line. Recently in the year 2014 a Sambar was also killed in the railway accident.

Strategy:

A pucca wall has been built all along the Railway line to avoid accidental deaths of wildlife. Discussions are underway with the officials of PWD/NHAI and Railway department to build a tunnel or elevated road as per feasibility so that mitigation of impact due to national highway and railway line can be ensured. In this regard active co operation with concerned dept at the higher level is very essential.

All the above strategies and prescriptions are going to be implemented departmentally, however assistance from any other externally aided project which may help to expedite the achievement of these objectives, would be welcome.

7.2.2.4 Theme plan for Disaster Management

In the circumstances there is disaster such as fire, epidemic etc. The Deputy Director may take the following actions.

Fire

Adequate preventive measures like clearance of fire lines, awareness of villagers, deployment of fire squad and watchers with vehicles will be taken up in every fire season. In case of uncontrollable fire, help of fire fighting squad will be sought from District Administration.

Epidemic

Expert team may be constituted by involving a panel of veterinary experts. A detailed plan may be drawn by expert team and implemented in order to contain the epidemic.

7.2.2.5 Theme plan for Prey Species Augmentation

Based on the analysis done on the prey density census, the prey density in MHTR is comparatively low to support a viable number of tigers. To support the viable number of tigers and other carnivores in the reserve, augmentation of the prey species like sambar deer, spotted deer, black buck, chingara etc needs to be done in a phased and continuous manner. The tiger reserve has already infrastructure to keep the translocated animals from other areas. There are two predator proof soft enclosures are established in the reserve in northern part ie, Sheiljar (1Ha) and in southern part ie, Darra (28Ha). Prey species needs to be augmented in the area as a continuous process to build up a viable and flourishing population in the area in future.

7.2.2.6 Strategies

- Translocate prey species from other areas preferably from wild and natural areas.
- a special dedicated team needs to be constituted for the translocation purposes.
- training of the team shall be done by experts in this field who have practical knowledge in this translocation.
- hands on experience training and exposure visits shall be conducted to the team
- infrastructure and vehicles shall be procured.
- Suitable source population shall be identified for translocation after expert team inspection and examination on various parameters of health condition.
- Some sources for translocations are mentioned as following. Spotted deers can be translocated from Keoladeo National Park, Bharatpur. Sambar deers can be translocated from Sariska Tiger Reserve or Ranthambhore Tiger Reserve. Black bucks can be translocated from Sorsan, Baran. Even source population of prey species can be translocated from other good areas having healthy population.
- Translocation shall be conducted after getting proper permissions from competent authorities.
- Translocation of prey species shall be conducted in a continuous matter.

- other technically sound agencies like WII, Dehradun, MP forest department , etc shall be collaborated to attain technical support.
- financial assistance shall be tapped from state and central funds.

CHAPTER - 8

RESEARCH, MONITORING AND TRAINING

Research is one of the major issues in the Plan Outline of the Project Tiger document, 1972. The document envisaged that the scientific staff of the reserves would undertake basic research programmes aimed at evaluating systematic factors and influences, for devising pragmatic management practices to cover specific populations and the entire ecosystems. Research constitutes a very important aspect of effective management of wildlife protected areas. Research based wildlife management is crucial for the success of any Tiger Reserve. This is a legitimate activity, and must be compatible with the objectives of wildlife management in the protected area. The Tiger Reserve should have a clear wildlife research policy based on the following priorities.

8.1 Research Priorities

Wildlife management is a mix of field craft and science based on field research. Research in the Tiger Reserve should focus on the critical information needs, which are by and large common to most of our Protected Areas. Professional researchers working in isolation on topics or species relating to their field of interest can contribute very little for fostering wildlife management. The research should be “problem solving studies”, based on a consultative process involving PA management, indigenous people and overall ground reality prevailing in our tropical setting. Some “pressure points” for PA management are common to most of our PAs, and in addition to the ongoing small term projects, wildlife research in Mukandra Hills Tiger Reserve should preferably focus on these:

Table-21 Research Priorities

PA Managerial Priorities	Research Areas
A) Values Relating to PA :	- Regional changes in species richness & diversity - Changes in species occurrence - Effect on water table
1. Ecological/ Regional landscape	- Habitat fragmentation - Endangered species: prey base, age/ sex ratio, biomass computation, life table computation
2. Habitat degradation	- Types of exotic infestation - Control methods
1. Livestock depredation by	- Reasons for livestock depredation

carnivores & crop damage by wild ungulates	<ul style="list-style-type: none"> - Percentage of livestock in the food-spectrum of carnivores - Reasons for crop damage
4. Habitat management practices	<ul style="list-style-type: none"> - Biodiversity conservation vis-a-vis management practices in-vogue
5. Poaching	<ul style="list-style-type: none"> - Magnitude - Modus operandi (variations) - Wildlife crime intelligence and networking - Wildlife crime prevention
6. Fire	<ul style="list-style-type: none"> - Nature and efficacy of existing preventive and control measures - Changes in the habitat due to fire - Changes in animal use pattern due to fire
7. Insects as agents of ecological change	<ul style="list-style-type: none"> - Impact (magnitude) - Ecological changes - Periodicity
8. In-situ conservation	<ul style="list-style-type: none"> - Founder population size - Translocation
9. Eco-tourism	<ul style="list-style-type: none"> - Involvement of host-communities - Mechanism - Impact assessment
10. Jurisprudence	<ul style="list-style-type: none"> - Morphological studies - Biochemical studies - DNA fingerprinting
11. Wildlife disease	<ul style="list-style-type: none"> - Landscape epidemiology studies - Linkages between sylvatic & pastoral cycles
12. Animal monitoring and estimation techniques	<ul style="list-style-type: none"> - Customisation of softwares - Estimation procedures, indices for various species - Home range studies

B) Biotic Pressure on PAs:	
Vision beyond the PA	<ul style="list-style-type: none"> - Effect of existing land use - Mechanism/ strategy to mitigate ill effects - Magnitude of crop damage outside PAs - Methods for mitigation
Interface problems	<ul style="list-style-type: none"> - Decadal population growth in impact zones outside PAs (human/ cattle) - Resource use pattern of indigenous people - Impact of PAs on indigenous people - Legal status of the impact zone & related problems - Community role in conservation - Levels of sustainable use - Grazing impact - Regeneration status in right burdened forests - Impact of rights and concessions on habitat quality - Socio-economics of indigenous community - Resource requirements of indigenous people & dependencies - Traditional knowledge & occupation of indigenous communities - Impact assessment of Eco-development works

Apart from the above biological/ ecological researches, the Mukandra management should also encourage the collection of relevant information on the effects of the Tiger Reserve on local economy and communities of the surrounding villages. Such social researches should also be developed into reports, status papers, microplans, and other documents resulting in the formation of effective policies for upliftment / eco-development of local communities. Although these social projects may sound purely academic or official, and may not have any immediate obvious management significance, they would prove to be of a great value later, as the present scenario of the park - people interface in our country is bound to go a very long way.

Future strategy:-

1. Development of Infrastructure

A. Research Labs –

One main Research Lab at Kota will be constructed. The instruments required for different field research may be procured. There is an urgent need to carrying out systematic and basic research related to habitat, herbivore and carnivore status population density habitat use pattern etc. and impact of various works being carried out in an around the Protected Area. There is an urgent need of full time research officer, researcher and assistants.

B. Meteorological Stations –

Metrological Station at Jawahar sagar, Kolipura, Dara, and Gagron are to be established. There is an urgent need to take proper information and collate the data systematically.

Similarly, Chemical Immobilization equipment and drugs would also be required to capture the diseased or other wild animals in stress requiring help and treatment.

C. Constitution of Animal Rescue team:-

An Animal Rescue Team has to be constituted by Dy. Field Director, MHTR which will carry out the rescue and rehabilitation of wild animals. The details of team as following –

In-charge Officer	ACF Research
Range Officer	RO Flying
Forester	One
Forest guard	Two

The team members will be trained in, tranquilizing, trapping the distressed animal and providing it first aid; and in application of various useful instruments.

2. Constitution of Research Advisory Committee

Table-22 Research Advisory Committee may be constituted with the following members–

Sr. No.	Occupation	Designation
(i)	Chief Wildlife Warden, Rajasthan	Chairman
(ii)	C.C.F. & FD MHTR Kota	Member
(iii)	Dy. CF & Dy. Field Director MHTR Kota	Member
(iv)	ACF MHTR Kota	Member
(iv)	Representative from WII	Member
(v)	Vet Doctor and Msc Wildlife Science Scholar/ Professor/Head of Wildlife Dept.	Member
(vi)	ACF, Research MHTR	Member Secretary
(vii)	Any other Scientist / Forest officials Nominated by the Chief Wildlife Warden, Rajasthan.	Member/Special invitee

The Committee would have the following main activities: -

- To finalize the selection/identification of relevant research based studies.
- To review the progress of research activities carried out for the MHTR
- Provide suggestion/recommendations for improvement and smooth functioning of the research activities.

The meeting should be arranged as per the requirement, but at least once in six months. The members would be eligible to get travelling and dearness allowance and other facilities as decided by the Government from time to time.

8.2 Research Projects

Table-23 The following research works have to be conducted

Sr. No.	Consultancy services	Contracted Individual/ organizations
1	Baseline mapping of PA and surrounding areas	Kota University
2	Environmental Assessment of Regional Plan	Kota University

Sr. No.	Consultancy services	Contracted Individual/ organizations
3	PA Level Visitor Management and Participatory Eco-tourism Study	Kota University
4	Process Documentation Research	Wildlife Institute Of India Dehradun
5	Documentation of traditional knowledge	Wildlife Institute Of India Dehradun
6	Faunal Survey, on insects, fishes, reptiles and Amphibians; Conservation Status and distribution of Rare and Endangered Animals.	Zoological Survey of India
7	Floristic Survey, Vegetation Description, Conservation Status And Distribution of Rare and Endangered Plants/Plants Communities contributed for Herbarium	Botanical survey of India, Jodpur
8	Mapping of the Protected Area (PA) & Surrounding Areas in RTR	WII Dehradun
9	Study on Wildlife health Disease Surveillance and monitoring	WII Dehradun/IVRI Bareilly
10	Development and establishment of long term ecological programme in MHTR with reference to physical, biological and sociological aspects and linking it up with spatial data base	WII Dehradun

Apart from above short-term research work, following research works have been conducted by individuals or organization.

8.3 Monitoring Framework

A proper monitoring mechanism is needed to assess the impact of management prescription applied in the field and help in making necessary adjustments for future management. The following areas need continuous monitoring to help in evolving an effective management strategy for the protected area.

- Change in distribution pattern and composition of wild animals in relation to vegetation change.
- Successional changes in vegetation cover
- Change in hydrology of the area due to soil and water conservation works.
- Change in habitat condition due to management interventions.
- Invasion of weeds
- Impact of different management practices on food chain.
- Change in migration pattern of major species like Panther, Sloth Bear, Four – Horned Antelope etc.
- Reduction in anthropogenic pressure due to eco –development works.
- Change in nature of waterholes present in Kalisindh, Chambal, Amjhar and Ahu Rivers.

The Park Management will continue to ensure that the monitoring of biological resources forms a basic routine activity in protected area management. It is the principal way in which the management can identify trends or changes and hence gauge the effectiveness of its managerial inputs. Though it may sound an unplanned and subjective procedure, it is easy to collect useful biological information in a simple, systematic and scientific manner. The management should strive to include a number of useful monitoring activities in the routine duties of the staff, as well as regular annual estimation of wildlife, counts and other activities. All such data should be incorporated in the MIS in a routine manner.

The Tiger Reserve should continue the present system of ecological monitoring of flora and fauna. As stated above, the Reserve has a very good network of forest camps covering all vegetation cover types and habitats of wildlife. All these forest camps will be provided with camp registers containing printed Performa of information/ data collection relating to the broad phenology of the vegetation type, species-wise animal sighting with their age-class and sex-class structures, females with fawns, lactating females, and others etc. The Performa for recording indirect evidence of tiger and panther has also been included. As far as management is concerned, a useful inventory could be as simple as information on the distribution of important species, whose numbers reflects important ecological processes. Even crude indications of the numbers of these animal species would add to the value of inventory. A coloured photographic guide for identification of animals has been

prepared and distributed among all the field staff. A photographic album of ground flora covering many species of grasses, herbs and shrubs will be prepared and will be distributed to all field staff involved in day to day monitoring to facilitate easy identification of species from the management point of view. The data generated from such continuous monitoring will later be inferred/ analysed into interesting trends, and form basis for species-specific and habitat specific planning in the Tiger Reserve. The proforma of the above camp register is given below. Each Forest Guard in-charge of the respective camp must fill in the requisite information derived from the daylong patrolling of his beat. This will lead to generation of a lot of data on the basic parameters required for managing a wildlife protected area.

The data can be compiled for large carnivores on the basis of camp registers and monthly presence map for tiger and panther may be prepared.

Format of Patrolling Camp Register for Routine Ecological Monitoring

Particulars of Patrolling			Pheneology			
Date	Place & Compartment No.	Time	Flowering trees/ Plants	Fruiting Trees/ Plants	Leaf fall	New Leaves
1	2	3	4	5	6	7

Herd Structure of Ungulates														
Total No. of Herds (Cheetal / Sambar/)	All Male Herd				Female-Fawn Herd				Mixed Herd					
	Adult	Sub-Adult	Fawn	Total	Adult	Sub-Adult	Fawn	Total	Male Adult	Male Sub Adult	Female Adult	Female Sub Adult	Fawn	Total
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Various Stages of Antler Development					Birth Frequency of Ungulates (15 days Intervals)		Stages of Gestation	
Males with Fallen Antlers	Males with Developing Antlers	Males with Branched velvet Antlers	Males with Developed Hard Antlers	Total	Date	Total New Borns	No. of Pregnant Female	No. of Lactating Females
23	24	25	26	27	28	29	30	31

Data/ Evidence Relating to the Panther											
Male/ Female Pugmark (No./ Unit Distance Walked)	Urination (No./ Unit Distance Walked)	Scraping (No./ Unit Distance Walked)	Call (No./ Unit Distance Walked)	Scratches (No./ Unit Distance Walked)	Scat (No./ Unit Distance Walked)	Cattle Kill	Other Kill	Stride Measurement	Straddle Measurement	Signature Inspecting Officer	
32	33	34	35	36	37	38	39	40	41	42	

8.4 Training Needs Assessment

Wildlife management is a technical, time consuming and a challenging job. Training in wildlife management is indispensable at all levels which is considerably lacking especially in the lower level functionaries like forest guards and forester and even among RFO and DCFs to a considerable extent. Training can be a wildlife diploma course run by Wildlife Institute of India Dehradun which is of 9 to 10 months or short duration courses may be organized at District level or F.T.I Jaipur.

Capacity building is an important component of the present project. The project is expected to provide the major source of funding for this activity proposed in the management plan so that local human resource can be further developed.

Following is the list of areas which are likely to be covered:

- Interpretation and application of laws and regulations.
- Wildlife evidence, collection of biological samples and their interpretation.
- Wildlife diseases and other health care matters.
- Postmortem of wildlife carcasses.
- Census operations.
- Participating rural appraisal and different aspects of JFM (joint forest management).
- Rescue operations of wild animals.
- Herbarium development and maintenance.
- Training to operate computers, GPS (Global Positioning System) etc.
- Preparation of manual GIS (Gross Information System)
- Identification of flora & fauna existing in the park.

Formal Training Courses:

The wildlife Institute of India (WII) Dehradun has two wildlife management courses other than short term i.e. one or two week courses. The one at DCFs and ACFs level is ten months post graduate diploma courses and the other at Range officer's level, is a certificate diploma courses of 3 months. The staff deployed for PA management will either be already trained or will be given this opportunity in order to achieve the management goals in a better way. For training a provision of Rs 20 lakhs has been kept.

Establishing a learning center:

To educate the staff and make them aware regarding conservation of biodiversity and to familiarize them with different aspects of wildlife management, it is proposed to construct learning cum interpretation center adjacent to Dara gaon Rest House. Books, magazines and other reading material will be kept there to update the knowledge of the staff and visitors.

Training Needs Assessments

Though the management of the MHTR ecosystem itself is a learning process for the majority of the frontline staff, the Park Management should ensure that the newly inducted staff undergoes wildlife training conducted by various Institutes in the State and outside. Officers should be encouraged to undergo Diploma as well as

Certificate and Capsule courses conducted by the Wildlife Institute of India, Dehradun for officers down to the Forest Ranger. The information about the training and institute providing training is as following –

Table-24 Information about the training and institute providing training

Sr. No	Course Name	Course Type	Course Duration	Participant Level	Resource person/org.	Frequency
1	Improved Wildlife Management	Diploma Course	Nine Months	A.C.F./DCF	WII, Dehradun	Once
2	Eco-development	Module	Three Months	A.C.F./DCF	WII	Once
3	Improved Wildlife Management	Certificate Course	Three Months	F.R.	WII	Once

Besides these Forest Guards posted in wildlife area will be trained for wildlife management at wildlife training centre at Kota. Apart from above basic trainings, trainings on other issues will also be imparted to staff and officers like communication skills, motivation etc.

Weapon training

The staff has to face the anti-social elements including hard-core criminals, who are engaged in unlawful activities. To have an effective control, the staff must be equipped with modern arms and ammunitions and should know how to handle them. A full course training in handling the arms and ammunition will be arranged for the field staff on regular basis.

Wildlife Health Monitoring Training

Monitoring of wildlife health and treatment of various contagious diseases require some technical skills. The staff must also know the techniques to collect samples to send it to forensic laboratory or to the research centre at WII, Dehradun for its detailed analysis.

Chemical immobilization training

It has been realized that wild animals frequently stray near the human habitation especially during summer season. Such unusual situation creates problems, both for wild animals and human beings. Such animals that come under distress will be safely captured to be released in the wild after proper treatment.

Tourism and interpretation training

Tourism and Interpretation are very sensitive issues. Even a slight discourteous behavior can defame the PA as well as the Forest Department. The staff engaged in handling the tourists will be properly trained to handle the situation in a cordial manner. In doing so implementation of various Acts and Rules, related with wildlife tourism and management will also be ensured. Similarly, staff deputed for interpretation activities will be given sufficient knowledge about the Protected Area and other on-going activities. If the tourists are not satisfied for their queries, the purpose of extension and Interpretation can not be achieved. A fundamental training and regular refresher course training to the staff should be done. At present no systematic training on tourism and interpretation activities has been organized.

Computer Application Training:

Use of Computer application and related softwares has now become an indispensable task for day-to-day management. Application of GIS and other related software and their interpretation could improve the efficiency of the P.A. Management. All these efforts may be useful, when the staff is capable enough to handle these machines. Hence a three week **Capsule course training** for the selected staff / officers will be arranged at Jaipur. Apart from these training some other important topics may be included if required. For the use of training imparted and management of PA, GIS related software and equipments are proposed to be procured.

8.5 Human resources development Plan (HRD Plan)

Wildlife management is a specialized branch, which needs special orientation, skill and knowledge. Training makes a technocrat and field staff perfect in their profession. Exposure of good efforts done in the *par excellence* sight develops a feeling of motivation to achieve the goal to the same degree or sometimes higher also. Not only this, tremendous confidence is also developed if the initiative

taken is appreciated by others. Hence it is always good to initiate effort to impart special training to all level of staff in various relevant fields.

Imparting of training to the field staff and the officials posted in the MHTR has got much relevance, as they have to handle sensitive bio-diversity conservation vis-à-vis eco-development issue. Although adequate technical assistance and guidance would be availed from the concerned experts, imparting regular refresher courses covering different topics is recommended for the various levels of staff of Mukandara Tiger Reserve as following –

Table-25

S. No	Course Name	Course Type	Course Duration	Participant Level	Resource person/ org	Frequency
1	General wildlife management course	Orientation Course	One week	CCF/CF/DCF	WII, Dehradun	Once
1 a	--do--	Orientation Course	10 days	DCF/ACF	WII, Dehradun	Once
1 b	--do--	Orientation Course Module I	One week	Ranger Foresters	Forestry Training Institute, Jaipur	Once
1 c	--do--	Orientation Course	One week	Forest Guard & Cattle Guard	Wildlife training Centre kota	Once
2	Soil and moisture Conservation	Orientation Course	One week	Ranger Foresters, & Forest Guard	FTI Jaipur	Once in a year
3	Rural development	Orientation Course	One week	Ranger Foresters, & Forest Guard	FTI Jaipur	Once in a year
4	Enforcement of Law and Enactment's	Refresher Course	Three days	Range officers Dy. Ranger Foresters & Forest Guards	Wildlife training Centre at kota	Once in six months
5	Education Awareness course	Refresher course	One week	ACF, Range officers, Foresters and Forest guard	WII, Dehradun for DCF and ACF; FTI Jaipur For Foresters and Forest guards.	Once in two year

The senior as well as lower field staff should be exposed to latest trends and developments achieved in different subjects related with wildlife management. Such exposure would help the field staff to carry out various management practices for

effective management. A regular short- course requires to be organized from time to time for the ground level field staff to impart technical expertise to carry out various routine works, like; population estimation, water hole management, wildlife habitat management and the like.

To impart training in the above topics and other useful subjects, the selected staff should be sent to Wildlife training Centre at Kota, for which funds and equipments has to be provided.

Conducting Study tours at par-excellence sites: -

Eco-development study tour for EDC members and associated staff will be organised. Wildlife management study tour for Officers & field staff to other protected areas of the country will be undertaken too.

Workshops and Field Study: -

Every year workshop and field study will be organized in MHTR to share the experiences gained during field works and disseminate the new knowledge and practices being used in other PAs. Some of the topic for workshop and field study may be –

Wildlife and its habitat monitoring.

Understanding the objective of data collection during regular patrolling.

Wildlife census and field techniques

Anti poaching, Legal proceeding and forensics

Micro planning for eco-development in surrounding villages

Fire protection training

EDC Account keeping

Environmental Education and Awareness

PA planning workshop

Regional planning workshop

PA management plan finalization workshop

During these types of workshops and field trainings regular interactions/ discussions between officers and field staff will also add to the understanding of new perspectives relating to wildlife management.

CHAPTER – 9

TIGER POPULATION AND HABITAT ASSESSMENT

Protocol for the Monitoring of Reintroduced Tigers

The 24 x 7 monitoring protocol using radio telemetry & field evidences is being done. Monthly update on the ranging pattern of individual tigers is maintained besides taking note of the status of radio collars, cattle kill, association of tigers etc.

- Monitoring teams deployed for ground tracking for each tiger on a daily basis.
- Each monitoring team is comprised of one field staff and one village wildlife volunteer
- Each team is supervised by an ACF / range officer of MHTR.
- Monthly update on the ranging pattern of individual tigers maintained and sent to CWLW and NTCA.

Facilities and equipments:

- Motor bikes, gypsies are provided to each dedicated monitoring team.
- A multi channel radio-receiver, an antenna and a coax cable provided to each team.
- One GPS and a compass also provided to each team for recording locations.
- Data sheets for recording tiger locations, kills and scats.
- Sleeping bags, torch and winter cloths also provided to monitoring teams.
- A panel of forest staff for monitoring tiger from all ranges prepared. Task of monitoring will be given to each individual for 15 days after which another team will be deployed.

Responsibilities:

Each monitoring team is assigned to receive signals from the radio-collars of the reintroduced tigers as well as to record pugmarks, camera trapes and direct sightings of all tigers and document information in required format. (Annexure-15)

- They will enter the GPS locations of tiger through signals, pugmarks, scent marks, scratch marks etc as well as record information of their kills. Scat samples will also be collected by field monitoring team.

- Each team have to inform the movements of tiger along with other information in required format on a daily basis to the wireless control station of MHTR and keep the record of the same. The wireless control station will intimate progress to concerned supervisory officer.
- The supervising team will surveillance the activities of the monitoring teams and cross check the radio-signals and locations of the tigers.
- Daily report on tigers status (location, movement, kills and scats) is reported to the concerned Range Officer, ACF and DCF of MHTR.
- Month wise reports will be prepared by ACF and sent /submitted to the Field Director, MHTR, CWLW, Rajasthan Forest Department.

Intensive patrolling through M-STripES

This system will be an integral part of security system being implemented in Mukandra Hills Tiger Reserve.

Aims:

- Assist in Effective Patrolling & Protection
- Evaluate Status & Trends of Carnivores & Ungulates at Regular Intervals
- Monitor Habitat Change
- Evaluate Human Pressures
- Generate Reports to Provide Quantitative Information for Management Effectiveness Assessment and Decision Making

Applications:

- Monitoring population status, trends, and spatial occupancy
- Mapping of illegal activities and their trends
- Guiding Park Management for patrolling - spatially and intensity
- Mapping and trend analysis of human impacts
- Understanding interrelations between above parameters
- Export of data for in-depth analysis in desired format
- Entry, Analysis, Interpretation, and use of Phase I data at field level
- Ready reports at desired spatial & temporal scales and for evaluating management effectiveness and guiding decision and policy making.

Plate7: Tiger monitoring



Camera trap training to field staff and village wildlife volunteers



Foot patrolling

Pugmark



Radio Collar

Field Protocols & Equipment:**Patrol Data collection**

- Routine / Anti-poaching / Investigation Patrol
- GPS Units (or PDA's) and Data Collection Forms
- Training of Tiger Reserve Staff in Data Collection and Software Entry

Field Protocols & Equipment:**Ecological (Phase I) Data collection**

- Carnivore Sign Survey
- Ungulate Line Transect
- Human Pressure Assessment on Plots on Transects
- Ungulate Dung on Plots on Transects
- Habitat Status on Plots on Transects
- Fixed Location PIP's for Tigers (min. 5 in each beat monitored once a week)
- GPS Units (or PDA's) and Data Collection Forms
- Training of Tiger Reserve Staff in Data Collection and Software Entry

Implementation of M-STrIPES will help in informed decision making for management and protection for the protected area managers. The spatial output available to the managers at field level at monthly and quarterly basis will help strengthening management and protection.

Implementation of M-STrIPES:

- Each beat is traversed by the patrol party and sightings, evidences and incidences are recorded as per proforma.
- Data formats are prepared in Hindi or English language for data collection.
- Staff is thoroughly trained in observation and data collection.
- Data sheet is handedover to Information Assistant (IA) at Division level monthly.
- Spatial maps are generated along with different themes like carnivore sightings, herbivore presence, fire incidences, human presence, illegal felling etc.
- All these maps are generated and viewed by Divisional Forest Officer / Dy. Director at an interval of 15 days / 1 month for the division. The same can be

viewed for the Tiger Reserve by Conservator of Forests/Field Director. Abnormality/un-natural change in the trend in the observation have to be investigated thoroughly and decision taken accordingly.

- The same will be transmitted to Chief Wildlife Warden & National Tiger Conservation Authority for information.
- The decision on patrolling, protection measures and management issues can be addressed scientifically.
- The significant changes in respect of presence of carnivore, herbivore and habitat condition can be detected and necessary intervention can be taken up.

While on regular or targeted patrolling duties the personnel shall record the following information:

- 1) Each patrolling team shall be equipped with a GPS unit and a digital camera besides the regular equipment (e.g. wireless, torch, etc).
- 2) the date, time GPS coordinates of the beginning of the patrol recorded.
- 3) preferably the GPS unit shall be switched on throughout the patrol in a track log mode. However, due to constraints of technical Knowhow or other issues if this is not possible then a GPS coordinate recorded and written down in the record from every 30 min or at major deviations from a straight line path.
- 4) the total number of persons on the patrol are recorded along with number of armed personnel and type of arms. The mode of patrol is also recorded, e.g. on foot, bicycle, motorcycle, 4WD, boat, etc.
- 5) a record of all illegal activities is entered in the data sheet along with time, data and coordinate stamp.
- 6) A record of signs and sightings or highly endangered species while on patrol is also maintained by entering the GPS coordinate, date and time of the sighting/sign as well as recording a digital picture of the same if possible.

After the end of the patrol, the GPS track log is either downloaded on to a computer (in MSTRIPES program if applicable) or the datasheet with the recorded information deposited at the range Head Quarters. The Phase IV monitoring as well as M-STripES monitoring protocol is being followed in MHTR to facilitate implementation of monitoring protocol by maintaining daily patrolling log on patrolling camps/chowki registers. Periodic reports are being generated and used for management purpose since august 2012. The patrolling intensity patrolling log,

patrolling time locations is already being monitored through M-STrIPES. After every monthly report review meeting of the staff will be held for further improvement.

The M-STrIPES monitoring protocol vis a vis the customization done for the tiger reserve is very useful for continuous monitoring of wildlife, habitat & its health. Fortnightly update on date entry, storage, retrieval needs to be maintained with outputs in form of reports/ maps relating to protection & ecological aspects. These outputs if significant should be treated as Alerts. Mukandra Hills has a history of tiger extinction due to poaching. The source area is exposed and the buffer area as notified is small and would hardly have any buffering effect. Hence the tigers continue to remain vulnerable to several risks. Which interalia, include poaching, poisoning and road hits. So the patrolling intensity needs to be monitored through M-STrIPES.

9.1 Tiger Population Estimation and Monitoring Framework (Phase IV and MStrIPES)

This is the monitoring framework prescribed by NTCA for all forested landscapes of the country.

- a) **Sampling for ungulate encounter rates:** In each census unit, transects are laid according to one for each broad vegetation type. If vegetation type is same throughout the unit, then a single transect will do. Each transect line should be of 2 – 4 km. Each transect line should be walked at least three times to record the ungulate encounter rates. The encounter rates are recorded in prescribed performa and then the ungulate densities are worked out (*Buckland et al 1993*). To convert encounter rates to density, an estimate of the effective strip width of these transects would be essential. The effective strip width of a transect primarily depends on the visibility (vegetation and terrain type), ability to detect ungulates by different observers and animal behaviour response (*Buckland et al 1993*). However, ungulate response is likely to play an important role in disturbed areas in determining habitat and terrain-specific effective strip width by actually sampling selected sampling units. Modelling the transect line in a beat is habitat-specific (*Jhala and Qureshi 2004*), it would be able to use these estimates of effective strip widths for converting encounter rates of

ungulates to density estimates by modelling detection probabilities. The transect lines are permanently marked on field and the same transects need to be walked year after year.

- b) **Sampling for vegetation, human disturbance and ungulate pellets:** The same transects used for the previous exercise can be used. Ungulate encounter can be done in the morning and the same transects can be walked back in the evening to record vegetation, human disturbance and ungulate pellets. Vegetation should be sampled on every 400m along the transect. Broad vegetation type at each sampling point is to be noted down and the canopy cover within 15m distance is visually quantified into broad categories in the proforma given. 5 species of prominent trees and shrubs are noted. If weeds are present, weed abundance need to be scored on 0-4 scale (0 being absent and 4 high abundance). Within the same 15 m radius, the observer needs to record the signs of lopping, wood cutting and presence/ absence of human foot trail. On the same sampling point, a 1 m circular plot is done to quantify the ground cover. A mention needs to be made in the data sheet regarding the number of permanent human settlements, human and livestock population in the census unit if any. At every 400 m on the transect, a perpendicular transect of 20 x 2 m is taken and all pellets (wild and domestic ungulates) are counted.

Tiger Estimation and Phase IV: Intensive monitoring of source Populations

It is proposed to stratify a Tiger Conservation Unit (TCU) into tiger sign abundance classes of high, medium, low and no tiger sign at the beat and larger spatial resolution (range 100 sq km). In each of these strata, within a landscape (TCU), actual tiger density would be estimated in three-five replicates of sufficient size (50-200 sq km). All known techniques of tiger density estimates should be used depending on the logistic possibility within each landscape: capture-recapture based on camera traps (*Karanth 1995 and 1998, Karanth and Nichols 1998, 2000 and 2002, Karanth et al 2004, Pollock et al 1990, Carbone et al 2001 and Per Wegge et al 2004*), mark-recapture based on pugmarks (*Sharma et al in press*) and DNA profile obtained from tiger scats (*Broquet and Petit 2004, Prugh et al 2005 and Xu et al 2005*). These densities will then be extrapolated for the areas under various density classes within the landscape to arrive at a tiger population estimate. We do realise

that these population estimates are likely to have high variances, but since these estimates will not be used for monitoring trends (which is proposed to be done through the site occupancy and relative abundance data), they should suffice the need for converting a relevant ecological index to a more comprehensible concept of numbers.

It is proposed that source populations of tigers (tigers in Tiger Reserves and Protected Areas) in each tiger landscape complex be monitored intensively using the following methodology.

Camera trap is the most reliable method of calculating large carnivores like big cats in the research world. This method not only gives the estimate of individuals present in that area but also helps to understand the distribution pattern of these species. Systematic deployment of camera trapping can generate various pattern of animal behaviour and movement in protect areas. The most robust population estimates derived from camera trap data apply mark-recapture analysis Karanth & Nicols (2002, 2006) that assume that not all individuals are photographed and consequently attempt to estimate population size based on detection probability. There are two conditions for conducting such surveys Matiukhina et. al., (2013-2016) one is survey must be sufficiently short to ensure that the population is closed and has no mortality, birth, immigration or emigration during the survey period and second, that multiple captures of individuals is necessary to accurately estimate detection probability.

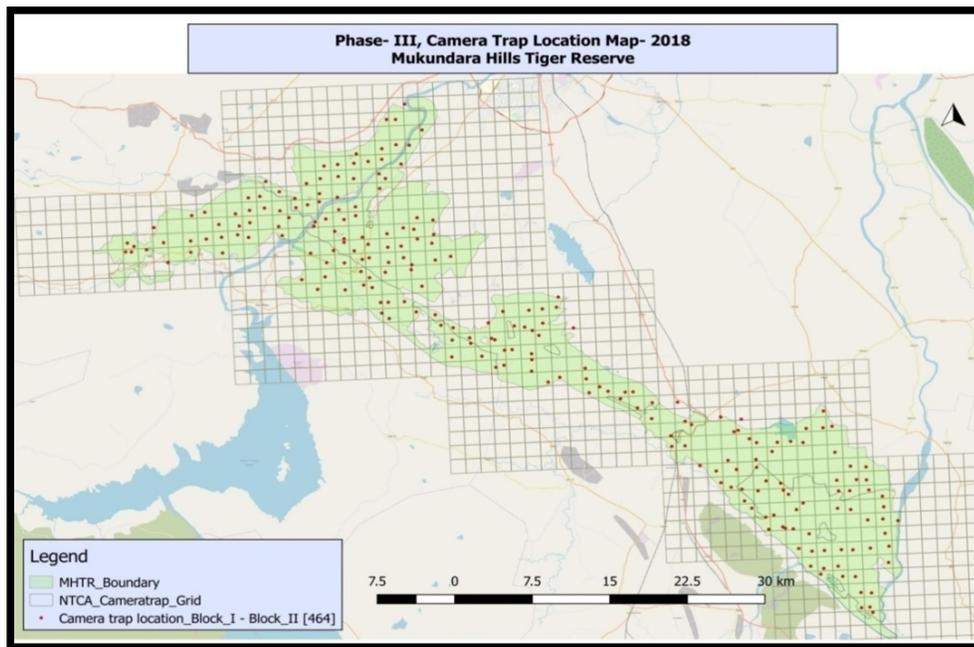
Field design

Camera trap in Mukundara Hillst Tiger Reserve was conducted from October 2018 to December 2018 in two Phases. 1.4x1.4 sq km grid were pllaced in entire Mukundra Hills TR (by NTCA Grid map) to place systematic cameras in core and buffer areas of MHTR. Five ranges of MHTR Kolipura, Borabas, Rawtha, Darrah and Ggaron were covered in Block- I and one range Jawaharsagar was covered separately in Block - II.

Carnivore species identification and distribution mapping

- Field work was done in two blocks (Block- I & Block II) using double sided camera traps.
- Closure period -25 to30 days
- Block –I (28th September to 28th October)
- Block – II (2nd November to 2nd December)
- Total number of camera traps -Block –I, 356 Block- II, 108

- Total – 232 camera trap points (double sided).
- Total cameras - 464



Map-9.1 Location of Camera traps in Mukundara Hills Tiger Reserve



Figure 9.1 Camera trap field exercise during AITE Phase -III

Data collection method

Data was collected twice in a week. Two separate cards were made for a single camera with unique id. Unique folders were created to transfer data from the cards eg. MUKU_001A_c001 / MUKU_001B_c001 for camera number one. Data was downloaded with the date mentioned folders.

Camera trap matrix was prepared to check the total trap nights of the camera. Every day camera was working was notes as 1 and camera stopped working as 0.
Annexure-16.

Photo registration of tigers:

Pictures of individual tigers obtained by camera traps or by regular cameras should be maintained in the form of a photo identity album. Records should be kept on the location, condition (breeding status, injury, etc) and associated tigers whenever a tiger is sighted. This will provide crude data on ranging patterns, demography and mortality.

Tiger pugmark and other signs:

Regular monitoring of tiger signs (pugmark tracings, plaster casts, etc) should be undertaken in every beat at a weekly interval with monthly compilation of data. With experience and exposure to the resident tigers and their pugmarks, the forest staff may be able to identify individual tigers from their track set characteristics (*Panwar 1979, Smith et al 1999 and Sharma 2001*). Sign surveys and individual tiger monitoring should become a regular task for every guard as was the practice some years ago and is currently practiced in some Tiger Reserves. The monthly data should be mapped and maintained to analyse trends.

Monitoring by telemetry in select areas:

Use modern technology of VHF, GPS and satellite telemetry to study and monitor aspects of demography, metapopulation dynamics (dispersal, ranging behaviour. In all source populations, tiger abundance and density should be estimated using camera traps, digital images of pugmarks and/or DNA profile from non-invasive methods biannually. The Project Tiger directorate will play the overall supervisory and coordination role for all the phases and tasks under each phase of the monitoring.

9.2 Habitat Assessment and Monitoring Framework

This consists: -

- a) Tiger presence and relative abundance.
- b) Tiger prey presence and relative abundance and habitat quality and anthropogenic pressure at a high spatial resolution of 15-20 km².

We consider a forest beat (an administrative) 15-20 sq.km.in size delineated primarily on natural boundary as the unit of sampling. Since each beat is allocated to a beat guard for patrolling and protection. The boundaries of a beat are well recognized by forest staff. The sampling would be systematically distributed in all beats of tiger occupied forests (Tiger Reserve, revenue and reserve forest) Thus in effect,the entire landscape where tiger are likely to occur is sampled .The detailed methodological approach for sampling Carnivore signs, Pellet/dung counts ,habitat and anthropogenic pressure are presented in the ‘Field Guide ‘ (Jhala and Qureshi 2004)

1. Sampling for Tiger, Leopard, and Other Carnivore Sign Encounter Rate

To obtain data on the presence, absence and intensity of use of a beat by tigers and other carnivores, we shall quantify the relative abundance of tiger, leopard, and carnivore signs in an area. The following procedure needs to be followed for data collection:

- A beat will be considered as a sampling unit.
- Areas within the beat that that have the maximum potential for tiger occupancy will be intensively searched.
- Since tigers and leopards have a tendency of using dirt roads, trails, foot paths, river beds and nullahas, these landscape features within the beat need to be searched intensively
- One to three persons who know the terrain and habitat features of the beat should conduct the search for tigers sign.
- There should be 3-5 separate searches (in different compartments within the beat and/or at different times 1-5 days apart) each search covering about 4-6 km distance in areas having the best potential for tiger presence. It is important to record the distance covered and the time spent during each search separately and accurately. If time is spent resting or in other activities while conducting the search, this duration should be reported separately. If possible the GPS coordinate of the beginning point of each search path should be recorded.
- The total minimum distance covered while searching for tiger and other carnivore sign should be 15 km per beat.
- Tiger and leopard signs should be classified into the following categories 1) Pugmark trails, 2) Scats (Old : dry with hair and bones visible; Fresh: dry but intact with shiny surface; Very Fresh: soft, moist, and smelly, 3)

Scrapes, 4) Scent marks (spray, rolling), 5) Rake marks on trunks, 6) Actual sighting, 7) Roaring (vocalization).

- A brief description of the topography and forest type is to be recorded for each sign.
- In case of pugmark trails, each trail set is considered as one sign (not each pugmark as one sign). In case a tiger (or other carnivore) continues to walk along a dirt road for a long distance (say 1 km), then this should be considered as one sign, and a comment recorded in the remarks section of the data regarding distance covered by a pugmark trail of a single tiger.
- Tiger and leopard signs if encountered outside of the sampling route should also be recorded with GPS coordinates (if available) and with appropriate comments.
- Special emphasis should be given to sign of tigress and leopards with cubs, and any authentic evidence of tiger cubs (sightings of cubs, lactating tigress, tracks, etc.) obtained within the past twelve months should be mentioned in the data sheet.
- While sampling for tiger and leopard signs, record should also be kept for signs of any other carnivore that are encountered.
- The number of livestock that are killed by predators within the past three months needs to be recorded in the questionnaire following the data sheet.

It is important to report data sincerely. It is likely that there may be reliable information that tiger/leopard is present in the beat being sampled, but no tiger/leopard signs are recorded during the intensive search survey. In such cases, mention should be made in the remarks column of the data sheets. However, failure in obtaining tiger sign from a beat is equally important as recording tiger/leopard signs and for appropriate analysis of this data the actual data should be reported.

2. Sampling for Ungulate Encounter Rates

This protocol outlines a simple method for quantifying ungulate abundance in an area based on visual encounters while walking along fixed line transects. The following procedure needs to be followed for data collection:

- A beat would be considered as the unit for sampling.

- After considering the shape, size, vegetation, and terrain type of the beat, a transect line of a minimum of 2 km and not exceeding 4 km will be marked for sampling.
- The transect line should traverse similar habitat (broad vegetation types) as far as possible. If the beat is composed of 2 or 3 distinct vegetation types eg. Mixed Teak Forest comprising 40% of the beat and the remaining 60% comprised of Miscellaneous forest with bamboo, then 2 separate line transects should be marked for sampling .
- The line transect within a beat may be broken up into 2 or more segments so that each segment has a minimum length of 2 km and traverses similar habitat.
- Care should be taken that a line transect is not located near a busy road nor should it run parallel to a river or other features of the landscape which may bias sighting of ungulates.
- For each transect the point of beginning and end point coordinates (Latitude and Longitude) should be recorded by a global positioning system.
- The broad forest type and terrain type that the transect traverses needs to be recorded.
- Each transect should be walked by 1-2 persons during the early morning hours (6:30 AM to 8:30 AM). Preferably one of the persons walking should be a good field person who is able to spot wildlife.
- A record should be kept of all mammals and peafowl seen during the walk in the prescribed format. For each animal sighting the following needs to be recorded: 1) serial no of the sighting, 2) time of the sighting, 3) species (eg. sambar, chital, wild pig, peafowl, langur, etc.), 4) group size –number of animals of the same species in the group sighted, it is important to try to count the number of animals in the group as accurately as possible. Animals are considered to belong to two different groups if the closest animals from the two groups are separated by a distance of over 30 m.
- If possible the number of young (fawns/calves less than 1 year of age) seen in the group should also be recorded.
- A broad habitat category (vegetation and terrain type) needs to be recorded for each sighting eg. S. No.5. 12 chital (10 adults and 2 young) were seen at 6:40 am, in mixed teak forest, gently undulating terrain.
- Each line transect needs to be walked at least on three different mornings for estimating ungulate encounter rates.

3. Sampling for Vegetation, Human Disturbance, and Ungulate Pellets:

To quantify the habitat parameters and determine relative abundance of ungulates sampling will be done along the same line transect on which ungulate encounter rates were estimated. For economy of time and effort it would be possible to first sample the line transect during early morning hours for ungulate encounter rate and then while returning along the same line, sample for vegetation and ungulate pellets. Sampling for vegetation, ungulate dung and human disturbance will be done only once on a transect.

- Again a beat will be the sampling unit, and sampling will be done along the established line transect.
- The beginning and end point coordinates of the line transect need to be recorded using a GPS unit.
- The same principal of laying line transects as explained in the section on ungulate encounter rates is applicable here.
- Vegetation would need to be sampled every 400 m along the transect.
- The vegetation would need to be quantified visually at the following categories for each plot: In 15 m. radius circular plot
 1. Broad vegetation type and associated terrain type eg. Grass land on hilly Plato terrain, semi evergreen and moist deciduous forest on hilly slopes and valley etc.
 2. Within a distance of approximately 15 m of the observer the five most dominant trees need to be listed in the order of dominance (abundance)
 3. The observer needs to list the 5 most dominant shrub species in order of dominance (abundance) within 15m of the location. He needs to categorize shrub density (under-story vegetation) as absent, very low, low, medium, and dense. Shrubs will be assessed on five point scale (0 to 4 i.e. absent to most abundant) for density estimation.
 4. If weeds are present, their abundance needs to be scored on 0 to 4 scale (0 being absent and 4 high abundance) and the three most common weeds seen in 15 m need to be listed in order of abundance.
 5. Within the same 15 m distance the observer needs to record number of signs of looping, wood cutting, and presence/absence of human foot trail.
 6. The observer needs to visually quantify the canopy cover at the location. The observer should subjectively classify the proportion of the sky above

him that is covered by canopy foliage and categorize it into <0.1, 0.1-0.2, 0.2-0.4, 0.4- 0.6, 0.6-0.8, >0.8 canopy cover

7. A mention needs to be made in the data sheet regarding the number of permanent human settlements, human population, and livestock population present in the beat (to the best of his knowledge).
8. A mention needs to be made based on the observer's knowledge if any non timber forest product is collected from the beat. If yes, which NTFP and to score the magnitude of collection on a 5 point scale (0- no collection 4-high rate of collection).

In 1 m radius circular plot

The observer needs to use a 2m long stick to define an imaginary circle around him with the stick as the diameter. Within this circular plot (2m diameter) the observer needs to a) quantify the percent ground cover, i.e. the proportion of the ground covered by herbs, grasses, litter, and bare ground, b) List the 3 most dominant grass species, and herb species in order of dominance.

4. Sampling for Ungulate Pellets

- ❖ Ungulate abundance will also be indexed by enumerating their fecal pellets. This exercise will be done on the same line transect that has been sampled for ungulate encounter rate. To save time, this exercise could be done after the line transect has been sampled in the early morning for ungulate encounters.
- ❖ At every 400 m along the transect (line of walk) the observer needs to sample an area of 2m by 20m, perpendicular to the transect for quantifying ungulate pellets. This is done by using the 2 m long stick held at the centre horizontally in his hand and by walking slowly, 20m right and left of the transect alternately at every 400m
- ❖ All ungulate pellets encountered need to be recognized to ungulate species and recorded in appropriate columns of the attached data sheet
- ❖ The number of fecal pellets needs to be counted. In cases where the pellets occur in large heaps, then they should be categorized into the following categories: A (50-100), B (100-200) and C (>200).
- ❖ In areas where small livestock like sheep and goat are known to be grazed, it is possible that fecal pellets of these can be confused with wild

ungulates especially those of chital. In such areas, a mention needs to be made that goat or sheep graze the area.

- ❖ In the last row of the data sheet the observer needs to report if ungulate/animal listed in the data sheet occurs in the sampled beat to the best of his knowledge irrespective of whether its pellets/dung were recorded in the plots.

9.3 Spatial Database Development:

The spatial data generated will be scientifically robust, and amenable for statistical analysis and inference. Since several replicate survey will be undertaken in each beat, it would possible to model tiger occupancy ,detection probability of tiger sign, and relative sign density at a high spatial resolution .Since data will be analysed in GIS domain several spatial attribute like human density; livestock density ,road network, topographical features, forest type and cover, meterological data, poaching pressure and landscape characteristic will be used as covariates to model tiger occupancy and relative abundance in a landscape and individual forest patches. Time series analysis of data at a larger spatial resolution is likely to have sufficient precision for monitoring spatial occupancy of tiger in association with changes in tiger prey, habitat quality and anthropogenic pressures.

It should be tried to address the issue of reporting inflated numbers by laying emphasis on animal signs instead of numbers. Furthermore, the resolution of the data generated will be reduced to four five categories (high, medium, low and absent). Several corroborating variables like prey encounter rates, pellet group counts and habitat condition will help in ensuring quality data; discrepancies in reporting will be easy to pinpoint. There would be an audit mechanism in place to scrutinize the data collection, compilation and analysis. National and International experts would act as observers while officers in- charge will ensure adherence to the prescribed protocol and transparency of protocol implementation.

The system once institutionalized and implemented ,will not only serve to monitor tiger population but will also monitor the status of other biodiversity resources of all tiger occupied landscapes ,truly exemplifying the role of tiger as a flagship. It will serve as an effective tool for decision makers. Managers and conservationist alike and will guide and plan land use policy at a landscape level.

9.4 Analysis and Reporting Framework:

Tiger monitoring team would be formed in MHTR. DCF (WL) MNP, Kota will be responsible for monitoring. Similarly Forest Range Officers will be responsible for monitoring of wildlife in the forests under their jurisdiction. For this the exiting staff, Field Biologists of Mukandra Hills Tiger Conservation Foundation/research scholars/ NGO workers/volunteers should be involved.

At range level each Range officer shall coordinate the team.

The teams should constitute from concerned field staff.

Assistant Conservator of Forest, Dara shall be the overall incharge of the Tiger Monitoring team.

A technical committee for monitoring the teams shall be formed as follows:

Field Director MHTR	-	Chairman
DCF (WL) MNP, Kota	-	Member
ACF, Dara	-	Member
Secretary		

The field level monitoring shall be coordinated by Research Officer/ACF.

A final annual report shall be prepared and submitted to the committee for discussion and the corrected version of the report shall be submitted by the Field Director to Chief Wildlife Warden of Rajasthan and Member secretary NTCA New Delhi.

CHAPTER – 10
PROTECTION AND INTELLIGENCE GATHERING

The comprehensive plan for protection and intelligence gathering based on the NTCA guidelines, with provisions for security auditing, networking and exchange of wildlife crime data with other prosecuting agencies within and adjoining States should be prepared.

10.1 The Tiger Cell

Along the basic lines of the Tiger Cell to be created at the State Govt. level, a similar cell will be created in the Field Director’s Office at Kota. The Cell will be entrusted with the responsibility of gathering information relating to offenders, and to establish an intelligence network and monitor the progress of pending court cases related to wildlife offences. The Cell will also collaborate with the local NGOs, Police department and informers for achieving the above objectives.

There will be a body especially meant to coordinate the anti poaching efforts of police and forest departments. The cell will review poaching/anti poaching scenario at the headquarters from time to time and will send appropriate directions to field officers. All major anti-poaching actions will be undertaken by the SP and DFO under the aegis of this cell.

10.2 The Strike Force:

10.2.1 District level Wildlife Protection Task Force:

This task force will be chaired by the Collector. SP and DFOs will be the members. They will plan joint operations related to anti encroachment drives and raids against illicit felling and poaching gangs. The committee would be as follows:-

Table-26 District level Wildlife Protection Task Force:

1	District Collector	Chairman
2	Superintendent of Police	Member
3	District Government Pleader	Member
4	ACF/ Range Officers	Member
5	Deputy Director & DCF	Convener

This task force will be constituted to effectively monitor the detection and prosecution of wildlife offences. It is also suggested to set up a legal cell to help investigation and to ensure maximum punishments to poachers and traders of wildlife products.

10.2.2 Deployment of Tiger Protection Force:

Concerned beat guard of the beat is supposed to be responsible for the protection of flora and fauna of his beat but it is unavoidable to provide some help to control the commission of forest offences. In addition to this, some anti-social elements also become active during festive occasions. Similarly, a few persons of some particular local tribe always look for an opportunity to kill wild animals to sell in the nearby markets. In order to supplement the protection activities, constitution of a separate Tiger Protection Force is being felt.

According to the direction of NTCA special tiger protection force has to be deployed in MHTR.

The Special Tiger Protection Force would be under the direct control of a Dy. Director. The Deputy Director of the reserve would ensure the proper functioning of the force. There should be a schedule of patrolling prepared by Deputy Director and supervised by ACF for each party of Tiger Protection Force.

The Special Tiger Protection Force will be equipped with firearms and provided a vehicle & mobile wireless. The task of creation of Special Tiger Protection Force is under consideration by CWLW and DG Police, Rajasthan.

Till the Special Tiger Protection Force is created a Wildlife Protection Strike Force at the tiger reserve headquarters should be constituted. This force would comprise of ex-army personnel and local people. The professional expertise of ex-army personnel and knowledge of track available with the local people would complement the effort of field staff to strengthen protection. Important features of this force would be:

1. The strike force will need to be professionally oriented through a capsule field training and equipped with wireless, weapons and vehicles apart from due authorization to perform the task. It would be under the control of the Deputy Director & DCF MHTR.
2. One squad of the Strike force would comprise of 10 ex-army personnel (including four gunmen) and 15 local persons to cover an area around 100 sq. km. There would be one Supervisor (ex-army) per squad. It is proposed to have 10 squads for Mukandara Tiger Reserve. Proper uniform dress code would be prescribed for the strike force.
3. The Strike Force would have the same immunity as any other Government field functionary for act carried out in good faith to protect wildlife and their habitat.
4. The ex-army personnel for the said force may be directly recruited from respective District level Sainik Kalayan Board and local person through Eco Development Committees (EDCs).
5. The budget, transport and other facilities, at par with the CRPF and other such organizations must be given. This Strike Force will act in any area against illegal intruders, timber mafia, poachers, armed grazers etc.

10.3 Strategy for Protection and Communication

10.3.1 Patrolling plan :-

Beat Tracking- MHTR is divided in to beats. Every beat should have three staff including ex army personnel. The bigger beats can be divided into sub beats for effective tracking of the area. The beat headquarters would be as close to the beat as possible or tent/chowki should be raised inside the beat for effective tracking of the beat area. The tracking has to invariably start at sunrise and most part of the beat should be traversed on foot to collect evidences of tigers and other animals and at same time record evidences of wood cutter/ poacher of any other illegal movement that has occurred during last night. The same has to be reported to range headquarters and division headquarters on the same day. Every beat has to be provided fixed and hand held wireless set.

10.3.2 Anti poaching camps

In Tiger reserve anti poaching camps will be set up at places where poaching incidences have been reported in the past and no infrastructure of forest department exists in the vicinity of these sensitive places. As night patrolling alone cannot solve

problem of poaching in such remote areas establishing anti poaching camp is the only remedy left. The anti poaching camps consist of minimum one person from Forest Department and one person from local village (Village wildlife volunteer). (Annexure-17)

10.3.3 Night Patrolling

(a) Range level

- Regular patrolling by vehicle – Incharge Range Officer/Forest
- In a week regular patrolling at night would be done by RO/forester in sensitive areas. 5 Members of tiger protection force and local range staff would do the patrolling.
- Joint patrolling by forest and police
- Once in a month joint patrolling would be done by RO and local SHO of respective police station.
- Full moon fortnight Night patrolling

At range level once in a week before full moon night and once in a week after full moon night, night patrolling would be done in the whole range. Every naka would patrol sensitive area in his beats.

Range officer would coordinate and supervise the night patrolling throughout the range.

(b) Division level

- Full moon night patrolling
- On every full moon night patrolling will be compulsorily done by all rangers and subordinate staff. ACFS and DCF would supervise different areas.
- Night patrolling by ACFs & DCF
- Once a week night patrolling would be compulsorily done by ACFs & once a month by DCF in sensitive areas.
- Flying squad – Night patrolling

Night patrolling by divisional flying squad will be done twice in a week on the routes given by DCF/ACF, the flying squad will also coordinate with local range

officers. The flying squad will also do joint patrolling with the ASI and 2 Constables every fortnight.

Intelligence Gathering Team

One team will be separately created for intelligence gathering and chasing poachers, apprehending wanted poachers and collecting information about illegal wildlife trade and allied activities. The team would be equipped with a separate vehicle. Local People will also be engaged. The team will operate in different areas under the control of DCF. The team would comprise of suitable forest staff, ex-army personnel's in tiger reserve to have an eye on the movement of poachers on the periphery. It will also collect information about the activities of mogiyas and wildlife traders in Sawai madhopur, Bundi, Karauli, Dausa, Tonk and Kota districts.

Joint Raids Police & Forest

Forest & police will conduct joint raids once a fortnight. The forest team will be headed by ACF while police party by Dy.SP. Sudden raids will be conducted at possible hideouts of the poachers and intensive searches will be made. This will greatly help in preventing poaching.

Deployment of Border Home Guard

Two company of Border Home Guard are deployed at range headquarter for prompt help to patrolling parties.

Reward to informers

Suitable reward to informers will be paid and secret register will be kept without declaring names of the informers. The register would be in personnel custody of DCF.

Incentive to staff

The park staff that is doing good work of tracking, information gathering, chasing and apprehending offenders will be suitably rewarded to keep their moral high.

Wildlife Crime Cell at Division Level

Crime cell will be established at division level comprising of on ACF, Data entry operator and one office staff.

Proposed protection plan;-

Endangered species international trade and market forces are compelling the man to kill brutally the innocent creatures of nature to fulfil his greed. A good protection plan can ensure the well-being of wild-animals in the area. The ultimate aim or concern of a protection plan is prevention of wildlife crime. This can be ensured by creating fear of being caught and punished in poachers. A fear of being detected and heavy penalty will ensure the protection of animals. The following steps, in addition to the ongoing anti poaching strategy in MHTR are suggested in this regard.

1. Proper patrolling
2. Early detection of offence
3. Subsequent follow-up action- lock-up facility and lock-up operating protocols equivalent to police stations.
4. Effective prosecution
5. Strong presence of staff in the field and forests department should be in dominant position. While in field photograph the area and find the position of fallen antlers whether these are extracted or not or in intact position. Depending on that one should plan to patrol the areas.

Preparation of crime map

There is a need for preparation of crime map of divisions. Similarly crime map will also be prepared for range level. A good crime map should have all the information about interstate boundary (Rajasthan-M.P. boundary), roads, vantage points and permanent camps that have been established for the purpose.

Proposed Patrolling plan

It is important that before patrolling the area one should understand the poacher's mind set and the detection of the crime should be done on the basis of kill report, death report and wildlife articles. There may be risk. So detection of risk is equally important for safeguards. A good show of strength helps in protection. The

probability of being caught should be increased and create fear in the poachers. There will be both patrolling; vehicle or patrolling on foot patrolling.

Patrolling plan

There will be six patrolling parties one in each range and one at division level. Each party will have one four wheel vehicle with wireless, torch, two handset of wireless, two rifles (ex-Army) and rest eight with lathi. One forester will lead the patrolling party. Concerned range officer will be the overall incharge of patrolling party. These patrolling parties will also cover Bundi-kota passage and Chambal-M.P. areas along with MHTR to check the offenders.

10.4 Intelligence Gathering and Coordination

Catching wildlife poacher on the spot is very difficult and is only possible if PA management has strong intelligence network. Strong intelligence management depends on the efficacy of field staff, proper liaison with local villagers and proper availability of infrastructure. Developing proper infrastructure network around protected area helps in achieving the objectives. Once information is received reaction time has to be small to catch the offenders red handed. This needs well trained and equipped force. Those who do good work in catching offenders will be suitably rewarded. Villager who helps in giving valuable information will also be rewarded. For this sufficient secret information fund should be available with Field Director for getting information about poachers. Developing reliable informers is a must. After careful evaluation informers can be created among the hunting community directly or through some middle man.. There are some people who are against such hunters in villages and town they can also be utilized. Poaching gangs after having internal rivalries can be utilized against each other and this can be means of good information about poaching.

Training centre has to be well grounded with infrastructure and staff. It should work as a wing of FTI, Jaipur. The situation of training centre is excellent to provide training in practical aspects of tracking in the field, monitoring wildlife census techniques, tourism management, eco-development issues and park related poaching.

10.4.1 General strategies for controlling poaching:

The following strategies are proposed to tackle the menace of poaching:

1. Improving Staffing Pattern

The effective protection of the wildlife reserve depends on the strength of the staff. Apart from number, the quality of the staff in terms of health and training is also desired. There has been no fresh recruitment of the staff at the RFO and forester level for more than 20 years. This is the cutting edge of the department. These two cadres represent the department in the field. They are the persons who actively form the front line staff. Trained, educated and young persons can deal with the crime better. It has become increasingly difficult to entrust them with tasks requiring certain level of training and education. Apart from this, additional pressure of communication with villagers so as to enlist their participation in protecting the reserve has been put on the staff. The staff also lacks regular training required to keep them fit and take coordinated action against poachers and the miscreants. Regular recruitment of the staff in required number is must.

The staffing pattern will be designed to meet the special needs of the reserve and regularly reviewed after every five years.

Special strike force will be created through careful selection and training with police force. A separate proposal for strike force will be sent.

Women staff will be inducted in the lower cadres to deal with women offenders.

2. Mobility

With change of time, the criminals have become equipped with fast vehicles, sophisticated weapons, mobile phones etc. The Park is not in a position to compete with the criminals with their existing level of operation. It will be helpful to provide gypsy/bolero to all Range Officers and Motor Cycles to all Foresters. Cycles should also be kept in Range Offices and Forester's office which can be used as per the need of patrolling. It is also suggested to keep one tractor at Range Office for patrolling on hard terrain.

3. Control over Use of Firearms around the Park

A large number of people hold firearms around the Park. There is a need for strict compliance of provision of section 34 of the Wildlife Protection Act 1972. The registration of weapons should be completed within stipulated time frame.

4. Control over Mining Activities

A large number of mines are operating close to the Park. The department has no control over these mines. Explosives are very frequently used on these mines legally or illegally. It not only adds to the confusion since the explosions can be used to camouflage gunfire used for poaching. The mining activity also attracts communities as labour force, which resort to poaching. Therefore it is essential that no mining should be done within designated eco-sensitive zone around the MHTR.

5. Firearms

It is required that firearms are provided to all officers from Field Director down to Forest Guard. Each patrolling party will be provided with firearms. The Government Order empowering forest officers to firearms is grossly inadequate. As an example, the government order restricts use of firearms in the night whereas the most poaching take place at night only.

6. Restriction of unauthorized Movement in the Park

A large number of villagers tend to move in the Park and many a time stay there for a number of days. Such movements are done on the pretext of grazing animals, wood gathering, worshipping etc. This unregulated entry provides opportunity to the poachers to enter the forest to commit serious wildlife crimes. This will be closely monitored, regulated and checked from time to time.

10.4.2 Secret Information and Wildlife Crime Prevention:

The poachers generally have serious criminal behaviors. The traditional hunting communities and nomadic tribes have vast network throughout the country through marriage alliances. Inquiries have shown that information about nomadic tribes becomes very essential for preventive action to be taken to curb wildlife crimes.

At present there is no establishment or arrangement similar to 'THANA' to control/prevent wildlife crime. To begin with it is proposed to establish "Wildlife Crime Control Cell" at Kota. The cell should function day and night. One officer along with 6-8 forest personnel and a vehicle should be available for the job.

Store room and "Malkhana" will also be constructed at appropriate places for safe custody of arms and materials seized under various Wildlife offences.

Following steps are required to prevent wildlife crimes by professional hunting tribes:

- The forest staff should be vigilant about the movement of the hunting communities and nomadic tribes. The camps of the nomadic tribes will be searched and an eye will be kept on their activities. It will be ensured that no such camps are allowed in the vicinity of the Park.
- Forest Department will establish checkpoints to ensure that vigil is kept at all entry points and exit points to the Reserve and the roads leading to it.
- There will be random checking of transport services
- such as trains, buses etc. at regular intervals by forest officials.
- The department will recruit women staff to carry out search and nab culprits since it is suspected that most of the illegal trade is done through women.
- The department will use all means and help wildlife enthusiasts to develop network of informers in the villages, railway stations, bus stops, and cities to obtain speedy information on the crimes. Rewards to informers will be given
- The patrolling methodology used by the field staff will be suitably modified so that their movement and secrecy matches that of a poacher.
- The staff is not trained in anti-poaching activities. Every year trainings will be organised for selected anti-poaching staff.
- There are inadequate weapons and ammunition. Every naka have at least one rifle gun issued. The staff will be trained annually in handling these weapons
- The prevention, detection and prosecution of forests and wildlife offences are very dismal. The record keeping and disposal of the cases is very poor. Well educated and trained forester capable of handling offence cases will be posted. Regular monitoring of cases is recommended. Separate lawyer appointed for dealing with wildlife cases will be appointed at Kota.
- Mechanisms of reporting cattle kills and speedy compensation will be ensured.

- There is an urgent need to reduce man animal conflict and in improvement of relationship of forest department with the villagers.

Poaching is mostly carried out because wild animals stray out in the agricultural fields. The locals employed in crop protection are mostly involved in poaching. Villagers provide full protection to these locals. There is a strong link to the crop depredation and poaching by locals. There is an urgent need to identify such sensitive areas, where crop raiding is common. The crop damage compensation and cattle compensation cases will be finalized as early as possible. Range officers will process the cases and get the compensation at the earliest possible. All compensation proposals will be prepared and sent to DCF within 15 days of the incidence. Division should issue sanction order within 7 days as DCF is now authorised by CWLW to pay compensation. Availability of the funds all round the year has to be insured especially for compensation. Normally the late release of CSS sanction is major cause of delayed payment of compensation. At any cost the compensation should be paid to the person concerned within 60 days of the incidence. At present crop compensation scheme does not exist. The same scheme should be introduced at the earliest.

The Eco development committees will be activated to solicit the support of the villagers in anti poaching drive. This will also help in developing network of informers.

The Forest Department & the Police Department will work in close coordination in the drive against poaching, training of Forest Staff and developing network of informers.

10.4.3 Field Level Improvements:

The wildlife protection requires substantial improvements at field level. A few are listed below:

- There should be round the clock readiness of the flying squad and the officers to nab the culprits. It is essential that there should be two flying squads in each division with separate staff and vehicles for day and night. Each vehicle should be provided with two drivers.
- The maintenance of Village crime report for each village should be made mandatory at Naka level and should be reviewed by ACFs and DCFs.

- All cases should be reviewed before ACFs and further DCFs before finalizing for compounding / filing charge sheet in the court.
- Tourism/VIPs/Protocol should be separated from the protection duties and suitable infrastructure. A post of ACF should be created for tourism.
- Each Range Officer should be empowered to operate secret information service fund. The fund limit may be kept as below:
 1. Range Officer: Rs.30000 per year with max. Rs 1000 each time.
 2. DCF: Rs. 3.00 lacs per year with max Rs. 5000 each time.
 3. Field Director Rs.5.00 lacs. per year with max. Rs 10000 each time.
- There should be two legal advisors/crime assistants for the Tiger Reserve at Kota.
- There are many counter court cases and offence cases filed against the staff. This has discouraged staff in taking initiative in prevention. The counter cases are treated as private cases of the individual officer himself. All such cases must be treated as government cases, unless otherwise proved. Professional training to deal with wildlife offence cases should be imparted regularly.
- Forensic kits may be developed.
- Secret list of persons with criminal track record and involved in poaching either officially convicted or not, should be prepared at range level. Constant watch should be maintained on such persons.
- The ground level staffs are either old foresters and forest guards or uneducated semi-permanent cattle guards. The motivational levels are very low. Young and energetic staff should be specially deployed for this specific job.
- At range level, 5-6 forest guards should kept as reserve for emergency calls, so that any information related to poaching can be checked.
- There have been a few cases of villagers electrifying the fencing. Wild animals are getting electrocuted due to this. Villagers should be dissuaded from electrifying the fence.
- There is no malkhana to keep the seized offence material and wildlife products. One such ware-house (malkhana) should be constructed at the Range level.
- The system and procedure of forensic investigation is not well settled and laid down. Lot of confusion prevails while sending the seized wildlife material for

forensic analysis. Lots of institutions like WII and Hissar veterinary college should be contacted and agreement should be finalized for analysis.

- The teams involved in the anti-poaching operations should be rewarded properly.
- Training for judiciary, police and other law enforcing should be organised. Forest department should take lead and conduct training programmes.
- Government to be approached for declaring Wildlife Wing at par with police and they should be exempted from election duties and other duties.
- Computerized record keeping of crimes and other information should be taken up. Mechanisms of exchange of information should be evolved to have better understanding of the modus operandi of the poachers.
- The service conditions of the wildlife staff should be suitably modified so that they can work with motivation Modifications are required in conditions of leave entitlement and mess facilities etc.
- There should be prescribed time frame for investigation and filing charge sheet. Award Scheme and out of promotion Scheme should be framed to motivate the staff.
- A percentage of compensation realized in offence cases should be given to the staff.
- Forest Officers should be empowered with police powers under Arms act within 10 kms. radius from the periphery of the Tiger Reserve

10.4.4 Security Plan by addressing human-Wildlife Interface

The Security Plan will be for the entire Mukandra Hills Tiger Reserve (both core and buffer area).

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

1. The Tiger Reserve is surrounded by large number of human habitations.
2. The poverty in the fringe areas coupled with the demand for the forest and wild animal products exerts a considerable pressure on the Tiger Reserve.

3. Inadequacy of skilled manpower resources.
4. Inadequate intelligence network for providing timely information about impending activities.
5. Difficulty in detection and prosecution of cases.
6. General lack of awareness, understanding and support from the fringe communities.
7. Hunting by local people.

10.4.4.1 Objectives

1. To maintain and conserve bio diversity by providing efficient protection
2. To maintain and conserve viable population of tiger and its prey species
3. To check illegal and unscientific harvesting of NTFP and fuel wood
4. To enhance capacity building of staff
5. To provide infrastructure for protection
6. To save the Mukandra Hills Tiger Reserve from all forms of biotic/ anthropogenic pressures in terms of –
 - (i) Cattle Grazing
 - (ii) Poaching
 - (iii) Fuel Wood and Fooder removal
 - (iv) Fire
 - (v) Encroachment & Mining
 - (vi) Boundary Demarcation & Mutation of forest land
 - (vii) Bawarias & other traditional hunters
 - (viii) Relocation of Villages
7. To develop human resource so as to utilise them in best possible way for protection.
8. Use of modern technology and equipment enabling effective protection.

10.4.4.2 Problems in achieving the objectives

- 1 Inadequate staff
- 2 Patrolling is difficult in monsoon
- 3 Illicit felling and collection of NTFP
- 4 Improper boundary demarcation
- 5 Human settlements-16 villages situated in the core zone.

- 6 Price tag attached to wildlife products in international market, Chain of people involved in wildlife trade outside jurisdiction of Tiger Reserve Management.
- 7 Lack of proper intelligence gathering network for Prevention of offences.
- 8 Low motivational level of frontline staff and Officers.
- 9 Lack of proper equipment and other resources to deal situation
- 10 Hostile attitude of local people and administration.

10.4.4.3 Protection Strategy

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

- Staff / chowkies listed with duty allocation and route chart
- The teams are equipped with mobile wireless sets.
- The patrolling teams systematically cover the area allotted to them
- Special instructions/ provisions for squads
- Surveillance: hotels, tourist points, vehicles, bus stand, trains and other means of transportation on the fringe of the Tiger Reserve and nearby towns.
- Surveillance of traditional hunters
- Coordination with local police
- Sanctioning labourers for patrolling
- Networking
- Preparation of daily schedule
- Regular checking of market places
- Surprise checking of barriers
- Preparation of “crime maps” with periodic updating
- Monitoring cattle kill, human kill, injury incidences and crop raiding
- Monitoring issues relating to compensation
- Monitoring water points near habitation
- Preparation of crime gang dossiers at range level
- Preparation of individual crime dossiers
- Monitoring of habitual offenders
- Preparation of monthly Crime Map on 1:50,000 scale indicating location of each crime with date.
- Conveying progress to Field Director/ Dy. Director on a daily basis through wireless
- Deviating from routine schedule during emergencies

- Taking note of offences registered in local police station
- Using tape recorder/ camera etc. to record evidences
- Special monitoring of water holes near human habitation during the pinch period
- Surveillance of half eaten carcasses of livestock on account of carnivore depredation to be carried out to eliminate the possibilities of poisoning for retaliatory killing by local people.
- Continuous monitoring of the area where more than three incidents of livestock depredation are reported within a fortnight.
- Village level crime register to be maintained at the EDCs level to keep track of villagers involved in wildlife offences.
- Maintaining list of vehicles passing through manned barrier and surprise check by senior officer at such point every month.

10.4.4.4 Security Plan-

In Mukandra Hill tiger reserve following activities, *inter alia*, form part of the Security Plan :

- a) Raising, arming and deployment of Special Tiger Protection Force.
- b) Use of information technology in wildlife crime prevention.
- c) Launching M-STrIPES for field patrolling and monitoring conservation status of Tiger Reserve.
- d) Deployment of antipoaching squad with proper equipment.
- e) Establishing and maintenance of existing patrolling camps/chowkies and deployment of local work force/ Home guard/Border Homeguards/ RAC for patrolling.
- f) Organising vehicular patrolling by constituting squads comprising of field staff/ local work force/ Home-guard/ Border Homeguards/ RAC /ex-army personnel, with wireless handset and paraphernalia for apprehending offenders, apart from prescribing a patrolling calendar for the squad.
- g) Establishing and maintenance of wireless network.
- h) Organising surprise raids jointly with the local police in railway stations, local trains, bus-stops, buses and possible hideouts of poachers.
- i) Ensuring special site-specific protection measures, during monsoon as „Operation Monsoon“ – considering the terrain and accessibility.

- j) Deployment of local work force / ex-army personnel / home guards/Border Homeguards/RAC at sensitive places to enhance protection status of Tiger Reserve and ensure effective action against offenders.
- k) Deployment of local work force for patrolling, surveillance of water holes, manning barriers, secret information ,awareness generation.
- l) Procurement of arms and ammunition.
- m) Procurement/maintenance of Range level Anti poaching squads.
- n) Rewards to informers.
- o) Legal support for defending court cases.
- p) Procurement of vehicles, boats and other equipment like field gear, night vision device etc.

10.4.4.5 Strengthening of infrastructure

The following activities, inter alia, would form part of reinforcing the infrastructure in Mukandra Hills Tiger Reserve

- a) Civil Works (staff quarters, family quarters, office improvement, patrolling camp, house keeping buildings, Interpretation Center, Barrier Checkpost, culverts).
- b) Maintenance, creation and upgradation of forest road network.
- c) Maintenance and creation of wireless Network.
- d) Maintenance and creation of fire watch system.
- e) Maintenance and creation of bridges, Water harvesting structures, anicuts.
- f) Maintenance, creation of firelines.
- g) Maintenance and creation of earthen ponds.
- h) Procurement, maintenance of vehicles (Gypsy, Jeep, Canter,Tractor etc.).
- i) Habitat improvement work including grassland development, weeds eradication ,drinking water etc.
- j) Procurement of hardware, software and Geographical Information System (GIS).
- k) Procurement of compass, range finder, Global Positioning System (GPS), camera traps.
- l) Procurement of satellite imageries for management planning.
- m) Map digitization facility for management planning.

Standard Operating Procedure (SOP) will be followed for Security Plan indicating the resources available, process of ensuring effective protection through law enforcement, detection of offences, apprehending poachers, chasing cases in court of law and ensuring conviction of offenders.

Proper Supervisory checks at Range officer level, ACF level, DCF level and Field Director level will be ensured for protection of habitat, prey and reintroduced Tigers in Mukandra Hills Tiger Reserve.

Security auditing will be done for various protection measures adopted in Mukandra Hills Tiger Reserve to know efficacy of programme. The activities like secret information cover in and around tiger reserve, poaching threat, detection of offences, follow up of court cases, conviction rate etc would security audited from time to time at reserve level. For effective protection strategy the Information regarding Beat, Naka & Range in MHTR is given in **Annexure-18**.

10.5 Fire Protection.

Forest fires are mainly caused by people driving or walking through the road in the core, villagers passing through core, honey gatherers, grazers & tress-passers. The fires are ground fires in which the dried grasses and the litter gets burnt. Canopy fires are not observed in this area. The fire incidences in MHTR is enclosed as **Annexure-19**.

A fire protection plan will be prepared every year keeping the experience of past years in view. Both preventive and combative measures will be adopted for protection of forest fire. Forest fires are mostly experienced during summer months e.g. April to June, hence a close vigil will be kept for early detection of fire.

Existing Fire lines:

1. Raontha to Laxmipura.
2. Bevada Talai to Khinmuch B.
3. Khinmuch B to Mashalpura
4. Block Khinmuch B to Gadde ki gadar (near rest house Dara)
5. Forest block Manoharpura to Dara near tower line
6. Jhamra block Manoharpura to Dara near Padampura
7. Kethuni Kharla block Ghatoli to Damodarpura block

8. Block Ghatoli Bandar muta to doliya
9. Block Chandbaodi Bagghi Road to Borabas.
10. Kothla to Laxmipura mataji .

(i) Preventive Measures:

The preventive measures will include creation of fire lines in Fire sensitive and grass bearing areas. Besides this awareness camps will be organized to obtain people's cooperation to prevent forest fires 3 Km fire lines creation is proposed during the plan period.

(ii) Combating Measures:

These measures will be taken up to extinguish forest fires once it occurs. Prompt detection of fire outbreak and communication is of utmost importance for this purpose. Watch towers will be constructed at suitable sites on high hills for keeping a watch on outbreak of fire. Existing watch towers in the reserve areas are in need of repairs, besides this some more watchtowers will be constructed during the plan period. Each watch tower will be equipped with a team of two to three firewatchers and a wireless set for quick communication in case of fire incidence reported in fresh area. Local people will also be motivated to cooperate in fire fighting operations by providing cash or kind incentive.

Few proposed watch towers are:

Peer Magara
Gudha Rajpura

10.6 Control on removal of Fuel wood and fodder

The local population has been using dried wood, as fire wood for their domestic purpose but the existence of large towns like Borabas, Bhainsroadgarh, Rawatbhata, Dabi, Dhaneshwar , Dara station, Dhabadeh, Suket, Ramganjmandi and Kota on the periphery of the core have prompted the local people to collect the fuel wood for selling in these markets. Regular patrolling of wood depots in these markets coupled with patrolling and protection in sanctuary area may help to check this practice to some extent. The Gas authorities will be coordinated to supply more LPG connections in the township on priority basic. Alternative source of energy will be provided and people will be motivated to adopt them. Participatory meetings will

be organized for creating awareness among the people in the interest of conservation of the core.



Village Women Carrying Head Load of Fuel wood

Lopping & Cutting of Trees:

The tiger reserve is surrounded by number of villages. There are 16 villages inside and more than 100 villages outside the core area within 5 km from the boundary of the tiger reserve with a large human population and a cattle population. So the entire pressure of the livestock surrounding the sanctuary is on the forest area because the people are dependent on forest resources in terms of fire wood and fodder. Lopping of Dhok, Salar, Khakhra, Kalam, Ber and many other species is done on large scale for feeding the domestic cattle. Tendu and Bamboo are used for house construction, repair and also for manufacturing agricultural implements. However, no organized or commercial cutting of trees except for fire wood has been observed in the core. The area towards Ramganjmandi and Suket is famous for its Kota stone quarries. Thousands of labourers are working in these areas and are totally dependent on forest for fire wood. The villagers of nearby villages cut the wood and sell it to the nearby towns like Suket, Dhabadeh and Ramganjmandi. The maximum consumption of wood is during winter. The incidence of illicit wood cutting during winter is more.

Strategy:

1. Though the field staff is protecting the forests and wildlife of the core, their protection efforts will be strengthened by equipping them with more wireless sets mobile as well as stationary, especially in sensitive areas. Education and awareness will be created among local population about ill effect of such practices.

2. The eco development committees would be constituted in the villages surrounding the core with in 2 km periphery and eco developmental activities shall be started.
3. The concept of Kulhadi band panchayat would be promoted.
4. Check points should be strengthened with staff, protection equipments & communication network.

10.7 Removal of Encroachments

The encroachment in the area adjoining the boundary is primarily for agriculture. In some cases the encroachment on forest lands is only for fodder by Gurjar community residing in the area. The area is vulnerable to encroachment because –

1. The boundary demarcation is not clear as most of the boundary pillars are missing.
2. The field staff is not well versed with the boundaries or they pay very little attention.
3. No proper land record is being maintained at Range or Naka level.
4. Adequate survey staff is not available for resolving the dispute.
5. Mutation of forest land in the revenue records is incomplete.

Strategy:

Demarcation of the entire tiger reserve will be done a fresh with permanent boundary pillars for protecting the tiger reserve from encroachment. Maps and records will be prepared even for smallest unit of management, that is beat and it will be made available to the lowest functionary i.e. Forest Guards. Encroached forest area is to be evicted by resorting to strict legal action and adherence to the government guidelines against encroacher. Regular patrolling during pre monsoon period and rainy season will be carried out to check and counter encroachment efforts. The patrolling will be more intensive in the sensitive and peripheral areas.

Boundaries

The strategy for achieving the objectives envisaged in the TCP is multi – pronged. The boundaries and rights of local people within the reserve are required to be known with maximum accuracy so as to enable the management to identify the area accurately on the ground. Settlement as per the provisions of Wildlife

(Protection) Act 1972 and survey and demarcation of boundaries is the major prescription for success of this strategy.

Settlement:

The rights and privileges in the reserve area have already been settled.

Demarcation:

The area of the tiger reserve is not properly demarcated on ground, which causes many managerial problems. The field staff finds it difficult to protect the land from encroachment that sometimes results in grave conflict of the staff with the encroachers. The boundary demarcation was done in the areas declared as reserve forests but in most parts of these areas the boundary demarcation pillars are either damaged or missing. However, the entire area of the tiger reserve needs a fresh and permanent demarcation.

Erection of Boundary Pillars:

Survey points are marked on the ground and at every survey point a boundary pillar is built for further reference. The line between these points separate the boundary of the forest area from the other land areas. After marking of the survey points, both internal & external boundary pillars are built at respective points as per the prevailing rules.

Maintenance and repair of boundary pillars would be carried out every year just after the monsoon. Demarcation register and maps with GPS coordinates would be maintained both in Range Offices and the Divisional Office. The Range Officer with the help of field staff will check the boundary pillars and get the damaged ones repaired and missing ones replaced. They will send the verification certification to the FD and Dy. C.F. at end of the year.

10.8 Human – Wildlife Conflict

The local population in the past had an access to forest with limited control. After the promulgation of forest act and wildlife protection act the free access has been restricted–

- The villager’s accessibility to the forest recourses has been banned.
- There is ban for collection of minor forest produce and grazing.

- The entry to the core is restricted. There is a growing feeling that the core has been created for tourists and the core no more holds promises for villagers.
- The wild animals cause damage to crop and their domestic animals which result in poaching of wild animals.

Proposed strategy

1. The villagers should be encouraged to go for permanent fencing all along the forest and village.
2. The damage to the crop and the domestic animals should be adequately compensated.
3. The cattle compensation should be implemented.
4. The degraded areas on the periphery of PA should be developed as pasture or medicinal plants /MFP farms.
5. The entry fee to the core includes eco development surcharge, the money must be spent back in the region for development.

10.9 Control on Mining

1. The situational Analysis
2. Mining is another major problem in the MHTR. Mining in the areas adjoining Core area is primarily for sand stone, rubble stone, Kota stone and in rivers kalisindh Amjhar for bajri.
3. The boundary demarcation is not clear as most of the boundary pillars are missing. The forest land records are not properly maintained.
4. The field staff is not well versed with the boundaries. Very little attention is paid to guard the boundaries, boundary marks, compartment boundaries etc. No proper land records are being maintained at Range or naka level. Adequate survey staff is not available, for resolving the disputes.

GENERAL STRATEGY:

1. Patrolling of the boundaries of the PA should be done regularly to check if there is any breach of the boundary line and whether illegal mining is there.
2. DCF, ACF, ROs should personally inspect sensitive areas from time to time as per the norms and the report thus obtained should be monitored in the review meeting.
3. All the broken or removed pillars are to be replaced immediately.

CHAPTER – 11
MISCELLANEOUS ISSUES

11.1 Wildlife Health Monitoring

11.1.1 Disease surveillance and Prophylactic Immunization:

Protected areas are established with an aim to conserve components of biodiversity to maintain their status in the natural ecosystem to protect the species from premature extinction. Outbreak of fatal diseases among the population of wild animals has lost considerable wild fauna in the past. Large-scale mortality of Bison in South India during (1968 and 1975) and Kajiranga National Park (1981) by Rinderpest and by Foot and Mouth Disease (FMD) in 1952 had been reported in the past. Dissemination of a number of diseases, like; Rinderpest, FMD, Anthrax, TB and Rabies are common in wild animals. In order to maintain a good health status of the wild animals, efforts for disease surveillance is extremely important in the Protected Areas.

There is a great competition of survival among wild ungulates and cattle for both forage and water. The domestic animals come in contact with wild animals, particularly ungulates at common grazing fields and at waterholes. Due to this, chances of the transmission of various fatal infectious diseases from livestock, to wild animals, namely Rinderpest (RP), Anthrax, Foot and Mouth Disease (FMD), Haemorrhagic Septicaemia (HS)etc., are extremely high. It is also known that there are few diseases which are communicable to carnivores from diseased ungulates; e.g. Rabies, Anthrax, Hydatidosis and Trypanosomiasis (Arora, 1994)

Free-ranging wild animals are as susceptible to diseases as any other living beings. Diseases have been a major cause of local extirpation of a number of wild animal species in India. With the increasing interaction between wild and domestic animals, the chances of disease transmission amongst them are high. Therefore, similar to the attempts made for recording the occurrence of disease outbreaks in wild animals of protected regions, efforts will be made to know the occurrence of specific infectious and contagious diseases in domestic animals at the periphery of the protected wildlife areas. Until and unless different epizootiological cycles of various parasitic and infectious diseases are delineated, it will not be possible to plan out measures to eradicate these diseases from free ranging wild animals.

For maintenance of health of wild animals, it is essential to monitor and survey the parasitic and infectious diseases periodically so that necessary actions could be taken to prevent disease outbreaks and control large-scale mortality. Surveillance programmes will be a major aid in the implementation of long-term health management plan on the appropriate measure to maintain healthy population of wild animals and guarding them against the risk of sudden and heavy mortality or morbidity in Protected Areas. This can be best achieved by preventing transmission of diseases between wild and domestic and in-between wild animals by manipulating the factors involved in the transmission. Establishing the database for forecasting the diseases by performing epizootiological studies in and around the Protected Areas round the year is of utmost importance and needs attention.

Preventive medicine in free ranging wild animals is more closely related to wildlife management. In wildlife medicine health of population is its highest priority. Individual animal therapy in wildlife medicine is difficult if not impossible in most instances. Preventive medicine will be practiced to ensure the health of wild animals of the reserve.

A large number of cattle pass through the nearby area of core. There is a serious problem of illegal cattle grazing. The common use of water hole by cattle and wild animal is the main cause of introduction of infectious diseases in to wild. Following are the diseases that may attack wild animals of the reserve.

FMD	Leptospirosis
Anthrax	Protozoic
Brucellosis	Ecto-Endo parasite

11.2 Immunization of live stock:

In Mukandra Hills Tiger Reserve 14 villages present in core area. Villagers mainly dependent on animal husbandory and cattle. The cattle of these villages come in contact with wild animals in the area. There is every chance that the communicable diseases from the cattle are transmitted to the wild animals. This will result in fatal diseases in wild animals.

Strategy:

- List of the livestock within core area of the tiger reserve should be collected from Tehsil and maintained at Range, Naka and division level.

- Good liaison should be maintained with the districts Animal husbandry officer to carry out regular immunization and deworming of these Cattle.
- Cattle Camps should be organized by the department in collaboration with animal husbandry department to check the health of animals and immunization.
- Awareness programs should be held in villages to impart knowledge of communicable disease in cattle.
- The immunization program should be linked up with integrated cattle and dairy development program.

A. Prophylactic Immunization:

Some diseases which are common to this area and are epidemic in nature spread by both wild and domestic animals, preventive treatment against these diseases by the means of prophylactic immunization to the domestic animals will be given. Domestic cattle, which may transmit the disease among wild fauna, will be vaccinated to prevent the occurrence of FMD, Reinderpest, BQ and HS.

Such immunization is to be carried out in villages located within 5 Km. from the boundary of National Park and Sanctuary. It is believed that an animal can cover maximum distance of 5 Km. to graze and browse.

Prophylactic immunization to cover FMD, BQ and HS is to be regularly carried out with the help of Veterinary Department of Kota, Bundi, Chittorgarh, Jhalawar district every year, to reduce the chances of spread of disease from cattle to the wildlife. Following steps will be taken in this regard:

- Ring vaccination of all the cattle of the villages in the core of MHTR.
- Establishment of a team of vet doctor, RFO, flying and his staff for quick response.
- Supply of minerals to free ranging wild animals.
- Isolation enclosure to identified sick animals.
- Chemical treatment of water resources
- De worming
- Regulatory mechanism for cattle grazing/passage

B. Disease Surveillance:

A quick disease reporting, detection and treatment system only can achieve proper disease surveillance. In the case of wild animals, detection of disease is only based on observation on animal behavior and their day to day activities. Concept of landscape epidemiology that associates the occurrence of a certain disease with the existing landscape may also be kept in the mind. The knowledge of animal species typical to the given area and particular disease maintained and spread by them may be extremely useful in disease detection and treatment. If such a disease is detected, its prophylactic treatment by immunization, water hole treatment or aerosol immunization has to be done. To protect and maintain wildlife in PA with good health, it is necessary to achieve disease surveillance of native wild population and domestic cattle of adjoining villages.

Parameters for the monitoring of wild animals health –

General examination

Physical examination

Clinical observation

Laboratory investigations

Faecal examination

Hematological examination

Serological examination

Study of kill / Mortality

Detailed post-mortem examination

Collection of material for laboratory examination

Mortality Survey

The mortality survey will be an ongoing process every month. The camp staff will be suitably instructed to collect all mandibles/skulls from the habitat for an assessment of species specific/ age – specific mortality. For this body conditions and scouring through visceral observation will be taken in to account too.

CHAPTER – 12
ORGANISATION ADMINISTRATION AND BUDGET

12.1 Tiger Steering Committee -

As per the requirement of section 38U Wildlife Protection Act, the process of constituting tiger steering committee for ensuring, co-ordination, monitoring, protection and conservation of tiger, co-predators and prey animals is in progress.

12.2 Tiger Conservation Foundation –

As per section 38 X of Wildlife (Protection) Amendment act 2006, Tiger conservation foundation for the reserve will be established in order to facilitate and support management for conservation of tiger and biodiversity and, to take initiatives in eco-development. Proposals for the foundation have already been submitted.

12.3 Co-ordination with Line agencies / Departments

Co-ordination with Revenue, Police, Judiciary, Rural development, Agriculture, health, Veterinary, Horticulture, Zila Panchayat, Women and child development, PHED, Education, Tribal welfare, Railway etc. will be taken as per need.

Co-ordination with line agencies / departments are needed for:-

- Better protection
- Eco-development
- Gaps in habitat development
- Conflict resolution
- Protection

It is evident from the above that co-ordination is required in many ways and in many fields. Better co-ordination will not only ease pressure on limited resources of park management but will earn general goodwill among various sectors.

Help of police party:

Especially during rainy season the migratory sheep enter in the core and buffer area and adversely affect the natural regeneration and grasses. Due to this there is a shortage of food for herbivores and damage is caused to their habitat. During rainy season police help is essential to control the sheep during migration. It is therefore necessary that RAC or police exclusively deployed during rainy season.

For co-ordination following measures could be adopted:-

- Regular meetings with line department
- Co-coordinating with District Collector, SP and CEO, ZP for organizing special meetings with line departments.
- Knowing various schemes of line departments and identifying schemes suitable for the park area.
- Reserve tour of officials of line departments.
- Accreditation and highlighting achievements of other departments in reserve area.

These are few suggestive things, but in practice convergence could be achieved only through good interpersonal relationship with officials of line departments of various levels from district to village. Officer of the park should interact with their respective counterparts in other departments.

12.4 Staff Deployment

Details of officers posted as Field Director & Chief Conservator of Forest and Deputy Conservator of forest (Deputy Director) Mukandara Hills National Park Kota are enclosed in **Annexure-20**.

Table-27 The existing organizational structure of the MHTR is as follows:

S No.	Name of the Post	Sanctioned	Filled	Vacant
1	CCF Wildlife Kota & Field Director (ex officio) MHTR	1	1	0
2	DCF & TA to CCF Wildlife Kota & Field Director MHTR	1	1	0
3	Assistant Conservator of Forest – 1. Administration, 2. Development 3. Flying Squad	3	0	3
4	Range Forest Officer – II Grade	2	0	2
5	Assistant Account Officer	1	1	0
6	Junior Accountant	1	0	1
7	Office Superintendent	1	0	1
8	Office Assistant	2	1	1
9	PA	1	1	0

S No.	Name of the Post	Sanctioned	Filled	Vacant
10	Clerk Grade I	2	2	0
11	Clerk Grade – II	2	1	1
12	Surveyor	1	0	1
13	Driver	1	1	0
14	IV class	3	3	0
15	Chowkidar	1	1	0
	Total	23	13	10

Table-28 The existing staff position in DCF MNP office is as follows:

Office of Deputy Conservator of Forest, Mukundara National Park Kota

S No.	Name of Post	Sanctioned	Filled	Vacant
1.	Deputy Conservator of Forests Mukundara National Park	1	1	0
2	Assistant Conservator of Forests	4	3	1
3	Range Officer Grade I	2	1	1
4	Range Officer Grade II	6	5	1
5	Forester	17	15	2
6	Assistant Forester	18	18	0
7	Forest Guard	111	48	63
8	Assistant Accounts Officer	1	1	0
9	Office Assistant	1	1	0
10	Clerk grade I	2	1	1
11	Clerk Grade II	4	3	1
12	Driver	5	3	2
13	Surveyor	1	1	0
14	Veterinary Doctor	1	1	0
15	Assistant Veterinary Doctor	1	0	1
16	Class IV	2	2	0
	Total	177	104	73

Detailed range reorganization with their area jurisdiction has been enclosed as **Annexure-21**.

STRUCTURE AND RESPONSIBILITIES:

The average manpower on each naka is 3.0 which are very less as compared to the nature of work, offences and the area. It has to be increased so that things can be managed within human limitations and working capacity of the individual.

Table-29 Proposed Structure and Requirement of Posts for Mukundara Hills**Tiger Reserve**

S.No.	Name of Post	Required	Sanctioned Post	Additional Requirement	Remark
1.	Chief Conservator of Forests (Wildlife) & Field Director Mukundara Hills Tiger Reserve	1	1	0	
2.	TA to Chief Conservator of Forests (Wildlife) & Field Director Mukundara Hills Tiger Reserve	1	1	0	
3.	Deputy Conservator of Forests Mukundara Hills Tiger Reserve Kota	1	1	0	Currently post is named as Deputy Conservator of Forests Mukundara National park
4	ACF & TA to Deputy Director Mukundara Hills Tiger Reserve Kota	1	1	0	
5	ACF Eco Dev. & Relocation at Kota	1	0	1	
6	ACF Jhalawar	1	0	1	

S.No.	Name of Post	Required	Sanctioned Post	Additional Requirement	Remark
	HQ at Jhalawar				
7	ACF Jawahar Sagar HQ at Kota	1	1	0	
8	ACF Flying and Tourism	2	2	0	
9	Range Officer Grade -Ist	2	2	0	
10	Range Officer Grade -IInd	8	8	0	
11	Foresters	30	17	13	
12	Asst. Foresters	30	18	12	
13	i-Forest Guards / Beat Guards 152	250	52 (62 Vacant)	198	Total Area of MHTR 760 Sq Km@ 5 per Sq Km =152
	ii- Barrier, Check Post, wireless Station - 48				
	iii- Flying Squad & Strike Force-50				
14	Wireless Sub Inspector	2	0	2	
15	Veteinary Doctor	1	1	0	
16	Research officer (M. Sc wildlife science)	2	0	2	
17	Accountant/ Accounts officer	3	2	1	
18	Office Asst.	3	2	1	
19	Clerk Grade I	10	4	6	
20	Clerk Grade II	16	7	11	
21	Drivers	17	6	11	
22	Surveyor	3	1	2	
23	Computer operator	4	0	4	

S.No.	Name of Post	Required	Sanctioned Post	Additional Requirement	Remark
24	Class IV	10	6	4	
	Total	413	164	289	Additional requirement of 249 posts must be created

Asst. Conservator of Forest Dara HQ at Jhalawar

RFO at Dara	RFO at Gagron	RFO At Raontha
4 Nakas at Dara Station (Morukalan), Sawan Bhado Dam, , Dara Gaon,	3 Naka – Mashalpura, Naulav and Raajpura	4 Nakas at Raontha, Mandargarh, Damodarpura and Chandbaori
Beat Guards	Beat Guards	Beat Guards

Asst. Conservator of Forest Jawahar Sagar HQ at Kota

RFO at Jawahar Sagar	RFO at Kolipura	RFO at Borabas
5 Nakas at Jawahar Sagar, Sripura, Khera, Gudha and Bhainsroadgarh	3 Nakas at Kolipura, Girdharpura and Kaaniya Talaab	4 Nakas at Borabas, Rath Kaankra, Bandha Dharampura and Nayagaon
Beat Guards	Beat Guards	Beat Guards

There is no separate staff presently deployed for protection and the existing staff is collected whenever there is any information regarding occurrence of an offence. Four special forest protection squads are required with their Headquarter at Jawahar Sagar, Dara gaon, Gagron and Kolipura. It will comprise of one forester and 5 forest guards. This staff will be specially trained. They will be assisted by police personnel. One police party will consist of minimum 5 persons. These patrolling parties will have one vehicle for quick movement in the tiger reserve.

STAFF AMENITIES:

Staff Housing: Office of the Field Director & Deputy Director and residential complex establishment will be at Kota. The existing and proposed buildings at Kota

and in the field, which are currently in use and will continue to be used for different purposes.

Most of the buildings mentioned above are old and need urgent repairs. Besides, due to lack of compound wall, the seized forest produce is not safe, therefore it is essential to construct the compound walls as well. For management of the MHTR effectively, residential and office facilities are of utmost necessity. Apart from this, at every naka residential facility will also be provided for the staff.

Rest House:

There is only one rest house with Forest department in the MHTR. Others falling in MHTR are under the control of other departments.

Table-30 A list of rest houses is given below:

S.No.	Name of Rest House	Place	Remark
1	Forest Rest House	Dara gaon	Two suites
2	Irrigation Rest House II nd	Jawahar Sagar	Two room

Rest houses are to be maintained as they act as inspection bungalows for the officers.

Activity Budget

Presently the Mukandra Hills Tiger Reserve gets funds from Central Government and State Government under various budget heads. Establishment cost is born by the State Government under Non-Plan Budget head.

Depending on the need for Mukandra Hills Tiger Reserve, the financial requirement for execution of various components/ requirements proposed under this Tiger Conservation Plan, for the plan period, have been detailed Maintained in **Annexure-22.**

Plate 8: APO works 2018-19



Building construction



Construction of WHS



Maintenance of building



Maintenance of line transect



Two wheeler for staff



Water supply for wildanimals

Plate-9 :- APO Works-II



Fire line maintenance



Eviction of encroachment



Maintenance of water hole



Range inspection

Incentives to the staff posted in MHTR:

For the management of such a tiger reserve a team of dedicated, interested and competent person is very essential. As this job is of very strenuous nature all capable staff firstly resists their posting and subsequently if posted, they keep on managing to get shifted outside. To attract the persons towards the MHTR management and hold them here, they should be given some incentive. No project howsoever attractive it may be, including the present one, can be run effectively without competent and interested staff. Therefore a provision of special allowance @ 10% of salary (Basic pay) is proposed for this project. Also the staff getting transferred in to MHTR may be given one month salary as movement charges.

Health checkups / Insurance:-

Regular health camps will be organized for health checkups of staff and villagers. Some hospitals could be contracted for complete checkup and treatment of staff and their immediate family. This will ensure better health and will in turn result into better output from staff & will have great value. Possibilities of Health insurance for staff & field assistant living in interior areas will be explored with insurance company.

12.5 Fund Raising Strategies

The NTCA will be the main fund provider for development, eco-development, research, protection, environmental education and other activities. The State Govt. will help in establishment, other developmental activities and tourism.

The entry fee deposited in MHTR foundation will be used for protection and management of protected area, eco-tourism and development of host community. Funds may be raised from different donors through Tiger Foundation.

12.6 Schedule of Operations

All the operations in the PA will be completed as per the direction and scheduled prevailing in the department. The scheduling for some Operations is given below.

Table-31 Schedule of Operations

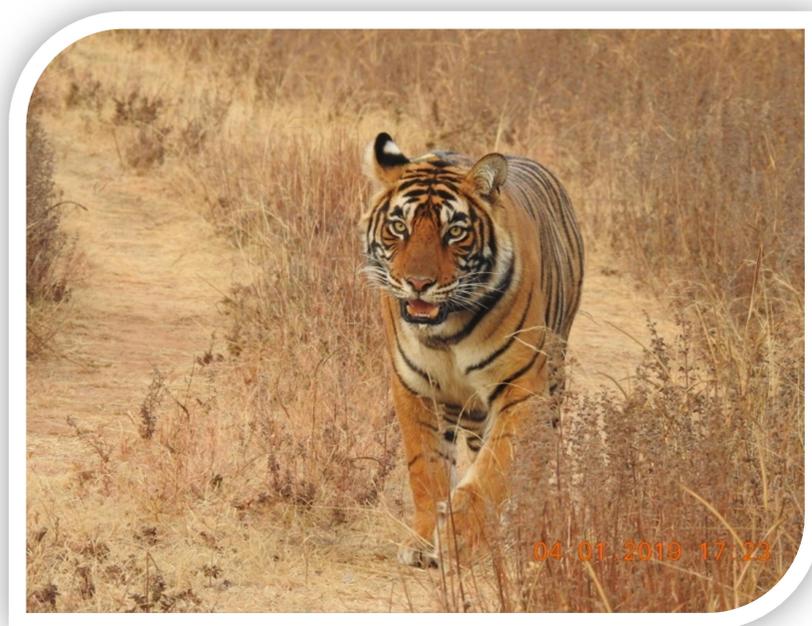
Operations	Months											
	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Forest Protection	█											
Fire Line maintenance	█											█
Fire Protection		█										
Road Repairs								█				
Water conservation work	█								█			
Water supply to wildlife			█									
Grazing Control						█						
Anti Poaching	█											
Deployment Ex-Army Personnel	█											
Vehicle or Patrolling	█											
Village Relocation	█											
Census of wildlife				█								
Deployment of local workforce	█											
Maintenance of bridge, dam, WHS, roads								█				

Government of Rajasthan
FOREST DEPARTMENT

Tiger Conservation Plan
Mukandra Hills Tiger Reserve
(Period 2020-21 to 2029-30)

Part – II

For Buffer Area



Field Director, Mukandra Hills Tiger Reserve,

Part A

The existing Situation

CHAPTER – 1

INTRODUCTION OF THE AREA

1.1 Name, Location, Constitution & Extent

1.1.1 Name

The name of the area is “Buffer area of Mukandra Hills Tiger Reserve”

1.1.2 Location

The Core Area of Mukandra Hills Tiger Reserve is surrounded mostly by revenue land and villages with some contiguous forest blocks of territorial Forest Division-Kota, Bundi, Chittorgarh and Jhalawar, Ramgarh-vishdhari Sanctuary of Bundi and Bhaisraodgarh Sanctuary of Chittorgarh. The forest blocks of territorial divisions of Kota, Bundi and Chittorgarh were included in the buffer area so that the contiguous areas could form important conduits for prey and predators’ movement. Low protection level and higher biotic pressure have also caused degradation of these areas and inclusion of these areas in the buffer area of the Tiger Reserve shall accord better level of protection with habitat improvement.

1.1.3 Constitution

Section 38 V (4) (II) of the amended Wildlife (protection) Act 1972 deals with the “buffer or peripheral area” consisting of area peripheral to critical tiger habitat or core area, where a lesser degree of habitat protection is required to ensure the integrity of core critical tiger habitat with adequate dispersal of tiger. Delineation and notification of the Buffer Zone for Mukandra Hills Tiger Reserve has been completed in 2013. The situation of CTH i.e. Core and Buffer in context of Mukandra Hills Tiger Reserve is peculiar in the sense that the Buffer Zone is neither peripheral to CTH nor surrounds it. The forest areas adjoining the CTH or in vicinity were notified as the Buffer Zone based on following considerations:

Forest areas adjoining the Critical Tiger Habitat of Mukandra Hills Tiger Reserve which are important habitat for Tiger and other wildlife and which will help in reducing biotic pressure on Critical Tiger Habitat have been included in buffer zone.

1.1.4 Extent: The total area of the buffer is 342.82 sq. km.

1.1.4.1 Area Statement of the buffer including revenue land falling in three districts is as follows:

Table-32 MHTR Buffer area district wise

Sr. No.	District	Forest area (in Sq. Km.)	Revenue area (in Sq. Km.)	Total area (in Sq. Km.)
1	Kota	217.44	7.40	224.84
2	Jhalawar	68.23	9.90	78.14
3	Chittorgarh	39.85		39.85
	Total	325.52	17.30	342.82

Table-33 MHTR Buffer area protected area & forest area wise

Sr. No.	Protected area/ forest area	Forest area (in Sq. Km.)	Revenue area (in Sq. Km.)	Total area (in Sq. Km.)
1	Darra Sanctuary	2.20	8.54	10.74
	Jawaharsagar Sanctuary	15.87	-	15.87
2	Territorial area Kota	216.28	7.20	223.48
3	Territorial area Jhalawar	67.20	1.56	68.76
4	Territorial area Chittorgarh	23.98	-	23.98
	Total area	325.52	17.30	342.82

Table-34 :Area Statement of Mukandra Hills Tiger Reserve (Buffer Area)

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Darrah Sanctuary	Jawaharsaga r Sanctuary	National Gharial Sanctuary
1.	Mashalpura-A(Part) Compartment 1-24, 37-49	Reserved	Kota	7282.570	0	0	0	
	Mashalpura-A(Part) Compartment 25-36	Reserved	Jhalawar	692.23	0	0	0	
2.	Mashalpura-B(Part) Compartment 1-17	Reserved	Kota	4537.870	0	0	0	
	Mashalpura-B(Part) Compartment 18-48, 51, 52, 54, 55	Reserved	Jhalawar	6027.80	0	0	0	
3.	LohDungri(Part)	Reserved	Kota	488.800	0	0	0	
4.	RadiDand	Protected	Kota	2593.157	0	0	0	
5.	Foota(Part) Compartment 7, 12-22, 24-31	Reserved	Kota	3107.500	0	0	0	
6.	Doliya(Part)	Reserved	Kota	3617.900	0	0	0	

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Darrah Sanctuary	Jawaharsaga r Sanctuary	National Gharial Sanctuary
	Compartment 31-35, 37-43, 46-51, 57-60, 69							
7.	Amjhar-B	Protected	Kota	116.128	0	116.128	0	
8.	Laxmipura (Jhalawar)	Protected	Jhalawar	103.448	0	103.448	0	
9.	KanyaTalab(Part)	Reserved	Chittorgarh	2398.000	0	0	0	
10.	Peermagra(Part) Compartment 23, 27, 28	Reserved	Chittorgarh	320.000	0	0	320.0	
11.	Bhainsrodgarh-B	Protected	Chittorgarh	17.000	0	0	17.00	
12.	Shreepura-A, B, C	Protected	Chittorgarh	425.000	0	0	425.000	
13.	Khalgaon-A, B	Protected	Chittorgarh	124.681	0	0	124.681	
14.	Bhunjar	Reserved	Chittorgarh	700.000	0	0	700.000	
			Total (Buffer)	32552.084	0	219.576	1586.681	

Table-35:Area Statement of Mukandra Hills Tiger Reserve (Revenue Village)

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Darrah Sanctuary	Jawahar Sagar Sanctuary	National Ghrial Sanctuary
1.	Chandbawri	Agriculture / Pasture	Kota	19.98	0	0	0	
2.	Jaspura (Nayagaon)	Agriculture / Pasture	Kota	116.17	0	0	0	
3.	Haripura (Uninhabited)	Agriculture / Pasture	Kota	86.32	0	0	0	
4.	Keshopura	Agriculture / Pasture	Kota	26.38	0	0	0	
5.	Mandergarh	Agriculture / Pasture	Kota	423.53	0	0	0	
6.	Rail (Uninhabited)	Agriculture / Pasture	Kota	67.35	0	0	0	
7.	Kailashnagri		Kota	0.00	0	0	0	

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Darrah Sanctuary	Jawahar Sagar Sanctuary	National Gharial Sanctuary
8.	Borkua (Kanpurakamajra)	Agriculture / Pasture	Jhalawar	8.16	0	0	0	
9.	Haripuradandiya	Agriculture / Pasture	Jhalawar	148.00	0	0	0	
10.	Golbav		Jhalawar	0.00	0	0	0	
11.	Gagron	Agriculture / Pasture	Jhalawar	320.00	0	0	0	
12.	LaxmipuraPrempura	Agriculture / Pasture	Jhalawar	288.30	0	0	0	
13.	Nolav	Agriculture / Pasture	Jhalawar	113.00	0	0	0	
14.	KothalaGati	Agriculture / Pasture	Jhalawar	113.00	0	0	0	
			Total (Revenue -	1730.19	0	0	0	

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Darrah Sanctuary	Jawahar Sagar Sanctuary	National Gharial Sanctuary
			Buffer)					
	1,Total Core			40186.078	19945.016	21162.088	17723.99	
	2. Total Revenue Core			1531.11	98.17	1381.83	149.28	
	3. Total Buffer			32552.084	0	219.576	1586.681	
	4. Total Revenue Buffer			1730.19	0	0	0	
	GRAND TOTAL			75999.462	20043.23	22763.49	19459.95	
Other area under administrative control of MHTR								
	Bardkala Kishorsagar	Protected	Kota	3066.54				
	Berkheda	Protected	Kota	90.76				
	Borabas-B	Protected	Kota	137.81				
	Akelgarh	Reserved	Kota	2784.138				
	Sakatpura	Protected	Kota	410.35				
	Ravtha	Unclassed	Kota	45.35				
	Karondi	Reserved	Bundi	856.80				

S.No.	Forest Block Name	Forest Type	District	Area (in Ha)	Area included in National Park and Sanctuaries (in Ha)			
					Mukundara National Park	Darraha Sanctuary	Jawahar Sagar Sanctuary	National Gharial Sanctuary
	Rampuriya	Reserved	Bundi	26.60				
	Dhaneswar	Reserved	Bundi	67.80				
	Nai ki Talai A B C	Protected	Chittorgarh	351.00				
	Total Area			7837.148				

1.2 Approach & Access:

Administrative HQ that is Kota is approachable by bus and rail from Jaipur and Delhi. Kota is 250 km from Jaipur by road and approx 300 km from Delhi by railway. Kota is on Bombay- Delhi B.G Rail Way Line.

From Kota tourists can visit Dara, Jawahar Sagar, Kolipura and Raontha which are situated approximately 40-50 km away from district headquarter. Gagron is another tourist place situated about 90 kms. from Kota and can be reached through national highway 12.

1.3 Statement of Significance:

The buffer has its significance in:

- Reducing pressure on core and also satisfy the needs of fodder fuel wood etc.
- Providing livelihood needs of villages and also employment opportunity to them through eco development and eco tourism.

1.4 Geology, Rock and Soil:

Geologically the area comprises of sandstone, limestone and conglomerate rocks.

Soil is Black or gray coloured found in patches lying upon the older formations. On slopes and plateaus the soil is murrum and unfertile. The depth of soil varies from 20cm to few 2 meters. Soil is mixed with pebbles and boulders.

1.5 Hydrology and Water Sources:

Many seasonal water bodies are spread across the buffer area but they generally go dry in summer month. This becomes a great challenge for park managers to ensure water supply in summer by way of creating artificial sources.

1.6 Vegetation Types:

Revenue and agricultural lands/private holdings are, by and large, devoid of good vegetation except scattered trees of Neem (*Azadirachta indica*), Ber (*Zizyphus mauritiana*), Aonla (*Embllica officinalis*), Deshi Babool (*Acacia nilotica*), Mango (*Mangifera indica*), Churel (*Holoptelia integrifolia*), Ficus spp. etc. Forest

areas included in the buffer area, however, have good vegetation that corresponds to Northern tropical dry deciduous forests and Northern tropical thorn forests. *Anogeissus pendula* is the dominant tree species supported by *Boswellia serreta*, *Lannea coromandelica*, *Acacia catechu*, *Butea monosperma*, *Zizyphus mauritiana* etc.

1.7 Wild fauna and habitats

The revenue lands included in the buffer area hardly have resident wild mammal population except Nilgai (*Boselephous tragocamelus*) and Black napped hare (*Lepus nigricollis*) but are regularly visited by principal herbivores of the CTH i.e. Sambar deer (*Cervus unicolor*), spotted deer (*Axis axis*) Wild boar (*Sus scrofa*) etc.. Other regular visitors to these areas are leopard (*Panthera pardus*), Hyena (*Hyena hyena*), Jungle cat (*Felis chaus*), Small Indian Civet (*Viverricula indica*), Common mongoose (*Herpestes edwardsii*), Palm Civet (*Paradoxurus hermaphroditus*), Porcupine (*Hystrix indica*), Jackal (*Canis aureus*) etc. The forest areas included in the buffer, however, support a good resident wild mammal population such as Leopard, Nilgai, Sambar deer, Wild boar, Hyena, Common Mongoose, Porcupine, Jackal, Hare etc. The movement of Tigers to buffer area is not present. The buffer area does not have good supportive habitat for wild life except a few good patches of forests. Protection, during their migration from one area to the other, requires great attention. Most of the areas are degraded and do not provide proper shelter for wild life. Cattle occupy most of the available natural shelter.

1.8 Major conspicuous changes in the habitat since inception

There has been regular deterioration of habitat of buffer area due to increasing population, resulting in enhanced demand of fuel wood, fodder, small timber and also land for agriculture. Animal husbandry is the main profession in this area and thus most of the forest areas/ grazing lands are overgrazed hardly leaving anything for visiting wild life. Development of buffer area requires development of good pastures & fuel wood plantations on community/waste lands.

CHAPTER – 2
STATUS OF TIGER AND CO-PREDATORS

2.1 Introduction

The survival of the prey and the predator species, mainly Tiger and Leopard, in the Critical Tiger Habitat, will depend upon the following factors:

- a. Reduction of poaching pressure from the Periphery
- b. Eco development initiatives to reduce the biomass extraction pressure in the Zone of Influence
- c. Involvements of the local people as primary stakeholders in the Tiger Reserve vis a vis economic benefits.
- d. Conservation Education Initiatives

2.2 Distribution:

Recently reintroduced the Tigers prefer buffer area is very less. However the occurrence of leopards, characteristic of occupying even disturbed habitats is reported but population density is relatively low. The other carnivores Hyeana, Jackal. Jungle cat are present in good number. The prey base is mostly blue bull, sambhar and wild boar. Due to high degree of disturbance, these areas have very low density of Prey base.

2.3 Abundance Status

No tiger movement has been reported in the buffer area owing to the high degree of disturbance. Evidences of occurrence of leopards have, however, been reported on the basis of kills of wild prey as well as sheep and goats. Occasional sightings of leopards have also been reported in the buffer area.

As far as prey base is concerned, blue bulls are available in abundance. Sambhar and wild boar are also found in buffer area.

2.4 Prey Predator Relationship

The complexity of relations between predator, co-predator and prey is viewed as an important aspect of Wildlife Biology today. The challenge before the wildlife manager is to keep these relations undisturbed. The impact of the predator on their

prey has always been a controversial aspect of predator ecology. Information's such as how many predator and prey are there in an area, how often the predator kills, how they select prey species, sex age and condition of the prey and the contribution of mortality of prey other than predation are essentially different aspects of study of the population dynamics of the prey.

Studies show that Leopard (*Panthera pardus*) is the major mammalian predators in buffer of MHTR. Their main prey species comprise of Sambhar, blue bull, Wild boar etc. The predators also prey on porcupine, black-napped hare and domestic livestock.

2.5 Assessment of threats

- Presence of hunting tribes like Kal Beliya, Mogiya, Nat, Kanjar etc in and around the buffer areas.
- Tremendous Grazing Pressure in and around villages on buffer.
- High biomass extraction from the buffer forest areas of the MHTR in form of firewood, lopped fodder, grazing etc. leading to habitat degradation.

CHAPTER 3
HISTORY OF PAST MANAGEMENT AND PRESENT PRACTICES

3.1 Conservation & Forest Management History:

The buffer area included in Mukundara Hills Tiger Reserve falls in three districts of Kota, Jhalawar and Chittorgarh. These areas have been managed as per the working plan in force according to the time.

The working plan prescriptions for the areas falling in three districts have been as follows:

Kota: the management of the buffer area falling in Kota district has been as follows:

1. Before 1948 these forests were exploited for Kattha, Coal and local needs. Only some trees were reserved and named as *Mamnua*. As a result these forests were ruthlessly exploited by contractors and local people. There were 65 grass beams from which grass was distributed to local people. 7 grass beams were under Bagar department for use of state. Kota state also made a department named Bandhat for constructing check dams to prevent soil erosion. However success could not be achieved in this.
2. From 1948 to 1962: after merger of Kota state in to Rajasthan two notifications were issued which generously gave the concessions to local people. This resulted in uncontrolled exploitation of forests. Forest areas were allotted for Adhik Anna Upjao Yojana for agriculture. Rules for concessions in forests were revised in 1955 under which farmers and tribals were given permission to harvest *Mamnua* trees too. This led to severe destruction of forests. Forest officials harvested the Khair trees for kattha from anywhere and there was no working plan. As a result well stocked forests which were easily approachable were harvested by coppice with standard technique. The harvested coupes were not protected against grazing and fire. This created large vacant areas between forests. Only after 1956 there was a reduction in number and area of coupes to be harvested yearly. Also the harvested areas were fenced.

The situation of Jaagir Forests was even worse. They were exploited ruthlessly from 1948 to 1950. The harvested areas were not protected from any kind of pressure like grazing and fire. In 1956 control of Jaagir Forests was

vested in forest department after which proper management of these forests was started.

3. From 1962 to 1971: For the first time in the history of forests forest blocks and compartments were marked on GT sheet. Forests were managed scientifically and seven working circles were formed. These working circles were:

Coppice with standard

Concessionist

Rehabilitation

Grass and Grazing

Minor Forest Produce

Social Forestry

Wildlife Working Circle- this working circle had 27441 ha forest area. A complete ban on hunting of wild animals was enforced. Emphasis was laid on extension among school and colleges through movies, slides, painting competitions etc. provisions of picnic spot, view points, water holes etc. were kept.

4. From 1980 to 1989: during this period forests were managed according to the working plan prescriptions of Shri P S Bhatnagar. He prescribed following working circles –

- Kaldhi Management Circle
- Concessionist Working Circle
- Rehabilitation Working Circle
- Fodder Working Circle
- Watershed Working Circle
- Minor Forest Produce Overlapping Working Circle
- Social Forestry Working Circle
- Protection of Plateau and Badlands Improvement Working Circle
- Wildlife Working Circle

Wildlife Working Circle: this circle was formed to maintain the existence of wild animals in the forest. It had 27441 Ha. Restocking of forest was proposed with exotic species. Ban on entry in to forest during particular season was

prescribed. Emphasis was laid on extension and education. Mining was prohibited in these areas.

5. From 1998-99 to 2007-08: Shri Z A Khan wrote this working plan and he prescribed following circles

- Rehabilitation Working Circle
- Grass and Fodder Working Circle
- Watershed Improvement Working circle
- Minor Forest Produce Overlapping Working Circle
- Plantation Working Circle
- Miscellaneous Working Circle

This working plan prescribed a complete ban on hunting. It was also prescribed that small anicuts and checkdams be created in nullahs to ensure water availability to animals during pinch period. However the prescriptions of this working plan could not be implemented fully.

6. The current Tiger Conservation Plan in force is from 2015-16 to 2019-20. The areas of buffer have been kept in following working circles:

Table-36

Sr. No.	Working Circle	Block	Compartment
1.	Soil Conservation and Rehabilitation Working Circle	Futa	12-22, 24-31
		Mashalpura A	23,37-41,46,47-49
		Raadi Dand	12-17
		Loh Doongri	1,2,5,6,8,9,10
2.	Grass and Grass Beed Working Circle	Raadi Dand	1-11
		Futa	7
		Mashalpura A	43
3.	Plantation Working Circle	Dolya	31-35, 37-43, 46-51, 57, 59
		Mashalpura B	1-17
4.	Wildlife Management Overlapping Working Circle	Mashalpura A	1-24, 37-49
		Mashalpura B	1-17
		Loh Doongri	1
		Futa	7, 12-22, 24-31
		Dolya	31-35, 37-43, 46-51, 57-60, 69
5.	Forest Protection Overlapping Working Circle	Mashalpura A	1-24, 37-49
		Mashalpura B	1-17
		Loh Doongri	Partial – 3,5,6,8,10

			Full- 1,2,9
		Futa	7, 12-22, 24-31
		Dolya	31-35, 37-43, 46-51, 57-60, 69
		Raadi Dand	
6	Minor Forest Produce Management Overlapping Working Circle	Mashalpura A	1-24, 37-49
		Mashalpura B	1-17
		Loh Doongri	Partial – 3,5,6,8,10 Full- 1,2,9
		Futa	7, 12-22, 24-31
		Dolya	31-35, 37-43, 46-51, 57-60, 69
		Raadi Dand	

Apart from the above the ecotourism sites have also been included in the working plan under ecotourism management overlapping working circle.

Jhalawar:

1. Prior to 1948: There was no scientific management of the forests and they were exploited for wood n kattha. Raipur, Balgarh and Kokanda Dhanwas forests were reserved for hunting.
2. 1948 to 1961: Some attention was given to the management of the forests when Sironj forest area was transferred to Madhya Pradesh. Coupe cutting continued as per the wish of DFO, hence the rules of silviculture were overlooked and coppice with standard practice of harvesting was followed. No protection was given from grazing and fire to the felled coupes resulting in their degradation. Land was also transferred for agriculture in Adhik Anna Upjao Yojana. From 1955 to 1959 plantations were carried out in 806 acres of area but were not maintained properly.
3. 1961 to 1971: Shri Harish Chandra wrote the working plan and marked blocks and compartments on the ground. The working circles proposed were:

- Coppice with Standard Working Circle
- Concessionist Working Circle
- Miscellaneous Working Circle⁴
- Plantation Working Circle
- Rehabilitation Working Circle
- Khair Overlapping Working Circle

Wildlife Management: 15 shooting blocks were created. Every year a maximum of 14 tigers, 6 leopards, 4 bears, 12 sambar and 35 cheetals could be hunted. There was no basis for these numbers.

4. From 1976-77 to 1985-86: This working plan was written by Shri B M Agrawal. He prescribed following working circles:

- Concessionist Working Circle
- Fodder Bank Working Circle
- Miscellaneous Overlapping Working Circle
- Soil Conservation Overlapping Working Circle
- Khair Improvement Overlapping Working Circle
- Tendu Leaves Overlapping Working Circle
- Experimental Overlapping Working Circle

It was prescribed in the working plan for preservation of wild animals. It was also prescribed to attract birds on the water bodies, salt licks near water holes etc. it was also prescribed to encourage photography of wild animals and protection of forests to increase the number of wild animals.

Table-37 Forest Management status in past working plans

Compartment no	Sh.B.M Aggarwal
Forest block Mashalpura A	
25-36	Concessionist
54-55	Wild life mgt
Mashalpura B	
18-19	Kaldhi van prabhandan
20-21	Wildlife Management
22-28, 39-43	Soil rehabilitation

5. 1988-89 to 1997-98: This working plan was written by Mrs Savita Anand. This was the first working plan that was written in hindi. Following working circles were prescribed in this working plan:

- Forest Protection Working Circle

- Plantation and Rehabilitation Working Circle
- Grass and Fodder Working Circle
- Chambal River Valley Soil Conservation Working Circle
- Non Timber Produce Overlapping Working Circle

For wild life management following objectives were kept:

- Works beneficial to the wildlife were to be promoted to provide conservation and biological balance.
- To foster conditions for conservation of wildlife and improvement in their natural habitat.
- To enhance the ecological value of the forests

Sloping Water troughs in all the shooting blocks were prescribed. Plantations were also prescribed around the water holes. Tree felling on the banks of nullahs was banned.

Table-38 Forest Management status in past working plans

Forest block Laxmipura	
Compartment no	Smt Savita Anand
1-2	Plantation & Rehabilitation Circle
Forest block Mashalpura A	
26-27, 29-36, 54-55	Plantation & rehabilitation
Mashalpura B	
18	Grass and Grazing
40-43	Plantation & rehabilitation

- 2013-14 to 2022-23: This working plan was written by Shri K C Meena. Following working circles were prescribed in this working plan, also mentioned is the detail of buffer area transferred to the tiger reserve:

Table-39 Detail of buffer area transferred to the tiger reserve

Sr. No	Working Circle	Block	Compartment
1.	Soil Conservation & Rehabilitation (Miscellaneous Forest Amelioration Series)	Mashalpura A Mashalpura B	25-36 30-40

Sr. No	Working Circle	Block	Compartment
2.	Grass & Grazing	Mashalpura B	18-29
3.	Plantation	-	-
4.	Forest Protection Overlapping	Mashalpura A Mashalpura B Laxmipura	25-36 18- 48,51,52,54,55
5.	Wildlife Management	-	-
6.	Non Timber Forest Overlapping	Mashalpura A Mashalpura B Laxmipura	25-36 18- 48,51,52,54,55

In this working plan the block of Mashalpura has been mentioned in wildlife management circle as a sensitive area for wildlife.

Chittorgarh:

1. Before 1948: Udaipur estate appointed Sardar Bishan Singh as forest officer in 1880. He was given magisterial powers against forest offences. Forests were conserved primarily for hunting purpose. Felling and grazing were banned in these areas. However local people had the freedom of grazing and felling from other areas for their daily needs. Shri Ayodhya Prasad was appointed as forest conservator in 1920. After him Shri laxman Das from 1926 to 1930 and Shri Basantilal Bhurdia from 1934 to 1937. All these forest officers worked towards organizing forest management though they could not start coupe system because the Head of Udaipur State was against felling of green trees.

From 1941 to 1944 Rao Sahib E V Padmanabham Pillai was appointed forest conservator who tried to bring discipline in to forest staff.he played a major role in formulation of Mewar Forest Act 1942. This act divided the forests in to Khalsa and Jaagir Bhomaat. Mewar Forest Act further divided khalsa forests in to reserved, protected and village forests. Shikaargaahs were protected from felling and grazing. Experimental work plans were made for harvesting with 30 year rotation on simple coppice method.

In February 1944 Sardar bahadur Singh became forest conservator and chittorgarh forest division was formed on 6th June 1944. After this work plans

were prepared for the division by different officers in which coppice with standard system was followed.

2. From 1948 to 1961: After the merger of princely states in to Rajasthan in 1948 a notification was issued giving people liberal concessions to local people which resulted in reckless and unscientific harvesting of the forests. After constitution of state of Rajasthan tree removal ordinance was declared in 1949. In 1952 Jaageers were merged in to the state and in 1953 Rajasthan Forest Act was made. Forests were demarcated and settled during this time. In 1955 Forest Concession rules were amended and made more liberal. Tribals and farmers were given concession for harvesting of trees on royalty for house making and agriculture. These areas were harvested under coppice with standard system and felling cycle was kept from 30 to 40 years. Some trees were declared Mamnua. For fuelwood and katha the harvesting of trees was on the wish of the forest officer which resulted in large scale exploitation of the forests. After 1956 the area of felling coupes was reduced and they were also fenced. Rotation of Khair trees was enhanced to 30 years and steps were taken for the first working plan of the area.
3. 1961-1972: this working plan was written by Shri K K Kotia. This working plan was prepared for 4,54,944 acres of area in which following working circles were prescribed:
 - Dhokada Management Working Circle
 - Concessionist Working Circle
 - Teak management Circle
 - Bamboo Overlapping Working Circle
 - Khair Overlapping Working Circle
 - Protection Working Circle
 - Miscellaneous Overlapping Working Circle
 - Minor Forest Produce Overlapping Working Circle
4. 1971-72 to 1975-76: no working plan existed prescriptions of earlier working plan were followed.
5. 1976-77 to 1985-86: the working plan for this period was written by Shri S Bhuliyar. It had following ten working circles

- Dhokada Management Working Circle
 - Teak Management Working Circle
 - Miscellaneous Working Circle
 - Concessionist Working Circle
 - Teak Local Demand Working Circle
 - Khair Overlapping Working Circle
 - Bamboo Overlapping Working Circle
 - Salar Gurjan Overlapping Working Circle
 - Soil Conservation and Rehabilitation Working Circle
 - Minor Forest Produce Overlapping Working Circle
6. 1985-86 to 1987-88: No working plan was in force.
 7. 1988-89 to 1997-98: Thus working plan was written by Shri S K Srivastava. In this working plan the area of Kania Talaab compartement no. 7-9 included in buffer was put in Local Demand Management Working Circle. Compartement no. 8 of Kaania Talaab was put in felling series of 1997-98. Compartement no. 2,5,6,10-18 were put in Plantation Working circle.
 8. 1998-99 to 2007-08: No working plan was in force.
 9. Working Plan 2008-09 to 2017-18: This working plan was written by Shri K C Meena. In this working plan the forest block of Kaaniya Taalaab now included in the buffer area of the tiger reserve was prescribed as under:
 Forest Protection Working Circle – Compartement No. 9
 Soil Conservation & Rehabilitation Working Circle – Compartement No. 10-18
 Plantation Working Circle; Compartement No. 1-8

3.2 Protection of Tiger, its Prey and Habitat:

Habitat can only be improved by way of intensive eco development, and also reducing people pressure on forest by way of providing alternative livelihood options and also involving them actively in forest management and also sharing benefits of tourism, developmental programmes with locals.

3.3 Other Land use –

Most of the inhabitants of these villages are involved in agriculture and animal husbandry activities for livelihood.

Developmental programmes and tourism must involve locals and aim at reducing pressure on the buffer in the long term.

3.4 Research, Monitoring and Wildlife Health:

Since the entire buffer area was never under single management control hence lot of research needs to be carried out and a great amount of baseline data needs to be collected and analyzed which can help the MHTR management to understand and plan for the integrated development of the buffer. A research project will be outsourced to a wildlife institute/wildlife expert who will be fully dedicated to collect and analyse the data and suggest measures to improve the buffer habitat and sustainable management practices.

3.5 Nature Education and Interpretation:

Excessive publicity regarding wildlife conservation must be pursued so that people understand the importance of nature and also support the working of the department. An Interpretation centre will be set up in Kota to sensitize people in wildlife conservation and its importance.

3.6 Administration and Organization:

There will be no separate administration and organization for the buffer owing to the fact that buffer is neither a contiguous forest nor a separate entity and also all the proposed ranges have core and buffer jurisdiction. A separate division for buffer is neither feasible nor practical. However for administrative convenience and effective protection post of ACF Dara will have its headquarter at Jhalawar and ranges under him under his control will be Dara, Gagron and Daanta. A new range will be created in Danta.

CHAPTER 4:
PRODUCTION SECTORS IN THE LANDSCAPE

4.1 Forestry

The operations such as planting, maintenance, thinning, final felling, carried out by the Forest Department as well as by other agencies in the Buffer areas of Mukandra Hills Tiger reserve do cause disturbance to wildlife, but at the same time ensure protection of the wildlife from poachers due to the presence of the staff and labors. The forests are not worked for small timber in this division. The villagers who live adjacent to reserved/ protected forests of this division need small timber for their requirements, in small quantities, and they collect it either from the forest or from private and revenue lands. Often the people trespass into the forests (no man's land is their perception) and collect their requirements. In order to achieve the specified objectives aiming at resource building and improving crop status of forest, re-establishing coexistence between forests and various stake holders on forests is of great importance.

4.2 Agriculture

Agriculture, animal husbandry, collection of NTFPs, Labour work etc. are the main occupations. Irrigation facilities are not properly developed. Rabi crops are grown on a small scale along natural water courses. Traditional irrigation system called 'Haran' is practiced by plugging these water courses and by constructing a water channel on contour. Water pumps are also being used for irrigation.

Use of pesticides and fertilizers must be regulated and people must also be encouraged to do organic farming and stall feeding of the cattle. One village every year must be focused intensively.

4.3 Integrated Development (eco development, development through Dist. Administration) :

With active co operation of district administration development of buffer villages must be taken up in consultation with the MHTR management.

4.4 Tourism

MHTR authorities must ensure that guides, drivers, hoteliers, etc must be locals so that they can identify themselves with the MHTR.

4.5 Fisheries

Sawan Bhado dam in the vicinity of buffer and also other important water bodies identified and fishery activities will be developed so that it can reduce pressure on the Chambal river for the illegal fishing activities.

4.6 Road / Rail transport

Speed of vehicles will be regulated by constructing speed breakers at every 300 meters and sign boards will be placed at good locations so that people can be aware of wild animal movement and also accidents can be minimized to a great extent.

4.7 Industry:

Kota is fortunately a hub of industrial establishment hence employment generation must help in wildlife conservation.

4.8 Mining

Kota is also a hub of mining industry. It is famous for Kota stone, limestone and sandstone mines. They must be in conformity with the environmental standards and also reclamation of mines must be pursued so that habitat is restored and employment is generated which will help in wildlife conservation.

4.9 Irrigation projects

There is only one Sawan Bhado irrigation project in the area which provide water for local irrigation.

4.10 Animal Husbandry

Most of the villages in the buffer area are dependent on animal husbandry for their livelihood.

CHAPTER 5

LAND USE PATTERNS AND CONSERVATION-MANAGEMENT ISSUES

5.1 Land use Classification:

Agriculture is the main type of land use in the buffer. The area is rain fed with meagre irrigation facilities. Villagers practice primitive agricultural methods. Erratic rains and droughts put more pressure on their economy. They have small landholdings and that too on undulating terrains which are mostly unfit for agricultural practices. The main kharif crops are maize, urad, moong, tuar etc. and where irrigation is possible wheat, gram, mustard etc. are grown as Rabi crops.

The zone of influence extends over the entire periphery of the forests. There are revenue areas within the boundary of MHTR occupied by villages. They largely influence the reserve through their agriculture and associated varied land use practices.

5.2 Socio-economic Profile of Villages:

Generally most of the villages are socially and economically very backward with low illiteracy rate and poorly connected. Villages lack basic infrastructure like hospital, school etc. Bhil, Rajput, Bavariyas, Garasias, Meena etc. are important tribals living in the reserve. Phylotatry and zoolatry is common among them. Even celestial bodies are also worshiped. Their religious places are called “Deora” generally situated either at outskirts of the village or near some hill clad with forest. They also worship the “Magra Baoji” i.e. the God of hills.

All these villages are tribal dominated. Bhil, Gurjjar and Kathodi are the main tribes here. Most of the villages are purely inhabited by a single tribe but some are of mixed type. Each village has several hamlets called ‘Phalas’.

5.2.1 Land:

Land distributing are variable from village to village as per the population, crop pattern, occupation and caste wise. The Bheel has lowest land owners, as the caste is totally dependent on forest resources. On the other hand Gujjars has highest pasture land for grazing the animals. Jaat has more agricultural land as the community is dependent on farming resources. Graciya caste has mostly dependent on Goat rearing. The farmers have occupied total 1190 Bigha land in the entire buffer

zone of MHTR. The revenue land is 678.5 Bigha with average 57.54 Bigha per village. The total forest land occupied by farmer is 511.5 Bigha with average 42.46 Bigha per village. The village such as Haripura-dandiya, Kelash-nagri and Golbav totally dependent on agriculture forest land.

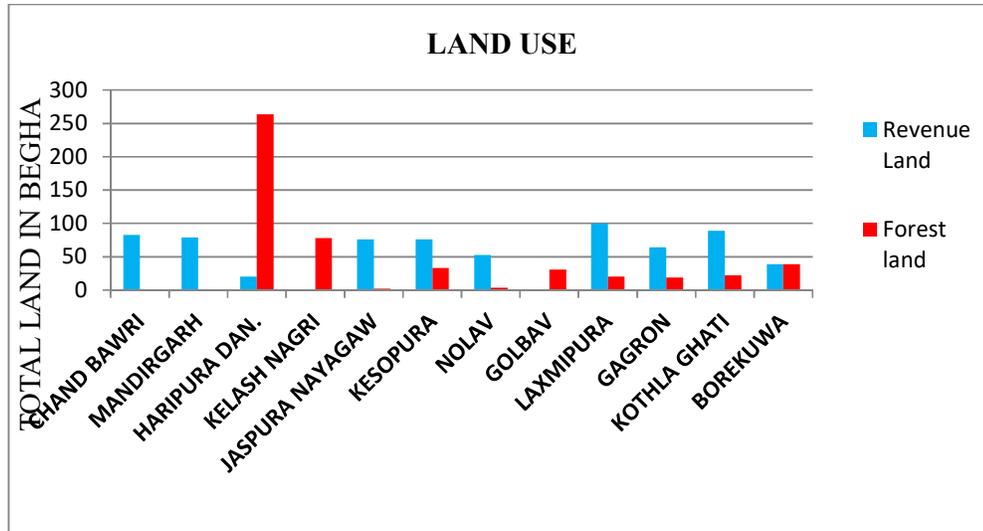


Figure-5.2.1 Average village wise land in Bigha

5.2.2 Fuel use:

Main sources of fuel are forest wood for about 91.5% of the household and only 8.5% are using LPG. There are not any alternate fuel sources for the villagers. Wood consumption rate is high in Mandirgarh followed by Borekuwa and Gagron. Only 5 villages have LPG, which are not more than 5 connections in each village. The LPG refuelling centres are far from the most of the villages. The average distance of the refuelling centres are 5-40 km.

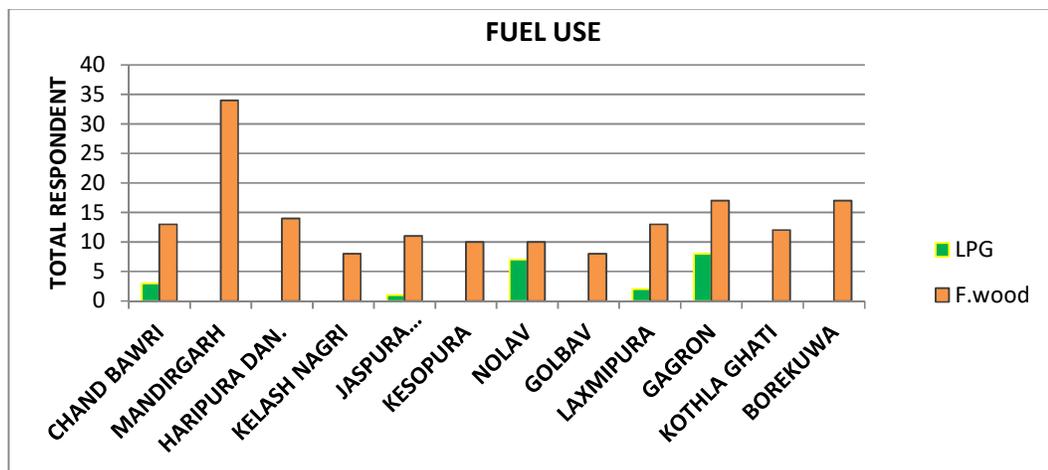


Figure-5.2.2: Fuel consumption, village wise

Table-40 village wise LPG refuelling centres

Nearest LPG refuelling centres			
VILLAGES	NEAREST CENTRE	KM	DISTRICT
Chand- Bawri	Kota	40	Kota
Mandirgarh	Mandana	15	Kota
Haripura-Dandeya	Jhalawar	17	Jhalawar
Kelash -Nagri	Kanwas	17	Kota
Jaspura-Nayagaw	Kota	30	Kota
Kesopura	Mandana	13	Kota
Nolav	Jhalawar	10	Jhalawar
Golbav	Kanwas	12	Kota
Laxmipura	Jhalawar	12	Jhalawar
Gagron	Jhalawar	5	Jhalawar
Kothla-Ghati	Jhalawar	7	Jhalawar
Borekuwa	Kanwas	25	Kota

5.2.3 Livestock:

The average Goat rearing farmers in the buffer zone are 58.58 %, Sheep 0.91%, Buffalo 34.08%, cow 69.25%, Dog 8.5%, Poultry 21.5%, Horse 0.25% ,Ox 2.75% and having ' 2' Gagroni tota (*Alexandrine parakeet*).

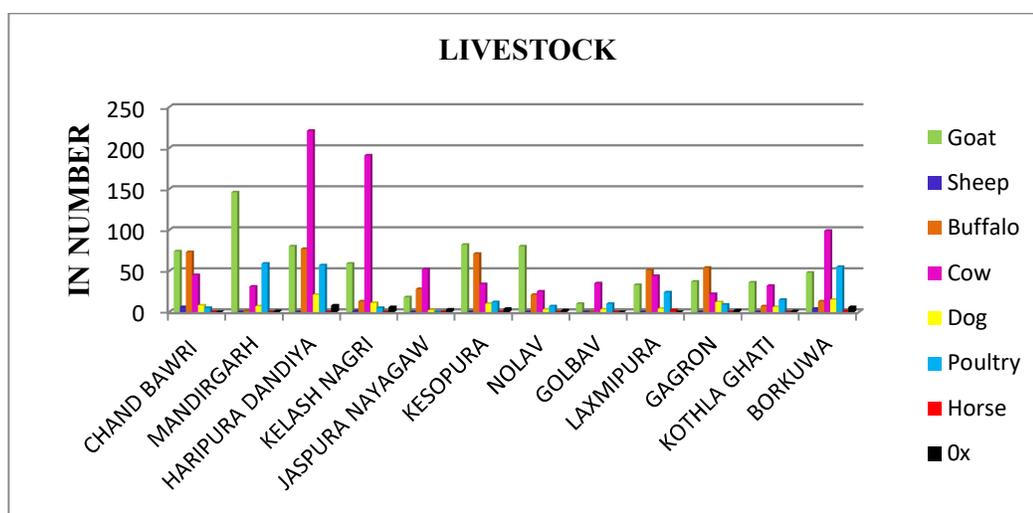


Figure-5.2.3: village wise livestock detail

5.2.4 Income:

In order to assess the strength and sustainability of livelihood, growth in village income are dependent on land, the primary sources of income for the rural masses. What appears to be lacking is the diversification of the workforce .the villages need for more opportunities in the non-farm sector to provide sustainable livelihood to its people. There is a large potential for such diversification. Strengthening the livelihood and sustained growth in other sector of job oriented works may impact to change the living standard of people. Women’s are contributing the income of households be it through working in MG-NERGA, and other development activates including the plantation scheme of forest department in the protected area. In the near future micro finances are a major intervention to empower women need to be implementing in a constructive way.

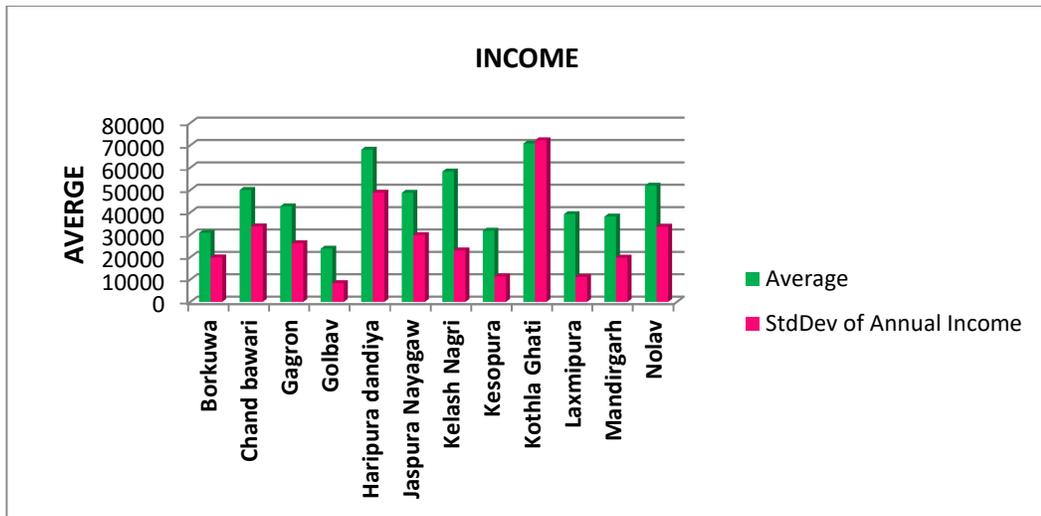


Figure-5.2.4(a) : village wise average income (per household)

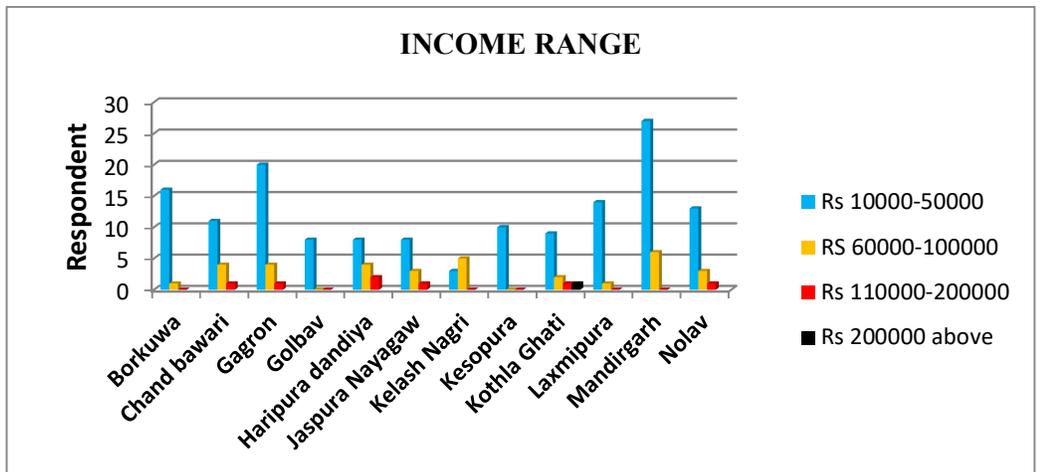


Figure-5.2.4(b): income range

Income sources:

Income sources are mostly agricultural and forest even though people are dependent on day labour. The average earning sources are follows. Labour 51.09%, agriculture 24.92%, livestock 19.90%, forest 4.07%.

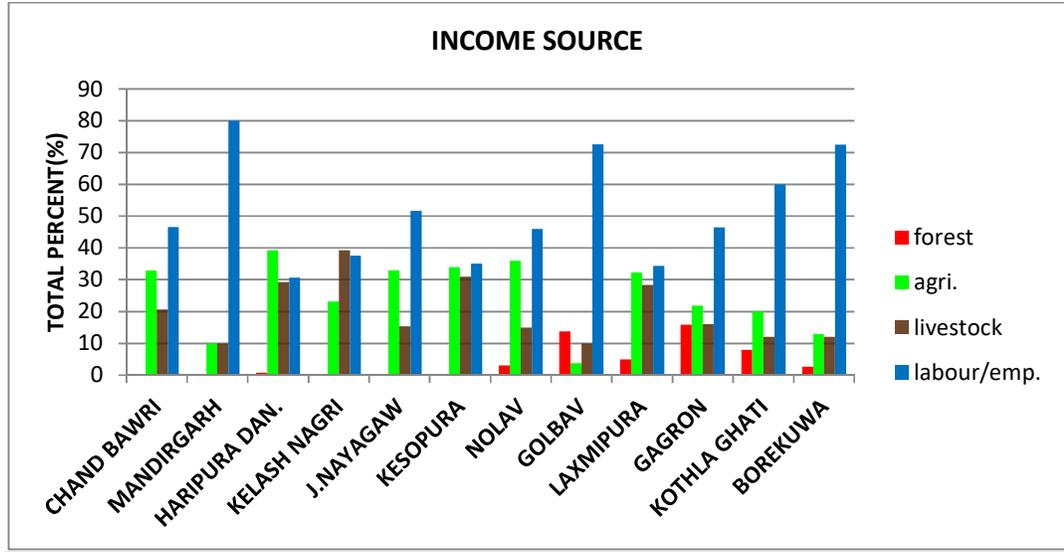


Figure-5.2.4(c): income sources

5.2.5 Forest dependency:

Forest consumption rate has very high in the buffer zone of MHTR. People are mostly dependent on all basic need of their daily survival ship on forest product inform of wood, mining, fodder, timber, fruit and many other way. Wood has highest consumption rate with average 71.83%, Mining 10.63%, Timber 8.13%, Fruit 3.82%, other 2.46%.

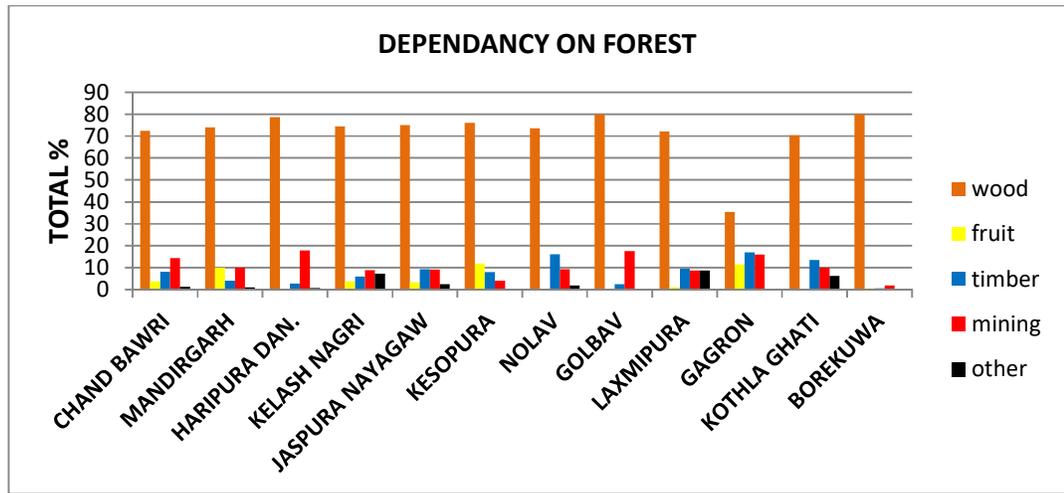


Figure-5.2.5: dependency on forest

5.2.6 Wildlife conflict and sighting:

Conflict:

The loss of domestic animals by diseases 46.38%, natural death rate is 22% conflict rate is 33.5%.

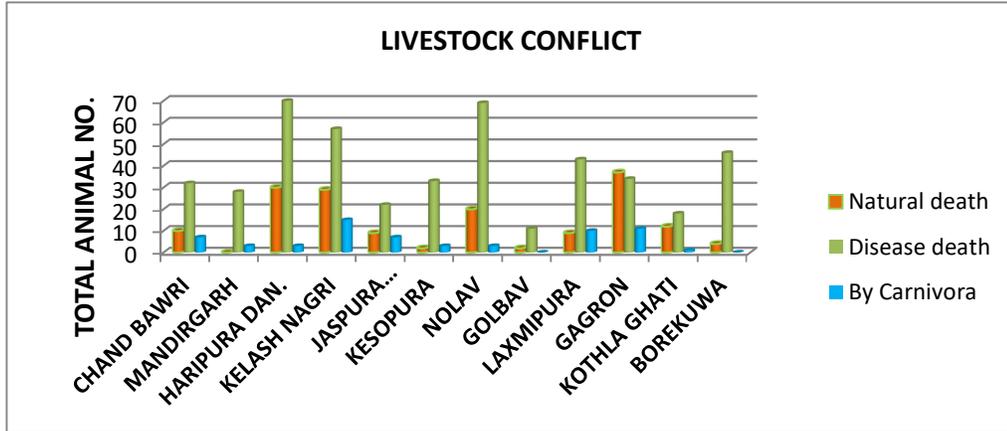


Figure-5.2.6(a): livestock conflict rate

Wildlife sighting

Although there is not any direct sighting during the study but indirect sighting has been reported from the villagers. The maximum number of Nilgai has been reported with 41.16%, jackal 21.25%. Wild boar 18.25%, Chital 9.33%, Hyena 5.91%, Wolf 3.16%, Wild dog 2.58%, Chinkara 2.66%, Languor 2.5%, Leopard 1.25%, Sloth bear 0.83% Other 0.46%.

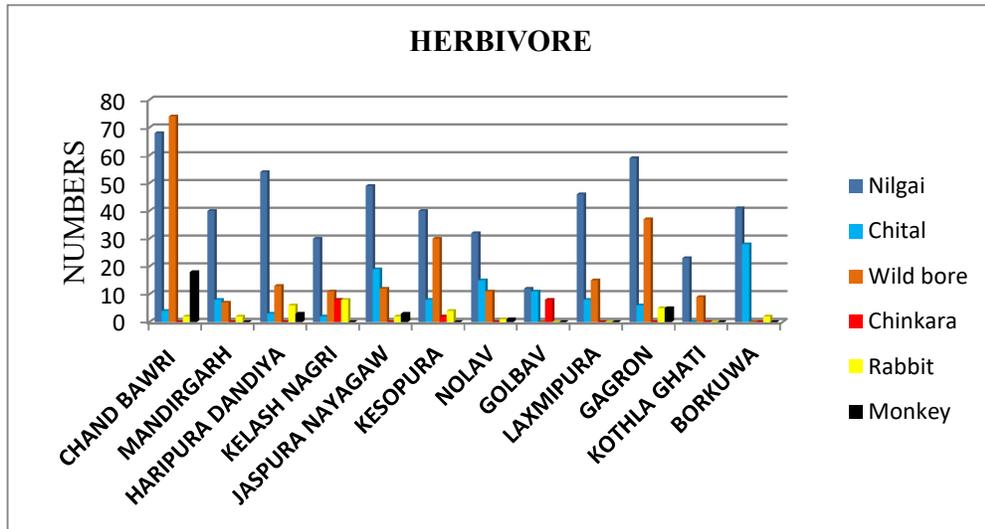


Figure-5.2.6(b) : Herbivore sighting, village wise

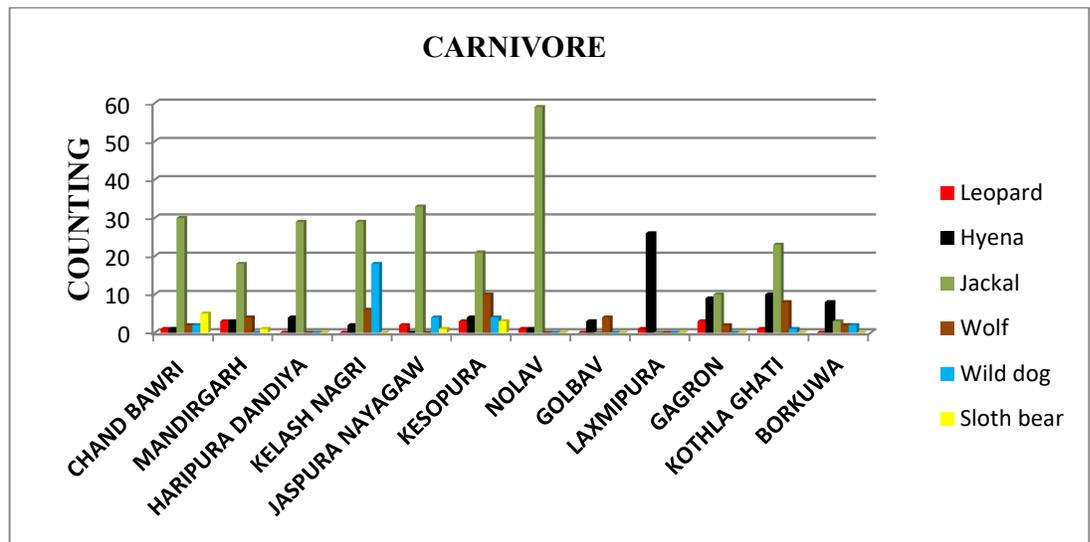


Figure-5.2.6(c) : carnivore sighting (village wise)

5.3 Assessments of inputs of line agencies / other departments

Various line agencies / departments are working in the buffer zone of Mukandra Hills Tiger Reserve. These are:

1. Irrigation Department.
2. Public Works Development.
3. Electricity Distribution Corporation.
4. Rajasthan Tourism Development Corporation.
5. Police Department.
6. Transport Department.
7. Gram Panchayat and Municipality.

Part - B

The Proposed Management

CHAPTER 6

VISIONS, GOALS, OBJECTIVES AND PROBLEMS

6.1 Vision:

The buffer zone, consisting of the area peripheral to critical tiger habitat or core area will ensure the integrity of the critical tiger habitat with adequate dispersal of tiger and other key species. The area will also ensure the co-existence of wildlife and human activities. Buffer will also support the livelihood, developmental, social and cultural rights of the local people (u/s 38 V (4) (ii) of W.L.P. act). The area will also support the production sector activities intermingled with biodiversity conservation and ecosystem function values. The tourism and religious values will also be addressed here. This will be a “managed resource zone” out side the P.A. including forest patches, revenue lands & private holdings, addressing the issues of conflict, there by reducing pressure on core area.

6.2 Management Goals:

To reduce impact of local people upon MHTR core and vice versa through active people’s participation thereby improving Park –People Interface.

6.3 Management Objectives:

The following objectives have been thought to maintain the set of values of buffer area recognized and prioritized earlier.

1. To provide and protect the supplemental habitat and dispersal path way for the spill over wildlife population specially tiger.
2. To support the social, cultural and economical well being of the communities in the zone of influence to reduce their dependence on core area for forest based resources through eco-development activities and conservation education.
3. To maintain and wherever necessary restore the key ecosystem functions for ecological security and economic prosperity of the region with special importance to the water shed function of the major rivers of the area.

4. To maintain the productivity of the production sectors after mainstreaming with conservation values on sustainable basis and to generate alternate livelihood options for the local communities.
5. To enhance the quality of educational, recreational and wilderness experience given to the general public.
6. To provide the opportunity of religious tourism in a sustainable manner.

6.4 Problems in achieving objectives:

6.4.1 Constraints/ problems in achieving objective no.1

1. **Disturbance due to Habitations**—The major part of the buffer consists of human interaction zone, which includes human habitations, private estates, agricultural fields, road network etc. that creates a lot of disturbance to the wildlife dispersal. The private estates and farmlands are contiguous to the core. Many of them are abandoned and have a large number of laborers' settlements that are dependent on forest for various resources.
2. **Resource dependency of local people**- Dependency of local people for lively hood and NTFP collection is increasing day by day. It is also a potential threat to the objective.
3. **Forestry activities** – Forestry operations in the reserve forest area also creates disturbance to the dispersal of wildlife.
4. **Illegal activities**- The area is having potential threat of lopping, poaching, felling etc. These are also management problems and need constant watch.
5. **Road and transmission line** - The expanding road network and transmission lines are also threat to dispersal.
6. **Lack of data base**- Above all, the lack of database of dispersal of wild life is another problem in implementing any management strategy.

6.4.2 Constraints/ problems in achieving objective no.2

1. **Lack of socio-economic database** - Only a very few studies have so far scientifically dealt with assessing the socio-economic status of adjoining villages. Not much information has been documented so as to formulate an effective eco-development plan.

2. **Low priority to eco-development in the RF areas** - Not much work has been done earlier in the RF areas for the eco-development.
3. **Poor integration with other departments-** Poor integration with other departments results in poor developmental activities in the area specially RF adjoining areas.
4. **Lack of infrastructure and trained staff:-** The staff especially, at the lower level, lacks in proper training regarding eco development and lack of infrastructural facilities adds more problems to it.

6.4.3 Constraints/ problems in achieving objective no.3

1. **Absence of base line data** – The base line data about the different factors affecting the water sheds like silting, soil erosion, surface runoff; chemical characteristics of water, etc. is not available till date. These data are very crucial to monitor the ecosystem functions and conserve the watersheds.
2. **Fire** –The man made fires by grazers, poachers, NTFP collectors etc. is a problem for maintaining the watershed capacity.
3. **Activities in the estates** – Clearing of lands, use of pesticides etc. by the estate management and rich farmers reduce the quality of the ecosystem services.
4. **Potential threat- Illegal activities** – Different illegal activities like lopping & felling, NTFP & fire wood collection, livestock grazing, etc are affecting the ecosystem functions and creating major threats towards the conservation of inviolate areas.

6.4.4 Constraints/ problems in achieving objective no.4

1. **More and more emphasis on conservation values** – Now-a-days more and more emphasis is given on conservation values that are impediment to fulfill the needs of this objective.
2. **Lack of database** – the knowledge regarding the actual extraction capacity without disturbing the conservation values is lacking. This is also hampering the implementation strategies of this objective.

3. **Market** – Though the market for cash crop is still very good but ups & downs in the market is a global phenomenon and problem for management.

6.4.5 Constraints/ problems in achieving objective no.5

1. **Condition of already existing signage** – Very few signages exist by the side of Mukandra road and other main highways and road networks. The condition of these existing signages is very poor and these are not proper. There is need to install properly designed modern sinages
2. **Lack of awareness campaigns** – Awareness campaigning organized by the forest department for the pilgrims to protect the sanctity of the inviolate areas is not sufficient and the interpretation & publicity activities need to be augmented and made more effective.

CHAPTER 7

MANAGEMENT STRATEGIES

7.1 Delineation of Buffer Area

For the first time, the 'core' and 'buffer' areas of a tiger reserve have also been defined, in the Wildlife (Protection) Act, 1972, the former being the critical, inviolate area, and the latter the peripheral area to foster coexistence with local people for safeguarding the integrity of the core.

It is proposed that the forest areas from territorial divisions contiguous with buffer will be merged in the tiger reserve buffer. Currently total area of Buffer is 34282.274 ha and another 9792.44 ha area from territorial divisions which is contiguous with buffer can be merged in to it. Thus the total area of the buffer will be 44074.714 ha and the total area of the tiger reserve will be 85791.90 ha including both core and buffer.

The buffer zone of a Tiger Reserve has twin functions, viz.:

- i) To provide habitat supplement to the spill over population of wild animals from the core area, conserved with the active cooperation of stakeholder Communities, and
- ii) Providing site specific, need based participatory eco development inputs to local stake holders for reducing their resource dependency on the core zone and for eliciting their support towards conservation initiatives in the area.

Therefore, both the buffer zone and the multiple use area, if any, surrounding the buffer, should be subjected to conservation oriented community program as a part of eco-development, taking care not to distort the village dynamics in an artificial manner resulting in the entry of market economy, which may make the whole exercise counter-productive.

Guidelines for the management of buffer Zone

- (A) Communities living in the buffer zone,(having the status of Sanctuary,Reserve forest,Protected forest or revenue land) should be involved in the management of Tiger Reserves with reciprocal commitment as a part of overall conservation strategy. The reciprocity would decide in the mutual *quid pro quo* of

- (i) Fostering site-specific eco-development initiatives based on participatory micro-level village plans to provide alternative resources to people apart from livelihoods. The eco-development inputs, interalia, may include biomass substitution (eg.alternative fuels), biomass generation and forestry, eco-tourism, agriculture, watershed management, small irrigation, local livestock improvement, agro processing, artisan and any other site specific item as desired by the people, not having a deleterious effect on buffer area resources.
 - (ii) Reciprocation by the local people through specific measurable actions as per a MOU for improving protection and conservation, which interalia, may include curtailment of illicit grazing, reducing fuel wood and small timber collection from buffer areas, increasing participation in fire protection and anti-poaching efforts.
- (B) Community involvement in the management of buffer zone, should be promoted as provided in sections 33B, 36B and 36D of the Wildlife (Protection) Act, 1972.

The general principles of management of buffer will be as follows-

1. Co-occurrence agenda (Wildlife and People).
2. A “no-go-area” for industrial development (but retrofitting safeguards required if such infrastructure already exists)
3. The wildlife status of buffer should not be elevated to that of the core and managerial interventions should be restricted to allow tiger/wildlife gene permeability and low density occupancy while facilitating the meta-population dynamics of tiger in productive patches.
4. Factoring in the landscape context and reducing resource dependency of local people on forests through sectoral integration resulting in ecologically sustainable livelihood option.
5. Using the impact of natural / managerial interventions in the core area as a guide for dealing with forestry practices and wildlife management in the buffer.
6. Identifying zones of influence vis-à-vis the various land uses operating in the area.
7. Overarching focus on habitat restoration/productivity, reduction of forest resource dependency, providing ecologically sustainable livelihood options to local people, permitting ecologically sustainable land uses, avoiding intensive

forms of land uses like mining or heavily used infrastructure and actively addressing human wildlife interface. In case such land uses are present or permitted appropriate mitigation measures need to be enforced so as not to compromise on the conservation objectives of the buffer.

8. Convergence of ongoing district level schemes is important to provide ecologically sustainable livelihood options for local people. This would reduce their dependency on forest resources while eliciting the much needed public support. A sizeable portion of tourism gate receipts should be recycled and earmarked to eco development committees for village specific interventions as per the participatory micro plan, with reciprocal commitments to protect wildlife and their habitat on quid-pro-quo basis.

7.2 Zone and Theme Approaches to Management Strategies

The width of the tiger reserve area is very less. To increase the width, buffer area is to be added primarily meant to act as a shock absorber for the area. The core area serves as a breeding ground for the animals. Surplus animals from the core area will move to buffer areas. The success and sustainability of the core area depends on a healthy and well managed buffer area.

On account of heavy grazing, uncontrolled felling and lopping of trees the eco system in the buffer area has deteriorated. The soil cover in the buffer is naturally very thin since most of the rocks are sand stone sheet rocks.

Table-41 Important sites for buffer area development are as follows –

S.No	Forest Blocks	Range
1.	Kaniya Talab	Kolipura
2.	Mashalpura	Dara and Gagron
3.	Doliya	Ranvtha
4.	Futa	Borabas

General Strategy:

Buffer areas require a ‘course filter’ approach for maintaining a variety of plant and animal species.

- Day to day monitoring

- Habitat amelioration.
- Fostering indigenous fodder and fruit species.
- Maintaining existing water points.
- No drastic habitat interventions
- Cropping pattern / harvesting to factor in cover values.
- Inherent /induced diversity indices need to be computed for maintaining the edges.
- Human – wildlife interface issues to be addressed.
- Treatment for riparian zones/unique features.
- Retention of dead trees, snags.
- Restoration/protection of existing corridors.

The Scope of Managerial interventions will be as follows :-

- (i) Providing ecologically sustainable livelihood options to local people in collaboration with various sectors/organizations.
- (ii) Incentivizing local people for protecting forests and wildlife (PES, Eco-tourism)
- (iii) Ensuring retrofitting measures in sectors of development with reciprocal commitments.
- (iv) Ensuring active management in areas where tiger/ Co predators / wild ungulates co-occur with people to minimize human-wildlife interface conflicts.
- (v) Ensuring monitoring of tiger/wildlife on periodic basis in standardized manner, amenable to scientific inference.
- (vi) Ensuring surveillance and protection of tiger and wildlife.
- (vii) Building up the capacity of field staff and local people as a part of an adaptive management to ensure effective implementation.
- (viii) In case the buffer comprises of protected area then managerial interventions should be in conformity with the provisions of the Wildlife (Protection) Act, 1972.

7.2.1 Zone Plans

The following zone plans are proposed for buffer of MHTR.

1. Zone Plan for Eco-Development
2. Zone Plan for Forestry

3. Zone Plan for safeguards/retrofitting measures
4. Zone Plan for tourism
5. Zone Plan for reclamation of mined areas

These zones are overlapping and segregation has been described only for Management purposes.

7.2.1.1 Zone Plan for Eco-Development

Mukandra Hills Tiger Reserve has many peripheral villages on all sides. The problems of these peripheral villages need to be addressed properly. The management practices in the past attempted to keep the villagers away. The villagers residing in the vicinity have been dependent on this protected area. It has resulted in conflicts with the villagers. In response to biotic pressures on protected (core) area, a broad based strategy of ecodevelopment has to be adopted. The eco-development has two main thrusts i.e. improvement of buffer management and involvement of local people in developmental activities so that the negative impact on the core could be reduced.

Eco-development activities to provide alternative fuel and fodder resource on the fringes of MHTR were executed. These also provided alternative livelihood opportunities for the local people. These schemes overlooked the participatory approach, which is fundamental philosophy of eco-development programme. At this juncture, we have to initiate the process of trust building and participation. These initiatives will generate initial trust of the local communities with the park management enhancing the understanding of the staff about the programme and generating base line information on the impact villages. The investments, so far, had been very low, sporadic & without proper micro planning. The real issues of management – conflict with people, could not be addressed.

An elaborate institutional mechanism for implementation of the ecodevelopment programme in buffer areas of MHTR will be developed. This institution will ensure participation of different stake holders, quick decision making at park management & state level and will facilitate the implementation of eco-development programme at grass root level. Whole of the buffer area will fall under Eco-development zone. As per section 18A (read with section 36A) of the Wildlife (Protection) Act, 1972, till the rights of affected persons are finally settled, the State

Government should make alternative arrangement for making available fuel, fodder and other forest produce to affected persons in terms of their rights as per record.

The objectives will be:

- To improve fuel-fodder resource so that local demands can be met.
- To develop strategy based upon micro plans to meet the needs of local people.
- To motivate the local people to adopt such agricultural patterns and land use which are compatible for wild life.
- To promote district level welfare schemes in eco development zone to benefit local people through ongoing welfare programme as well as special programme for their up liftment in various government scheme.
- To maintain natural demographic setup of the prey & predators.
- Spreading environmental education.

Strategies

The strategy of micro planning should be adopted at village level apart from: creation of EDCs with Panchayati Raj Institution representation, confederating such EDCs, ensuring benefits to local people for protecting forests on a quid-pro-rqo-basis etc. The agricultural practices (if intense) require monitoring in the context of cropping pattern and ensuing change in cover values. Likewise, sale of agricultural land resulting change in land use pattern should also be monitored so that the corridor values are not affected. Since livelihood is a big concern and dependency of local people on forests is considerable, the district level.

Welfare schemes should be factored in the eco-development zone to benefit local people. Further, special programmes should be fostered through funding support from Finance Commission, State Plan, CAMPA etc., apart from Project Tiger.

The strategies can be summarized as follows:

- ❖ Village level micro planning for benefits to local people on quid-proquo-basis(involving EDC)

- ❖ Innovative use of Participatory Management/REDD+/recycling of tourism gate receipts to EDCs.
- ❖ Benefits from district level developmental works (convergence), interalia covering
 - (a) Public health and family welfare
 - (b) Food and nutrition security
 - (c) Education
 - (d) Natural resource management and water security
 - (e) Roads
 - (f) Energy
 - (g) Housing and
 - (h) Livelihoods

After identification of problems, specific strategies have been perceived which are as follows:

(i) Strategy to meet fuel wood Demand:

The strategy would be two fold:

- ❖ Immediate measures
- ❖ Long Term measures

Immediate Measures:

- Subsidized LPG distribution to the prioritized in buffer and other peripheral villages.
- Linkage with District agencies for ensuring better LPG supply by opening, LPG outlets at Ramganjmandi, kanwas ,Rawathbhata and Mandana.

Long Term measures:

- Creating fuel wood and fodder plantations on charagah/ community lands with consent of Gram Sabha on silvipastoral model.
- The degraded forestlands to be taken up by planting indigenous species for fuel wood plantations.

(ii) Strategy to reduce grazing pressure:

Since grazing is being practiced in the buffer areas, some steps for mitigating it are proposed subject to availability of land. Wastelands/ charagah . Grazing will be regulated in the bufferarea.

No grazing will be permitted in the reserve forest as these areas potential sites for breeding of tigers. For development of herbivores also some areas has to be made free from cattle grazing.

(iii)Strategy for improving Socio-economic conditions

(a) Improvement of Agricultural productivity:

- The Government of Rajasthan has recently issued orders to provide electricity connections to villagers in the periphery on priority basis to utilize land for fodder development. This can also be utilized to improve the agricultural productivity.
- Funds can be used on watershed basis for improving the irrigation system by making dams and soil & moisture conservation works in the agriculture field.

(b) Integrated livestock development program for income enhancement of farmers increasing livestock population with increase in consumption of milk products has put a great stress on natural resources like water & vegetation. Because of low productivity of cattle, farmers always tend to rear livestock on zero cost or low cost basis by utilizing available pastures & forest areas at no cost. This situation can be avoided by increasing the productivity of livestock through technological inputs in livestock production sector. Breed improvement techniques health care & training of farmers can help them a lot. Artificial insemination de-worming and immunization are important aspects of livestock development. Stall feeding of cattle will be promoted by breed improvement.

(c) Income Generating Activities

- i) **Constitution of self help groups:** Self help groups will be constituted amongst the members of EDCs. Micro financing through self-help groups will help in upliftment of their economic status. Various handicraft works, candle making, agarbatti making etc. activities can be initiated through self help groups.

- ii) **Employment as travel/ tourist guides:**It is mandatory for all the tourists to take a registered travel guide while visiting Mukandra Hills Tiger Reserve. The local unemployed youth of buffer area will be trained as wild life guides and will be registered with MHTR to go with the tourists. This will not only provide employment to these youths but will also inculcate inclination towards wild life conservation. These guides will also work as messengers amongst the rural mass & will act as connecting link between forest administration & villagers.
- iii) **Tourism vehicles to EDC members:-**The villages in the buffer areas will be prioritized for registering tourism vehicle to be utilized for tourism purpose and the benefit will flow to the villagers. This will spread a positive message for tiger conservation, the economic benefits are flowing to the people.
- iv) **Use of Local work force/home guards in Protection and patrolling in buffer areas:** Local work force will be employed through EDCs. for protection purposes in the buffer area. This will not only provide employment for the local unemployed youth but will also spread the message of benefits of forest & wild life conservation. Home guards locally recruited will be employed to assist local staff in forest and Wild life protection. For eco development micro plan would be prepared for villages in and around buffer forest area. The Eco development committee will be formed/activated. Activities will be taken up in consultation with committee.

Livelihood support initiatives through village micro plans

- a) **Participatory micro planning and implementation processes:**Micro planning support teams composed of park personnel, collaborating NGOs and villagers (each team with at least one woman and with members able to easily communicate with village woman) would assist village communities to develop and implement site-specific reciprocal plan on a sustainable basis. Focused guidelines, clearly determined investment criteria, supportive training programs and carefully scheduled planning will be ensured to meet the objectives of ecodevelopment and to embody the active commitment & participation of local people.
- b) **Methodology to be adopted for village eco-development**

- Active participation of all segments of society in plan formulation and decision making through a community institutional frame work of village eco-development committees that elicits the widest possible consensus.
- Participatory rural appraisal (PRA) focused on the mutual interactions and reciprocal arrangements between the management and people.

Integration of rural development programs

Various rural development programs are being implemented in the district under financial support of Govt. of India and with the plan funds of State of Rajasthan. Efforts will be made to channelize maximum funds towards the buffer area. National rural employment guarantee scheme is an important scheme flowing maximum funds to the rural areas. Focus will be to propose more & more eco-development works in buffer area under this scheme. Funds available under other social welfare & employment generation schemes will also be utilized in buffer area at optimum level.

Monitoring and evaluation

Monitoring and evaluation are two indispensable arms, which support and strengthen any management. Developing & using information base is essential step in deciding management goals & objectives. It is expected that findings of a well organized, rigorous scientific monitoring will help park management in the following aspects:

- Status of implementation of scheme.
- Quality of works executed.
- Enhancement in benchmark knowledge.
- Improve decision-making.
- Reduce overall management costs & enhance benefits.
- Improve sustainability.
- Increase public awareness & people's participation.

An analysis of reciprocal commitments and obligations will be done to evaluate the works. The success indicators have to be evaluated whether these are in accordance with those anticipated at the time of micro planning.

7.2.1.2 Zone Plan for Eco-tourism

In MHTR, tourism is restricted to the core zone only because no other site has been developed to attract the tourists. The development of Ecotourism in buffer area will not only reduce the pressure of tourists over the core area but will also earn sizable foreign exchange together with employment generation largely around forest areas benefiting rural population around Mukandra Hills Tiger Reserve. Zone Plan for Eco-tourism will include areas having tourism infrastructure/ tourism regulation as per the NTCA guidelines.

Eco-tourism guidelines

Eco-tourism will be based on following guidelines:

- a. Facilitating wild life eco-tourism involving local host communities.
- b. Facilitating wild life tourism on private lands in the vicinity as per the normative guidelines.
- c. Obtaining contributions from private commercial tour operators and lodge owners for local community development.
- d. Obtaining contributions from tour operators for maintaining tourist facilities and staff welfare.

Eco tourism objectives

- a. Help visitors to minimize their negative impacts on the environment by enhancing their understanding of the fragility of the environment. This will be supported by offering literature, briefings, leading by examples and taking corrective actions.
- b. Prevent both accidental and purposeful action by tourists that cause damage to environment, such as crowding, harassment of endangered species, trampling, off-road driving and improper disposal of waste.
- c. Ensure that tourism revenue covers the cost of management of tourism on wild lands and protected areas. New untouched eco-tourism sites will be searched. Ban on use of plastics at eco-tourism sites will be imposed. There will be strict code of conduct for the visitors. Severe punishments will be awarded for persons violating the rules.

Nature Education

It is very essential to have a proper extension network to promote education and awareness towards wild life protection and conservation at Mukandra Hills Tiger Reserve. Following specific activities will be undertaken for this purpose.

- a. Extension unit will prepare, develop and disseminate publications, pamphlets, posters & other relevant publicity material. A library will also be set up.
- b. Film/Video shows, puppet shows, chaupals, exhibitions etc for both rural and urban populace will be organized. Schools & other educational institutions will also be associated.
- c. Experience sharing workshops and exchange visits will be organized and bidirectional feed back will be obtained.
- d. To achieve maximum publicity, mass media will be utilized. TV programmes, radio talks, press releases etc will be organized. Environmental awareness camps will be organized for nature education to students.

7.2.2 Theme Plans

Management strategies, sometimes, cannot be confined to a particular zone & these cut across two or more zones. Various theme plans, which have been, conceived for the buffer zone of MHTR are as follows:

Theme plans for buffer area are:

1. Protection
2. Meeting Fuel wood Demand
3. Administration
4. Livestock healthcare and breed improvement
5. Income generating initiatives

7.2.2.1 Theme plan for protection

Protection is the top most priority area of management. Wildlife management is 99% protection & 1% management.

Objectives:

- a. To reduce the biotic/anthropogenic pressures on movements/ migration of wildlife by:

- i) Controlled & rotational grazing in pastures/forest lands of buffer area to make the optimum use of such areas. This will reduce the movement of cattle towards the core area.
 - ii) Protection against poaching.
 - iii) Protection of forest areas against encroachment & mining.
 - iv) Fire protection in forest areas and community plantations / pastures.
 - v) Vigilance over traditional hunter tribes.
- b. To develop human resource so as to utilize them in best possible way for protection.

STRATEGY:

Construction of Pucca Wall

To avoid Man – animal conflict crop protection wall will be constructed all around the periphery of CTH especially adjoining to agriculture fields. These crop protection walls will be made 6 feet height for sensitive and vulnerable area of the CTH is required. Every year at least 5 km wall will be constructed. The work will be started from highly sensitive and vulnerable areas to less sensitive areas.

Out of turn Agriculture Electric Connections:

For ensuring livelihood of villagers on the periphery, improvements have to be made. Presently due to non-availability of agriculture electric connections, most villagers depend on rain fed agriculture only. Due to uncertain rainfall even Kharif crop is not ensured. Due to this uncertain agriculture villagers are inclined to depend on forestry based activities for alternate source of income and also goat rearing. If irrigation is assured, peripheral villagers will not only get Kharif crop, but can grow Rabi crop also. This will ensure better livelihood option and the practice of goat rearing will get reduced. Villagers will also be able to take horticulture and vegetable crops too. It will improve livelihood of these families and also at same time help in controlling illegal grazing. There is constant demand from other villages for priority connections as they are on the wait list for more than 15 years now. Govt. of Rajasthan vide its order No. F.12(16)/urja/04/part/Jaipur, dated 7th March, 2008 has issued an order to release the electric connections on priority basis under revised agriculture policy 2004, rule 7(i) to (iv) (sa). As per this order revenue villages located on the periphery of RTR will be given immediate priority agriculture connections. The village would be selected in consultation and connection will be released in maximum 3 months from date of application. Efforts will be made for such orders which will be applicable to MHTR periphery villages.

Priority agriculture connections are mainly being given for producing fodder crops. This will help in promoting concept of stall feeding and cattle breed improvement programme, which will help in controlling illegal grazing in CTH area.

Use of Local work force/home guards/border home guards in Protection and patrolling in buffer areas:

Local work force will be employed through EDCs for protection purposes in the buffer area. This will not only provide employment for the local unemployed youth but will also spread the message of benefits of forest & wildlife conservation. Home-guards and border home-guards will be employed to assist to local staff in forest and Wildlife protection.

Reduce grazing pressure:

Since controlled grazing is to be allowed in the buffer areas, some steps for mitigating it are proposed subject to availability of land. Identification of wastelands /charagahs for fodder plantations will be carried out.

Efficient use of Buffer area through silvipastoral developments:

As per earlier management practices, the buffer area in P.A., used to be developed in such a way so that the buffer area could support not only the wildlife but also full fill the requirements of the local people especially for fuel wood and fodder. But after Hon'able Supreme Court order dated 14.2.2000, a complete ban on removal of forest produce from sanctuaries and national parks, has been imposed. Therefore now the management strategy will be to allow the cattle grazing in a controlled way in the buffer area with the sole objective of pushing these cattle out from the core area. Hence the silvipastoral activities are proposed in buffer area.

Development of pasture Area:

A total of 2000 hectares of land will be brought under pastures for the village cattle. Every year an area of 200 hectares will be undertaken for pasture development works. This area will be spread all over and around the buffer and units of approximately 50 hectares will be taken up. These units will also help in regulating the cattle grazing in each closure.

Species for pasture development:

In many of the areas selected for pasture development there is good tree growth of Khirni, Tendu, Godal, Sadar, Salar, Butea and Bamboo. These trees shall be preserved. Suitable grass species of *Cenchrus setigerus*, *C. ciliaris*, *Dicanthium annulatum*, *Sehima nervosum* and *Stylosanthes hamata etc.* shall be sown.

Operation to be carried out:

The selected area will be fenced with loose stone wall so as to prevent cattle from entering the area. Live hedge plant seeds will be sown along the fence to make it more effective. For this the seeds / cutting of *Jatropha curcas* or *Euphorbia spp.* can be sown. Gates will be provided at suitable places. Soil and moisture conservation works will be done in the fenced area. Scattered contour trenches of size 30 cm depth, 45cm width will be dug.

A grove of shady trees will be planted near the water points in pasture closures to provide shade for wild animals. Seeds of the fodder spp will be distributed free of cost to the villagers so as to motivate them to take up growing of fodder in their own agriculture field.

Utilization of pastures:

The success of the scheme lies in proper utilization of the created pasture without deteriorating the resources. For this villagers will be taken in to confidence by the park management. The benefit of the proper use of pasture has to be explained to the people and proper system of grazing has to be adopted. It will help in eliminating conflicting attitude and will ensure developing a healthier relationship between the managers and local masses.

Grazing in pasture immediately after the onset of monsoon will result in uprooting of germinated seedlings. Also palatable species of grasses and freshly sprouted shoots germinating from old stock of perennial species will be devoured leading to depletion of seed stock and loss of vigour in rhizomes. This will lead to preponderance of unpalatable species. Hence in order to make good use of closures it is essential that grazing is not allowed in the earlier period of development, so as to ensure good seed availability for making the closures self sustainable.

Pattern of grazing:

Under rotational grazing the pasture unit (50 Ha) will be divided in to ‘grazing blocks’. Conversely four separated closures of approximately same size and situated reasonably apart will be treated as grazing block. Each of the ‘grazing blocks’ shall be closed to grazing for whole year by rotation while remaining three blocks shall be opened for grazing in rotation at intervals of one month from July. Only the cattle card holder will be permitted in to the closure for grazing.

Free distribution of the fodder species seeds to agriculture land holder so that they can take up fodder cultivation in their agriculture field.

7.2.2.3 Theme plan to meet fuel wood Demand:

The strategy would be twofold: 1. Immediate measures 2. Long Term measures

Immediate Measures:

LPG Distribution to the prioritized villages causing immense pressure to the core area. Linkage with District Administration for establishing distribution Center/ agency at strategic locations like Dara station, Borabas, Dolia, Mashalpara, Gagron etc with an effective mode of distribution

To reduce pressure on forest wood, the L.P.G. supply outlets will have to be set up at least at the following places:- Dara station , Naulav, Raontha, Chandbaori, Gagron, Mander Garh, Bhatwara, Borabas Bhainsroadgarh, Sripura, Khera, Latiyana.

Minimum 20 gas connections will be given in above listed villages at suitable rate, It is expected that 5000 gas connections would be given during 5 years.

Improved Crematoria:

Nearly 8-10 quintals of wood is consumed in traditional cremation of a dead body. This amounts to consumption of large quantity of fuel wood. The villages and towns in and around the core are facing acute problem of fuel wood for cremation. The improved crematoria will save a considerable quantity of wood. Hence it is proposed to install at least one improved crematoria in at least 20 selected villages.

Improved Smokeless Chulhas:

Fuel wood is the only means of cooking food in this area. The conventional chulas consume large quantity of wood. To economize improved smokeless chulhas will be given to the adjoining villagers. Minimum ten chulhas will be given in each village at a subsidized rate of Rs.20/- each. Before distributing the same demonstration would be arranged. It is expected that 500 chulhas would be distributed during 5 years.

Long Term measures:

Fuelwood plantations on charagah lands after consent of Gram Sabha on silvi-pastoral model.

The degraded forestlands may be taken up for fast growing species for fuelwood plantations.

Fuel wood Plantation:

Fuel wood requirements: The villagers in and around the tiger reserve use wood as main source of fuel. Approximately 1000 head loads are brought by villagers every day. The tree covers in revenue areas have been removed in the name of increase in agriculture production. This diverts the total pressure on the forest areas for fuel wood. With per capita consumption of 0.018 m³ the annual requirement of fuel wood comes to 1280 cubic meters for the population of 71,104 living in and around the reserve. This fuel requirement will be met by raising fuel wood plantation in the buffer area.

The plantation Area:

A unit of 25 hectares each will be selected for plantation in the buffer zone over a span of 5 years. 40 units will be selected. Thus 200 hectare area per year will be taken up under this scheme in first 5 years.

Table-42 Choice of Species: The following species will be given preference in fuel wood plantation:

Ronjh – <i>Acacia leucophloea</i>	Desi Babool – <i>Acacia nilotica</i>
Tendu – <i>Diospyros melonoxylon.</i>	Khair – <i>Acacia catechu</i>
Bamboo – <i>Dendrocalamus strictus</i>	

Village level site specific strategies: Fuel wood plantation and fodder development: Fuel wood plantations and fodder development to be carried out in a unit of 25 Ha areas in the following villages as listed below.

Table-43 This will help in reduction of pressure on the core area to a great extent.

S.No.	Villages	Teshil	Units	Area (ha)
1.	Haripura dandi	Jhalarapatan	1	25
2.	Morukalan	Sangod	1	25

S.No.	Villages	Teshil	Units	Area (ha)
3.	Morukhurd	Sangod	1	25
4.	Kishore Sagar	Sangod	1	25
5.	Bhatwada	RamGang Mandi	1	25
7.	Baxpura	RamGang Mandi	1	25
8.	Ghatoli	RamGang Mandi	1	25
10.	Nayagaon	RamGang Mandi	1	25
11.	Jhmara	RamGang Mandi	1	25
12.	Amjahar	RamGang Mandi	1	25
13.	Raontha	Ladpura	1	25
14.	Padampura	Ladpura	1	25
15.	Kothala	Ladpura	1	25
16.	Haripura	Ladpura	1	25
17.	Bhanwaria	Ladpura	1	25
18.	Dadwara	Ladpura	1	25
19.	Keshopura	Ladpura	1	25
20.	Nayagaon	Ladpura	1	25
21	Borabas	Kota	4	100
22	Lotiyana	Chittorgarh	2	50
23	Sripura	Chittorgarh	2	50
24	Rawath Bhata	Chittorgarh	2	50
25	Sanita	Chittorgarh	2	50
26	Bhunjar Kalan	Chittorgarh	2	50
27	Dhaneshwwar	Bundi	2	50
28	Karondi	Bundi	4	100
			40	1000

Development of Natural Fruit Areas:

It is proposed to develop natural fruit areas in the reserve. For this fruit species like tendu, ber, jamun, lisoda, gular, khajur etc will be promoted. Naturally available fruit groves in the reserve will be identified and developed. The cost structure for the development of such areas is mentioned in the financial forecast. Internal cost for different components may vary depending upon the requirements of the site, which will be decided on the basis of treatment plan prepared for the purpose. Local fruit bearing species will be planted in the treated area.

Fuel saving and alternate fuel devices:

To reduce the growing pressure on forests, it is essential to introduce extensive fuel saving devices in the surrounding villages and towns of MHTR use of improved stoves, LPG, use of pressure cookers, training of fuel saving cooking techniques will be imparted to villagers. Help of Kisan Vikas Kendras will be taken in this field.

7.2.2.4 Theme plan for Livestock Health care and breed improvement program:

The excess of grazing in buffer reduces the availability of food in the reserve and brings contagious diseases to wild animals. Large uneconomic cattle population maintained by the villagers should be replaced by small number of high milk yielding cross bred cattle. Such cattle will be stall fed by their owners. It is therefore proposed to undertake an extensive cattle breeding program by artificial insemination. Training to breeders including immunization of cattle will be imparted frequently.

Around CTH of MHTR villagers keep large number of cattle herds comprising of cow, buffalo and goats. Most of the cattle are unproductive and mainly responsible for habitat depletion. Existing cows and buffaloes have to be replaced by cattle breed improvement programme. Park management will work in tandem with Animal husbandry department and NGOs for this responsibility. Rearing of goats will be discouraged.

The programs proposed are:-

Improving the breed of livestock and inculcating practice of stall feeding.

Immunization of the livestock.

To fulfill this objective full co-operation would be sought from the veterinary units of animal husbandry department functioning in Ladpura, Sangod, Ramganjmandi, Jhalarapatan, Rawathbhata, Bhainsroadgarh, etc.

Creation of Immunization Buffer:

An immunization buffer will be created around the tiger reserve in consultation with District Veterinary officials, Indian Veterinary Institute (IVRI) and Wildlife Institute of India.

The concept of creating immunization buffer around tiger reserve will be initiated keeping in mind the principles of herd immunity which is as follows:

1. Herd immunity concept proposes that in contagious diseases such as Canine Distemper (CD) the chain of infection is likely to be disrupted when large numbers of a population are immune (vaccinated) or less susceptible to the disease (due to vaccination).
2. The rationale behind this is that the exposure of unvaccinated/susceptible animals (tigers in the case of tiger reserves) to infected animals shall be substantially reduced. Hence greater the proportion of individuals which are resistant/vaccinated/immune to the disease, lesser are chances of its transmission. In essence vaccinated animals stand as a firewall between tigers and stray animals.
3. A policy of herd immunity can be formulated for stray dogs and cats around tiger reserves to prevent the spread of CD and provide a level of protection to a vulnerable unvaccinated group like tigers.
4. The herd immunity threshold i. e. proportion of immune individuals in a population (in the instant case population includes all animals susceptible to CD including tigers) above which a disease may no longer persists needs to be arrived at in and around tiger reserves. Possible source of information can be retrospective data available with the local veterinary & animal husbandry office or colleges which shall help to see secular trends of CD cases in the said geographical area. Analysis of disease data can help establish:
 - b. Virulence of the CD virus prevalent in the area
 - c. The efficacy of commonly used vaccines to see number of cases contacting the disease inspite of vaccinationEmpirical data of different diseases however has shown that vaccinating 70 to 80% of the population helps in reduction of transmission of the disease. This shall help in designing a vaccination protocol for the envisaged immunization buffers with optimum costs as the entire population need not be vaccinated.
5. If retrospective data is not available then support from Veterinary Colleges/ Animal Husbandry Departments needs to be solicited for conducting a sero-prevalence study of stray dogs and cats around

the tiger reserve for CD. The sylvatic presence of CD in tiger reserves can be established by

- a. Retrospective data on wild animal mortality available with tiger reserve management.
 - b. Screening of serum samples of tiger after blood collection subsequent to immobilization.
6. Site specific preventive measures can be taken keeping in mind the following factors:
- a. The CD virus is fragile and will perish above 20-25 degrees C in sunlight. Therefore drying of fomites after washing is sufficient.
 - b. Any case of death if detected in the buffer/adjoining areas, the carcass should be removed and the area disinfected by flaming or 1:30 solution of bleach.
 - c. The CD virus is susceptible to chemicals such as 0.75% phenol, 1:30 bleach solution and detergents.
 - d. Accordingly disinfectant baths can be put up at all entry points to the park for vehicles coming from outside, staff should be advised to maintain strict hygiene of their premises inside the reserve.
 - e. Advisories in the form of hoardings, posters, leaflets in dailies can be issued highlighting common signs and forms of CD with graphics and with contact numbers for reporting if a CD case is suspected in and around the reserve.

7.2.2.5 Theme plan for Watershed development/Improving water table/Water harvesting in the buffer:

WHSs:

Water harvesting devices like WHSs and ponds etc. shall be constructed. These structures will not only conserve soil and moisture but also provide drinking water facility for wild animals. In hilly parts and slopes small stop dams and loose stone wall will be erected to check soil erosion as well as to collect water in pools.

Talais (Earthen water pond):

There are many natural depressions available in the foothills. These depressions can be developed in the form of small or big WHSs / water ponds as per the availability of the site.

Development of other water holes:

Though rivers are available as mega water bodies, the reserve is also provided with other rivulets and water springs. During subnormal rain year, water crisis arises. Open well / tube well (with water trough) and guzzlers will be constructed at suitable places.

Talais:

Talais /pond will be taken up this not only ensures the water availability of the MHTR buffer but also helps in the improvement of water table in the adjacent villages. These activities must be taken up with the help of EDC so that people living in and around the buffer will get employment which can in turn support the livelihood of villagers.

WHSs:

Since area is drought prone hence to increase availability of during water to animals, it is proposed to construct WHSs in the buffer. This will not only ensure the water availability of the buffer but will also help in the improvement of water table in the adjacent villages. These activities must be taken up with the help of EDC so that people living in and around the buffer will get employment which can provide support to the livelihood of villagers.

Returns/Outcomes:Grass and Fodder

The average annual yield of grass is expected to be around three tones per hectare. Hence the production of grass from 2000 hectare pasture land will be 6000 tones. The value of this grass @ Rs. 50 per quintal is Rs. 3.00 Lac per annum. In outer areas the eco development committees can make grass banks and collect the money generated by sale of grass from these areas under supervision of the park management. This money can be used for further maintenance of these pasture areas developed outside the buffer.

Fuelwood

In all 500 hectares of non forest area will be brought under fuel wood plantations. These plantations will be harvested after 10 years. Anticipated production from these plantations will be about 10 metric tonnes of fuel wood and 5.0 cu.mt. of small timber per hectare.

Increased Agriculture Production:

The eco development will help raising the water table in wells, thus providing more water for the agriculture. The stall feeding of cattle will provide more cow dung manure that will reduce expenses on manure. EDCs can form milk cooperatives and market their milk at higher rates.

Increased Yield of Milk and Milk Products:

With the better fodder production animal health care and improved breed of cattle, the production of milk will increase. This will help in developing a trade based on milk products. Later EDCs may act as milk cooperative committees and market the milk at higher rates.

7.2.2.6 Theme plans for Income generating Innovative pilot projects:

Economic benefits through speed controlling devices on Highways operated by EDC's of buffer areas:

As per NTCA guidelines, speed detecting radar guns will be installed on the roads for detecting speed of vehicles and subsequent regulations. It is proposed that EDC's of the buffer areas may be empowered to operate the Radar guns with forest personnel, ex-military men and the fine accrued of the offence may be deposited in the account of the EDC of that village as per the Wildlife Protection Act,2003.

Legal Provision:

As per the Wildlife (Protection) Act, 1972 amended upto 2006 sec 60-A: Reward to persons-(2) When a case is compounded under section 54, the officer compounding may order reward to be paid to a person who renders assistance in the detection of the offence or the apprehending the offenders out of the sum of money accepted as by way of compounding not exceeding [fifty percent of such money]

Sec 60-B. Reward by State Government:

The State Government may empower the Chief Wildlife Warden to order payment of reward not exceeding ten thousand rupees to be paid to a person who

renders assistance in the detection of the offence or the apprehending of the offender/s, from such fund and in such manner a may be prescribed.

Gypsies to EDC's of buffer areas:

The problematic villages in the buffer area Borabas, Dara station, Nayagaon, etc., may be prioritized and based on the population of unemployed, few tourist gypsies may be provided on loan basis to be utilized for tourism purposes in the Park and the benefit will flow to the villages. This would send a message in the peripheral areas that for tiger conservation the economic benefits are flowing to the people.

Budget demand:

The budget for buffer area development would be demanded in the Tiger Conservation Plan after prioritizing the villages as per their impact on the MHTR.

CHAPTER 8

ECO DEVELOPMENT AND LIVELIHOODS

8.1 Policy and Institutional Framework:

Introduction:

Mukandra Hills Tiger Reserve has many peripheral villages on all sides. The problems of these peripheral villages need to be addressed properly. The management practices in the past attempted to keep the villagers away. The villagers residing in the vicinity have been dependent on this protected area. It has resulted in conflicts with the villagers. In response to biotic pressures on protected (core) area, a broad based strategy of eco-development has to be adopted. The eco-development has two main thrusts i.e. improvement of buffer management and involvement of local people in developmental activities so that the negative impact on the core could be reduced.

A few eco-development activities to provide alternative fuel and fodder resource on the fringes of MHTR were executed. These also provided alternative livelihood opportunities for the local people. These schemes overlooked the participatory approach, which is fundamental philosophy of eco-development programme. At this juncture, we have to initiate the process of trust building and participation. These initiatives will generate initial trust of the local communities with the park management enhancing the understanding of the staff about the programme and generating base line information on the impact villages. The investments, so far, had been very low, sporadic & without proper micro planning. The real issues of management – conflict with people, could not be addressed.

Institutional Framework:

An elaborate institutional mechanism for implementation of the eco-development programme in buffer areas of MHTR will be developed. This institution will ensure participation of different stake holders, quick decision making at park management & state level and will facilitate the implementation of eco-development programme at grass root level.

Specific issues to be addressed through eco-development

- i) Reduced dependence of villagers on core area.
- ii) Sustainable use of the resources of buffer.
- iii) Alternative livelihood strategies.

- iv) Amelioration of living conditions of villagers.
- v) Community development work.
- vi) Sharing of income of tiger reserve.
- vii) Non- consumptive use of resources through eco-tourism.
- viii) Specific investments in the key support sector of rural economy.

8.2 Livelihood support initiatives through village micro plans

a) Participatory micro planning and implementation processes:

Micro planning support teams composed of park personnel, collaborating NGOs and villagers (each team with at least one woman and with members able to easily communicate with village woman) would assist village communities to develop and implement site-specific reciprocal plan on a sustainable basis. Focused guidelines, clearly determined investment criteria, supportive training programs and carefully scheduled planning will be ensured to meet the objectives of eco-development and to embody the active commitment & participation of local people.

b) Methodology to be adopted for village eco-development

- i. Active participation of all segments of society in plan formulation and decision making through a community institutional frame work of village eco-development committees that elicits the widest possible consensus.
- ii. Participatory rural appraisal (PRA) focused on the mutual interactions and reciprocal arrangements between the management and people.

8.3 Integration of rural development programs

Various rural development programs are being implemented in the district under financial support of Govt. of India and with the plan funds of State of Rajasthan. Efforts will be made to channelize maximum funds towards the buffer area. National rural employment guarantee scheme is an important scheme flowing maximum funds to the rural areas. Focus will be to propose more & more eco-development works in buffer area under this scheme. Funds available under other social welfare & employment generation schemes will also be utilized in buffer area at optimum level.

8.4 Monitoring and evaluation

Monitoring and evaluation are two indispensable arms, which support and strengthen any management. Developing & using information base is essential step in deciding management goals & objectives. It is expected that findings of a well organized, rigorous scientific monitoring will help park management in the following aspects:

- i) Status of implementation of scheme.
- ii) Quality of works executed.
- iii) Enhancement in benchmark knowledge.
- iv) Improve decision-making.
- v) Reduce overall management costs & enhance benefits.
- vi) Improve sustainability.
- vii) Increase public awareness & people's participation.

An analysis of reciprocal commitments and obligations will be done to evaluate the works. The success indicators have to be evaluated whether these are in accordance with those anticipated at the time of micro planning.

CHAPTER 9
MAINSTREAMING STRATEGY WITH VARIOUS PRODUCTION
SECTORS

Introduction

Mainstreaming towards wildlife concerns should be understood as a process to integrate wildlife conservation with various production sectors of the buffer zone where the primary emphasis is not conservation. This will safeguard wildlife interests by ensuring habitat supplement in buffer areas i.e. beyond the core for tiger spatial land tenure dynamics. Further, it would also strengthen conservation by reducing the possible interface conflicts between various production sectors and conservation, which otherwise leads to wild animals' earning a 'pest value' and eventually getting eliminated from the area. Thus, mainstreaming of wildlife concerns in the outer buffer landscape is essential to prevent such area from turning into '*ecological sinks*'. Mainstreaming tiger (wildlife) conservation concerns in various production sectors is imperative for the buffer zone to be viable and let it fulfill its objectives. This will involve modification of developmental practices in the key production sectors to make them more 'conservation friendly'. The process is, sector as well as landscape specific. However, some generic suggested activities based on environmental guidelines issued by the Ministry of Environment and Forests for developmental projects in different sectors, are as follows:

9.1 Wild life habitat

For mainstreaming habitat works, the following strategies will be followed:

- i) Monitoring of wildlife/tiger presence or sign survey in standardized formats on a daily basis will be done.
- ii) Foot patrolling by staff to ensure protection is mandatory for any situation.
- iii) Exchange of tiger/wildlife presence data with core or nearby other divisions will be done.
- iv) Monitoring of water points for sign survey will be done every day.
- v) Timely payment of compensation for livestock killings to reduce the retaliatory killing of wildlife.
- vi) Depredation by wild carnivores will be addressed and exgratia payment will be given in time.

- vii) Regulation of livestock grazing in areas prone to wild ungulates' movements will be effectively accomplished.
- viii) Timely and proper payment of compensation for crop damage by wild animals will be given to the effected person/family.
- ix) Village forest committees will be directed to keep strict vigil on forest fires to avoid great disasters.
- x) Review of wildlife status will be discussed in the meetings of forest development agency and further course of action will be determined.
- xi) Regulation of collection of non timber forest products from the reserve will also be done
- xii) Monitoring of village cattle for disease will be done for prevention from epidemics
- xiii) Maintenance of village level wildlife crime dossier is very important to enhance the knowledge base about the crimes of the area.
- xiv) Protection of riparian margins, if any, as special habitat will be done.
- xv) Retention of old/dead trees as unique habitat has a great value. So these will be retained.
- xvi) Staggering of forest stands belonging to different age groups will be maintained.
- xvii) Maintenance of grassy blanks for herbivores' forage is necessary.
- xviii) Incentives to local communities, from the foundation fund, will be given to keep up the enthusiasm among them.
- xix) Accruing of funds through recycling of gate receipts, as a reciprocal commitment for villagers' involvement in addressing wildlife concerns, forming part of MoU with the tiger conservation foundation in the village level micro plan.

9.2 Agriculture: For mainstreaming the agriculture around park, the following strategies will be followed:

- i) Adoption of 'eco-agriculture' model as a land use pattern to produce food as well as to conserve wildlife.

- ii) Sudden change in cropping pattern (*viz.* lure crops) will be discouraged to avoid accentuating man-wild animal conflicts.
- iii) Mosaic habitat *viz.* mixture of Fallow land, cultivation field, fruit orchard, plantation, under planting of shrubs, small timber etc. will be promoted to mimic natural forest.
- iv) Provision of economic incentives for safeguarding wildlife concerns will be there.
- v) Incentive for carbon, water and other environmental services will be given to local people.
- vi) Ex-gratia compensation for losses due to wildlife will be given rationally and in time.
- vii) Traditional farming will be encouraged for conservation.
- viii) Use of green manure will be promoted and use of chemical manures and pesticides will be discouraged.
- ix) Marketing of local products will be facilitated through tiger conservation foundation.
- x) Rural tourism will be promoted and involvement of local people will be ensured.
- xi) Use of market instruments through tiger conservation foundation (production certificate for organic products) for production, marketing etc. will be done.

9.3 Integrated Development

(i) Eco-development

Participatory village level planning and preparation of village level micro plans for eco development will be done. Providing inputs for resource substitution, income generation, community welfare and ecotourism for reducing the resource dependency of local people on surrounding forests through foundation will be done.

Ensuring reciprocal commitments with the local people through respective eco-development committees, forming part of MoU in the micro plan for safeguarding wildlife interests.

(ii) Development through District Administration

This involves multiple sectors operating in the landscape pursuing development, where wildlife concerns have to be integrated through formal contracts/ agreements between the Tiger Conservation Foundation, district authorities and eco-development committees. The responsibilities of various parties will be spelt out in the contract/ agreements for safeguarding wildlife concerns along with reciprocal commitments. Normally, such contracts/ agreements will discourage any detrimental practice and assign responsibility to the community for carrying out some interventions. In return, the community should receive an assurance from the tiger reserve authorities to have access to certain natural resources in the area or benefits.

9.4 Eco-Tourism

For mainstreaming the tourism, the following strategies will be followed:

- i) Development of ecotourism spots in buffer area.
- ii) Facilitating wildlife ecotourism involving local host communities.
- iii) Obtaining contributions from private commercial tour operators and lodge owners for local community development and conservation.
- iv) Contributions from tour operators for maintaining tourist facilities, staff welfare, and conservation.

9.5 Industry- There is a no major industry in near the buffer area. The captive mines of which are located in the fringe area of buffer zone. Some small scale and cottage industries are also situated in the town. There is need to promote development of commerce in form of small scale industries in adjoining area so that the dependency of local people on forest resources for their livelihood is reduced. Engaging local people in handicraft industry with micro financial support will be a preferred option for livelihood.

9.6 Irrigation projects: There is only one minor dam used for irrigation purpose in the buffer zone. This dam called Sawanbhado dam is located near Kanwas. Following measures will be undertaken to mainstream wildlife concerns in the area.

- i) Safeguards will be taken to prevent landslides on the periphery of reservoirs.

- ii) Monitoring of recharge of ground water will be done.
- iii) Silting and erosion prone areas will be identified and preventive measures will be under taken.
- iv) Old trees in the impounded area will be retained to facilitate roosting of birds and fostering ecotourism.
- v) Joint patrolling in the water body areas will be done with irrigation department.

9.7 Temple Pilgrimage – Pilgrimage is a growing problem in wildlife areas. In the buffer zone major pilgrimage site is Mandergarh temple situated in the Ranvtha Range. Following strategies will mainstream it:

- i) Master plan will be prepared and followed for normative approach for crowd regulation and visitors' facilitation.
- ii) Proper garbage disposal will be ensured.
- iii) Accommodation facilities for pilgrims in nearby Satellite townships will be provided.
- iv) Architectural code of civil works as contained in the master plan should blend with the environment.
- v) The key habitats, wildlife corridors will be avoided for pilgrimage purpose.
- vi) Pollution of local streams and water bodies will be checked.
- vii) Local shopping facilities to tourists through the Tiger Conservation Foundation, involving the Eco-development Committees, can be provided.

CHAPTER 10:

RESEARCH, MONITORING, TRAINING & WILDLIFE HEALTH

Introduction

Research on natural and social science is essential for PA management. The tiger reserve management has to be equipped with all scientific data of exact status of park resources, ongoing ecological process, nature of threats and opportunities, etc.. It will help in proper decision-making and adopting effective strategies to deal with various management challenges. For strengthening park management, Research and Monitoring are integral parts. Core of Mukandra Hills Tiger Reserve is a natural laboratory and it has vast scope for research. It is also necessary to engage organizations like WII, WWF and WCS to conduct research around buffer areas.

10.1 Research Priorities, Main Projects and Implementation

The research priorities are in the following fields:

1. Creation of baseline data – The information regarding flora, fauna, their distribution, abundance, movement pattern, ecosystem type, ecosystem services, social values is lacking. So, top priority will be given to create the base line data. To do this help will be needed from reputed organizations and research institutes.
2. Landscape level studies – Studies will be conducted to know the landscape aspects and connectivity. It will reflect the present condition and from this model it can be simulated to know the future of wildlife in this landscape.
3. Ecosystem level studies – The phyto-sociological studies in the park is also a priority sector, as there are a good number of endemic species found in and around buffer area. The different functions, aspects and critical biotic impacts are the other areas where research has to be given special emphasis.
4. Species level research –There is a huge scope to explore new species and their detailed ecological status and distribution over this geographical area. Along with this, different entomo-fauna, herpeto-

fauna, mammalian species are there which require broad scale studies on their diverse ecological values and aspects.

5. Studies on Human dimensions – Anthropogenic factor are one of the major factors involved in any park management. The buffer is having human settlements, agricultural area, cash crop plantation and other such multiple land use areas. Extraction of natural resources from the forest areas is a usual practice of local residents. These practices along with livestock grazing and poaching are having direct adverse effects on the habitat conditions and wildlife status of core and buffer. So, study should be conducted on the aspect of biotic impacts on animal movements.
6. Animals' behavioral studies – The ethology of the wild animals in human dominated areas, the ranging pattern, movement pattern etc. should be studied.

10.2 Monitoring frame work

Monitoring is an indispensable arm that supports and strengthens tiger reserve management. It is expected that findings of a well organized, rigorous scientific monitoring will help the tiger reserve management in the following aspects.

- Improve decision-making.
- Improve quality of management.
- Reduce overall management cost & enhance benefits.

An analysis of reciprocal commitments and obligation will be done during the monitoring process. The success indicators have to be evaluated whether these are in accordance with those, anticipated at the time of micro planning. A committee at tiger reserve level will do monitoring. It is suggested that eminent scientists and tiger reserve managers should be requested to serve on this committee.

10.3 Training needs assessment: Proper training is required in following fields:

1. Crime investigation and filing complaints.

2. Intelligence network building.
3. Preparation of forest offence case files.
4. Monitoring methods including camera trap.
5. Wild life forensics.
6. Management in other protected areas of the country.

10.4 Training programs

- Training of local people for skill transfer.
- Training of teachers for students.
- Training of forest personnel for eco-activities.
- Training of trainers for above approach methods.

10.5 Human Resource Development Plan

To build up capabilities in human resource, trainings and exposures shall be organized in the National institutes of repute. Specific orientation towards research has to be developed. Persons having inclination towards research and monitoring have to be picked up and sent for specific training courses.

10.6 Wild life health monitoring

It is essential to periodically monitor and survey the parasitic and infectious diseases in the buffer area. On the basic of these reports, park managers will be able to take necessary action to prevent the disease outbreak.

Following examinations are important for the evaluation of health & detection of diseases in wild ungulates.

- 1- General examination
 - a. Physical examination
 - b. Clinical observation
- 2- Laboratory test
 - a. Fecal examination.
 - b. Hematological examination.

c. Serological examination.

3- Study of kill

a. Detailed post mortem examination

b. Collection of material for laboratory examination.

10.7 Mortality survey

Detailed investigations will be carried out with reference to each mortality and action will be taken accordingly. Complete data will be kept and analysis will be done as per the situation.

CHAPTER 11
TIGER POPULATION AND HABITAT ASSESSMENT

11.1 Daily Monitoring Protocol

Daily monitoring of forest habitats is primary operation of tiger monitoring. Forest watchers and guards must patrol a considerable area everyday to identify the presence and absence of tiger and other co-predators and the effective habitats where they are leaving their indirect evidences. The forested area of buffer of MHTR tiger reserve will be divided into several census blocks to pursue systematic evaluation of tiger monitoring. For daily monitoring and forecasting at block level, following different activities are proposed to be carried out in the field:

1. Extensive survey will be carried out in all the regions at census block level to identify the potential habitats where tiger and other co-predators are migrating.
2. The field staff along with the regular patrolling duty will do this.
3. The presence/absence data of tiger and other co-predators will be gathered by both direct sightings and indirect evidences like pugmark, scat, scrape, rake mark, scent marking, vocalization, kills etc..
4. At least 10 pugmark impression pads (PIPS) will be laid in a census block, preferably in areas frequented by tigers & other co-predators.
5. The distance between two successive PIPs will be 1 km.. The size of PIPs will be 3m ×2m.
6. The PIPs will be monitored once a week for tiger and other co-predators' evidences (pugmarks/ scats) and camera traps (at least one pair in each block) will also be deployed.
7. Photographs of the individuals, in case of direct sighting, will be captured with digital cameras. Plaster casts of pugmarks will also be taken.
8. Sudden/drastric reduction in tiger and other co-predators' evidences must be conveyed to the range office and divisional office as warning and alarming information.
9. All the available data from daily monitoring will be kept in proper format with GPS location and direct sightings will be conveyed to the divisional office.

11.2 Tiger Population Estimation and monitoring framework (Phase I, II and III)

The monitoring framework for tiger and other co-predators is a multiphase process.

Phase I: Spatial mapping and monitoring of tigers, prey and habitat.

This stage consists of mapping of tiger presence and relative abundance, tiger prey presence and relative abundance, habitat quality and anthropogenic pressure at a high spatial resolution of 15 to 20 km².

Sampling for tiger, leopard, and other carnivore sign encounter rate.

Phase I contains intensive survey of the PA for the search of tiger, leopard or other carnivore signs. This target data is extremely easy to collect and require no high-level technical skills or equipment. Tiger monitoring team will primarily be responsible for the data collection. The Tiger monitoring team will be trained in the data collection protocol and will be tested for consistency.

To obtain data on presence, absence and intensity of use of a census block by tigers and other carnivores, the relative abundance of tiger, leopard, and carnivore signs in a block will be quantified. The following procedure needs to be followed for data collection:

- The total area under PA will be divided in to several census blocks and each census block will be considered as a sampling unit.
- Areas within the block that have the maximum potential for tiger/ panther occupancy will be intensively searched.
- Since tigers and leopards have a tendency of using dirt roads, trails, footpaths, riverbeds and ‘nallahs’, these landscape features, within the block, will be searched intensively.
- One to three persons who know the terrain and habitat features of the block should conduct the search for tiger/panther sign.
- There should be 3-5 separate searches (in different parts within the block and/or at different times 1-5 days apart), each search covering about 4-6 km distance in areas having the best potential for tiger/panther presence. It is important to record the distance covered and the time spent during each

search separately and accurately. If time is spent in resting or in other activities, while conducting the search, this duration should be reported separately. GPS coordinates of the beginning point of each search path should be recorded.

- The total minimum distance covered, while searching for tiger and other carnivore sign, should be 15 kms. per block.
- Tiger and leopard signs should be classified into the following categories 1) Pugmark trails, 2) Scats (Old: dry with hair and bones visible; Fresh: dry but intact with shiny surface; Very Fresh: soft, moist, and smelly, 3) Scrapes. 4) Scent marks (spray, rolling), 5) Rake marks on trunks, 6) Actual sighting, 7) Roaring (vocalization), 8) Kills (Predation on wild prey).
- On a terrain and vegetation cover like MHTR core, getting pugmark trail is little difficult. So maximum emphasis will be given on getting other signs.
- A brief description of the topography and forest type is to be recorded for each sign.
- In case of pugmark trails, each trail set will be considered as one sign (not each pugmark as one sign). In case, a tiger (or other carnivore) continues to walk along a dirt road for a long distance, then this should be considered as one sign, and a comment should be recorded in the remarks section of the data, regarding distance covered by a pugmark trail of a single tiger.
- Tiger and leopard signs if encountered outside the sampling route should also be recorded with GPS coordinates and with appropriate comments.
- Special emphasis should be given to signs of tigress and leopardess with cubs, and any authentic evidence of tiger cubs (sighting of cubs, lactating tigress, tracks, etc.) obtained within the past twelve months.
- While sampling for tiger and leopard signs, record should also be kept for signs of other carnivores that are encountered.
- The number of livestock that are killed by predators within past three months needs to be recorded in the questionnaire following the data sheet.
- It is important to report data sincerely. It is likely that there may be reliable information that tiger/leopard is present in the block being sampled, but no signs are recorded during the intensive search survey. In such cases, mention should be made in the remarks column of the data sheets. However, failure in

obtaining tiger sign from a block is equally important as recording signs and for appropriate analysis of this data, the actual data should be reported.

Phase II: Spatial and attribute data:

The spatial and attribute data that are likely to influence tiger occupancy of a landscape will be used for modeling in a GIS domain. The vegetation map, terrain model, night light satellite data, drainage, transportation network, forest cover, climate data, normalized difference vegetation index, livestock abundance, human density, socio – economic parameters etc. will be used for modeling habitat condition and tiger occupancy. Beat wise vegetation sampling will be done to generate broad vegetation map. This modeling will help in determining current spatial distribution of tigers, potential habitats, threats to crucial linkages between occupied landscape & conservation planning.

Phase III: Estimating the population of tigers, its co-predators and their prey:

Teams of researchers will be deployed in each landscape complex for estimating tiger and its co-predators' density and ungulate densities with in stratified sampling units.

11.3 Habitat assessment framework -

This consists of:

- a) Tiger presence and relative abundance.
- b) Tiger prey presence & relative abundance.
- c) Habitat quality and anthropogenic pressure at a high spatial resolution of 15-20 sq.kms.

A forest beat (an administrative unit), 15-20 sq.km. in size, delineated primarily on natural boundary will be the unit of sampling. The sampling will be systematically distributed in all beats of forests of buffer area and adjoining revenue lands. Thus, the entire landscape where tigers & panthers are likely to occur/migrate is sampled. The detailed methodological approach for sampling other carnivore signs, pellet/ dung counts, habitat & anthropogenic pressure will be followed.

11.4 Spatial data base development

The spatial data generated shall be scientifically robust and amenable for statistical analysis & inference. Since several replicate surveys will be undertaken in each beat, we shall be able to model tiger occupancy, detection probability of tiger sign and relative sign density at a high spatial resolution. Since data will be analyzed in GIS domain, several spatial attribute like human density, livestock density, road network, topographical features, forest type & cover, meteorological data, poaching pressure and landscape characteristics will be used as co-variants to model tiger occupancy and relative abundance in a landscape and individual forest patches. Time series analysis of data at a larger spatial resolution is likely to have sufficient precision for monitoring spatial occupancy of tiger and its co-predators in association with changes in their prey, habitat quality and anthropogenic pressures.

11.5 Analysis and reporting framework

A tiger monitoring team will be constituted in buffer area. It will function as follows:

- i) Concerned Range Officer shall coordinate the monitoring team in his range.
- ii) Concerned 'naka' staff & watchers will accompany them.
- iii) Asstt. Conservator of Forests shall be the overall in charge of the tiger monitoring team.

- v) Range Officer Research shall be the coordinator of the group. A technical committee for the monitoring activities of the teams will be constituted as:

Conservator of Forests & Field Director, MHTR	-	Chairman
Deputy Conservator of Forests, Buffer MHTR	-	Member
Asstt. Conservator of Forests	-	Member
All Range Officers	-	Member
Range Officer, Research	-	Member

Asstt. Conservator of Forests shall coordinate the field level monitoring. The final annual report shall be prepared and submitted to the Chief Wildlife Warden, Rajasthan and NTCA, New Delhi.

CHAPTER 12
PROTECTION AND INTELLIGENCE GATHERING

12.1 Deployment of native workforce

Different strategies have to be adopted for protection and intelligence gathering in a tiger reserve, by the management officials. One step will be direct implementation and control over the illegal activities by checking the culprits who are actually involved in committing crime, while another way is to reduce the crime by solving the problems/reasons for which these people go for poaching & other crimes. Different strategies recommended are-

- i) For protecting the buffer area, the native residents will be deployed as security personnel/ Village Wildlife Volunteer (VWV) through EDCs.
- ii) Promoting the concept and awareness of eco-tourism amongst the local communities and their direct involvement in it will be a good solution.
- iii) Young boys and girls will be deployed in different activities of the eco-tourism wing, thus the threats towards conservation practices, from the local residents, will reduce.
- iv) Eco-development committees will be constituted whose duties will be operation of tourism in the park. Different activities like selling the tickets, controlling the vehicle entry, avoiding the usage of non-biodegradable products and replacing them with bio-degradable products, checking the actions of the tourists and suggesting proper behavior are expected from these EDCs.
- v) Local people will be deployed as guides and watchers in different activities like jungle patrolling, tiger trailing, nature walk & green walk, bullock cart ride and also in visit to rural heritage sites. Thus local youths will be deployed in protection work as well as in revenue earning business.
- vi) Consciousness towards biodiversity conservation will be spreaded through local youths.

The standard of life of the native communities will be raised both economically as well as ethically through proper education of their children.

This process will reduce their dependency on the natural resource and they will associate themselves in conservation actions. Thus, deployment of native workforce will help in sustainable management of MHTR.

12.2 Patrolling strategies including Joint Patrolling

Patrolling operations will be carried out through trekking as well as by motor vehicles/ bikes in different zones of the buffer area. Regular patrolling will be carried out for effective protection of valuable flora and fauna of the buffer area. Vulnerable locations will be visited regularly. The patrolling staff will be equipped with Rifle, Wireless sets, GPS, medicines. They will record every observation in course of their patrolling and will report regularly to the range head quarter through wireless sets. Whenever there is emergency, the field staff will immediately report to the Range head quarter and depending upon the situation, all adjacent camps will join hands in tackling the situation. Measures suggested for effective patrolling are as follows:

- i) Regular day and night patrolling and sudden checking will be carried out by each camp/chowki located in buffer region.
- ii) Range officers of respective ranges of buffer zone will patrol the area at least twice a week.
- iii) Joint foot patrolling will be done at least once in each fortnight with range staff of both buffer as well as core areas under the leadership of a range officer. They will search for all the wildlife signs and patrol vulnerable areas. They will also search for illegal activities if any.
- iv) Supervising officers will do crosschecking of patrolling.
- v) All existing patrolling paths will be cleared annually to provide safe passage to field staff for patrolling.
- vi) The trekking paths will also be maintained every year
- vii) Proper mapping of these patrolling paths and trekking routes will be done and if required, new alignment for effective patrolling will be done.
- viii) Basic logistic support will be provided to field staff such as wireless equipment, search and torch lights, arms and ammunition, kerosene, jungle boots, medicines etc.
- ix) Servicing of rifles and guns will be done as per requirement.
- x) Repair of wireless sets will be done as and when required.
- xi) Ration will be provided to the staff in each camp.

- xii) A ready stock of new torchlight's will be kept at the range head quarters for replacement of old and unserviceable torch and searchlights and the defective ones will be repaired immediately.
- xiii) At least 5 liters of kerosene will be supplied to each field camp every month and new hurricane lamps will be provided to replace the old ones, where electricity is not there.
- xiv) Two pairs of uniform, one pair of jungle boots and two pairs of socks will be provided to each field staff every year.
- xv) Other items of uniform such as raincoat, pull over etc. will be provided to staff in every two years.
- xvi) A quality binocular will be provided to each camp to enhance the range of visibility for effective patrolling.
- xvii) Night vision binoculars will definitely help in effective patrolling during night emergencies.
- xviii) Construction of watchtowers at strategic locations will enhance the efficiency of patrolling staff.
- xix) A mobile patrolling party of divisional head quarter will also check and cross check the areas covered by various other parties, in order to supervise their patrolling activities.
- xx) Special protection parties will be organized.
- xxi) A monitoring / daily observation register will be maintained in each patrolling camp, in which the field personnel will record their daily observations based on patrolling.

12.3 Maintenance of Village level Crime Dossiers

To control the illegal activities, a proper list of persons residing in the adjoining villages and having a record of forest offences will be prepared. For this purpose, police department sources may be referred and their photographs should be kept in all respective range offices and division offices. Proper description of their address along with their identifying marks will be categorically written in proper format. For investigating any forest offence in adjacent areas, these people should be interrogated and their alibi information should be collected from other residents. If a categorical list can be prepared in this way, it will help in both reductions of offences

as well as intelligence gathering, as few poachers or offenders later on may become good informers to help the department.

12.4 Fire Protection

Accidental and man-made wild fires are quite common in the buffer area of MHTR. The vegetation types like grasslands and deciduous forests are more susceptible to forest fires. To control forest fires following strategy are proposed:

- i) Existing fire lines in grass lands will be maintained by cleaning the lines in at least 3 m. wide strip and work must be completed before February, i.e. before the dry season sets in.
- ii) Trekking paths that also act, as fire lines will be similarly maintained.
- iii) Special firewatchers will be deployed during summer season through EDCs.
- iv) During the daytime, extensive patrolling will be carried out to detect point of origin of fire if any.
- v) Whenever any fire is detected, every effort will be taken up to extinguish it. It will be ensured that the staff shows no negligence in this regard.
- vi) Whenever any patrolling staff detects any fire, it must be conveyed over wireless to the respective beat, range and division office and the record must be kept in diary or patrolling record.
- vii) Before start of the dry season, the divisional officer must hold meeting of all the rangers and beat officers to identify the fire prone areas and mount up vigil in such areas to prevent fire.
- viii) Efforts should be made, through the eco-development committees; to influence the local villagers not to make any man made fire incidents.

12.5 Intelligence Gathering and Coordination

Intelligence gathering is a very important tool for prevention of wildlife crime. Prior information of movement of poachers and illegal wildlife traders helps to initiate timely action to prevent the offence. It is also necessary to nab the culprits even after the offence has been committed. The success of protection depends on information gathered by the management. The mechanism of information collection, in most of the cases, becomes highly personalized and its effectiveness depends upon the initiative taken by the official concerned.

Some of the proposed strategies are as follows:

- i) Maintenance of regular source of information by the Field Director, Dy. Field Director, Asstt. Field Director and Range officers for getting regular feedback about the miscreants. A reliable source will have to be specially maintained in each notorious locality that harbors poachers.
- ii) Close collaboration with Police and Custom authority will be maintained.
- iii) Assistance from NGOs, Wildlife enthusiasts and local people will be sought.
- iv) Provision for suitable rewards to informers will be kept.
- v) Suitable modifications in patrolling methodology of the field staff so that their movements and secrecy matches with that of poachers.
- vi) Well-equipped legal cell at FD office will be established for record keeping and disposal of cases of forest and wildlife offences.
- vii) Soliciting support from villagers through mass eco-development activities in villages of buffer area.
- viii) Secret list of persons with criminal track record/involved in poaching, whether convicted or not, will be prepared and regularly updated at Range level.
- ix) A fund for operating secret information service will be maintained.

Since the illegal activities in the area are also related to neighboring states, it is necessary to have coordination between various enforcement agencies like Police, Railway police, Customs, Director of intelligence etc. There should be one committee comprising of all these agencies to exchange the information. This committee should meet at least once in six months. For better management and protection, coordination among various line department and law enforcing agencies is required.

CHAPTER – 13

ECOTOURISM AND INTERPRETATION

Now a day's most of the activities of the people are confined to their houses. Business or service one hardly gets a chance to be a part of nature. There are many people who have not really seen how a Jungle looks or what a thrill it is to walk and watch wild animals in the jungle. Gradually a lull to see and wander in the forest is surfacing in the society. Nature tourism is called "Eco –tourism".

Living with the nature in camps, trekking and viewing wildlife would definitely be a source of adventure and environment education. It may not be possible for a stranger to have an idea about the forest and the nature on his own, the services of experienced person acquainted with nature and wildlife with a set of comprehensive guidelines is essential.

Existence of wildlife is an indication of biological health of an area. The recognition and understanding of inter relationship between flora and fauna by human beings is of utmost importance for co existence and well being of all the three.

Increasing tourism trends in wildlife areas brings about varieties of pressure threatening the very bio-diversity of protected areas. Therefore a well thought well planned and disciplined tourism is the need of the time.

The protected areas can only become sustainable with presence of friendly host communities around their periphery. The communities can become friendly if they are gaining economically, socially and culturally through the Eco-development programme and tourist activities.

Eco-tourism in context of Tiger Reserve is ecologically sustainable nature-tourism, which is emerging as an important component of tourism industry. It is distinct from mass tourism, having sustainable, equitable, community based effort for improving the living standards of local host community living on the fringes of the Tiger Reserve. Eco-tourism is proposed to be fostered with financial support to the host community through soft loans from eco-development committees, in accordance with site-specific Eco-Tourism plan and carrying capacity of Tiger Reserve in the buffer areas. The Core/Critical Tiger habitat would be used for tourism only in the initial years and the ongoing tourism activities in such areas should be phased out in the fringe / buffer areas, without affecting its corridor values. The development of tourism related facilities within the buffer zone of the Tiger Reserve would continue with inputs under Project Tiger. The opportunities for stake holders would include

management of low cost accommodation for tourists and showcasing the culture of the region.

OBJECTIVES

Nature education and tourism development program is proposed in this project with the following objectives.

- To promote nature tourism among all sections of the society.
- To develop a sense of appreciation for all living beings.
- To promote understanding and appreciation of the tiger reserve and its significance for cultural, religious and recreational purposes.
- To promote public understanding and support in favor of policies and programs being executed for the preservation of the tiger reserve.
- Creating a source of income to the local communities.
- To dispel the fear from wild animals and encourage sympathy, support and love for wildlife as a whole.

13.1 Organization, Setup and Management

Tourism in MHTR will be managed by a tourism cell. For computer job work out sourcing will be done.

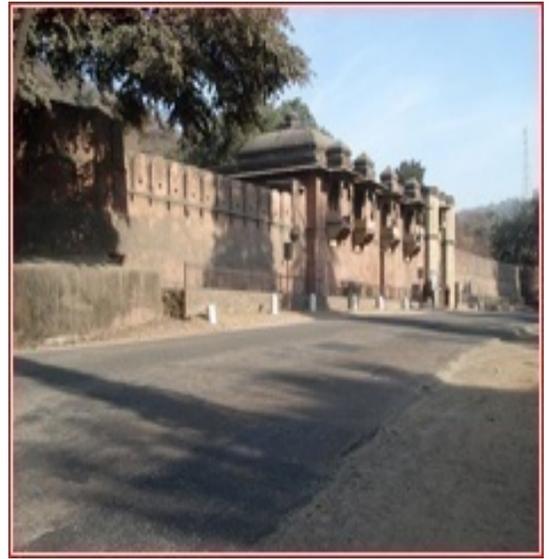
A proper system of advanced booking will be enforced through DOIT, Jaipur Rajasthan so that there is no uncertainty and wastage of time at the entry point. For this-

- (1) Tourism zones must be delineated.
- (2) Routes must be laid out and tourists are to be restricted to these routes only.
- (3) Trip time to be fixed to 4 hours only. Two trips to be allowed in a day, one in morning and one in evening.
- (4) Only petrol Gypsies/Camper and canters of local Eco Development Committee will be registered by the park authorities and allowed to enter the park for a trip at the initial stage. Reservation of vehicles could be done well in advance.
- (5) Till tourism gains momentum private vehicles suitable for the terrain will be allowed and fee will be collected as per the prevailing orders of CWLW Jaipur.
- (6) MHTR is fortunate to have richness of natural beauty, flora and fauna accompanied with places of religious historical and archaeological importance.

Plate-10 :- Heritage sites in MHTR



Gagron Fort



Abli Meeni Mahal



Ranvtha Mahal



Badoli Temple

The rich cultural and historical heritage of the area attracts people from other states of India as well as from all over the world. Tourism has over the past decade emerged as a key sector in the National Parks. The tourist traffic in the park has been growing over the last few years.

So far tourism in MHTR has been attracting domestic and foreign tourists in small numbers but looking to the enchanting beauty and splendor of the picturesque forest wealth presents in the surrounding sanctuaries and reserve forest areas, there is still a lot of scope for opening avenues of tourism related to nature and forests. The development of “Green Tourism” or Eco- Tourism will not only enhance the tourist arrivals in the district but will also earn sizable foreign exchange together with employment generation largely in an around the reserve giving benefit to rural population living in and around the park.

Guides

Nature guides will be selected from local Eco Development Committes and registered by the park authorities. The guides will be compulsory with each vehicle.

Vehicles

Two types of vehicles, i.e., gypsy/camper and 16/20 seat canter (mini canter and mini buses) will be permitted in the park.

Table-44 Comparison of Gypsy & Canter:

Gypsy	Canter
<p>Advantages</p> <p>Less air & sound pollution per vehicle</p> <p>Better satisfaction of the tourists since vehicle is less noisy, the noise of the vehicle is more tolerable</p> <p>Better satisfaction to tourists since disturbance from fellow tourists is less</p> <p>Privacy of the tourists is assured</p> <p>More freedom to pursue special interests, little chance of clash with interests of tourists</p> <p>Delays before entering the park are less</p>	<p>Disadvantages</p> <p>More air & sound pollution per vehicle</p> <p>More noisy, disturbs tourists since noise is less tolerable</p> <p>Disturbance from the fellow tourists is more</p> <p>Privacy is not assured since the group is large</p> <p>The diverse interests of tourists cannot be satisfied</p>

Gypsy	Canter
<p>Erosion of forest tracks per vehicle is less since vehicle is light</p> <p>Satisfies the ego of VIPs and rich people</p> <p>Can run on all designated forest tracks</p> <p>Suitable for serious photography</p> <p>Control by nature guide is better since tourists are less</p> <p>Close one to one communication with nature guide</p> <p>Creates less turbulence behind the vehicle, thus, disturbance to dust is lesser in case vehicle is moving slow</p>	<p>Delays before entering the park are more since tourists are lifted from various places</p> <p>Forest Track damage per vehicle is more since vehicle is heavy</p> <p>The rich people and VIPs feel as if they are commoners</p> <p>Canters cannot run on all designated forest tracks</p> <p>Serious photography cannot be done unless the whole group comprises of photographers</p> <p>In case nature guide is not good the tourists may become unruly</p> <p>One to one communication with nature guide is difficult</p> <p>Creates more turbulence behind the vehicle, thus disturbance to dust is more.</p>
<p>Disadvantages</p> <p>Limited seating capacity, hence large number of vehicles are required resulting in higher frequency of disturbance to the animals</p> <p>Large groups cannot be accommodated on same routes which causes dissatisfaction.</p> <p>More chances of violation of rules since nature guides & drivers can easily be lured.</p>	<p>Advantages</p> <p>Can accommodate large number of tourists, hence less number of vehicles are required implying less frequency of disturbance to the animals. One canter can accommodate tourists equivalent to 4 or 5 gypsies</p> <p>Group satisfaction is better since the group is able to share same experience on the same route, it is better option for group entertainment.</p> <p>Less chances of violation of rules</p> <p>Less maneuverability, hence cannot</p>

Gypsy	Canter
<p>A Gypsy can rush quickly to the spot where tiger is being sighted. Since it has high maneuverability breaking speed limit rules and behaving unruly is possible.</p> <p>Gypsy is risky in case a enterprising driver takes it very close to the tiger.</p> <p>wildlife viewing is poor since its height is less, tourists stand on seats & even on the top to view animals creating a situation of risk.</p> <p>Not effective for educational trips, educational value of gypsy tour is poor but good for conducting surveys.</p> <p>gypsy can go cross country for sighting tigers leaving designated tracks, thereby damaging habitat</p> <p>The trip incurs a higher cost.</p> <p>Seating in gypsy is crowded and uncomfortable</p>	<p>rush to spot where tiger is being sighted</p> <p>Canter are more safe due to its height</p> <p>wildlife sighting is better since seats are high</p> <p>Better for educational trips, more educative in case nature guide is proficient.</p> <p>Canter cannot go cross country and off the tracks hence less damage to habitat is caused by canter.</p> <p>The trip is cheaper</p> <p>It has more space and is less crowded.</p>

Problems of Management of Tourism:

The staff cannot communicate in English, thereby; communication with tourists directly is inadequate. Due to language problem staff is unable to provide requisite information to the tourists. The behavior of the staff is sometimes improper which is unpalatable to the tourists and others. Staff is overburdened because of shortage of manpower. They have to work hard from early morning to late evenings, thus, reducing their efficiency.

Roster System of Vehicle

The Roster system is an assured business activity. The local people won't be getting benefited because of the business opportunity. At the most the local people

are engaged only as drivers. For sustainability of the Park, local people should get maximum benefit. It should not become yet another business opportunity for the people with money and the greedy. Only the locals who are drivers as well owners should be allowed to register the vehicles to ply in the Park. This ensures maximum involvement of the needy local people in protection of the Park.

Tourism Methodology

- Tourists will be allowed in the park on through registered vehicles only.
- Trekking/camping/adventure tourism is not in vogue.

Closing season

The park will remain closed for tourists from July to September every year.

Tourism Facilities

Kota is well connected by train from Jaipur, Agra, Delhi and Bombay. It is also well connected by road with Jaipur, Agra and Delhi. From low cost to luxury class hotels have come up in Kota for the tourists. Tourist reception centre run by the Tourism department facilitates tourists and provides them required information. One Interpretation centre is planned to be constructed at Garadiya Mahadev Temple. Lack of Interpretation centre is also felt by the tourists. Tourists need to be tackled by trained and reliable group of persons in a sophisticated manner. Tourists still approach the forest department for correct information and guidance.

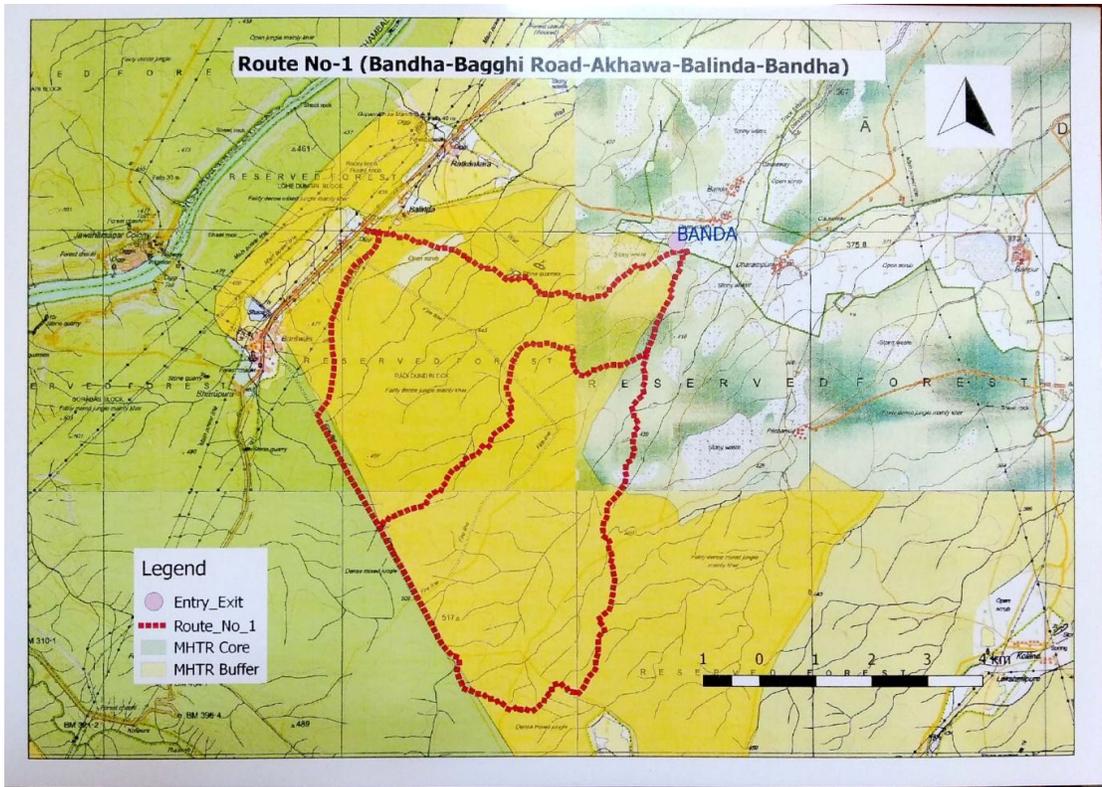
Tourism Zone

The proposed tourism zones in MHTR are as follows

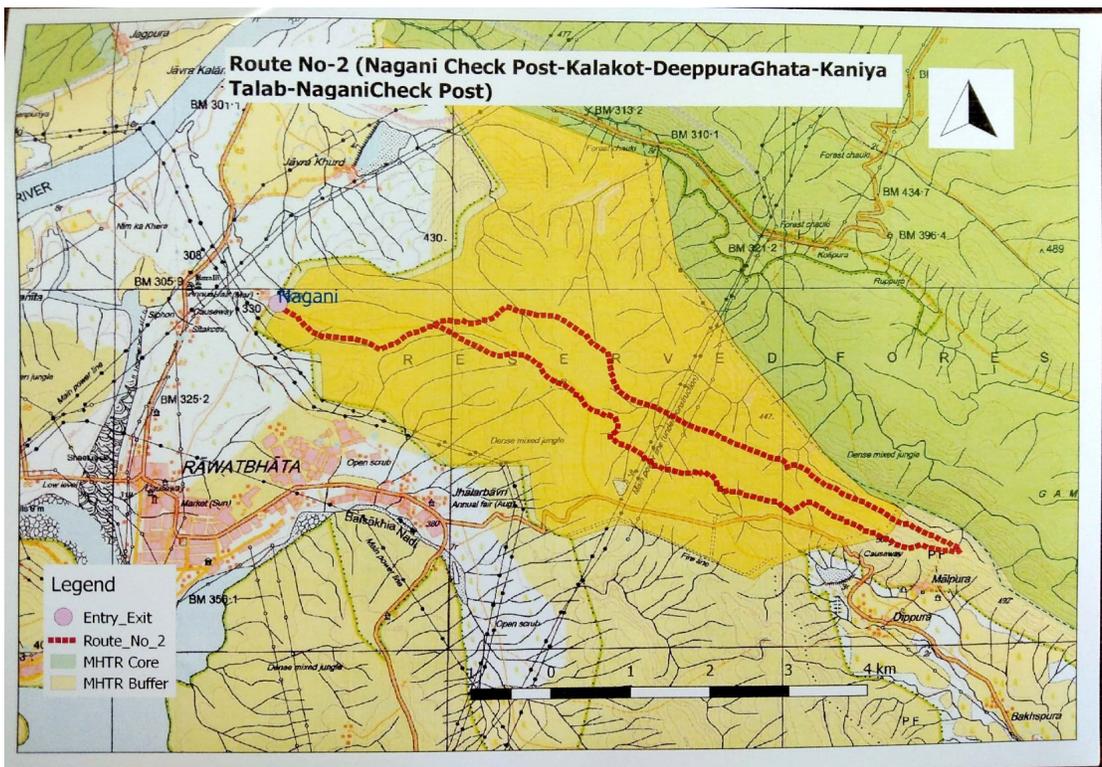
1. Bandha-Bagghi Road-Akhawa-Balinda-Bandha
2. Nagani Check Post-Kalakot-Deppura Ghata-Kaniya Talab-Nagani Check Post
3. Mandergarh Barrier-Mandergarh Tabla-Keshopura-Rojhala Talab-Mandergarh barrier
4. Morukalan-Banjar-Retiya Talai-Patdaiya-Sawanbhado

All these routes are fair weather tracks, which normally takes one full day time for up and down. These are to be maintained every year after the rains to keep them usable.

Route-1 :- Bandha-Bagghi Road-Akhawa-Balinda-Bandha

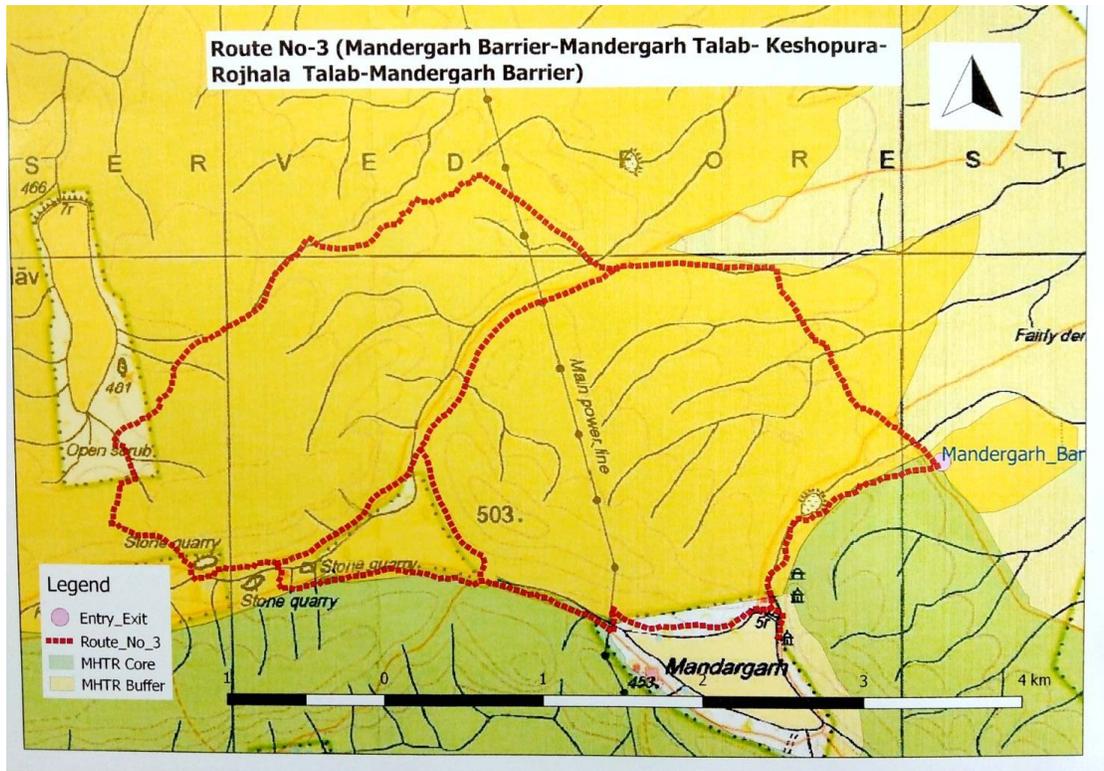


Route-2 :- Nagani Check Post-Kalakot-Deeppura Ghata-Kaniya Talab-Nagani Check Post

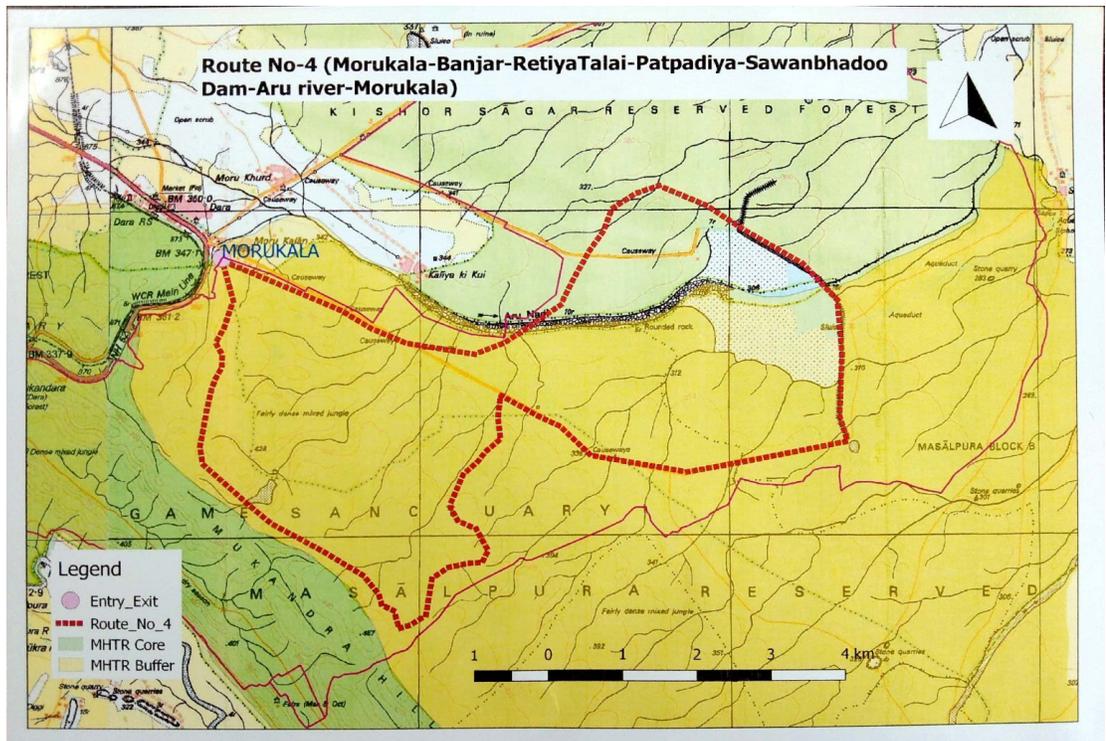


Check Post

Route-3 :- Mandargarh Barrier-Mandargarh Talab-Keshopura-Rojhala Talab-Mandargarh barrier



Route-4 :- Morukalan-Banjar-Retiya Talai-Patpadiya-Sawanbhadoo Dam-Aru river-Morukalan



13.2 Determination of Carrying Capacity

In the present scenario of our country, mainland eco-tourism largely connotes to wildlife tourism. Eco-tourism provides the necessary impetus for wildlife conservation and helps in eliciting the much needed public support. It can be expressed as a function of human interventions for eco-tourism (weighted ecologically) added to biodiversity:

$$ET : f [(HI \times EP) + (BD)]$$

where, ET : Eco-tourism

f : Function

HI : Human interventions for eco-tourism

EP : Ecological principles

BD : Biodiversity (wild plants/ animals in their natural habitat)

Any eco-tourism venture - domestic, intra-regional or international - has to be weighted and audited ecologically before it is embarked upon, to avoid ecological dislocation.

Determination of Carrying Capacity:

Tourism in MHTR will be confined to the core area at least for a decade. Hence the number of tourist vehicles plying in the park will influence to a large extent the sustainability and well being of the park. Large number of vehicles will certainly disturb the animals and cause a lot of erosion and pollution in the park. Less number of vehicles will put the tourist in difficulties. Hence optimum number of vehicles that park can sustain will be calculated on the basis of well known carrying capacity formulae. The maximum number of vehicles permitted per trip in MHTR will be on the basis of carrying capacity calculation for MHTR as per NTCA guidelines.

Research need for Eco-tourism activities & carrying capacity -

The primary objective of wildlife management is to protect and conserve wildlife and its habitats. For environmental education and environmental awareness activities tourism is promoted in protected Area. More tourism may adversely affect the conservation of wildlife. Hence well thought eco-tourism programme is necessary to improve the financial condition of surrounding host communities and raising fund for wildlife management without causing adverse impact on wildlife and

its habitat. The core area of MHTR is very small so a scientific research is necessary to propose eco-tourism activities in the protected Area.

13.3 Implementation of Ecotourism Guidelines

As per the guide lines of NTCA no tourism activity is to be permitted in the long run in the CTH area. Presently looking to the tourism scenario in MHTR it has become essential to continue tourism activity in CTH area for the present plan period. Efforts will be made to divert tourism pressure from core area to buffer area.

For proper regulation of tourism in nature Govt. of India has formulated Eco-tourism Policy & Guidelines (2002). Further NTCA has issued circular for proper regulation of eco-tourism – dated 14 December 2007.

Following regulations are prescribed for different categories of stakeholders:

For the Park Management:

The following operational guidelines are proposed:

The eco-tourism planning should be flexible, site-specific and participatory, and should form part of a larger eco-development/ eco-regional plan for the area

Assessment of existing infrastructure, surface transportation, air service, road, electricity, water supply, law and order situation

The eco-tourism package should invariably include:

- Simple, adequate boarding and lodging facilities, in tune with the environment and the general setting of the landscape
- Road network within the identified tourism zone
- Self - guided Nature trails
- Transportation options
- Interpretation Centers
- Way-side exhibits
- Signage
- Observation towers
- Public conveniences
- Garbage disposal facility
- Living quarters for staff/ personnel

- Structures with an exotic look causing visual pollution and non-compatible and unaesthetic architecture should be avoided
- Site-specific micro - planning for community based eco-tourism should be resorted to
- Providing soft-loans from the “Foundation” to identified beneficiaries
- Temporary housing structures blending with the surrounding should be encouraged Environmental, physical & social carrying capacities to limit the various developmental activities in the fringe area to be identified for eco-tourism
- Mechanism to ensure continuous monitoring of adverse effects of tourism for quick redressal should be devised
- Recognize eco-tourism operators, provide incentives to deserving cases and award quality labels

Provide visitor information & interpretation services (bilingual) covering:

- “Do's” and “Don'ts”
- What to see?
- Where to see?
- (Brochures, leaflets, guide service, visitor centers)
- Periodic training programmes on eco-tourism should be conducted for tourism administration, planners, operators and general public

Ensuring training programme to the host community in:

- Lodge ownership/ management
- Basic education and awareness
- Health and sanitation
- Skill development for preparation of local souvenirs as appropriate
- Codes of conduct
- Forest and wildlife conservation
- Litter control
- Forging partnerships with tourists & tourism industry
- Environmental management
- To evolve and implement eco-tourism package in a few selected sites initially as pilot projects

For Tour Operators/ Developers

- To abide by the planning restrictions, codes and standards prescribed by the authorities
- Implementation of desired environmental principles through regulation
- Conducting EIA/ environmental audits for new/ ongoing eco-tourism projects
- Being sensitive to the conservation of endangered species & corridor value of the area
- To ensure construction of structures blending with the environment as per the prescribed building code
- To take into consideration the carrying capacity and sociological use-limits of the site while creating tourist facilities, and ensuring safety & convenience of tourists.
- To use local material and design as far as possible, while avoiding over construction.

The planning, architectural design and construction of tourist facilities should use eco-friendly techniques viz., solar energy, recycling of garbage, harvesting of rain water, natural cross-ventilation instead of AC, self-sufficiency in food through kitchen garden & farming.

- Energy & water saving devices should be used apart from controlled sewage disposal.
- Control of noise pollution, chemical pollution and air emissions.
- Use of signages/ boards as per the standard prescriptions in the code.
- Reduced use of environmentally unfriendly items like asbestos, CIS, pesticides, inflammable material.
- Respecting the historic and religious sites in the area.
- Providing appropriate interpretive service to visitors for communication with nature & local culture.
- Ensuring proper marketing of eco-tourism products.
- Ensuring training of staff on environmental issues.
- Ensuring safety and security of visitors.
- Respecting local inhabitants, culture & involving them in various activities and vocations as far as possible.

For the Visitors

- Abiding by the code of conduct, “Do's” & “Don'ts”

- Helping conservation, apart from protecting any site natural or cultural, this may be adversely affected by tourism
- Avoiding wastage of resources
- Avoiding littering & carrying back all non - degradable litter
- Leaving the camp sites clean before departing
- Avoiding removal of plants, seeds, drift - wood from the site
- Respecting local culture/ customs
- Respecting holy places
- Strictly adhering to the safety precautions

For the Host Community:

- Respect the value of environment and cultural heritage
- Avoid overusing the area
- Co-operate with the authorities in ensuring healthy eco-tourism
- Realize and react to the threat of investors who see opportunities and exploit the locals
- Be friendly with the visitors as effective “nature guides” & “conservationists”
- Park Interpretation programme
- Development of PA-level Participatory Eco-tourism & Visitor Strategy

Action Points for Planning

The development of an over-all eco-tourism strategy will incorporate the following:

- Local participation
- Sound environmental design
- Visitor management
- Conservation education
- Training
- Financial sustainability
- Monitoring & evaluation
- To assess the existing tourism situation and potential
- The desirable tourism situation and identify steps to attain the same
- To prepare a Participatory Community Based Eco-tourism strategy for the project area, involving the stakeholders through meetings & workshops
- The eco-tourism strategy should also address the following:
- Potential PA attributes vis-à-vis eco-tourism

- Identification of sites
- Development of monitoring mechanisms for ecological impact of eco-tourism
- Visitor information & levels
- Identify marketing opportunitie
- Development of guidelines for visitors/ staff viz., visitor centre, orientation centre, brochures, handbook, signages.
- Development of mechanisms to collate data of visitors for management.
- Development of guidelines/ building code for environmentally acceptable and culturally appropriate designs.
- Identification of: staffing levels for tourism, future requirements & training needs.
- Identifying institutional arrangement for eco-tourism management, mechanisms to increase long-term local participation in benefit - sharing and decision-making, local training needs
- Developing, monitoring & evaluation of plans to assess local participation & benefit sharing
- Evolving legal framework for eco-tourism activities
- Establishing administration and legal requirements for: Zoning, entry fees, revenue-sharing with indigenous people

13.4 Park Interpretation Programme

Interpretation programme is to be implemented in MHTR through:

- Interpretation Centre at Kota. For this a provision of Rs 50 lakhs has been kept.
- Park safari by Gypsy and Canter
- Visit of Fort and Temple
- Boating in Chambal river
- Nature trails Publications of brochure, poster, sticker, etc. for MHTR.

Eco-tourism Package for the Buffer Zone:

Community based eco-tourism is important in the present context. The host community should be actively involved in conservation and eco-tourism planning. Professional and technical training should be imparted to the local people to ensure them a sustained income from eco-tourism initiatives, apart from giving a respectable status.

There is more scope for involving the host community in several activities, viz. owners of modest tourist accommodation, catering (ethnic dishes), souvenir making, cultural events etc. There are several examples of local community involvement in eco-tourism, like Nepal (Annapurna Conservation Area, Sagarmatha National Park), Canada and South Pacific (Fiji group).

For the Visitors

The following facilities would be provided to the visitors in the buffer zone, as a part of the buffer zone eco-tourism package:

Nature Trail

Four nature trails of almost 2–8 km have been designed. These trails will enable the visitors to feel the forest by trekking and closely observing the trees and birds, which are found inside the park. A field brochure highlighting the interpretative points would be provided to the visitors.

Angling

Chambal River is a good spot for angling, since it is rich in many species of fresh water fishes. Trained local villagers would be entrusted with task of visitor management.

Horse/ Camel/ Camel cart Rides

Horse/ Camel/ Camel cart Rides would be made available to identified beneficiaries by providing loan from the Foundation/ EDC. The beneficiaries would be trained in the housekeeping and maintenance.

Ethnic Art/ Folk Dances

Talented beneficiaries will be provided loan for skill development and to foster talent, which will serve as added attractions to the visitors in the area, apart from generating income.

Problems:

Unplanned tourism in an area of conservation significance may lead to conflicting objectives. Different categories of tourist's viz. casual tourist, hardcore and dedicated nature lovers and religious tourist's are expected to visit the Sanctuary, once it is organized. The casual tourist may cause disturbance to the nature if their activities are not regulated. Disposal of waste by tourists, including plastic carry bags and other similar things is injurious to the health of the reserve. In order to minimize

these problems the tourism will be allowed in a controlled and regulated manner only.

THE STRATEGIES:

For achieving this goal analysis of the infrastructure of the park and facilities as regards the accommodation, food, movement in the park and guide services to be provided will be carried out. Identification of the places to be developed for tourism, assessment of kind of information the visitors would look for and message to be communicated to the visitors will also be taken note of in these proposals.

Identification of Zone:

For promoting tourism in MHTR, following aspects have to be developed so that visitors get attracted and carry desired message of nature conservation. Under the “Nature Education Campaign” in MHTR the following activities will be taken up:

- (a) Wildlife safari
- (b) Nature education camps.
- (c) Trekking.
- (d) Wildlife viewing.
- (e) Horse or camel safari.
- (f) Herbal medicine.
- (g) Botanical excursions.
- (h) Walking on Nature education Trail.
- (i) Bird watching

(a) Nature Education camps.

The MHTR is full of wonders of nature. A close observation of different organisms, plants and the animals, their growth, blooming and playing their role in the ecosystem will take the viewer in to an entirely different world. Each and every living organism is seen showing its existence and importance in the nature. Small insects, reptiles, birds and lower mammals can be seen performing their duties relentlessly with self-discipline. On the other hand flowering and fruiting plants/trees can be seen offering the feast of beauty and food to these animals, in turn seeking pollination and seed dispersal.

(b) Wildlife Viewing:

Generally watch towers and hides are used for animal and bird viewing as well as photography but this involves huge risk of poaching as well. Therefore this practice would not be encouraged. For serious wildlifers temporary hides can be erected under strict vigilance only. Separate budget provision would be needed for this. In general the wildlife viewing should be encouraged on foot or by open vehicle at low speed. There are few points listed below where wildlife viewing towers can be developed with utmost precaution of keeping them always manned. The construction will be designed in such a way so that without proper permission of the authority these will not be accessible to outsiders. The watchtower will be a double storied tower with one room having attached toilet facility.

The viewing/watch towers are proposed at following places –

- Ram Sagar
- Laxmipura (Prempura) Talao
- Naulav Talao

(c) Herbal Medicine:

The area is very rich in plant diversity. It has got a variety of trees and plants owing to the climatic and geological factors. It has got Bahera, Amla, Mahua, Dhavra, Arjun, Khakhara etc. on one hand and Orchids, Brahmi, Satavari, Safed Musli etc. on the other. There are many herbal medicines the adivasis use in curing snakebite, malaria, abrasion and bleeding and many other diseases. This aspect is yet to be explored fully in the interest of the mankind. Tours of such experts will be organized and a record of the specimen and there uses will be displayed in interpretation centres to be constructed at Kota, Dara and Jawahar Sagar.

Infrastructure Development:

For proper management of the park, basic infrastructure is necessary. Development of view places, rest places, nature trails, track, routes, construction of watch towers and hides at strategic locations, training of staff and guides for conducting nature trails and camps, printing of publicity material etc. are things which are necessary to promote tourism and nature education. Apart from this promotional activities will be taken up during wildlife week as well.

A dormitory will be constructed at Dara for regular eco – education trips of

students from neighboring areas.

Facilities for the tourist would be developed in the administrative zone and ticketing stations.

The following activities will be taken up for the interest of the tourist and native education groups:

- A. Trekking and trail walking, specially, during rains & winters
- B. Nature quiz.
- C. Watch tower and water hole observation.
- D. Plants species identification and information's on medicinal plants.
- E. Guided tours on selected tracks.
- F. Participation in census operation

Regulation, Monitoring and Evaluation:

Fee structure:

Fee structure for entry, still and movie cameras, vehicles and other charges will be taken according to order of Govt. of Rajasthan.

Program evaluation:

Program evaluation and feedback system will be introduced and information thus obtained will be regularly processed to improve upon nature education and tourism.

Regulations:

The following regulatory measures will be adopted

- There will be a Ban on night stay inside the Sanctuary without permission.
- Flow of Tourist will be guided to pre – decided routes only.
- Other activity related to eco –tourism will be regulated as per law.
- Religious tourism inside the reserve will be regulated.

CHAPTER – 14

ORGANIZATIONS, ADMINISTRATION AND BUDGET

1.1 Organization, Setup and Management

Buffer Areas Coordination Committee and its Linkages with Tiger Steering Committee and Tiger Conservation Foundation

To facilitate coordination and mainstreaming wildlife concerns of various production sectors in buffer zone, two committees have been proposed, namely State level Monitoring Committee and District level Coordination Committee. Coordination will be established among committees of core and buffer for better working. The Mukandra Hills Tiger Foundation will look after the matters of eco development, research etc. in buffer zone also. In the executive body of Mukandra Hills Tiger Foundation, there will be representation from buffer and connectivity area also.

1.2 Coordination with EDCs, Confederation and other Line Agencies/ Departments/ Production Sectors

A confederation of EDCs of different villages will be formed. Field Director MHTR and Dy. Conservator of Forests Mukandra National Park will coordinate with different departments of the State Government and other institutions & non-Governmental organizations for conservation of Mukandra Hills Tiger Reserve and its buffer area. Mukandra Hills Tiger Foundation will ensure this coordination and will try to concentrate the flow of funds for development of buffer area.

1.3 Fund Raising Strategies

Mukandra Hills Tiger Reserve gets funds from Central Government as well as State Government under various Plan and Non-Plan schemes but no funds are being received specifically for development area. Various forestry works are, however, being undertaken under regular plan schemes and NREGS. Funds can be received from following schemes:

CENTRAL SECTOR:

- 1) Development of National Parks & Sanctuaries.
- 2) Project Tiger Scheme.
- 3) Eco-development Scheme.
- 4) National Rural Employment Guarantee scheme (NREGS)
- 5) Integrated forest protection scheme.

STATE SECTOR:

- 1) Preservation of wildlife in Rajasthan.
- 2) CAMPA
- 3) NABARD
- 4) MJSA/RJSA

Following other sources can also be explored:

1. The Mukandra Hills Tiger Foundation can directly receive funds from various national and international donor agencies, NGOs and private sectors.
2. **Ploughing back of revenue earned-** Part of revenue earned from tourism shall be ploughed back for development of core & buffer of MHTR.
3. **Income from Hotels** – Hotel situated inside the MHTR and in Eco-sensitive zone of MHTR can be charged with additional fees (Green Cess) ranging from Rs. 500 to Rs. 3000 per month per room.

1.4 Schedule of operations:

Sanctioned works will be executed as per schedule of time. Following is the proposed time schedule:

- | | | |
|------|---|------------------------|
| i) | Soil & moisture conservation works | Before rains |
| ii) | Desiltation of water holes, nadis & anicuts | Before rains |
| iii) | Eradication of unwanted species | During and after rains |
| iv) | Clearing & maintenance of tracks | After rains |
| v) | Cutting of fire lines | In winter |

- | | | |
|------|---|-------------|
| vi) | Construction of water harvesting structures | After rains |
| vii) | Repair of buildings | After rains |

MHTR proposes an Annual Plan of operations every year, based on the various strategies envisaged in the management plan. Govt. of India also sanctions the grant but timely allocation of funds never takes place. Sometimes it reaches as late as in October. As a result, timely execution of works becomes impossible and half of the crucial period just goes waste.

1.5 Activity Budget:

Activity wise financial requirement for execution of various components proposed in this Tiger Conservation Plan.

Items of budget components are as follows:

Recurring cost (Maintenance cost)

- i) Treks & Roads
- ii) Expenditure on protection forces – Ex-army man
- iii) Fire protection
- iv) Cattle kill compensation
- v) Crop compensation
- vi) Maintenance of buildings
- vii) Vaccination of domestic cattle
- viii) Wild life census
- ix) Uniform to field staff
- x) Tourism management
- xi) Training and Research
- xii) Secret service
- xiii) Cash reward
- xiv) Maintenance of wireless network
- xv) Running & maintenance of vehicles

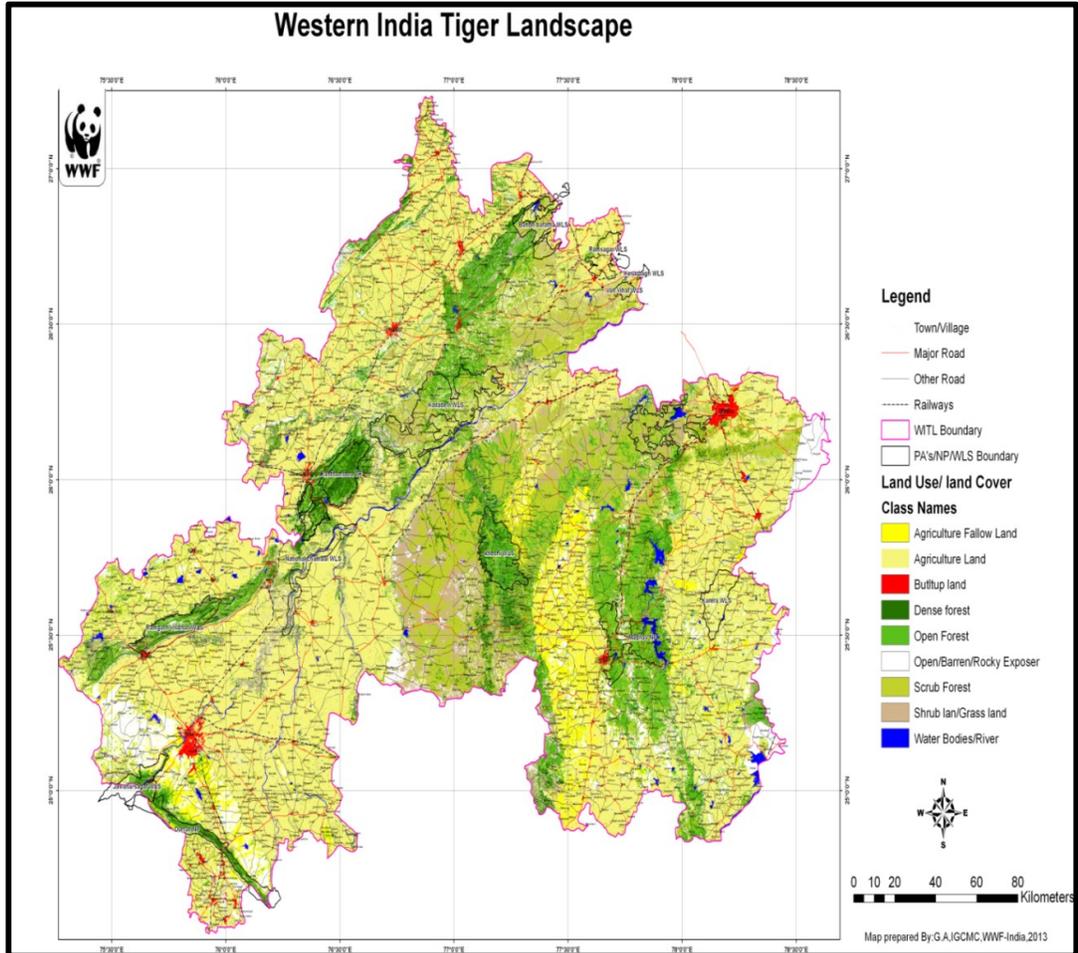
Non Recurring cost

- 1) Buffer area management
 - i) Roads
 - ii) Soil & water conservation
 - iii) Habitat improvement
 - iv) Protection force – Home guards
- 2) Infrastructure Development
 - i) Vehicles
 - ii) Wireless system
 - iii) Office equipments
 - iv) Field equipments
- 3) Amenities for field staff
 - i) Solar lighting
 - ii) Camping equipments
- 4) Tourism management
 - i) Tourism facilities
 - ii) Nature trails
 - iii) Camping facilities
 - iv) Publications
 - v) Barracks for flying squad & field staff
- 5) Information technology
 - i) Computers
 - ii) Survey equipments
- 6) Village Eco-development
 - i) Entry point investment (credibility activities)
 - ii) Village eco-development programme
 - iii) Income generating activities including dairy development

7) Environmental Education

- i) Development & procurement of education material
- ii) Educational programmes

CORRIDOR AREA PLAN



Tiger Conservation Plan: For Adjoining Areas (Corridors)

INDICATIVE PLAN

PART - A

CHAPTER - I

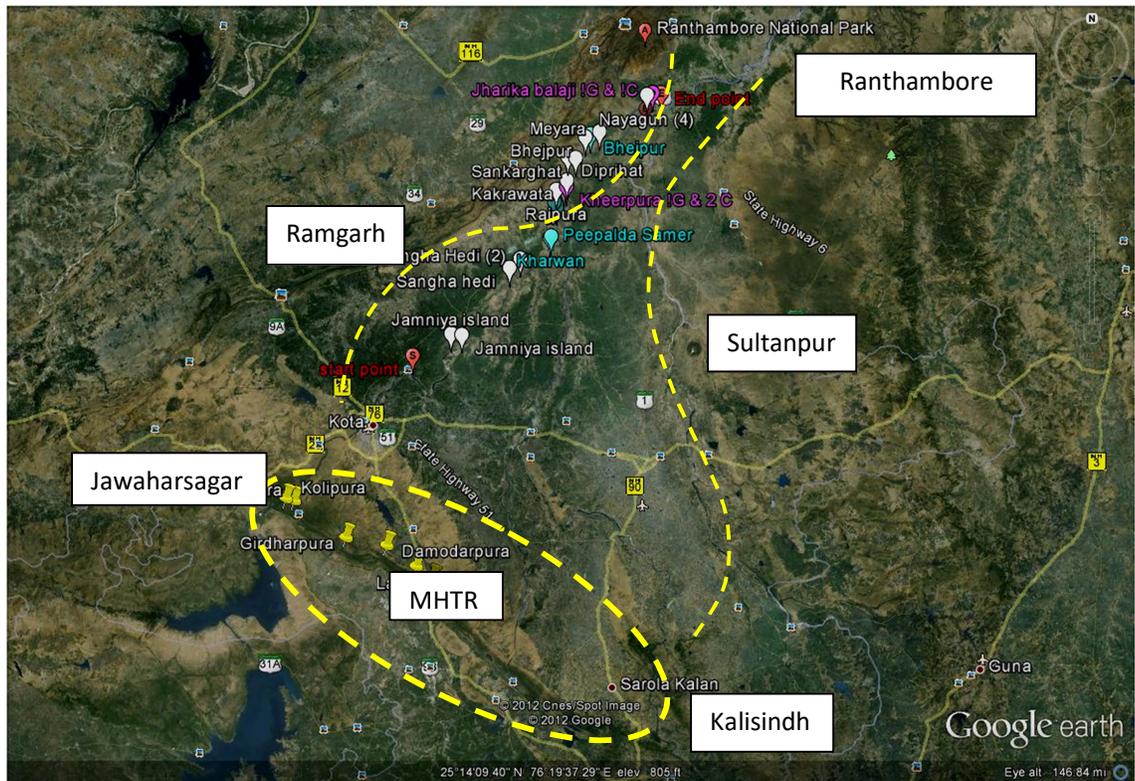
INTRODUCTION OF THE AREA

Corridors

Section 38V 4(ii) of The Wild Life (Protection) Amendment Act - 2006 provides that each Tiger Reserve is required to create Core, Buffer and Corridors areas. Conservation of Tiger will not only require the management of core and buffer areas but it will also be necessary to maintain their connectivity to other core areas for ensuring gene flow as an ecological requirement for long term survival of the species. Therefore, it will be necessary to identify these areas of connectivity/corridors between two source populations. Infact management of these critical areas will be as important as the core areas. In most of the cases such areas will be under traditional forestry practices and other landuses. These areas will also be under tremendous pressures due to habitations and human activities. Therefore in such areas the existing management practices will have to be modified so as to upgrade and maintain the ecological status of the connectivity/corridors. Obviously the agenda of co-existence will have to be implemented for such areas with a focus on the wildlife habitat parameters and the livelihoods/developmental needs of the local communities. Role of the local communities, line agencies and other stakeholders will be extremely important for the management of such areas. The plan for these areas has to be very simple and focused. Many of the activities of extension, research/ monitoring and HRD will have to be linked with the Buffer Area Plan.

Significance of corridors

Isolated populations of wild animals face the risk of extinction owing to insulation and inbreeding depression. Habitat fragmentation adversely affects wildlife due to decreased opportunity available for wild animal movement from different habitats. This in turn prevents gene flow in the landscape.



Ecological corridor map of connecting routes between RTR and MTHR

Such connecting habitats, apart from facilitating animal movements also act as refuge for spill over populations from the core areas. They may also act as smaller “source” by facilitating breeding and movement of native wildlife populations to colonize adjoining habitats. Natural linear features like rivers or mountain ranges may act as boundaries for wildlife populations. However, disturbance of corridors on account of human interventions (highways, canals, industries, roads, railway tracks, transmission lines, mines) is deleterious to wildlife.

“Source” populations are those which produce a surplus of animals which are potential colonizers. On the other hand, “Sinks” are those populations in which deaths exceed births, and their persistence depends on regular influx of immigrants.

Patches of suitable habitats in the landscape may support wildlife populations (local populations), which may be separated from one another on account of various disturbance factors. Collectively, such patches of local populations are known as “regional populations”. This general situation of subdivided populations interacting with one another in a landscape to supplement new genes through movement is known as a “meta population”. In the context of tiger land tenure dynamics, the core-buffer areas conform to the “island-mainland” or “coresatellite” form of Meta population model. The core area of a tiger reserve

provides a source of colonizers for the surrounding local populations of different sizes and varying degrees of isolation.

The core area may not readily experience extinction owing to the protection inputs for maintaining its inviolate nature. However, the surrounding isolated patches in the buffer area may suffer from local extinction if wildlife concerns are not mainstreamed in the area. Therefore, a Meta population management approach is required for the buffer zone as well as corridors to facilitate:

- (a) Supplementing declining local tiger populations
- (b) Facilitating re-colonization in habitat patches through restorative management
- (c) Providing opportunity to tiger for colonizing new areas through patches of habitats (stepping stones) between isolated populations.

The existing protected area has become an ecological island with severely depleted linking corridors. There is a serious threat to the wildlife population due to protected area network being in islands. As a result, erosion of genetic variability is taking place for want of linking corridors to protected areas. The small sized population and simple structure tends to be more susceptible to the genetic loss than large geographically dispersed and subdivided population. Loss of genetic variability has been diminishing the chance of survival of a population due to inbreeding depression and loss of evolutionary potential. There is need to increase the number of protected areas depending upon genetic variation and bio geographic distribution of species and eco system and linking them with broad stable and balanced corridors so that the physical and ecological boundaries of fauna coincide. For this purpose multiple use areas with the potential of acting as corridors will be identified and scientifically managed.

The Existing Corridors:

Mukundara and Dara hill Ranges in Kota district, along with the adjoining forests of Jawahar Sagar Wildlife Sanctuary and Ramgarh Vishadhary Wildlife Sanctuary in Bundi district, along the banks of River Chambal has a potential to act as a corridor between Ranthambhore Tiger Reserve and Mukundara Hills Tiger Reserve. The Sawai-Mansingh Sanctuary, Qualiji Closed area of Ranthambhore Tiger Reserve can act as a source of population site for Southern Protected areas like Ramgarh

Vishadhari WLS and MHTR where up to RVWLS corridors are linear through hills and gorges.

Administration and Organization: The Corridor falls nearby to the areas of Mukandara Tiger Reserve. Various Wildlife and Territorial Divisions commanding the corridor area are as follows:-

1. Dy. Conservator of Forest, Project Tiger Ranthambhore, Sawai Madhopur.
2. Dy. Conservator of Forests Territorial, Sawai-Madhopur
3. Dy. Conservator of Forests, National Chambal Sanctuary Sawai-Madhopur.
4. Dy. Conservator of Forests, Wildlife Division, Kota
5. Dy. Conservator of Forests Territorial, Bundi

Assesment of threats:

The size of corridors including buffer Area are very small. In the landscape some corridors are linear and some are stepping stone corridors and those are under heavy pressures from the population in vicinity. Already these areas are highly degraded. In some places there is threat of people encroaching upon the forest land and utilizing it for agriculture purpose. Stray incidences of illegal removal of masonry stone and tree cutting also occur. The biggest threat to these areas is from livestock grazing particularly goats and sheep the population of which is increasing day by day.

The present MHTR has evolved through different stages. The owners have changed from princely state to Government. Through this process of state controlling the resources, the local people got alienated gradually over a period of time. In the past local villagers had access to forest for grazing livestock and extracting natural resources but after certain notifications, restrictions were imposed which have also resulted into conflict of local communities with Forest department.

The Human-Wildlife conflict mostly occurs due to crop depredation by wild animals and livestock depredation by leopards. There is compensation mechanism against crop raiding and cattle depredation but doesn't reach in correct time which tends to create negative attitude towards the conservation of wildlife and its habitat. There are also records of poaching. The villagers may sometime retaliate in negative way which might results in poaching of wild animals.

Human presence is very close to the forests and such a close interface of wildlife with people and livestock sometimes leads to increased conflict. Increasing

conflict will subsequently hold back the movement pattern of wildlife. Cattle lifting incidents can create chaos in community and in return wildlife has to lose their lives in form of carcass poisoning, poaching and sometime forest fire triggered deliberately by the communities.

THREATS: Chambal River has faced ample transformations due to various developmental activities in the landscape such as Roads, Dams, Canals and Sand mining. The dry and shallow river bed of Chambal and Kalisindh is attracting dozens of sand miners. Large quantities of sand are extracted from the area.

BARRIERS: Roads and highways, water canals and rail networks are passing through the corridors creating large barriers for the movement of wildlife. Water canal from Kota Barrage passes through the corridor horizontally and parallel to River Chambal. Water remains in this canal for couple of months, mainly during January and February. There are ample dry streams coming from Chambal which act as corridor for wildlife and tigers. However, rampant agriculture practice across the area may prove hindrance for the movement of wildlife in corridors.

The ever increasing demand for firewood and fodder exerts tremendous pressure on the PA's and on corridors. The cattle rearing community depends primarily on the forest for grazing their cattle, particularly during the monsoon period.

Although Government has designed the route of sheep grazing yet the sheep herd owners illegally enter into PA's and come with direct and indirect conflict with wildlife. Such grazing activity has adversely affected regeneration of native plant species and the quality of grass has deteriorated in the area.

Socio-Economic Profile of Villages and Resource Dependency and Human-Wildlife Mutual Impacts:-

The people of the area are mainly agriculturist and pastoralist, whose economy is totally based upon natural resources of land and forest, supplemented with labour work in mines, Govt. development works and in the agriculture fields of other people.

The average land holding of the people is very small (1.5 to 2 Hectares), with a large number of marginal farmers having large families. Some communities are pastoralists, totally dependent upon the dairy activities. Landless communities are

dependent upon labour for livelihood. Some communities like Brahmins, Rajputs, Jat, Bania are well educated and are in service with Govt. or Non-Govt. organisations. They are generally well off. These communities are also the main business class in the area.

Other communities such as agriculturalists, pastoralists and landless labourers form the major portion of the society. All these communities have natural resource based economy, mainly dependent on rainfall resulting in poor economy.

Agriculture is a seasonal work and does not provide employment through out the year. They do not have employment for nearly six months in a year. During these six months of unemployment they take up variety of jobs like animal husbandry, labour, fuelwood collection, collection of timber and N.W.F.P., etc. to supplement their income. Most of their activities are dependent upon forests, thus, the number of people visiting forests for illegal purposes increase tremendously.

The communities, which are dependent on animal husbandry traditionally, live near forest areas or in the forest areas, which facilitates easy grazing for their large number of cattle, which they keep to sustain their economy. They are busy round the year but the practice of cattle feeding change with seasons.

Forest areas falling in the corridors of the territorial Divisions i.e. Bundi, Kota are very sensitive for mining and poaching. Some landless communities like Bhil, Banjara and Meena are also engaged in Sand Mining from rivers mainly Chambal & Banas and illegal sand stone quarrying in Forests as well as from other legally sanctioned mines. Due to presence of livestock, graziers, have increased. The incidences of human-wildlife conflicts are on the increase.

All the corridors have high human presence and distinct livelihood dependency on the forests of corridors. The people living in this area mainly belong to Gurjar and Bairwa communities of Rajasthan. Some other communities like Jat, Prajapat, Brahmin and Keer are also found here. "Mongiyas" the notorious community specialized in trapping and killing of wild animals are found throughout the landscape. In the corridor land use pattern is divided amongst Agriculture, Ravines and Forests. Forests has highest stake in land occupancy than Ravines and least area is covered by farm lands.

Agriculture and cattle rearing is main occupation in corridor villages. The villagers are dependent on the forest for fuel wood, grazing and NTFP collection. Agriculture is carried out along the bank of the rivers and on steep slopes. Wheat and mustard are the major crops produced along with millets, chili, sesame and pulses.

Assessments of inputs of line agencies /other departments: -

The inputs of Agriculture department, Animal Husbandry department and other line departments have been good. Large numbers of people are provided employment through MNREGA by Rural Department. However, a lot needs to be done to promote stall feeding of animals. Goat and sheep rearing has been promoted in the area which is detrimental to forests. A policy change is required in this matter and goat and sheep rearing needs to be discouraged.

Cattle vaccination camps will be organized in coordination with Animal husbandry department in the villages around Mukandara Hills Tiger Reserve and in corridors. While technical help will be taken from Agriculture University, Jaipur & Kota for the development of fodder plots in villages around MHTR. inputs from NGOs towards implementation of sustainable interventions that help to reduce dependency from the forest resources will also be taken.

Vision: To establish and nurture a linkage with nearby PA and also various divisions of forest and other line departments so that viable wildlife population is maintained at the source and gene flow takes place between the PA via these corridors.

Management Goal: Wildlife populations in corridors and in adjoining managed forests are increased and protected. Effectively manage corridors with coexistence and established meta-population of tigers to double their numbers in the landscape.

Management Objectives:

1. To monitor Tigers, Co-Predators and Prey in the corridors. (Work will be supported by WII, WWF etc.).
2. To strengthen cattle compensations scheme with ex-gratia payment in corridor and the Villages too for long term security of dispersing tigers and co-predators.
3. To assess the connectivity of the corridors that connects Ranthambhore NP to neighbouring protected areas. With the help of GIS teams, maps marked with corridors will be developed at the scale of 1:50,000.
4. Implement livelihood conservation initiatives in the villages such as solar models, energy efficient chulhas, sustainable agriculture practices,

development of fodder lands and veterinary services through Local NGOs and Line departments.

Problems in Achieving objectives:

Corridors that connect Mukandara National Park to other managed forests are not with delineated boundaries. Any land can act as a corridor until and unless it doesn't have barriers and threats. In the landscape, MHTR connects with neighbouring forests with river, streams, ravines, gorges, hills and even with crop-lands. There are rivers and ample of streams that support movement of wildlife smoothly from nearby PAs. However it's impossible for the park management to conduct studies and monitor corridors with limited staff and budget. For the rest of objectives, management will request concerned authorities like IT wing of the Forest Department or State Remote Sensing Centre to develop maps. NTCA has to increase funds for tiger reserve and its corridors. WII may carry out intensive studies while Non-Government Organisation like WWF having experience in landscape management can continue studies on corridors in larger view like landscape level. Other NGOs can work with communities on livelihood conservation.

The main issues relating to corridor management are:

- (i) Reduction in biotic pressure from villages situated inside corridors.
- (ii) Man- animal conflicts due to late & insufficient compensation for loss of livestock.
- (iii) No Provision for crop damage compensation.
- (iv) Lack of Funds.
- (v) Inadequate intelligence information network poor legal assistance and protection to forest staff.
- (vi) Multiple administrative control and poor integration with other departments..
- (vii) Poor regeneration and inadequate information on techniques for habitat manipulation like the weed etc.
- (viii) Insufficient Base Line data.
- (ix) Lack of Political Will regarding launching new welfare schemes.
- (x) Lack of awareness about Eco-tourism concept and insufficient interpretation facilities.
- (xi) Higher age group and educational background of the staff with least training and technical manuals exposures.

SWOT Analysis:

Strengths-Weaknesses-Opportunities-Limitations (SWOT) Analyses

Strengths:

- Several conservation initiatives by locals already in place
- Some amount of sensitization towards conservation has to take place viz control on grazing, poaching of prey
- Good relationship between Forest Department and village headmen (Sarpanch) through local organizations and WWF.
- Availability of water inside the park through out the year.

Weaknesses:

- Lack of awareness amongst local communities
- Prevailing hunting, mining, encroachment around the park.
- Sand mining and ravine flattening in corridors. Expansion of crop lands that is to change in land use pattern.
- Crop damage and injury by wildlife causes resentment
- Depredation of cattle by carnivores causes retaliation killing.
- Unsustainable developmental activities
- Socio-economic condition of the local community

Opportunities:

- To use the funding by NTCA to reduce dependency on forest resources
Increasing involvement of locals in conservation activities
- Decreasing animosity towards Forest Department through goodwill from incentives provided.
- Presence of International Organisations for Studies on corridors such as WWF, WII.

Threats:

- Poaching
- Mining
- Illegal and unsustainable fuel wood harvesting
- Other development projects
- Sand mining in Banas River belt
- Increase in invasive species /weed in buffer and corridors ex. *Prosopis J.*

MANAGEMENT STRATEGIES

- I.** River Banas and river Chambal are extensively used by local people for vegetable cultivation. Fencing on the agriculture fields that fall in corridor passage should be discouraged.
- II.** Relocation of all the villages in the corridor region would not be possible but education and awareness on corridors should be taken to villagers of corridor villages.
- III.** Delineate the corridor and develop the area with native forestry species and restoration of the degraded patches within corridor area shall be taken up.
- IV.** Develop water points at appropriate places.
- V.** Improve protection to reduce risks of poaching through SMART Patrolling.
- VI.** Co-ordination with Governmental/Non Governmental Organisations in the landscape for putting conservation in mainstream.
- VII.** Implementation of eco-development activities for reducing resource dependency of local people on surrounding forests.

Delineation of Corridors and other habitat used by tigers and copredators:

Recently it has been observed that spill over tiger population of Ranthambhore uses these corridors for their movement to other areas. Tigers have been tracked moving away out of Ranthambhore and using these areas as corridors for dispersal to Kota and other regions. These are important linkages of Ranthambhore landscape with other forested landscapes and it is through these linkages that the genetic transfer has been taking place for centuries. Therefore, in the long run these linkages are crucial to the wellbeing of tigers in the core area. The core area can give everything but this linkage with other wildlife areas of the part of the country can only be provided by the corridor area.

Ranthambhore – Ramgarh Vishdhari – Mukundara hills

Delineated as important corridor for movement of tiger and other animal. From the high animal density areas of Ranthambhore to other suitable Sink areas those are from Qualji Closed area to Papda RF, Indragarh RF and Ramgarh Vishdhari WLS and further from Jawahar Sagar to Dara WLS or MHTR. This Corridor can be developed by undertaking the following activities.

- a) Protection and afforestation.
- b) Soil conservation and water harvesting measures.
- c) Effective anti-poaching measures.
- d) Increase support for conservation from corridor villages.
- e) Habitat restoration of corridor villages, forest land and revenue land.

Details of forest and non-forest land falling in the corridor is tabulated below:

Ranthambhore – Ramgarh Vishdhari – Mukundra hills

Table-45 List of Forest Blocks falls under the above corridor

S.No.	District	Range	Block	Area (Ha.)	Remark
1	Bundi	RAMGARH	VISHDHARI	4004.98	RAMGARH VISHDHARI SANCTUARY
2		HINDOLI	UMARMATA	1974.29	TERRITORIAL
3		RAMGARH	SHIKARBURJ	1062.56	RAMGARH VISHDHARI SANCTUARY
4		BUNDI	SATHOOR	1917.76	TERRITORIAL
5		INDERGARH	SAKHAVDA	103.00	RTR Buffer
6		DABI	RAMPURIYA	2670.06	TERRITORIAL
7		RAMGARH	RAMGARH	2904.79	RAMGARH VISHDHARI SANCTUARY
8			POLGHATA	443.00	RTR Buffer
9		RAMGARH	PIPALYA MANAK CHOWK	5138.34	RAMGARH VISHDHARI SANCTUARY
10		HINDOLI	PIPALJHAR	33.52	TERRITORIAL
11			PAPRA	1080.60	RTR Buffer
12		HINDOLI	OWAN	2316.89	TERRITORIAL
13		BUNDI	NURSERY BUNDI	6.00	TERRITORIAL
14		RAMGARH	JHARPEER	2217.54	RAMGARH VISHDHARI

S.No.	District	Range	Block	Area (Ha.)	Remark
					SANCTUARY
15		INDERGARH	KAILASHPURA	60.25	RAMGARH VISHDHARI SANCTUARY
16		BUNDI	KANTI ASTOLI	2356.57	TERRITORIAL
17		RAMGARH	KATHIYADI RAJWAS	676.69	RAMGARH VISHDHARI SANCTUARY
18		RAMGARH	KHATKAD	2307.39	RAMGARH VISHDHARI SANCTUARY
19		INDERGARH	LAKHERI	2174.44	RTR Buffer
20		DABI	LAKSHMIPUR A	859.46	TERRITORIAL
21		HINDOLI	MARADI BANDI KA KHEDA	2030.52	TERRITORIAL
22		INDERGARH	MATAJIWALA	454.54	RTR Buffer
23		BUNDI	MUNDER	2640.65	TERRITORIAL
24		HINDOLI	NAHARGARH BHOJGARH	3640.99	TERRITORIAL
25		NAINWA	NANDGAON	18.01	TERRITORIAL
26		DABI	GUNWAR	4629.00	TERRITORIAL
27		JAWAHARSA GAR	GUDHA RAJPURA	2943.44	JAWAHARSAG AR SANCTUARY
28		BUNDI	GUDHA NEEM KA KHEDA	3746.22	TERRITORIAL
29		RAMGARH	GUDHA MAKDUKA	176.56	RAMGARH VISHDHARI SANCTUARY
30		KESHORAIP ATAN	GOPALPURA	10.55	TERRITORIAL

S.No.	District	Range	Block	Area (Ha.)	Remark
31			GHAZIPUR	649.04	RTR Buffer
32		DABI	GARARDA	1452.21	TERRITORIAL
33		INDERGARH	GAINDOLI	1880.07	RTR Buffer
34		INDERGARH	FOLAI	2038.94	RAMGARH VISHDHARI SANCTUARY
35			DOBARLI	6.02	RTR Buffer
36		HINDOLI	DIWANJI KA BAAG	29.55	TERRITORIAL
37		DABI	DHORELA GARARDA	3053.28	TERRITORIAL
38		HINDOLI	DATUNDA	2646.44	TERRITORIAL
39		DABI	DASALIYA A	1739.93	TERRITORIAL
40		DABI	DABI PALKAN	3510.35	TERRITORIAL
41		BUNDI	CHAMPABAAG	13.38	TERRITORIAL
42		BUNDI	BUNDI KI NANGI PAHADIYA	47.54	TERRITORIAL
43		BUNDI	BHIMLAT	1491.46	TERRITORIAL
44		RAMGARH	BHAIRONPUR A	4313.22	RAMGARH VISHDHARI SANCTUARY
45		INDERGARH	BANKLIYA MAHADEV	259.31	RTR Buffer
46		INDERGARH	ARIAL BUD KARWAR	1589.53	RTR Buffer
47		INDERGARH	ANDHAURA	9.07	TERRITORIAL
48		DABI	AMLAT ANARKHOH	4326.45	TERRITORIAL
49		JAWAHARSA GAR	AMBARANI	6710.60	JAWAHARSAG AR SANCTUARY
50		BUNDI	TALABGAON	0.54	TERRITORIAL

S.No.	District	Range	Block	Area (Ha.)	Remark
51		INDERGARH	SALAMDARA C	243.96	RTR Buffer
52		INDERGARH	SALAMDARA B	151.55	RTR Buffer
53		INDERGARH	SALAMDARA A	49.62	RTR Buffer
54		BUNDI	PHOOLSAGAR	111.41	TERRITORIAL
55		DABI	PARANA	913.28	TERRITORIAL
56		INDERGARH	KANKRA	1365.40	RTR Buffer
57		BUNDI	KESARPURA	245.07	TERRITORIAL
58		HINDOLI	KHINYA	1873.94	TERRITORIAL
59		DABI	LAMBAKHOH	1040.20	TERRITORIAL
60		DABI	MARADI	3071.25	TERRITORIAL
61		NAINWA	MARAH FATEHPURA E	1428.67	TERRITORIAL
62		NAINWA	MARAH FATEHPURA D	101.09	TERRITORIAL
63		INDERGARH	MOHANPURA	1952.60	RTR Buffer
64		BUNDI	NAYABAAG	128.73	TERRITORIAL
65		DABI	GOLPUR	455.70	TERRITORIAL
66		INDERGARH	GARHWALA	957.27	RTR Buffer
67		DABI	GARARDA B	101.97	TERRITORIAL
68		DABI	DHANESHWAR	1636.13	TERRITORIAL
69		DABI	DASALIYA B	348.27	TERRITORIAL
70		BUNDI	BORKHANDI	193.22	TERRITORIAL
71		DABI	BANKI	203.28	TERRITORIAL
72		INDERGARH	BALWAN	941.15	RTR Buffer
73		KESHORAIP ATAN	BALAPURA	107.12	TERRITORIAL
74		DABI	DORA	6.28	TERRITORIAL
75		INDERGARH	PAPDI	353.14	TERRITORIAL
76		DABI	KACHALIA	4409.98	TERRITORIAL

S.No.	District	Range	Block	Area (Ha.)	Remark
77		DABI	MARADI B	21.24	TERRITORIAL
78		NAINWA	MEENO KA JHOPADIYA	225.80	TERRITORIAL
79		NAINWA	TALWAS	4323.89	RTR Buffer
80		INDERGARH	SALAMDARA D	193.49	RTR Buffer
81		DABI	KHADIPUR	1225.51	TERRITORIAL
82		DABI	KARONDI	2663.36	TERRITORIAL

Table-46 List of Revenue Area falls under the above corridor

S.No	District	Village	Area in Ha
1	Bundi	Barodiya	0.79
2	Bundi	Dhakni	143.96
3	Bundi	Nadhahet	3.96
4	Bundi	Borkhandi	0.25
5	Bundi	Rampuriya	25.16
6	Bundi	Nathawa	479.89
7	Bundi	Solaki Jhonpariyan	176.29
8	Bundi	Talab Gaon	726.10
9	Bundi	Haripura	86.98
10	Bundi	Shahpura	376.99
11	Bundi	Gurha Nathawatan	260.97
12	Bundi	Bisanpura	220.56
13	Bundi	Neem Ka Khera	753.59
14	Bundi	Mohanpura	134.44
15	Bundi	Onarji Ki Jhonpariyan	353.18
16	Bundi	Megharawat Ki Jhonpariyan	266.88
17	Bundi	Anoppura	817.54
18	Bundi	Megharawat Ki Jhonpariyan	36.27

S.No	District	Village	Area in Ha
19	Bundi	Parana (Bheelonwala)	177.91
20	Bundi	Holaspura	131.79
21	Bundi	Golpur	662.01
22	Bundi	Lorda	3.81
23	Bundi	Parana (Bheelonwala)	46.52
24	Bundi	Holaspura	51.18
25	Bundi	Loicha	164.97
26	Bundi	Golpur	8.25
27	Bundi	Kewariya	451.13
28	Bundi	Guwar	1200.90
29	Bundi	Gardara	857.76
30	Bundi	Kalyanpura	41.34
31	Bundi	Dora	388.68
32	Bundi	Kachhalya	1049.62
33	Bundi	Palka	106.32
34	Bundi	Gardara	0.95
35	Bundi	Palka	1996.71
36	Bundi	Kanwarpura	1551.31
37	Bundi	Dabi	804.86
38	Bundi	Parana (Karadonka)	5.37
39	Bundi	Bijari	251.07
40	Bundi	Thari	837.51
41	Bundi	Bhawani Pura	76.54
42	Bundi	Beodiya	296.38
43	Bundi	Dhaneshwar	1391.01
44	Bundi	Bhagwanpura @Chainpuriya	511.84
45	Bundi	Sootra	852.01
46	Bundi	Dasalya	26.46
47	Bundi	Gurha	32.88
48	Bundi	Bakchanch	44.21
49	Bundi	Budhpura (CT)	1.11
50	Bundi	Barfoo	739.35

S.No	District	Village	Area in Ha
51	Bundi	Ganeshpura	107.19
52	Bundi	Dasalya	478.99
53	Bundi	Daboosar	2.34
54	Bundi	Chhant Ka Khera	374.21
55	Bundi	Gurha	339.83
56	Bundi	Ratanpura	136.68
57	Bundi	Peepalda	501.74
58	Bundi	Naroli	617.69
59	Bundi	Rajpura	805.85
60	Bundi	Lambakhoh	1370.53
61	Bundi	Bakchanch	3.04

Development of integrated landuse approach for the area commensurate with tiger conservation and co-existence agenda.

Afforestation work and Ravine Management in corridors:

To improve vegetation cover for wildlife movement in corridor areas mainly on the periphery of Mukandara tiger Reserve, the plantation and land restoration work will be taken up by planting suitable local plants like Ber, Gular, Karanj, Chural, Khair, Kadam, local grasses, Khus, Munja, Elephant grass, etc. This will help us in restoring waste lands and ravines in corridors. Maintenance for 5 year will be done in public private manner.

Ravine management will also be considered with Gram Sabhas and plantation will be raised accordingly to meet requirements like fuel wood species, browsing speices and fruit bearing trees.

Soil & moisture conservation work:-

To improve the water conditions in corridors and to conserve the water holding capacity of the soil check dams/WHSS etc. will be developed at appropriate places so as to benefit local population and wildlife both.

Wildlife management in territorial forest areas.

Maintenance of the biological diversity is the new mandate for forest and wildlife planners and managers. This implies management of wildlife on all categories of lands under the control of the forest/wildlife departments. This is different compared to the current protection afforded to wild animals under the law outside the PAs. Protection does not necessarily mean that their habitats are being managed. Protection is critically essential to wildlife management but protection by itself is not habitat management that is fundamental to conservation.

Besides reorienting forest management practices objectively, the managed forests need support of the full range of habitat management practices as they relate to a PA properly. Hence the challenges for conserving biodiversity in corridors are far steeper than the Protected areas.

Habitat management cannot be in isolation of management for corridors. The existence of villages within most sanctuaries and national parks is a reality. Notwithstanding any village relocation programmes, between several groups of villages the forest actually exists as a set of several corridors. Natural forest growth existing between a series of plantations constitutes corridors, especially for life forms dependent on older successional stages. Hence all possible measures that we take in PAs will be imitated for the corridor areas and territorial forests. Apart from this entire Silvicultural Treatment model will be developed for corridor areas which are under territorial divisions. Ancillary support systems and miscellaneous regulations—such as forestry related activities such as roads, extractions, paths, camping sites, coups, forest depot, fire lines will be kept in control. Fuel wood collection, sale and nistar can be carried out in participation with communities so that their actual pressure can reduce from the bottle neck areas.

Zone Plan Management Strategies for corridors.

The delineated **corridor area** of Mukandara Tiger Reserve can be divided in two zones.

- 1. Forested Zone**
- 2. Multiple-Land Use zone.**

In both the zones protection strategy would be;

Protection from Grazing and lopping:

To control grazing in corridor areas and in habitat block barriers will be constructed in each habitat blocks. Community living near by will also be brought in confidence through gram sabhas and conceptulisation of corridors will be discussed. Through livelihood programs pasture lands will be developed in Village grazing fields, concession areas will be marked in corridors.

Poaching:

Dispersing Tigers or other cats have always been target of poachers in corridors. To control poaching, chowkis, patrolling units will be formed for continous patrolling in corridor areas. Informer network too will be developed for corridor areas. Continous monitoring of dispersing cats and other wildlife will be under operation with WII, WWF field teams. Kill monitoring in corridors will be done meticulously to avoid cattle poisoning incidents for retaliation killing.

Anti-Poaching measures and other activity:-

1. Regular Patrolling
2. Survillence over suspicious tribes/persons.
3. Maintenance of village wise wildlife crime report for each village.
4. Mechanisms to ensure rapid reporting of cattle kills and speedy compensation.
5. Rewards to Informers.
6. Construction of Forest Guard Checkposts.
7. Wireless stations at the checkposts and barriers at necessary points where human disturbance is possible.
8. SMART patrolling trainings to be given to frontline staff.
9. Patrolling gears and accessories to be provide to the staff at chowkis.

Intelligence Gathereing:

The intelligence on the movement of the invasive poacher will be gathered from the loyal reliable informer from the fringe village areas. The persons in the civil dress of the department in the weekly markets or periodic maket near the fringe area will collect the information about the detrimental activities related to wildlife and park security.

Fuelwood and fodder

1. The degraded areas on the periphery of the PA should be developed as pastures/medicinal plant farms and fuel wood plantations.
2. Distribution of LPG on subsidiary rates.
3. Smoke less chullahs and energy efficient models of the stoves will be showcased and developed in corridor villages.
4. High value fodder species like elephant grass will be introduced in corridor villages.

Man-animal conflict: - The villagers should be encouraged to go for permanent enclosures near their settlements to avoid cattle lifting at night. Stall feeding model will be discussed and encouraged in villages to reduce grazing pressure and depreddation inside the forest areas. Compensation mechanism (Ex-Gratia Payment) **Annexure-23** for the Cattle and Human loss should be made as early as possible and voluntary organizations will be involved for interim compensation. The Crop depreddation Compensation Scheme as proposed in Tiger Project areas by Govt. of India is not yet implemented in these regions. Efforts should be made to implement the crop compensation scheme to these areas as well. The pattern of the Human Willife Conflict will be studied in Corridor villages and recommendation to the Government will be suggested.

Forested Zone:

- With participation of local community, flora and fauna and important wildlife habitat shall be protected. This will involve deployment of local people in protection work.
- Commercial and domestic use of forest products shall be regulated as per the previous working plan of the respective divisions.

Multiple-Land Use Zone:

This zone shall consist of human settlements, agriculture, and small-scale industries. This zone will also involve providing alternative livelihood options to minimize resource dependency.

Protection of wildlife and their habitat:

Several measures will be taken in order to protect wildlife populations and their habitat in the Corridor area.

- Nature sensitization
- Employment of local youth for protection
- Paid informers who will report poaching or habitat destruction incidences.
- Self-help groups who will be beneficiaries of rotational funds will also be expected to give information of poaching or habitat destruction.

ECO-DEVELOPMENT AND LIVELIHOODS

Constitution of the committee.

As such there is no formation of EDC being taken up for corridors of MHTR. Although framework mentioned below will be taking in to consideration the eco-development activities in the corridors. Corridor of MHTR will be looked after by the committee formed for Critical Tiger Habitat of Mukundra Hills National Park.

Policy and Institutional Framework.

The purpose of demarcating and creating corridors for the park is to try and facilitate movement of wildlife across multiple source populations. Most corridors will have people living within them who have a close relationship with the core area. In such cases, there can be several measures taken by the management to try and wean the local people away from using resources from the core, buffer and corridors. It is also important to note that these people lose life and property by living close to the core area. They face high amounts of crop depredation, cattle depredation and many times human death. It is important to gain goodwill from them for any successful conservation programme. For this purpose, the tiger reserve management will have to work with several other governmental and non-governmental bodies to reach out to the people living in the buffer.

The eco-development programme shall be carried out through the eco-development committee (EDCs to be formed in corridors and buffer of the MHTR). Several other organisations shall also take part in the eco-development programme like WWF, DASTAKAR, local NGOs and multiple Self-Help Groups (SHGs) present in the area.

Livelihood Support Initiatives through Village Micro-plans

The drafting of a Village-Micro Plan requires an understanding of the feasibility and want of the specific livelihood initiatives. A Village Micro-Plan

involves community-asset buildings, individual income-generation activities, alternate energy and energy conservation devices, biomass regeneration, and human resources development suitable for the area. The micro plan shall be prepared by the EDC which will be formed with the help of NGOs and the Forest Department.

Integration of Rural Development Programmes

The District Co-ordination Committee can decide on integrating the plans of the Forest Department in the corridor area and the existing Rural Development Programmes. In addition, the following Rural Development Programmes which exist in other areas can be started in the area with the help of the district administration.

- Central Rural Sanitation Programme: This programme can be used to establish low- cost sanitation facilities in the area.
- Pradhan Mantri Gram Sadak Yojana: This programme can be used to connect several villages without linking roads.

Monitoring and Evaluation

The beneficiary organisations should report back to the Eco-development Committee and the Executive Committee of the Tiger Conservation Foundation which will monitor the transfer of funds. All monetary transactions will happen only through the Tiger Conservation Foundation. There will be an annual review and evaluation of the effectiveness of the Eco-development program by the District Level Monitoring Committee which will be formed soon.

TIGER POPULATION AND HABITAT ASSESSMENT

Day to day Monitoring Protocol.

Apart from forest land remaining land in corridors are private agriculture land and other government land, in which only some transient wild animals are found. In these areas for trekking/monitoring of straying tigers, trekkers, village wildlife watchers, informers shall be engaged from local community.

Tiger Population Estimation Framework.

- Corridor areas which fall in buffer and continuous with CTH, Provisions of Phase- IV Monitoring Protocol of NTCA would apply in this aspect.
- Corridor areas, which are forest land but scattered and not adjoining / continuous to CTH.

In these areas beat-wise monitoring of signs and encounters of animals/vegetation/habitat disturbance would be carried out following Phase- I Monitoring Protocol twice in a year (Summer & Winter). Simultaneously waterhole census will be carried out for estimation of fauna. Analysis and reporting will be done annually.

Rajasthan Forest Department, Government of Rajasthan has given permission to carry out research on corridors from Ranthambhore to neighbouring protected to the WWF-India. Forest Department will work with WWF in coordination to monitor movement of wildlife in corridor areas. And promised by them WWF will submit the data on the same.

ORGANIZATION, ADMINISTRATION AND BUDGET

Corridor Areas Coordination Committee:

Since the corridor area of the Reserve is large and is spread over in multiple districts of one state, hence separate committee for coordination is not required. The committees constituted for the core area would also oversee the works related to corridor and buffer area. Committee will also liaise with Madhya Pradesh State forest Department on administrative issues that need to be address in relation to corridors.

Schedule operations and Activity budget will be developed in coordination with associated divisions that have share in corridor areas.

Development of MHTR corridors:

MHTR is not only rich in scenic beauty and bio-diversity, but also has at least two probable corridors from Ranthambhore – one through Indergarh-Lakheri-Ramgarh Vishdhari Sanctuary-Dabi-Jawahar Sagar Sanctuary and the other through the ravines of Chambal and Kalisindh to Dara. However, special efforts are required to conserve this rich natural heritage, to provide safe passage/corridor to the tigers of adjacent Ranthambhore Tiger Reserve and to reintroduce tigers in the area. This can facilitate movement of wild animals between MHTR and RTR and also help in gene exchange. An intensive program of rehabilitation will be started in the following corridors to facilitate uninterrupted gene flow.

Table-47 An intensive program of rehabilitation will be started in the following corridors to facilitate uninterrupted gene flow

Sr No.	Name	Length & Breadth	Approx Area in Km.
1.	Dara – Gandhi Sagar	35 km x 6 km	210 sq km.
2.	Dara –Ramgarh	25 km x 7 km	175 sq km

Detailed survey and microplan will be prepared with the help of local villagers because plan has to be implemented by both wildlife authorities and local people. The corridors are multiple land use areas which include forest areas, community pasture land and privately owned lands. It is proposed that suitable areas would be rehabilitated during the plan period within these corridors by under taking following activities with active collaboration of territorial DCFs of the concerned forest and also DCF Core and Buffer of Ranthambhore Tiger reserve and wildlife divisions –

1. Protection and afforestation.
2. Soil conservation and water harvesting measures.
3. Development of eco tourism and recreational facilities.
4. Effective anti poaching measures.

Suggestive measures for development of corridors:

1. The revenue villages falling within the corridor should be covered under eco-development scheme. Microplans for each selected village should be prepared.
2. Proper habitat is required for easy movement of animals. Hence planting of adequate and suitable species is required. Extensive plantation works should be taken up for all animals. Shrub species should be included in the plantation
3. Anti poaching camps should be organized at the entry point of corridors.
4. Riverbed cultivation should be totally banned. Plastic should be banned in the area.
5. Soil and water conservation works should be taken up.
6. Entire corridor zones should be declared as eco sensitive zone.

Corridor area between MHTR and GandhiSagar sanctuary of MP is badly affected by sheep migration every year. Sheep migration through this area should be completely stopped. The area should be developed so that wild animals from GandhiSagar Sanctuary in Madhya Pradesh can move upto MHTR and vice versa.



सत्यमेव जयते

राजस्थान राज-पत्र
विशेषांक

RAJASTHAN GAZETTE
Extraordinary

साधिकार प्रकाशित

Published by Authority

चैत्र 28 गुरुवार, शाके 1935- अप्रेल 18 2013
Chaitra 28, Thursday, Saka 1935-April 18, 2013

भाग 1 (ख)

महत्वपूर्ण सरकारी आज्ञायें ।

वन विभाग

अधिसूचना

जयपुर, अप्रेल 9, 2013

संख्या प.3(8)वन/2012:- वन्यजीव (सुरक्षा) अधिनियम, 1972 (1972 का केन्द्रीय अधिनियम संख्या-53) की धारा 38V की शक्तियों का प्रयोग करते हुए राष्ट्रीय बाघ संरक्षण प्राधिकरण की अभिशंभा एवं सम्बद्ध ग्राम सभा तथा विशेषज्ञ समिति से परामर्श उपरान्त राज्य सरकार एतद्वारा अनुसूची-I (अ) में वर्णित वन एवं राजस्व क्षेत्र (41717.188 है.) एवं I(ब) में वर्णित वन एवं राजस्व क्षेत्र (34282.274 है.) कुल क्षेत्र 75999.462 हैक्टर को मुकन्दरा हिल्स व्याघ्र आरक्षिति (Tiger Reserve) घोषित करती है। उक्त मुकन्दरा हिल्स व्याघ्र आरक्षिति में से अनुसूची-I(अ) में वर्णित क्षेत्र को व्याघ्र संरक्षण के प्रयोजनार्थ अक्षत क्षेत्र रखे जाने के लिए "क्रान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat) तथा इसके चारों ओर, अनुसूची-I(ब) में वर्णित क्षेत्र, जिसका उद्देश्य वन्यजीव और मानव क्रियाकलापों के बीच स्थानीय व्यक्तियों के जीविकोपार्जन, विकास, सामाजिक और सांस्कृतिक अधिकारों की सम्यक् मान्यता के साथ सह अस्तित्व का संवर्धन करना है, को "मध्यवर्ती क्षेत्र" (Buffer Area) घोषित करती है। क्रान्तिक व्याघ्र निवासी क्षेत्र की सीमाएँ अनुसूची-II(अ) में तथा मध्यवर्ती क्षेत्र की सीमाएँ अनुसूची-II(ब) में वर्णित हैं। उक्त "क्रान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat) एवं "मध्यवर्ती क्षेत्र" (Buffer Area) को भविष्य में मुकन्दरा हिल्स व्याघ्र आरक्षिति (Mukandra Hills Tiger Reserve) के रूप में जाना जावेगा।

मुकन्दरा हिल्स व्याघ्र आरक्षिति (Mukandra Hills Tiger Reserve)

अनुसूची-I(अ)

"क्रान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat)

जिला-कोटा

वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हैक्टर)
1	2	3	4	5
1	झान्दवावडी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	3132.648
2	कोलीपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	458.600
3	रूपपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	216.168
4	फूटा (कम्पार्टमेंट सं. 23.32)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	223.40
5	नीम का खेडा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	106.936
6	कालाकोट	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	276.168
7	शयोदानपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	38.296
8	साकड	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	50.00
9	बोरवूड	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	284.904
10	डगचाघ	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	1064.208
11	केशरा झुमकिया	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	154.328
12	रुमडी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	100.968
13	कन्डार	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	56.928
14	गिरधरपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	667.304
15	बुजवाली चौकी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1561.512
16	डालिण (कम्पार्टमेंट सं. 61-68, 70-73)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1881.300

1	2	3	4	5
17.	दामोदरपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	2450.488
18.	दर्रा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	625.944
19.	मनोहरपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1400.648
20.	घाटोली	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	762.080
21.	अमझार-(ए)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	45.424
22.	बुर्जवाली चौकी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	63.74
23.	बोराबास	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	3018.008
24.	लोहडूंगरी (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	525.00
25.	थोलनपुर	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	635.016
26.	मशालपुरा-ए (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1196.184
27.	खीमच-बी (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	1274.748
28.	अकलगढ़ (आंशिक)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	775.00
योग:-				23045.948

जिला-कोटा
राजस्व क्षेत्र

क्र. सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हेक्टर)
1.	खडली बावरी	भंवरिया	लाड़पुरा	12.79
2.	रूपपुरा	बोराबास	लाड़पुरा	69.54
3.	लक्ष्मीपुरा	भंवरिया	लाड़पुरा	15.84
4.	गिरधरपुरा	डोलिया	लाड़पुरा	634.60
5.	दामोदरपुरा	भंवरिया	लाड़पुरा	88.58
6.	कोलीपुरा	बोराबास	लाड़पुरा	40.57
7.	मुकन्दरा (दरा गाँव)	पीपल्दा	रामगंजमंडी	96.08
8.	अखावा (मुकी)	बोराबास	लाड़पुरा	165.83
9.	घाटी	कुंकडाखुर्द	रामगंजमंडी	74.00
योग:-				1197.83

जिला-बून्दी
वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टर)
1.	गुडा राजपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	3014.528
2.	अम्बा रानी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	6745.920
योग:-				9760.448

जिला-बून्दी
राजस्व क्षेत्र

क्र.सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हेक्टर)
1.	रोजा का तालाब	धनेश्वर	बून्दी	0.00
2.	जवाहर सागर	जवाहर सागर	बून्दी	0.00
योग:-				0.00

जिला-झालावाड़
वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टर)
1.	मशालपुरा-ए आंशिक	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	411.316
2.	मशालपुरा-बी (आंशिक) (कम्पार्टमेंट सं. 49.50,53, 56-63)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	2476.60
3.	खीमच-बी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	181.248
योग:-				3069.164

जिला-झालावाड़
राजस्व क्षेत्र

क्र. सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हेक्टर)
1.	मशालपुरा	गागरोन	झालरापाटन	147.00
2.	नारायणपुरा	गागरोन	झालरापाटन	37.00
			योग:-	184.00

जिला-चित्तौड़गढ़

वन क्षेत्र

क्र. सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टर)
1.	कानिया तालाब (आंशिक)	उप वन संरक्षक, वन्यजीव, मुरा.उ., कोटा	आरक्षित वन	145.00
2.	पीर मगरा (आंशिक)	उप वन संरक्षक, वन्यजीव, मुरा.उ., कोटा	आरक्षित वन	3295.00
3.	मदार चौक	उप वन संरक्षक, वन्यजीव, मुरा.उ., कोटा	रक्षित वन	401.027
4.	बालापुरा	उप वन संरक्षक, वन्यजीव, मुरा.उ., कोटा	रक्षित वन	289.491
9.	भैंसरोड़गढ़	उप वन संरक्षक, वन्यजीव, मुरा.उ., कोटा	रक्षित वन	180.00
			योग:-	4310.518

जिला-चित्तौड़गढ़

राजस्व क्षेत्र

क्र. सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हेक्टर)
1.	अम्बा रानी	भैंसरोड़गढ़	रावतभाटा	37.21
2.	नोसेरा	श्रीपुरा	रावतभाटा	29.07
3.	भैंसरोड़गढ़	भैंसरोड़गढ़	रावतभाटा	83.00
			योग:-	149.28

"क्रान्तिक व्याघ्र निवासी क्षेत्र" (Critical Tiger Habitat) का विवरण

वन क्षेत्र: 40186.078 हेक्टेयर

राजस्व क्षेत्र: 1531.110 हेक्टेयर

योग: 41717.188 हेक्टेयर

अनुसूची- I(ब)

"मध्यवर्ती क्षेत्र" (Buffer Area)

जिला-कोटा

वन क्षेत्र

क्र.सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टर)
1.	मशालपुरा-ए (आंशिक) (कम्पार्टमेंट सं. 1-24,37-49)	उप वन संरक्षक, कोटा	आरक्षित वन	7282.570
2.	मशालपुरा-बी (आंशिक) (कम्पार्टमेंट सं. 1-17)	उप वन संरक्षक, कोटा	आरक्षित वन	4537.870
3.	लोह डूंगरी	उप वन संरक्षक, कोटा	आरक्षित वन	488.800
4.	राडी डन्ड	उप वन संरक्षक, कोटा	रक्षित वन	2593.157
5.	फूटा (कम्पार्टमेंट सं० -7,12-22,24-31)	उप वन संरक्षक, कोटा	आरक्षित वन	3107.500
6.	डोलिया (कम्पार्टमेंट सं. -31-35,37-43,46-51,57-60,69)	उप वन संरक्षक, कोटा	आरक्षित वन	3617.900
7.	अमझार - बी			116.128
			योग:-	21743.925

जिला-कोटा
राजस्व क्षेत्र

क्र.सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हेक्टर)
1.	चांद बावड़ी	डोलिया	लाड़पुरा	19.98
2.	जसपुरा (नया गांव)	डोलिया	लाड़पुरा	116.17
3.	हरिपुरा (गैर आबाद)	डोलिया	लाड़पुरा	86.32
4.	केशोपुरा	भंवरिया	लाड़पुरा	26.38
5.	मन्दरगढ़	भंवरिया	लाड़पुरा	423.53
6.	रेल (गैर आबाद)	भंवरिया	लाड़पुरा	67.35
7.	कैलाश नगरी	दान्ता	सांगोद	0.00
योग:-				739.73

जिला-झालावाड़
वन क्षेत्र

क्र.सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टर)
1.	मशालपुरा-ए (कम्पार्टमेंट सं० 25-36)	उप वन संरक्षक, झालावाड़	आरक्षित वन	692.23
2.	मशालपुरा-बी (कम्पार्टमेंट सं० 18-48,51,52,54,55)	उप वन संरक्षक, झालावाड़	आरक्षित वन	6027.80
3.	लक्ष्मीपुरा	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	103.448
योग:-				6823.478

जिला-झालावाड़
राजस्व क्षेत्र

क्र.सं.	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल (हेक्टर)
1	बोरहूवा (कानपुरा का मजरा)	गगरोन	झालरापाटन	8.16
2	हरिपुरा डांडिया	गगरोन	झालरापाटन	148.00
3	गोल बाव	गगरोन	झालरापाटन	0.00
5	गगरोन	गगरोन	झालरापाटन	320.00
6	लक्ष्मीपुरा प्रेमपुरा	गगरोन	झालरापाटन	288.30
7	नोलाव	गगरोन	झालरापाटन	113.00
8	कोथला घाटी	गगरोन	झालरापाटन	113.00
योग:-				990.46

जिला-चित्तौड़गढ़
वन क्षेत्र

क्र.सं.	वनखण्ड का नाम	वन मण्डल	वन का प्रकार	क्षेत्रफल (हेक्टर)
1.	कान्या तलाब	उप वन संरक्षक, चित्तौड़गढ़	आरक्षित वन	2398.000
2.	गैर नगरा (कम्पार्टमेंट सं. 23, 27, 28)	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	320.00
3.	कैलाशगढ़ 'बी'	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	17.00
4.	श्रीपुरा ए.बी.सी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	425.00
5.	खालगाँव ए-बी	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	रक्षित वन	124.681
6.	भुंजर	उप वन संरक्षक, वन्यजीव, मु.रा.उ., कोटा	आरक्षित वन	700.00
योग:-				3984.681

मध्यवर्ती क्षेत्र (Buffer area) का विवरण

वन क्षेत्र :	32552.084 हेक्टेयर
राजस्व क्षेत्र :	1730.190 हेक्टेयर
योग :	34282.274 हेक्टेयर
महायोग :	75999.462 हेक्टेयर

अनुसूची-II(अ)

(मुकन्दरा हिल्स टाईगर रिजर्व के क्रान्तिक व्याघ्र निवासी क्षेत्र का सीमा विवरण)

उत्तरी सीमा :-

एरु नदी के उत्तरी छोर से जहां वन खण्ड अम्बारानी की सीमा प्रारम्भ होती है, से वन खण्ड अम्बारानी की उत्तरी सीमा के सहारे-सहारे, जिला बूंदी एवं कोटा की सीमाओं के मिलान बिन्दु से होते हुए चम्बल नदी के किनारें तक, जो जवाहर सागर अभयारण्य की सीमा भी है। तत्पश्चात चम्बल नदी के विपरीत किनारें तक तथा किनारे के लम्बवत चलते हुए राष्ट्रीय घड़ियाल अभयारण्य की सीमा के मिलान बिन्दु तक। तत्पश्चात राष्ट्रीय घड़ियाल अभयारण्य की सीमा, जो अकेलगढ़ वन खण्ड में से होकर गुजरती है, पर चलते हुए तथा घड़ियाल अभयारण्य के क्षेत्र को सम्मिलित करते हुए गैपरानाथ के नाले तक। तत्पश्चात राष्ट्रीय घड़ियाल अभयारण्य की सीमा के सहारे-सहारे, जो लोह डूंगरी वन खण्ड में से होकर गुजरती है तथा मुकन्दरा हिल्स राष्ट्रीय उद्यान की सीमा भी है, वन खण्ड बोराबास की सीमा के मिलान बिन्दु तक। तत्पश्चात वन खण्ड बोराबास की उत्तर-पूर्वी सीमा पर चलते हुये कोटा-बोराबास जाने वाले रास्ते तक, बोराबास वन खण्ड को सम्मिलित करते हुए तथा ग्राम बोराबास को बाहर निकालते हुये। तत्पश्चात बोराबास से चांदबावड़ी जाने वाले मार्ग जो फायर लाईन भी है तथा वन खण्ड चांदबावड़ी की सीमा भी है, के सहारे-सहारे, वन खण्ड फूटा के कम्पार्टमेंट संख्या 23 की सीमा के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेंट संख्या 23 की उत्तरी सीमा पर चलते हुए तथा उक्त कम्पार्टमेंट को सम्मिलित करते हुए वनखण्ड चांदबावड़ी की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड चांदबावड़ी की सीमा के सहारे-सहारे, वनखण्ड फूटा के कम्पार्टमेंट संख्या 32 की सीमा के मिलान बिन्दु तक। तत्पश्चात उक्त कम्पार्टमेंट की उत्तर-पूर्वी सीमा पर चलते हुए तथा उक्त कम्पार्टमेंट को सम्मिलित करते हुए ग्राम चांदबावड़ी की राजस्व सीमा के मिलान बिन्दु तक, जो कि मुकन्दरा हिल्स राष्ट्रीय उद्यान की सीमा भी है, तक। तत्पश्चात वन खण्ड फूटा के कम्पार्टमेंट संख्या 32 की दक्षिणी-पश्चिमी सीमा पर चलते हुये ग्राम चांदबावड़ी एवं ग्राम हरीपुरा (गैर आबाद) की राजस्व भूमि बाहर करते हुये तथा ग्राम अखावा की राजस्व भूमि को सम्मिलित करते हुये वन खण्ड केसरा झूमकिया की उत्तरी सीमा के मिलान बिन्दु तक। वन खण्ड केसरा झूमकिया की उत्तरी सीमा के मिलान बिन्दु से उक्त वन खण्ड की उत्तरी सीमा के सहारे-सहारे वन खण्ड डोलिया के कम्पार्टमेंट संख्या 73,72,71,70,68,61 की उत्तरी सीमा के सहारे-सहारे, उक्त कम्पार्टमेंटों को सम्मिलित करते हुए, वन खण्ड दामोदरपुरा की उत्तरी सीमा तक। तत्पश्चात वन खण्ड दामोदरपुरा की उत्तरी बाहरी सीमा पर चलते हुये वन खण्ड दामोदरपुरा को सम्मिलित करते हुए वन खण्ड दरा की उत्तरी सीमा तक, वन खण्ड दरा को सम्मिलित करते हुये, वन खण्ड मशालपुरा-ए के कम्पार्टमेंट संख्या 50 की उत्तरी सीमा के मिलान बिन्दु तक, जो मुकन्दरा हिल्स राष्ट्रीय उद्यान की सीमा भी है। तत्पश्चात मशालपुरा-ए के कम्पार्टमेंट संख्या 50,51,52,53 व 54 की उत्तर-पूर्वी सीमा पर चलते हुये तथा उक्त कम्पार्टमेंटों को सम्मिलित करते हुए मशालपुरा-बी के कम्पार्टमेंट संख्या 49 के मिलान बिन्दु तक, जो दर्रा अभयारण्य की सीमा भी है। तत्पश्चात वन खण्ड मशालपुरा-बी के कम्पार्टमेंट संख्या 49,50,53,55 व 56 की उत्तर-पूर्वी सीमाओं के सहारे-सहारे उक्त कम्पार्टमेंटों को सम्मिलित करते हुये काली सिन्ध नदी के मिलान बिन्दु तक, जो दरा अभयारण्य की सीमा भी है।

पूर्वी सीमा :-

वनखण्ड मशालपुरा-बी के कम्पार्टमेंट संख्या 56 की उत्तरी सीमा जो काली सिन्ध नदी के किनारें पर मिलती है, से नदी के किनारें-किनारें कम्पार्टमेंट संख्या 56 एवं 57 की पूर्वी सीमा तक, उक्त कम्पार्टमेंटों को सम्मिलित करते हुए, जो कि दरा अभयारण्य की सीमा भी है।

दक्षिणी सीमा :-

काली सिन्ध नदी तथा वन खण्ड मशालपुरा-बी के कम्पार्टमेंट संख्या 57 की दक्षिणी सीमा के मिलान बिन्दु से प्रारम्भ होकर उक्त वनखण्ड के कम्पार्टमेंट संख्या 57,63 व 58 की दक्षिणी-पश्चिमी सीमा के सहारे-सहारे तथा उक्त कम्पार्टमेंटों को सम्मिलित करते हुये, ग्राम गांगरोन, कोथला घाटी, नोलाव एवं ग्राम लक्ष्मीपुरा उर्फ प्रेमपुरा को एवं उनकी राजस्व भूमि को व वनखण्ड लक्ष्मीपुरा को बाहर करते हुए, वन खण्ड मशालपुरा-बी के कम्पार्टमेंट न. 61 एवं 62 की बाहरी पूर्वी सीमा के सहारे-सहारे आहू नदी तथा कम्पार्टमेंट संख्या 62 की दक्षिण-पश्चिमी सीमा के मिलान बिन्दु तक। कम्पार्टमेंट संख्या 62 की दक्षिणी सीमा तथा आहू नदी के मिलान बिन्दु से प्रारम्भ होकर वनखण्ड मशालपुरा-बी की दक्षिण-पश्चिमी सीमा के सहारे-सहारे, वनखण्ड खीमच-बी की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड खीमच-बी को सम्मिलित करते हुए उक्त वनखण्ड की दक्षिणी-पश्चिमी सीमा के सहारे-सहारे उक्त वनखण्ड के कम्पार्टमेंट संख्या 9 की दक्षिणी सीमा के अन्तिम बिन्दु तक, जो दरा अभयारण्य की सीमा भी है। तत्पश्चात कम्पार्टमेंट संख्या 9 की पश्चिमी सीमा के सहारे-सहारे, वनखण्ड अमझार-बी को बाहर रखते हुए, वनखण्ड मनोहरपुरा की दक्षिणी सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड मनोहरपुरा की दक्षिणी सीमा के सहारे-सहारे वनखण्ड अमझार-बी को बाहर करते हुए वनखण्ड अमझार-ए के मिलान बिन्दु तक। तत्पश्चात वनखण्ड अमझार-ए की दक्षिणी-पश्चिमी सीमा के सहारे-सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए, वनखण्ड मनोहरपुरा की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड मनोहरपुरा की दक्षिणी सीमा के सहारे-सहारे ग्राम घाटोली तक। तत्पश्चात वन खण्ड घाटोली की दक्षिणी सीमा के सहारे-सहारे तथा उसे सम्मिलित करते हुए, वनखण्ड बुर्जवाली चौकी, काला कोट, नीम का खेड़ा, एवं कोलीपुरा की दक्षिणी-पश्चिमी सीमा के सहारे-सहारे उक्त वन खण्डों को सम्मिलित करते हुये जो मुकन्दरा

हिल्स राष्ट्रीय उद्यान की सीमा भी है तक। तत्पश्चात कोलीपुरा ग्राम के राजस्व क्षेत्र एवं रूपपुरा के राजस्व क्षेत्र को सम्मिलित करते हुए, कोलीपुरा-रावत भाटा मार्ग के साथ-साथ वन खण्ड कान्या तालाब के कोलीपुरा-रावतभाटा मार्ग के दायीं ओर के क्षेत्र को सम्मिलित करते हुए, कान्या तालाब के कम्पार्टमेंट नं. 1 तथा थोलनपुर की पश्चिमी सीमा के सहारे-सहारे, कोटा, चित्तौड़गढ़ तथा बून्दी जिले की सीमाओं के मिलान बिन्दु तक, कोटा, चित्तौड़गढ़ तथा बून्दी जिले की सीमाओं के मिलान बिन्दु से चम्बल नदी के उत्तरी छोर पर वनखण्ड पीर मगरा की निकटतम सीमा के मिलान बिन्दु तक, तत्पश्चात वन खण्ड पीरमगरा की दक्षिणी सीमा के सहारे-सहारे, उक्त वनखण्ड को सम्मिलित करते हुए; वन खण्ड बालापुरा की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड बालापुरा की दक्षिणी सीमा के सहारे-सहारे, उक्त वनखण्ड को सम्मिलित करते हुए; वन खण्ड मदार चोक के मिलान बिन्दु तक। तत्पश्चात वन खण्ड मदार चोक की बाहरी सीमा के साथ-साथ तथा उक्त वन खण्ड को सम्मिलित करते हुए, वन खण्ड भैंसरोडगढ़ पार्ट-ए के मिलान बिन्दु तक। तत्पश्चात वन खण्ड भैंसरोडगढ़ पार्ट-ए की बाहरी सीमा के सहारे-सहारे उक्त वनखण्ड को सम्मिलित करते हुए तथा वन खण्ड भैंसरोडगढ़ पार्ट-बी को बाहर रखते हुए भैंसरोडगढ़ से श्रीपुरा-लोटियाना जाने वाली सड़क के सहारे-सहारे, वन खण्ड पीरमगरा के कम्पार्टमेंट नं. 23,27 व 28 (आंशिक) को बाहर करते हुए, कम्पार्टमेंट संख्या 28 की पश्चिमी सीमा के उक्त सड़क के उत्तर में स्थित मिलान बिन्दु तक। तत्पश्चात पीर मगरा वन खण्ड की बाहरी सीमा के सहारे-सहारे वन खण्ड खालगांव ए-बी के मिलान बिन्दु तक।

पश्चिमी सीमा :-

वनखण्ड पीरमगरा तथा वनखण्ड खालगांव ए-बी के दक्षिणी सीमाओं के मिलान बिन्दु से प्रारम्भ होकर वनखण्ड पीरमगरा की पश्चिमी सीमा के सहारे-सहारे वन खण्ड खाल गांव ए-बी को बाहर करते हुए नोसेरा घाटे तक। तत्पश्चात नोसेरा घाटे से वन खण्ड गुडाराजपुरा की पश्चिमी सीमा के सहारे-सहारे एवं उक्त वन खण्ड की सीमा के एरु नदी के मिलान बिन्दु तक, तत्पश्चात एरु नदी के उत्तरी छोर पर स्थित वनखण्ड अम्बा रानी की सीमा के मिलान बिन्दु तक।

अनुसूची-II (ब)

(मुकन्दरा हिल्स व्याघ्र आरक्षित के मध्यवर्ती क्षेत्र का सीमा विवरण)

खण्ड 1 :-

वनखण्ड मशालपुरा-बी एवं वनखण्ड लक्ष्मीपुरा के मिलान बिन्दु से प्रारम्भ होकर वनखण्ड मशालपुरा-बी के कम्पार्टमेंट संख्या 62 की दक्षिण-पूर्वी सीमा के सहारे-सहारे आहू नदी के मिलान बिन्दु तक। तत्पश्चात आहू नदी के सहारे-सहारे काली सिंध नदी के मिलान बिन्दु तक। तत्पश्चात काली सिंध नदी के किनारे-किनारे वनखण्ड मशालपुरा-बी के कम्पार्टमेंट नं. 57 के मिलान बिन्दु तक। काली सिंध नदी तथा कम्पार्टमेंट नं. 57 की दक्षिण-पश्चिमी सीमा के मिलान बिन्दु से प्रारम्भ होकर उक्त वनखण्ड की दक्षिण-पश्चिमी के सहारे-सहारे, कम्पार्टमेंट संख्या 63, 58 व 59 की बाहरी दक्षिण-पश्चिमी सीमा के सहारे-सहारे, कम्पार्टमेंट सं. 61 के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेंट नं. 61 व 62 की पूर्वी सीमा के सहारे-सहारे वनखण्ड लक्ष्मीपुरा के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेंट सं. 62 की दक्षिणी-पश्चिमी सीमा के सहारे-सहारे आहू नदी के मिलान बिन्दु तक, जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट क्षेत्र की सीमा भी है, तक। वनखण्ड लक्ष्मीपुरा तथा राजस्व क्षेत्र ग्राम लक्ष्मीपुरा उर्फ प्रेमपुरा, नोलाव, कोथला घाटी एवं गगरोन को सम्मिलित करते हुए।

खण्ड 2 :-

वनखण्ड मशालपुरा-बी के कम्पार्टमेंट 56 की उत्तरी सीमा तथा काली सिंध के मिलान बिन्दु से प्रारम्भ होकर राजस्व क्षेत्र राजपुरा को बाहर करते हुए तथा वनखण्ड मशालपुरा-बी की पूर्वी सीमा के सहारे-सहारे, कम्पार्टमेंट संख्या 31 व काली सिंध नदी के किनारे पर मिलान बिन्दु तक। तत्पश्चात वनखण्ड मशालपुरा-बी की पूर्वी व उत्तरी सीमा के सहारे-सहारे वनखण्ड मशालपुरा-बी को सम्मिलित करते हुए, वनखण्ड मशालपुरा-ए की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड मशालपुरा-ए की उत्तरी सीमा के सहारे-सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए, ग्राम मौरू कला गांव को बाहर करते हुए, वनखण्ड दरा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड दरा की सीमा के सहारे-सहारे मशालपुरा-ए के कम्पार्टमेंट सं. 50 की सीमा के मिलान बिन्दु तक। तत्पश्चात मशालपुरा-ए के कम्पार्टमेंट संख्या 50,51,52,53,54 तथा वनखण्ड मशालपुरा-बी के कम्पार्टमेंट नं. 49,50,53,55 तथा 56 की उत्तर-पूर्वी सीमाओं के सहारे-सहारे, उक्त कम्पार्टमेंटों को बाहर करते हुए, कम्पार्टमेंट सं. 56 तथा काली सिंध नदी के किनारे स्थित मिलान बिन्दु तक। जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट क्षेत्र की सीमा भी है, तक।

खण्ड 3 :-

वनखण्ड दामोदरपुरा से लगे वनखण्ड डोलिया के कम्पार्टमेंट संख्या 57 की बाहरी सीमा से प्रारम्भ होकर कम्पार्टमेंट सं. 58,59,51,37,35,33,32,31,48,46 की बाहरी सीमा के सहारे-सहारे तथा उक्त

सीमा के अन्तर्गत आने वाले कम्पार्टमेंटों को सम्मिलित करते हुए, वनखण्ड डोलिया के कम्पार्टमेंट संख्या 71 की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड डोलिया के कम्पार्टमेंट संख्या 46 की पश्चिमी सीमा तथा कम्पार्टमेंट सं. 71 की उत्तरी सीमाओं के मिलान बिन्दु से प्रारम्भ होकर, कम्पार्टमेंट संख्या 71, 70, 68, 61 की उत्तरी सीमा पर होते हुए, तथा उक्त कम्पार्टमेंटों को बाहर करते हुए, वनखण्ड दमोदरपुरा की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड दमोदरपुरा की उत्तर-पश्चिमी सीमा के सहारे-सहारे वनखण्ड डोलिया के कम्पार्टमेंट संख्या 57 के मिलान बिन्दु तक, जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट की सीमा भी है। उक्त सीमा के अन्तर्गत आने वाले ग्राम जसपुरा, रेल (गैर आबाद), केशोपुरा तथा मन्दरगढ़ की राजस्व क्षेत्र भी सम्मिलित है।

खण्ड 4 :-

वनखण्ड फूटा के कम्पार्टमेंट संख्या 31, 30, 29, 28, 19, 15, 13, 12, 7, 20, 21 एवं 22 की बाहरी सीमा के सहारे-सहारे तथा इस सीमा के अन्तर्गत आने वाले कम्पार्टमेंटों को सम्मिलित करते हुए वनखण्ड राड़ी ढंड के मिलान बिन्दु तक। तत्पश्चात वनखण्ड राड़ी ढंड की बाहरी दक्षिण-पूर्वी तथा पूर्वी-उत्तरी सीमा के सहारे-सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए वनखण्ड लोह झूंगरी के मिलान बिन्दु तक। तत्पश्चात वनखण्ड लोह झूंगरी की सीमा के सहारे-सहारे गैपरनाथ के नाले तक। तत्पश्चात गैपरनाथ के नाले से राष्ट्रीय घड़ियाल अभयारण्य की सीमा के सहारे-सहारे वनखण्ड बोराबास की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड बोराबास की सीमा के सहारे-सहारे वनखण्ड चांदबावड़ी के मिलान बिन्दु तक। ग्राम बोराबास एवं उसके राजस्व क्षेत्र को बाहर करते हुए, तत्पश्चात वनखण्ड चांद बावड़ी की बाहरी सीमा के सहारे-सहारे वनखण्ड फूटा के कम्पार्टमेंट नं. 23 की सीमा के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेंट सं. 23 की दक्षिण-पूर्वी सीमा के सहारे-सहारे कम्पार्टमेंट को बाहर करते हुए वनखण्ड चांद बावड़ी की सीमा के मिलान बिन्दु तक। तत्पश्चात वनखण्ड चांद बावड़ी की सीमा के सहारे-सहारे वनखण्ड फूटा के कम्पार्टमेंट सं. 32 की सीमा के मिलान बिन्दु तक। तत्पश्चात उक्त कम्पार्टमेंट की दक्षिण-पूर्वी सीमा के सहारे-सहारे तथा उक्त कम्पार्टमेंट को बाहर करते हुए ग्राम चांद बावड़ी की राजस्व सीमा के मिलान बिन्दु तक, जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट की सीमा भी है। तत्पश्चात ग्राम चांद बावड़ी एवं हरी पुरा ग्राम के राजस्व क्षेत्र को सम्मिलित करते हुए कम्पार्टमेंट सं. 31 के प्रारम्भिक मिलान बिन्दु तक।

खण्ड 5 :-

वन खण्ड खालगांव ए-बी तथा वनखण्ड पीरमगरा के उत्तर-पश्चिम दिशा में स्थित मिलान बिन्दु से प्रारम्भ होकर वन खण्ड खालगांव ए-बी पश्चिमी की सीमा के सहारे-सहारे वन खण्ड भुजर के मिलान बिन्दु तक। तत्पश्चात वन खण्ड भुजर के कम्पार्टमेंट संख्या 12b की सीमा पर होते हुये तथा कम्पार्टमेंट संख्या 12a के मिलान बिन्दु तक। तत्पश्चात जवाहर सागर अभयारण्य की पश्चिमी सीमा के सहारे-सहारे वनखण्ड श्रीपुरा-बी के मिलान बिन्दु तक। तत्पश्चात वनखण्ड श्रीपुरा-बी की पश्चिमी सीमा से प्रारम्भ होकर तथा राजस्व क्षेत्र को बाहर करते हुये वनखण्ड भुजर के मिलान बिन्दु तक। तत्पश्चात वन खण्ड श्रीपुरा-सी के मिलान बिन्दु तक। तत्पश्चात वन खण्ड श्रीपुरा-सी की सीमा पर चलते हुये तथा उक्त वन खण्ड को सम्मिलित करते हुये वन खण्ड खाल गांव ए-बी के मिलान बिन्दु तक। तत्पश्चात वन खण्ड खाल गांव ए-बी की दक्षिण-पूर्वी सीमा पर चलते हुये वनखण्ड पीरमगरा के मिलान बिन्दु तक। तत्पश्चात वन खण्ड खाल गांव ए-बी की सीमा पर चलते हुये वनखण्ड पीरमगरा के मिलान बिन्दु तक। तत्पश्चात वन खण्ड खाल गांव ए-बी की सीमा पर चलते हुये प्रारम्भिक बिन्दु तक जो कि वनखण्ड ए-बी तथा वन खण्ड पीरमगरा की कोमन सीमा तथा मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल हैबीटाट क्षेत्र की सीमा भी है, तक।

खण्ड 6 :-

वनखण्ड श्रीपुरा ए.बी.सी का पार्ट-ए की पश्चिमी सीमा तथा बहामणी नदी के मिलान बिन्दु से प्रारम्भ होकर उक्त वनखण्ड की सीमा के सहारे-सहारे तथा उक्त वनखण्ड को सम्मिलित करते हुए।

खण्ड 7 :-

लेटियन-भैंसरोडगढ़ सड़क के दक्षिण में वनखण्ड-पीरमगरा के कम्पार्टमेंट संख्या 28 की सीमा पर चलते हुये कम्पार्टमेंट संख्या 27 व 23 की दक्षिणी सीमा पर चलते हुये तथा इन्हें सम्मिलित करते हुये वनखण्ड भैंसरोडगढ़-बी के मिलान बिन्दु तक। तत्पश्चात वनखण्ड भैंसरोडगढ़-बी की सीमा पर चलते हुये कम्पार्टमेंट-23 के मिलान बिन्दु तक। तत्पश्चात कम्पार्टमेंट संख्या 23 व 27 की सीमा पर सड़क के किनारे-किनारे चलते हुये कम्पार्टमेंट संख्या 28 की सीमा के प्रारम्भिक बिन्दु तक जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट की सीमा भी है, तक।

खण्ड 8 :-

सतलुवा से बंसवास जाने वाली सड़क के दक्षिण में स्थित वनखण्ड-कान्या तालाब के कम्पार्टमेंट संख्या-1 की सीमा से प्रारम्भ होकर उक्त वन खण्ड की सीमा पर चलते हुये तथा उक्त वन खण्ड को सम्मिलित करते हुये वन खण्ड कालसोटे के मिलान बिन्दु तक। तत्पश्चात वन खण्ड कान्या

तालाब तथा वन खण्ड कालाकोट, नीम का खेड़ा तथा कोलीपुरा की कॉमन सीमा पर चलते हुये रावतभाटा-बोराबास सड़क तक तथा उक्त सड़क के दक्षिणी किनारे के सहारे-सहारे चलते हुये प्रारम्भिक बिन्दु तक जो कि मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटिकल हैबिटाट क्षेत्र की सीमा भी है, तक।

खण्ड 9 :-

दरा-झालावाड़ सड़क के किनारे वनखण्ड अमझार-बी की सीमा से प्रारम्भ होकर उक्त वन खण्ड की सीमा पर झालावाड़-दरा मार्ग के सहारे-सहारे दरा-घाटोली मार्ग के मिलान बिन्दु तक। तत्पश्चात उक्त वन खण्ड की सीमा पर, मार्ग दरा-घाटोली के सहारे-सहारे जो वन खण्ड मनोहरपुरा की सीमा भी है तथा मुकन्दरा हिल्स टाईगर रिजर्व के क्रिटिकल हैबिटाट की सीमा भी है, तक। तत्पश्चात वन खण्ड अमझार-बी की सीमा पर चलते हुये तथा उक्त वन खण्ड को सम्मिलित करते हुये प्रारम्भिक बिन्दु तक।

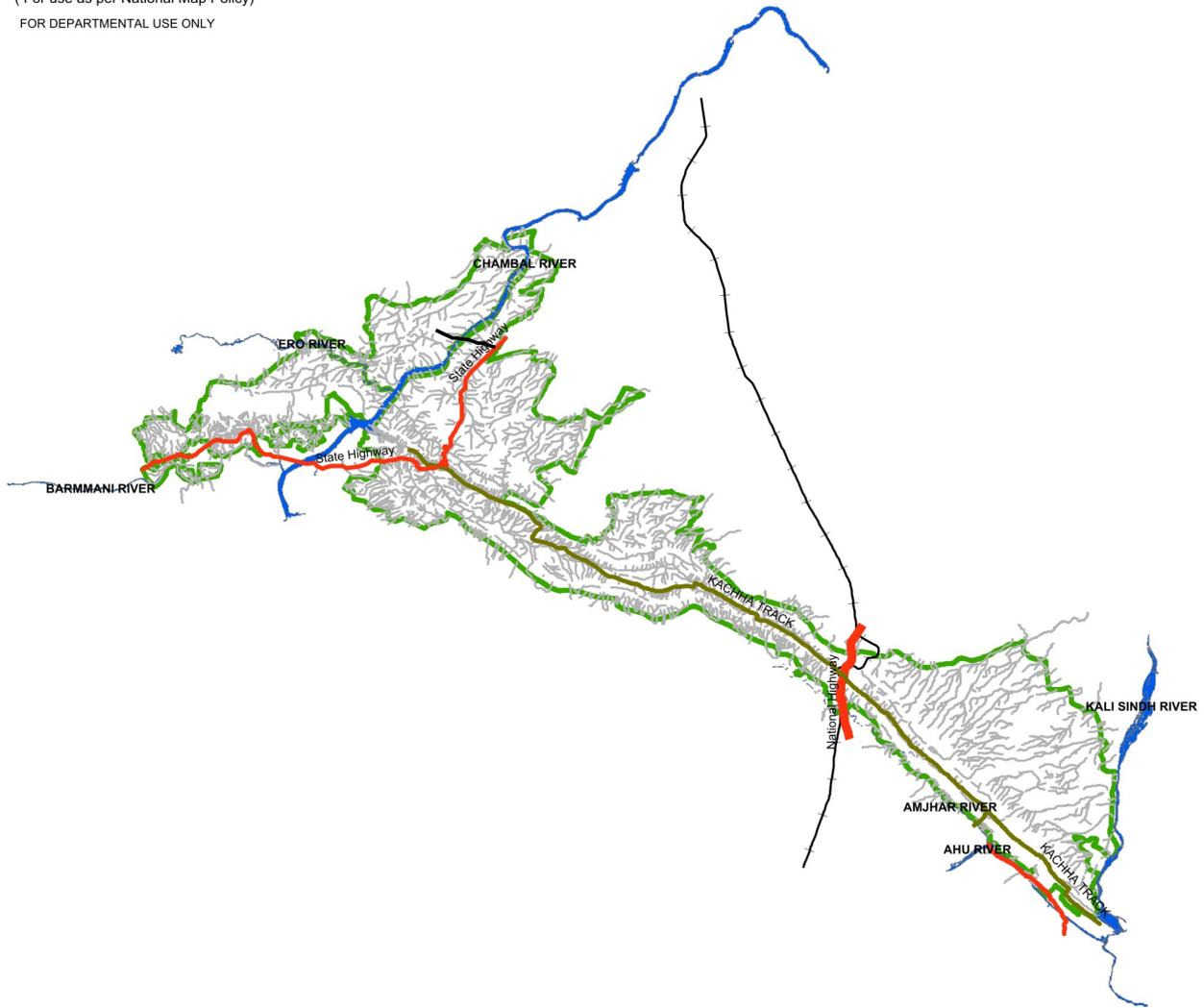
राज्यपाल की आज्ञा से,
सी.एस. रत्नासामी,
शासन सचिव,
वन विभाग,
शासन सचिवालय, जयपुर।

राज्य केन्द्रीय मुद्रणालय, जयपुर।

MUKANDRA HILLS TIGER RESERVE-KOTA

MAP OF DRAINAGE, RIVER AND ROAD

GIS Center, Information Technology Wing
 2013
 (For use as per National Map Policy)
 FOR DEPARTMENTAL USE ONLY



Legend

- DISTRICT ROAD
- KACHHA TRACK
- NATIONAL HIGHWAY
- STATE HIGHWAY
- RAILWAY
- DRAINAGE
- RIVER
- CTH_BUFFER_PARIFERY

THIS MAP HAS BEEN PREPARED FOR MANAGEMENT PURPOSES ONLY. FOR LEGAL PURPOSES, FOREST LAND RECORDS SHOULD BE CONSULTED

FOREST DEPARTMENT, RAJASTHAN



NOT TO SCALE

A LIST OF FLORA

(A = Abudent, C= Common , L = Less common , R = Rare ,I = introduced)

S.No	Botanical Name	Common Name	Family	Status
1.	<i>Acacia catechu</i>	Khair	Mimosaceae	A
2.	<i>Acaia lencucphloea</i>	Ronjh	Mimosaceae	A
3.	<i>Acucia nilotica</i>	Desi Bawalia	Mimosaceae	L
4.	<i>Acacia Senegal</i>	Kumta	Mimosaceae	R
5.	<i>Adina cordifolia</i>	Haldu	Rubiaceae	L
6.	<i>Aegle marmelos</i>	Bili	Rutaceae	L
7.	<i>Ailanthus excelsa</i>	Ardusa , paba	Simaroubaceae	L
8.	<i>Alangium salvifolium</i>	Ankol	Alangiaceae	A
9.	<i>Albizzia lebbeck</i>	Black siris	Mimosaceae	L
10.	<i>Albizzia odoratissima</i>	Safed siris	Mimosaceae	L
11.	<i>Albizzia procera</i>	Safed siris	Mimosaceae	R
12.	<i>Annona squamosa</i>	Sitaphal	Annonaceac	C
13.	<i>Anogeissus latifolia</i>	Dhuvda	Combretaceae	C
14.	<i>Anogeissus sericea</i>	Adruk , Indok	Combretaceae	R
15.	<i>Azadirachta indica</i>	Neem	Meliaceae	L
16.	<i>Balanites aegyptica</i>	Hingot	Balanitaceae	C
17.	<i>Bauhenia purpurea variegata</i>	Kachnar	Caesalpiniaceae	R
18.	<i>Bauhenia recemosa</i>	Jhinjha , Heetri	Caesalpiniaceae	L
19.	<i>Bombax ceiba</i>	Semal	Bombacaceae	L
20.	<i>Boswellia serrata</i>	Salar	Burseraceae	L
21.	<i>Bridelia retusa</i>	Asan , Lampan	Euphorbiaceae	R
22.	<i>Butea monosperma</i>	Khakhro	Papilionaceae	A
23.	<i>Casearia elliptica</i>	Mojal	Lecythidaceae	R
24.	<i>Cassia fistula</i>	Karmela	Caesalapiniaceae	L
25.	<i>Cassia siannea</i>	Kasid	Caesalapiniaceae	I
26.	<i>Cordia mixa</i>	Gunda , Lisoda	Ehretiaceae	L
27.	<i>Crataeve religiosa</i>	Varna	Capparaceae	R
28.	<i>Dalbergia latifolia</i>	Sisam	Papilionanceae	R
29.	<i>Dalbergia paaniculata</i>	Dhoban	Papilionanceae	R
30.	<i>Dalbergia sisso</i>	Sandeshro	Papilionanceae	I
31.	<i>Delonix elata</i>	Sandeshro	Caesalpiniaceae	C
32.	<i>Disopyros melanoxylon</i>	Timru	Ebenaceae	C
33.	<i>Ehretia laevis</i>	Tambolia	Ehretiaceae	L
34.	<i>Emblica officinalis</i>	Amla	Euphoribaceae	L
35.	<i>Erythrina suberosa</i>	Dhed khakhro	Papilionaceae	R
36.	<i>Eucalyptus sp.</i>	Nilgiri	Myrtaceae	I
37.	<i>Ficus benghalensis</i>	Vad	Moraceae	C
38.	<i>Ficus hispida</i>	Kamri	Moraceae	R
39.	<i>Ficus racemosa</i>	Umara	Moraceae	C
40.	<i>Ficus religiosa</i>	Piplo	Moraceae	C
41.	<i>Fimiana colorata</i>	Kodan , Kodala	Sterculiaceae	R

42.	<i>Flacourtia Montana</i>	Kankan	Flacourtiaceae	C
43.	<i>Gardenia resinifera</i>	Dikamari	Rubiaceae	R
44.	<i>Gmelina arborea</i>	Sewan	Verbenaceae	R
45.	<i>Grewia hirsute</i>	Khad Dhaman	Tiliaceae	L
46.	<i>Grewia tenax</i>	Gangeti	Tiliaceae	L
47.	<i>Grewia tiliaefolia</i>	Dhaman	Tiliaceae	L
48.	<i>Holoptelia integrifolia</i>	Kanji	Ulmaceae	L
49.	<i>Hymenodictyon excelsum</i>	Lunio	Rubiaceae	R
50.	<i>Kydia calycina</i>	Moti hirvani	Malvaceae	R
51.	<i>Lannea coromandelica</i>	Godla	Anacardiaceae	A
52.	<i>Leucaena leucocephala</i>	Subabul	Mimosaceae	I
53.	<i>Limonia acidissima</i>	Kotbadi	Rutaceae	R
54.	<i>Madhuca indica</i>	Mahudo	Sapotaceae	A
55.	<i>Mallotus philippensis</i>	Kanku , Rohan	Euphorbiaceae	R
56.	<i>Mangifera indica</i>	Amba	Ancardiaceae	C
57.	<i>Melia azaderach</i>	Bakain limdo	Meliaceae	L
58.	<i>Milium tomentosa</i>	Umb	Annonaceae	L
59.	<i>Mitragyna parviflora</i>	Kalam	Rubiaceae	C
60.	<i>Moringa oleifera</i>	Sahjana	Moringaceae	L
61.	<i>Oroxylum indicum</i>	Tentu , Pharry	Bignoniaceae	R
62.	<i>Phoenix sylvestris</i>	Khajur	Palmae	A
63.	<i>Pithecellobium dulce</i>	Kikar	Mimosaceae	R
64.	<i>Pongamia pinnata</i>	Karanj	Papilionaceae	A
65.	<i>Prosopis cineraria</i>	Khijdo	Mimosaceae	R
66.	<i>Prosopis juliflora</i>	Vilayati	Mimosaceae	I
67.	<i>Pterocarpus marsupium</i>	Bia	Papilionaceae	R
68.	<i>Sapindus emarginatus</i>	Aritha	Sapindaceae	R
69.	<i>Schreberia swietenoides</i>	Mokho	Oleaceae	R
70.	<i>Soymida fabrifuga</i>	Royan	Meliaceae	R
71.	<i>Sterculia urens</i>	Kadayo	Sterculiaceae	L
72.	<i>Syzygium cumuni</i>	Jambu	Myrtaceae	R
73.	<i>Syzygium heynianum</i>	Makkaniya Jambu	Myrtaceae	A
74.	<i>Tamarindus indica</i>	Khatri Amla	Caesalpiniaceae	L
75.	<i>Tecomella undulata</i>	Rohida	Bignoniaceae	R
76.	<i>Tectona grandis</i>	Sag . Sagwan	Verbenaceae	L
77.	<i>Terminalia arjuna</i>	Kohda	Combretaceae	L
78.	<i>Terminalia bellarica</i>	Baheda	Combretaceae	A
79.	<i>Wrightia tinctoria</i>	Dudhia	Apocyanaceae	A
80.	<i>Wrightia tomentosa</i>	Dudhia	Apocyanaceae	L
81.	<i>Zeyheria mauritiana</i>	Bordi	Rhamnaceae	A
82.	<i>Zeyheria xylophora</i>	Ghat bor	Rhamnaceae	I

SHRUBS

S.No	Botanical Name	Common Name	Family	Status
1.	<i>Adhatoda vesica</i>	Ardusa	Acanthaceae	C
2.	<i>Agave americana</i>	Ketaki	Agavaceae	R
3.	<i>Calotropis gigantea</i>	Akdo	Asclepiadaceae	A
4.	<i>Calotropis procera</i>	Akdo	Asclepiadaceae	L
5.	<i>Capparis decudu</i>	Ker	Capparaceae	R
6.	<i>Capparis grandis</i>	Pandan Bor	Capparaceae	R
7.	<i>Capparis sepiaria</i>	Kanther	Capparaceae	A
8.	<i>Corissa conjesta</i>	Karamada	Apocynaceae	L
9.	<i>Cassia auriculata</i>	Awala	Casalpiniaceae	A
10.	<i>Cassia occidentalis</i>		Casalpiniaceae	L
11.	<i>Clerodendromus phlomidis</i>	Arani	Verbenaceae	L
12.	<i>Denedrocolamus strictus</i>	Bans	Poaceal	C
13.	<i>Dendrophthoe fulcuta</i>	Vahi – hankal	Lorarthaceae	C
14.	<i>Dichrostachys cinera</i>	Goya khair	Mimosaceae	C
15.	<i>Euphorbia nerifolia</i>	Thor	Euphorbiaceae	C
16.	<i>Euphorbia nivulia</i>	Thor	Euphorbiaceae	C
17.	<i>Helicteres isora</i>	Marod phalli	Sterculiaceae	A
18.	<i>Holarrhena antidysenterica</i>	Kadwa	Apocyanaceae	A
19.	<i>Hibiscus lobatus</i>	Kadwa	Malvaceae	L
20.	<i>Jatropha carcus</i>	Rattan jyot	Euphorbiaceae	A
21.	<i>Jatropha gossypifolia</i>	Chhoti Ratan jyot	Euphorbiaceae	A
22.	<i>Kirganelia reticulata</i>	Kambori	Asclepiaduceae	A
23.	<i>Leptadenia pyrotechnica</i>	Khinp	Mimosaceae	A
24.	<i>Mimosa humata</i>	Aila	Nyctoginaceae	R
25.	<i>Nyctenthes arbor –tristis</i>	Tamta	Plunbeginaceae	A
26.	<i>Plumbago zeylanica</i>	Chitrak	Euphorbiaceae	L
27.	<i>Ricinus communis</i>	Aroundo	Euphorbiaceae	R
28.	<i>Securinus leucopyrus</i>	Shenvi	Euphorbiaceae	L
29.	<i>Securinea virosa</i>	Shenvi	Euphorbiaceae	L
30.	<i>Thespesia lampas</i>	Paras papal	Malvaceae	R
31.	<i>Viscum articulatum</i>	Vando	Loranthaceae	L
32.	<i>Vitex nigundo</i>	Nagod	Verbenaceae	A
33.	<i>Vogelia indica</i>	Chitawal	Plembegenaceae	A
34.	<i>Watheria indica</i>	Chitawal	Sterculiaceae	L
35.	<i>Woodfordia fruticosa</i>	Dhavadi	Lythraceae	L
36.	<i>Zizyphus glabarata</i>	Bordi	Rhamnaceae	L
37.	<i>Zizyphus nummularia</i>	Chanibor	Rhamnaceae	L

CLIMBERS

S.No	Botanical Name	Common Name	Family	Status
1.	<i>Abrus precatorius</i>	Ratti	Papilionaceae	C
2.	<i>Ampelocissus latifolia</i>	Khata limbu	Vitaceae	C
3.	<i>Argyrea sericea</i>	Samudrasok	Convolvulaceae	L
4.	<i>Asparagus racemosus</i>	Satvari	Liliaceae	L
5.	<i>Butea superba</i>	Khakhra – vel	Papilionaceae	R
6.	<i>Canavalia gladiata</i>	Alad	Papilionaceae	L
7.	<i>Cardiospermum halicacabum</i>	Kak mardika	Sapindaceae	A
8.	<i>Cayratia camosa</i>		Vitaceae	C
9.	<i>Celastrus paniculata</i>	Mali	Celastraceae	L
10.	<i>Cissampelos parerira</i>	Pahod Bel	Menispermaceae	C
11.	<i>Cissus repanda</i>	Panibel	Vitaceae	C
12.	<i>Clitoria ternatea</i>	Panibel	Papilionaceae	R
13.	<i>Coccinia India</i>	Tindori	Cucurbitaceae	C
14.	<i>Cocculus hirsutus</i>	Vevdi	Menispermaceae	C
15.	<i>Cosmostigma racemosum</i>	Vevdi	Asclepiadsceae	R
16.	<i>Cryptolepis buechanani</i>	Vevdi	Periplocaceae	C
17.	<i>Cucumis callosus</i>		Cucurditaceae	C
18.	<i>Cuscuta reflexa</i>	Amarvel	Convolvulaceae	C
19.	<i>Discorea bulbifera</i>	Varahi kand	Discoriaceae	C
20.	<i>Discorea hispida</i>	Bhoi kand	Discoriaceae	C
21.	<i>Discorea pentaphylla</i>	Kudvel	Discoriaceae	C
22.	<i>Hemidesmus indicus</i>	Dudhvel	Asclepiadaceae	C
23.	<i>Hiptage bengalensis</i>	Ameti	Malpighiaceae	R
24.	<i>Ipomoea nil</i>	Kaladana	Convolvulaceae	C
25.	<i>Ipomoea pestigridis</i>	Kaladana	Convolvulaceae	C
26.	<i>Ipomoea sindica</i>	Kaladana	Convolvulaceae	L
27.	<i>Ipomoea sinentica</i>	Kaladana	Convolvulaceae	
28.	<i>Leptadenia reticulata</i>	Nani dodi	Asclepiadaceae	R
29.	<i>Luffa echinata</i>	Turia	Cucurbitaceae	C
30.	<i>Luffa echinata</i>	Kakadvel	Cucurbitaceae	C
31.	<i>Maerua arneria</i>	Hemkans	Capparidaceae	R
32.	<i>Merremia emargyptica</i>		Convolvulaceae	C
33.	<i>Merremia aegyptica</i>		Convolvulaceae	C
34.	<i>Merremia hederacea</i>	Hemkans	Convolvulaceae	C
35.	<i>Momordica balsama</i>	Hemkans	Cucurbitaceae	R
36.	<i>Momordica dioca</i>	Kikoda	Cucurbitaceae	A
37.	<i>Mucuna pruriens</i>	Kavach	Papilionaceae	C
38.	<i>Oxystelma esculma</i>	Kavach	Asclepiadaceae	R
39.	<i>Pergularia daemia</i>	Kavach	Asclepiadaceae	C
40.	<i>Peuraria taberosa</i>	Gejvi	Papilionaceae	C
41.	<i>Passiflora edulis</i>		Passifloraceae	L
42.	<i>Rhynchosia bracteata</i>	Kamal vel	Papilionaceae	C
43.	<i>Rhynchosia minima</i>		Papilionaceae	C

44.	<i>Rivea hypocrateriformis</i>	Faug , Fag	Convolvulaceae	C
45.	<i>Tinospora brackteata</i>	Faug , Fag	Menispermaceae	C
46.	<i>Trichosanthes brackteata</i>	Ratrani	Cucurbitaceae	C
47.	<i>Trichosanthes Cucumarina</i>	Ratrani	Cucurbitaceae	C

HERBS

S.No	Botanical Name	Common Name	Family	Status
1.	<i>Abelmoschus manihot</i>	Jungle Bhindi	Malvaceae	C
2.	<i>Abutilon indiaum</i>		Malvaceae	C
3.	<i>Acalypha ciliata</i>		Euphorbiaceae	C
4.	<i>Acalypha malabarica</i>		Euphorbiaceae	C
5.	<i>Acalypha indica</i>		Euphorbiaceae	C
6.	<i>Acanthospermum hispidum</i>		Compositae	A
7.	<i>Achyranospermum aspera</i>	Ulta kanta	Amraldaceae	A
8.	<i>Aeschynomene indica</i>		Papilionaceae	C
9.	<i>Ageratum conyzoides</i>		Compositae	C
10.	<i>Aloe vera</i>	Patha	Lilaceae	R
11.	<i>Alysicarpus hamosus</i>	Patha	Papilionaceae	C
12.	<i>Alysicarpus longifolius</i>	Patha	Papilionaceae	C
13.	<i>Alysicarpus procumbens</i>		Papilionaceae	C
14.	<i>Alysicarpus rotundifolia</i>	Patha	Papilionaceae	C
15.	<i>Alysicarpus tetragonoloba</i>	Patha	Papilionaceae	C
16.	<i>Alysicarpus vaginalis</i>	Patha	Papilionaceae	C
17.	<i>Ammania baccifera</i>		Lythraceae	C
18.	<i>Amarania gracilis</i>		Amrntaceae	C
19.	<i>Amarania hybridus</i>		Amrntaceae	C
20.	<i>Amarania spinosus</i>		Amrntaceae	C
21.	<i>Amarania tricolor</i>		Amrntaceae	C
22.	<i>Argemone maxicana</i>		Papaveraceae	A
23.	<i>Bidens bipinnata</i>		Compositae	A
24.	<i>Baccopa bipinnata</i>	Brahmi	Scrophulanaceae	
25.	<i>Blepharis liniriaefolia</i>	--		C
26.	<i>Blumea glomerata</i>	--	Compositae	C
27.	<i>Borreria stricta</i>	--	Rubiaceae	A
28.	<i>Brassica nigra</i>	Kali Rai	Cruciferae	L
29.	<i>Cannabis sativa</i>	Bhang	Cannabianaceae	R
30.	<i>Cassia abrus</i>	Chimod	Caesalpinaceae	C
31.	<i>Cassia pumila</i>		Caesalpinaceae	C
32.	<i>Cassia tora</i>	Puwad	Caesalpinaceae	C
33.	<i>Celosia argentea</i>		Amrntaceae	C
34.	<i>Centella asiatica</i>	Brahmi	Apsiaceae	R
35.	<i>Chenopodium album</i>	Chil	Chenopodiaceae	C
36.	<i>Cleome gynandra</i>		Capparaceae	C
37.	<i>Cleome viscosa</i>		Capparaceae	C
38.	<i>Clitoria biflora</i>		Papilionaceae	L
39.	<i>Commelina benghalensis</i>		Commelinaceae	A

40.	<i>Commelina haskami</i>	--	Commelinaceae	A
41.	<i>Commelina paludosa</i>	--	Commelinaceae	A
42.	<i>Corchorus acutangulus</i>	--	Tiliaceae	L
43.	<i>Corchorus capsularis</i>	--	Tiliaceae	L
44.	<i>Corchorus depressus</i>	--	Tiliaceae	L
45.	<i>Coronopus didymus</i>	--	Cruciferae	L
46.	<i>Crotolaria filipes</i>	--	Papilionaceae	R
47.	<i>Crotolaria juncea</i>	Saniya	Papilionaceae	C
48.	<i>Crotolaria medicaginea</i>	Ran Methi	Papilionaceae	C
49.	<i>Curcuma amada</i>	--	Zingiberaceae	L
50.	<i>Curcuma inodora</i>	--	Zingiberaceae	L
51.	<i>Cyanotis fasciculata</i>	--	Commelinaceae	C
52.	<i>Cyathocline rotundifolia</i>	--	Compositae	C
53.	<i>Cyperus compressus</i>		Cyperaceae	C
54.	<i>Cyperus rotundifolia</i>	--	Cyperaceae	C
55.	<i>Desmodium dichotomum</i>	Shal parni	Papilionaceae	C
56.	<i>Desmodium gagetikum</i>	--	Papilionaceae	C
57.	<i>Desmodium rotundifolium</i>	--	Papilionaceae	C
58.	<i>Desmodium neomaximum</i>	--	Papilionaceae	C
59.	<i>Desmodium trifolium</i>	--	Papilionaceae	C
60.	<i>Dipteracanthus patulus</i>	--	Acanthaceae	L
61.	<i>Dipteracanthus micranthus</i>	--	Acanthaceae	L
62.	<i>Dipteracanthus prostrates</i>		Acanthaceae	L
63.	<i>Echinops echinatus</i>	Bhangaro	Compositae	C
64.	<i>Echipta alba</i>	Bhangaro	Compositae	C
65.	<i>Eclipta prostrata</i>	--	Euphorbiaceae	C
66.	<i>Euphorbia geniculata</i>	--	Euphorbiaceae	C
67.	<i>Euphorbia hiita</i>	--	Euphorbiaceae	C
68.	<i>Euphorbia hypercifolia</i>	---	Euphorbiaceae	C
69.	<i>Euphorbia prostrata</i>	--	Euphorbiaceae	C
70.	<i>Evolvulus alsinoides</i>	Kalishankhawali	Convolvulaceae	C
71.	<i>Haplanthus tentaculatus</i>	--	Acanthaceae	L
72.	<i>Haplanthus verticillatus</i>	--	Acanthaceae	L
73.	<i>Hydrilla verticillata</i>	--	Hydrocharitaceae	C
74.	<i>Hygrophila auriculata</i>	--	Acanthaceae	C
75.	<i>Indigofera cordifolia</i>		Papilionaceae	A
76.	<i>Indigofera tinctoria</i>	--	Papilionaceae	C
77.	<i>Justica repens</i>	--	Acanthaceae	C
78.	<i>Lepidagathis trinervis</i>	---	Acanthaceae	A
79.	<i>Lepidium sativum</i>	--	Cruciferae	C
80.	<i>Leucas aspera</i>	Kubi	Labiatae	A
81.	<i>Leucas cephalotes</i>	Kubo jungli	Labiatae	C
82.	<i>Lecucas zeylanica</i>	Kubo	Labiatae	C
83.	<i>Limnophila indica</i>		Scrophulariaceae	C
84.	<i>Lindenbergia indica</i>	Patharchati	Scrophulariaceae	
85.	<i>Nervilia araguana</i>	--	Orchidaceae	R
86.	<i>Neracanthus sphaerystachys</i>	--	Acanthaceae	R

87.	<i>Ocinum canum</i>	Jungli tulsi	Labiatae	C
88.	<i>Phyllanthus niruri</i>	Bhoy Amli	Euphorbiaceae	A
89.	<i>Physalis maxima</i>	Popatiya	Solanceae	A
90.	<i>Physalis minima</i>	Popatiya	Solanceae	C
91.	<i>Physalis peruviana</i>	--	Solanceae	C
92.	<i>Pluchea lanceolata</i>		Compositae	C
93.	<i>Portulacaceae oleracea</i>	Moti luni	Portulacaceae	R
94.	<i>Portulacaea quadrifida</i>	Zini luni	Portulacaceae	R
95.	<i>Pulicaria angustifolia</i>	--	Compositae	C
96.	<i>Riungia parviflora</i>		Acanthaceae	C
97.	<i>Ruelia tuberosa</i>	--	Acanthaceae	C
98.	<i>Seasmum indicum</i>	Tal	Padaliaceae	C
99.	<i>Sesbania bispinosa</i>		Papilionaceae	L
100.	<i>Sida cordifolia</i>	--	Malvaceae	C
101.	<i>Sida ghutinosa</i>	--	Malvaceae	C
102.	<i>Smithia sensitive</i>	--	Papilionaceae	C
103.	<i>Smithia conferata</i>	--	Papilionaceae	C
104.	<i>Solanum nigrum</i>		Solanaceae	C
105.	<i>Solanum surattense</i>	Bhoi ringni	Solanaceae	C
106.	<i>Sphaeranthus indicus</i>	Gorakh mundi	Composite	C
107.	<i>Tephrosia labialis</i>	--	Papilionaceae	C
108.	<i>Tephrosia pumila</i>	--	Papilionaceae	C
109.	<i>Tephrosia purpurea</i>	--	Papilionaceae	C
110.	<i>Tephrosia tenuis</i>	--	Papilionaceae	C
111.	<i>Tephrosia villosa</i>	--	Papilionaceae	C
112.	<i>Tribulus terrestris</i>	Gokharu	Zygophyllaceae	R
113.	<i>Trichodesma zeylanica</i>	--	--	R
114.	<i>Tridax procumbens</i>	Kali Mendhi	Composite	A
115.	<i>Triumfetta pentandra</i>	--	Tiliaceae	C
116.	<i>Triumfetta rhomboidea</i>	--	Tiliaceae	C
117.	<i>Triumfetta rtudifolia</i>		Tiliaceae	C
118.	<i>Tubipora acaulis</i>	--	Acanthaceae	C
119.	<i>Urena lobata</i>		Malvaceae	L
120.	<i>Urginea indica</i>	Jungli Piyaj	Liliaceae	R
121.	<i>Vernonia anthihelmintica</i>	Kali jiri	Composite	A
122.	<i>Vicoa auriculata</i>	--	Composite	A
123.	<i>Vicoa auriculata</i>	--	Composite	L
124.	<i>Vicoa strumarinum</i>		Composite	A
125.	<i>Xanthium strumarium</i>	Gokharu	Composite	A
126.	<i>Zornia diphylla</i>	Samar ani	Papilionaceae	C
127.	<i>Zornia gibbosa</i>	--	Papilionaceae	C

GRASSES

S.No	Botanical Name	Common Name	Family	Status
1.	<i>Alloteropsis Cimicina</i>	---	Gramine	L
2.	<i>Andropogon pertusa</i>		Gramine	L
3.	<i>Apluda aristata</i>		Gramine	C
4.	<i>Apluda mutica</i>		Gramine	C
5.	<i>Aristida adscensionis</i>	Lapdu	Gramine	C
6.	<i>Aristida funiculata</i>	Laso lampdo	Gramine	L
7.	<i>Arthroxon serrulatus</i>		Gramine	C
8.	<i>Brachiaria racemosa</i>		Gramine	C
9.	<i>Cenchrus setigerus</i>	Dhaman	Gramine	L
10.	<i>Chloria solicostachys</i>		Gramine	C
11.	<i>Chloria Montana</i>	--	Gramine	C
12.	<i>Chloria virgata</i>	--	Gramine	C
13.	<i>Coix lachryma Jobi</i>	---	Gramine	R
14.	<i>Cymbopogon martini</i>		Gramine	L
15.	<i>Cynodon dactylon</i>	Dub	Gramine	A
16.	<i>Dendrocalamus strictus</i>	Bamboo	Gramine	A
17.	<i>Dicanthium annalatum</i>	--	Gramine	A
18.	<i>Digitaria adscendens</i>	---	Gramine	C
19.	<i>Digitaria granularis</i>	--	Gramine	C
20.	<i>Dineria ornithopoda</i>	--	Gramine	C
21.	<i>Echinochloa colonum</i>	Samo	Gramine	A
22.	<i>Eragrostis ciliaris</i>	--	Gramine	A
23.	<i>Eragrostis japonica</i>	--	Gramine	L
24.	<i>Eragrostis pilosa</i>	--	Gramine	L
25.	<i>Eragrostis viscose</i>		Gramine	L
26.	<i>Hteropogon contrortus</i>	Surawala	Gramine	A
27.	<i>Melanocenchrus Jacquemontii</i>	--	Gramine	A
28.	<i>Oryza sativa</i>		Gramine	C
29.	<i>Paspalidium flavidum</i>	--	Gramine	C
30.	<i>Paspalidium geminatus</i>	--	Gramine	C
31.	<i>Saccharum spontaneum</i>	Kans	Gramine	C
32.	<i>Stearia tomentosa</i>	--	Gramine	C
33.	<i>Setearia verticillata</i>	--	Gramine	L
34.	<i>Sorghum vulgare</i>	Baru	Gramine	C
35.	<i>Sporobolus vulgare</i>	--	Gramine	L
36.	<i>Spodiopogon rhizophorus</i>	--	Gramine	L
37.	<i>Tetrapogon tennelus</i>	--	Gramine	L
38.	<i>Themeda triandra</i>	Ratad	Gramine	L

39.	<i>Urochloa panicoides</i>	--	Gramine	L
40.	<i>Vetiveria zizanioides</i>	Khas	Gramine	L
EPIPHYTES				
1.	<i>Venda tessilata</i>	Vahi Hankal	Orchidaceae	C
2.	<i>Aeridus maculosum</i>	--	Orchidaceae	R
PARASITES				
1.	<i>Cuscuta reflexa</i>	Amar Bel	Convolvulaceae	C
2.	<i>C. hylina</i>	Amar Bel	Convolvulaceae	C
3.	<i>Dendrophoetha fulcata</i>	Vahi Hankal	Loranthaceae	C
PTERIDOPHYTES				
1.	<i>Enquisetum sp.</i>	--	Equisetaceae	R
2.	<i>Marselea sp.</i>	--	Marsiliaceae	C
3.	<i>Ophioglossum costum</i>	--	Ophioglosaceae	R
4.	<i>Cheilanthes tenuifolia</i>	--	Adiantaceae	C
5.	<i>Adiantum caudatum</i>	--	Adiantaceae	C
6.	<i>Ampeloperus prolifera</i>	--	-	R
7.	<i>Actinoptera radium</i>	Morpankhi	-	A

Annexure - 4

LIST OF FAUNA MHTR

Index A = Abundant , C= Common L = Less common R = Rare

LIST OF MAMMALS

S.No.	Local Name	English Name	Scientific Name	Status
1.	Bagh	Tiger	<i>Panthera tigris</i>	R
2.	Bhund	Wild Boar	<i>Sus scrofa</i>	C
3.	Cheetra	Panther	<i>Panthera pardus</i>	L
4.	Boot	Ratel	<i>Malivora capensis</i>	R
5.	Vandra	Common Langur	<i>Prebytis entellus</i>	C
6.	Jharakh	Striped hyanea	<i>Hyaena hyaena</i>	L
7.	Jungli minki	Jungle cat	<i>Felis chaus</i>	L
8.	Noliyo	Common Mongoose	<i>Herpestes edwardsi</i>	C
9.	Rinchh	Sloth Bear	<i>Mehursus ursinus</i>	L
10.	Roj , Neelgai	Blue bull	<i>Boselaphum tragocamelus</i>	C
11.	Hanhan	Indian Hare	<i>Lepus nigricollis</i>	C
12.	Heli	Indian procupine	<i>Hystrix indica</i>	C
13.	Shiyal	Jackal	<i>Canis aureus</i>	C
14.	Viju	Indian Small Civet	<i>Vivaricula indica</i>	L
15.	Bhedal	Four horned antelope	<i>Tetracerus quadricornis</i>	R
16.	sambhar	Sambhar	<i>Cervus unicolor</i>	L
17.	Chital	Spotted deer	<i>Axis axis</i>	

LIST OF BIRDS

Group	English Name	Latin Name	Local
Partridges & Francolins	1. Painted Francolin	<i>Francolinus pictus</i>	L
	2. Grey Francolin	<i>F. pondicerianus</i>	R
Quails & Button quails	1. Common Quail	<i>Conturnix</i>	C
	2. Rain Quail	<i>C. coromadelica</i>	C
	3. Rock Quail	<i>Perdicula argoundha</i>	C
	4. Yellow – legged Quail	<i>Turnix tamki</i>	C
	5. Barred Button Quail	<i>T. suscitator</i>	L
Pheasants	1. Indian Peafowl	<i>Pavo cristatus</i>	R
Geese , Whistling ducks shelduck, ducks	1. Ruddy Shelduck	<i>Tadorana</i>	R
	1. Gadwal	<i>Anas strepera</i>	R
	3. Eurasian Wigeon	<i>A. Penelope</i>	R
	4. Sport – billed Duck	<i>A. poecilorhyncha</i>	R
	5. Common Teal	<i>A. crecca</i>	R

	6. Garganey 7. Northern Pintail 8. Northern Shoveller 9. Common Pochard	<i>A. querquedula</i> <i>A. acuta</i> <i>A. clypeata</i> <i>Aythya ferina</i>	R R R L
Woodpeckers	1. Yellow-Crowned Wood pecker 2. Black Rumped Flameback	<i>Dendrocopos mahrattensis</i> <i>Dinopium benghalensis</i>	L C
Bardets	1. Brown-headed Bardet 2. Coppersmith Barbet	<i>Megalaima zeylanica</i> <i>M. heancephala</i>	L C
Hornbill	1. Indian Grey Hornbill	<i>Ocyrceros birostris</i>	R
Hoopoe	1. Common Hoopoe	<i>Upupa epops</i>	L
Rollers	1. European Roller 2. Indian Roller	<i>Coracias garrulous</i> <i>C. benghalensis</i>	R L
Kingfisher	1. Common Kingfisher 2. White-throated kingfisher 3. Pied kingfisher	<i>Alcedo atthis</i> <i>Haleyon smyrnesis</i> <i>Ceryle rudis</i>	L C L
Bee-eater	1. Green Bee-eater	<i>Merops orientalis</i>	C
Cercoos	1. Pied cuckoo 2. Common Hawk Cuckoo 3. Eurasian Cuckoo 4. Asian Koel 5. Sirkeer Malkoha 6. Greater coucal	<i>Clamator jacobinus</i> <i>Hierococcyx various</i> <i>Cuculus canorus</i> <i>Eudynamis scolopacea</i> <i>Phoenicophaeus leschnaultii</i> <i>Centropus sinensis</i>	C L L C R C
Parakeets	1. Alexandrine Parakeet 2. Rose ringed Parakeet 3. Plum headed Parakeet	<i>Psittacula eupatria</i> <i>P. krameri</i> <i>P. cynocephala</i>	R C C
Swift	1. House swift	<i>Apus affinis</i>	R
Owl	1. Barn Owl 2. Collared Scops Owl 3. Eurasian Eagle Owl 4. Spotted owl	<i>Tyto alba</i> <i>Otus bakkamoena</i> <i>Bubo bubo</i> <i>Athene brama</i>	R R R C
Nightjar	1. Indian Nightjar 2. Savanna Nightjar	<i>Caprimulgus asiaticus</i> <i>C. affinis</i>	C R
Pigeon	1. Rock Pigeon 2. Yellow-footed Green Pigeon	<i>Columba livia</i> <i>C. affinis</i>	C R
Doves	1. Laughing Dove 2. Spotted Dove 3. European Collared Dove	<i>Streptopelia senegalensis</i> <i>S. chinensis</i> <i>S. decaocto</i>	A A R
Rallids	1. Common Moorhen 2. Common Coot	<i>Gallinula chloropus</i> <i>Fulica atra</i>	R C
Waders	1. Common Redshank 2. Green Sandpiper 3. Wood snadpiper 4. Common sandpiper	<i>Tringa tetanus</i> <i>T. ochropus</i> <i>T. glareola</i> <i>Actitis hypoleucous</i>	L L L C
Thick Knees	1. European Thick-knee	<i>Burhinus oedicnemus</i>	L

	2. Great Thick-knee	<i>Esacus recurvirostris</i>	L
Plover & Lapwings	1. Little Ringed plover 2. Red wattled lapwing	<i>Charadrius dubius</i> <i>Vanellus indicus</i>	L A
Terus	1. River Tern	<i>Sterna aurantia</i>	L
Kites	1. Black Shouldered kite 2. Black Kite	<i>Elanus caeruleus</i> <i>Milvus migrans</i>	C C
Vultures	1. Egyptian Vulture 2. White –rumped Vulture 3. Long –billed Vulture	<i>Neophron percnopterus</i> <i>Gyps bengalensis</i> <i>G. indicus</i>	C R R
Eagles & Hawk Eagles	1. Crested Serpent Eagle 2. Changeable Hawk Eagle	<i>Spilornis cheela</i> <i>Spizaetus</i>	R R
Accipiters	Shikra	<i>Accipiter badius</i>	C
Buzzards	1. White –eyed Buzard	<i>Butostur teesa</i>	C
Falcon	1. Red – necked Folcon	<i>Falco chicquera</i>	R
Grebe	1. Little Greb	<i>Tachybaptus ruficollis</i>	C
Darter & Cormorants	1. Darter 2. Little cormorant 3. Great Cormorant	<i>Anhinga melanogaster</i> <i>Phalacrocarax niger</i> <i>P. carbo</i>	L C L
Egret & Herons	1. Little Egret 2. Intermediate Egret 3. Cattle Egret 4. Indian Pond Heron 5. Grey Heron	<i>Egretta garzetta</i> <i>Mesophoys intermedia</i> <i>Bubulcus</i> <i>Ardeola grayii</i> <i>Srdea cinerea</i>	A L A A L
Ibises	1. Black – headed Ibis 2. Black Ibis	<i>Threskiornis melounocephala</i> <i>Anastomus oscitans</i> <i>Ciconia epicopus</i>	L C L
Storks	1. Painted Strok 2. Asian Opwnbill strok 3. Woolly neeked strok	<i>Mycteria leucocephala</i> <i>Anastonus oscitans</i> <i>Ciconia epicopus</i>	L C L
Pitta	1. Indian Pitta	<i>Pitta brachyura</i>	C
Shrike	1. Longtailed Shrike 2. Great Grey Shrike	<i>Lanius schach</i> <i>L. excubitor</i>	A R
Treepie & Crows	1. Rufous Treepie 2. House Crow 3. Large billed Crow	<i>Dendrocitta vagabunda</i> <i>Corvus splendens</i> <i>C. mncrorhynchos</i>	A A A
Oriole	1. Eurasian Golden oriole	<i>Oriolus</i>	A
Minivet	1. Small Minivet	<i>Pericrocotus cinnamomomeuts</i>	C
Fantails	1. White throated Fantail 2. White – browed fantail	<i>Rhipidura albicollis</i> <i>R. aureola</i>	L L
Drongos	1. Black - Drongo 2. White – bellied Drongo	<i>Dicrurus macrocercus</i> <i>D. caerulescens</i>	C L
Paradise Flycatchers / Flycaters	1. Asian Paradise – Flycatcher 2. Red – throated Flycatcher 3. Grey – headed Canary Flycather	<i>Terpsiphone paradisi</i> <i>Ficedula parva</i> <i>Culicicapa ceylonensis</i>	L C C

loras	1. Common lora	<i>Aegithina tiphia</i>	C
Chat bush chuts, Robin etc.	1. Oriental Magpic Robin	<i>Copsychus saularis</i>	C
	2. Indian Robin	<i>Saxicoloides fulicata</i>	C
	3. Black Redstart	<i>Phoenicurus ochrurus</i>	C
	4. Common Stonechat	<i>Saxicola torquata</i>	C
	5. Pied Bashchat	<i>S. capreta</i>	C
	6. Variable wheater	<i>Oenanthe</i>	R
Starling and Mynas	1. Brahminy starling	<i>Parus major</i>	C
	2. Common Myna	<i>P. xanthogenys</i>	A
Bulbul	1. Red vented Bulbul	<i>Pyconotus cafer</i>	A
White eye	1. Oriental white eye	<i>Zosterops palpebrosus</i>	A
Babbler	1. Common Babbler	<i>Turdoides caudatus</i>	R
	2. Large Grey Babbler	<i>T. malcolmi</i>	R
	3. Jungle Bobbler	<i>T. Striatus</i>	A
Larks	1. Indian Bushlark	<i>Mirofra eyethroptera</i>	L
	2. Ashy Crowned Sparrow Lark	<i>Eremopterix nigriceps</i>	C
Sunbirs	1. Purple sunbird	<i>Nectarinia asiatica</i>	C
Sparrow weavers And mumias	1. House sparrow	<i>Passer domestica</i>	A
	2. Chestnut shouldered petronia	<i>Petronia xanthocollis</i>	A
	3. Daya	<i>Ploceus philpinus</i>	A
	4. Scaly- breasted Munia	<i>Lonchura punctulata</i>	C
	5. Indian Silverbill	<i>L. malabarica</i>	C
Wagtail	1. White wagtail	<i>Motacilla alba</i>	C
	2. White browed wagtail	<i>M. maderaspatensis</i>	L
	3. Yellow wagtail	<i>M. flava</i>	L
	4. Citrine wagtail	<i>M. citreola</i>	L
Pipit	1. Paddyfield Pipit	<i>Anthus phulvus</i>	A
Buntings	1. Crested Bunting	<i>Melophus lathami</i>	C

LIST OF REPTILES

S.No	English Name	Scientific Name	Status	
			National	Local
1.	Indian python	Python molurus	-	R
2.	Jhon Sandbosa	Eryx johni	-	L
3.	Common Skink	Mabuya carinata	-	C
4.	Cheakered Keelback	Natrix piscator	-	C
5.	Buff Coloured Keelback	Natrix stolata	-	R
6.	Rat snake	Ptyas mucosus	-	C
7.	House Lizard	Hemidactylus flavivrdis	-	A
8.	Starred tortoise	Geochaloue elegans	-	R
9.	Garden Lizard	Calotes versicolor	-	A
10.	Common India Krait	Bungarus caeruleus	-	R
11.	Russel's Viper	Viper russelli	-	R

12.	Indian Chamaeleon	Chamaeleon zeylanicus	-	R
13.	The Indian Crocodile	Crocodylus palustris	-	R
14.	Indian cobra	Maja naja	-	R
15.	Flapshell turrle	Lissemys punctat	-	R
16.	Fan- throated lizard	Sitana ponticeriana	-	C
17.	Moniter lizard	Varanus bengalensis	-	C
18.	Tree snake	Dendrolephis tristis	-	R

Aquatic

<u>S.No.</u>	<u>Scientific name</u>	<u>Common name</u>
1.	Gavialis gangeticus	Gharial
2.	Crocodylus palustris	Mugger
3.	Aspideretes gangeticus	
4.	Chitra indica	Sintar
5.	Lissemys punctata	Sundari
6.	Kachuga kachuga	Saal
7.	Kachuga dhongoka	Dhond
8.	Kachuga tentoria	Pacheda
9.	Hardell thurqii	Bhima
10.	Plantanista gangetica	Susu
11.	Lutra perspicillata	Udbilaw

Terrestrial

12.	Canis aureus	Lomadi (Jackal)
13.	Hyaena hyaena	Lakadbagga
14.	Canis pupus	Bhediya
15.	Vulpes bengalensis	Lomadi (fox)
16.	Panthera pardus	Tendua
17.	Felis chaus	Jungli Billi
18.	Felis caracal	Caracal
19.	Mellivora Capensis	
20.	Melursus Ursinus	Bhaalu
21.	Viverricula indica	
22.	Herpestes edwardsi	Nevala
23.	Herpestes auropunctatus	Nevala
24.	Funambulus pennanti	
25.	Hystrix indica	Sehi
26.	Bandicota indica	
27.	Rattus rattus	
28.	Mus musculus	
29.	Pyeropus giganteus	
30.	Rousettus leschenaulti	
31.	Lepus nigricollis	
32.	Gazella gazella	Chinkara
33.	antilope cervicapra	Kala Hiran
34.	Boselaphus tragocamelus	Neelgai

35.	<i>Cervus axis</i>	Cheetal
36.	<i>Cervus unicolor</i>	Sambhar
37.	<i>Sus scorfa</i>	Jungli suar
38.	<i>Macaca mullata</i>	Lal muh ka bandar
39.	<i>Presbytis entellus</i>	Langoor
40.	<i>Manis crassicaudata</i>	

List of Fishes

S.No	Scientific name of the species	Common name
1	<i>Dasyatis sephen</i>	Sukchi
2	<i>Hilsa hisha</i>	Hika
3	<i>Gadusia chapra</i>	Phulua
4	<i>Notopterus notopterus</i>	Patola
5	<i>Notopterus chittala</i>	Chital, Moye
6	<i>Chela laubuca</i>	Chal
7.	<i>Oxygaster bacaila</i>	Chilua
8.	<i>Barilus bola</i>	Galar
9.	<i>Barilius bendelisis</i>	Phulua
10.	<i>Barilius barna</i>	Galar
11	<i>Danio Devario</i>	
12	<i>Esomus denrica</i>	
13.	<i>Rasbora daniconius</i>	Zhanzhara
14	<i>Amblypharyngodon mola</i>	
15.	<i>Tor tor</i>	Mahaseer, Badas
16.	<i>Tor putitora</i>	Mahaseer
17.	<i>Puntinus conchoniuis</i>	Khadia
18.	<i>Puntinus sarana</i>	Soerni, Puthia
19.	<i>Puntius sophore</i>	Khadia
20.	<i>Puntius ticto</i>	Khaia
21.	<i>Catla catla</i>	Bhakur, Babas, Catla
22.	<i>Cirrhina mrigala</i>	Mrigal, Naren
23.	<i>Cirrhina rebu</i>	Reba
24.	<i>Crenopharyugodon idella</i>	Grass carap
25.	<i>Cyprinus carpio</i>	Common carp
26.	<i>Hypophthalmichthys molitrix</i>	Silver carp
27.	<i>Garra gotyla</i>	
28.	<i>Labeo bata</i>	Bata
29.	<i>Labeo бага</i>	Boga
30.	<i>Labeo bogguj</i>	
31.	<i>Labeo calbasu</i>	Kriya, Calbasu
32.	<i>Labeo gouius</i>	Kursa
33.	<i>Labeo rohita</i>	Rohu

34.	<i>Labeo fimbriatus</i>	Dogala rohu
35.	<i>Labeo dyocheilus</i>	Kharont
36.	<i>Osteobrama cotio</i>	Gudgudi
37.	<i>Carassius carassius</i>	Gold fish
38.	<i>Nemacheilus botia</i>	
39.	<i>Ompok bimaculatus</i>	Pauda, papda
40.	<i>Wallago attu</i>	
41.	<i>Clupisoma garua</i>	
42.	<i>Earropuchthys yacha</i>	Bachua
43.	<i>Pangasius paneasius</i>	
44.	<i>Salonia Silondra</i>	Silund
45.	<i>Heteropnustes fossilis</i>	Singhi
46.	<i>Clarias batrachus</i>	Mongura
47.	<i>Mysius aop</i>	Tengana
48.	<i>Mystus bleekeri</i>	Kitua
49.	<i>Mytus cavasius</i>	Kitua
50.	<i>Mytus seenghala</i>	Singhara
51.	<i>Mystus vittatus</i>	Tengana
52.	<i>Rita rita</i>	Gangara
53.	<i>Bagarius bagarius</i>	Lamra, Andhos, Andhmachh
54.	<i>Zenentodon cancila</i>	Sooja
55.	<i>Gambusia affinil</i>	Guppy
56.	<i>Moll neista formosa</i>	Black Moily
57.	<i>Rhinomugil carsula</i>	Natera
58.	<i>Ophicephalus guchua</i>	Sola
59.	<i>Ophicephalus marulius</i>	Sol
60.	<i>Ophicephalus punctatus</i>	gilgoncha
61.	<i>Ophicephalus striatus</i>	Durkasol
62.	<i>Ophicephalus leucopunctatus</i>	Sol
63.	<i>Amphipnous cuchta</i>	
64.	<i>Chanda nama</i>	Chanda
65.	<i>Chanda ranga</i>	Anzhara
66.	<i>Nandus nandus</i>	Chaman
67.	<i>Trichogaster asciatus</i>	
68.	<i>Glossogobius giuris</i>	Patharchita, Boda
69.	<i>Mastacembelus armatus</i>	Baam
70.	<i>Mastacembelus puncalus</i>	Baam

Annexure-5

Line transect coordinates

S.NO.	transect name	START COORDINATES						END COORDINATES						Bearing	Total distance	Range
1	JS 70	25	2	51.5	75	40	25.26	25	2	51.49	75	39	13.96	270	2 km	Jawahar Sagar
2	JS 71	25	3	56.2	75	40	26.22	25	3	55.7	75	39	15.06	270	2 km	Jawahar Sagar
3	JS 72	25	3	54.56	75	41	35.46	25	4	39.04	75	42	27.17	46	2 km	Jawahar Sagar
4	JS 73	25	7	7.05	75	42	49.86	25	6	2.47	75	42	47.61	180	2 km	Jawahar Sagar
5	JS 74	25	6	10.24	75	44	1.29	25	7	0.61	75	44	1.1	0	2 km	Jawahar Sagar
6	JS 75	24	4	59.1	75	41	38.45	25	5	1	75	40	27.09	270	2 km	Jawahar Sagar
7	JS 76	25	3	50.94	75	38	6.64	25	4	43.82	75	37	25.91	325	2 km	Jawahar Sagar
8	JS 77	25	2	53.16	75	37	59.41	25	3	39.97	75	7	10.19	316	2 km	Jawahar Sagar
9	JS 79	25	1	50.25	75	35	45.3	25	1	1.8	75	36	32.7	136	2 km	Jawahar Sagar
10	JS 80	24	59	39.82	75	35	35.11	25	0	40.96	75	35	36.43	0	2 km	Jawahar Sagar
11	JS 81	25	1	51.3	75	33	16.07	25	2	37	75	34	6.8	45	2 km	Jawahar Sagar
12	JS 82	25	0	45.68	75	34	25.54	24	59	40.94	75	34	24.11	108	2 km	Jawahar Sagar
13	JS 83	24	59	38.21	75	33	9.88	24	59	40.19	75	32	9.3	216	2 km	Jawahar Sagar
14	JS 84	25	0	31.58	75	32	4.11	25	0	30.8	75	33	15.65	90	2 km	Jawahar Sagar
15	JS 85	24	58	59.3	75	30	25.2	24	59	46.88	75	29	37.02	316	2 km	Jawahar Sagar
16	JS 86	24	59	45.62	75	30	45.47	25	0	32.62	75	29	56.56	316	2 km	Jawahar Sagar
17	JS 87	24	59	43.97	75	26	54.42	24	59	42.88	75	28	5.61	90	2 km	Jawahar Sagar
18	JS 88	24	58	40.08	75	27	14.83	24	58	38.17	75	28	26.13	90	2 km	Jawahar Sagar
19	K-42	24	54	4.4	75	46	12.3	24	53	17.5	75	41	1.75	136	2 km	Kolipura
20	K-43	24	55	26.7	75	42	12.5	24	54	39.6	75	43	0.9	136	2 km	Kolipura
21	K-44	24	56	17.7	75	42	40.6	24	55	24.7	75	43	28.48	136	2 km	Kolipura
22	K-45	24	56	14.7	75	43	50.3	24	55	26.5	75	44	37.7	136	2 km	Kolipura
23	K-46	24	57	26.3	75	36	44.6	24	56	39.4	75	37	33.7	136	2 km	Kolipura
24	K-47	24	57	26	75	37	56.4	24	56	38.4	75	38	44	136	2 km	Kolipura
25	K-48	24	57	25.3	75	39	7.7	24	56	31.6	75	39	55.89	136	2 km	Kolipura
26	K-49	24	57	23.9	75	40	18.7	24	56	37.2	75	41	7.9	136	2 km	Kolipura
27	K-50	24	58	29.2	75	40	19.2	24	57	41.8	75	41	7.6	136	2 km	Kolipura
28	K-56	24	59	18.3	75	38	20.8	24	58	30.4	75	39	8.5	136	2 km	Kolipura
29	B-51	24	58	28.55	75	41	31.3	24	57	41.64	75	42	20.4	136	2 km	Borabas

S.NO.	transect name	START COORDINATES						END COORDINATES						Bearing	Total distance	Range
		24	58	27.67	75	42	42.6	24	57	39.6	75	43	31.1			
30	B-52	24	58	27.67	75	42	42.6	24	57	39.6	75	43	31.1	136	2 km	Borabas
31	B-53	24	58	26.79	75	43	53.9	24	57	39.74	75	44	42.9	136	2 km	Borabas
32	B-54	24	58	25.89	75	45	5.21	24	59	14.95	75	44	19.6	136	2 km	Borabas
33	B-55	24	59	30.89	75	45	6.2	24	58	42.79	75	45	54.9	136	2 km	Borabas
34	B-57	25	0	40.29	75	39	10.5	24	59	53.87	75	40	0.04	136	2 km	Borabas
35	B-58	25	0	39.43	75	40	21.9	24	59	51.36	75	41	9.46	136	2 km	Borabas
36	B-59	25	0	38.56	75	41	33.2	24	59	51.51	75	42	22	136	2 km	Borabas
37	B-60	25	1	42.68	75	42	45.5	25	0	54.34	75	43	33.7	136	2 km	Borabas
38	B-61	25	1	41.79	75	43	56.8	25	0	53.3	75	44	44.1	136	2 km	Borabas
39	B-62	25	2	46.79	75	43	57.8	25	2	45.9	75	43	42.9	136	2 km	Borabas
40	R-34	24	50	42.23	75	56	50.77	24	50	41.57	75	58	1.92	91	2 km	Rawtha
41	R-35	24	51	37.7	75	54	25.06	24	51	48.03	75	53	33.22	281	2 km	Rawtha
42	R-36	24	51	47.34	75	55	38.29	24	52	34.91	75	54	49.68	317	2 km	Rawtha
43	R-37	24	53	59.67	75	52	7.9	24	53	13.18	75	52	51.55	136	2 km	Rawtha
44	R-38	24	54	0.42	75	50	58.54	24	53	13.74	75	51	47.75	136	2 km	Rawtha
45	R-39	24	52	56.52	75	50	55.66	24	52	57.12	75	49	44.37	271	2 km	Rawtha
46	R-40	24	51	56.94	75	49	44.48	24	51	47.06	75	50	54.91	96	2 km	Rawtha
47	R-42	24	56	11.39	75	51	0.36	24	55	6.3	75	50	57.61	180	2 km	Rawtha
48	R-43	24	55	16.03	75	52	10.19	24	56	20.65	75	52	10.91	0	2 km	Rawtha
49	R-44	24	56	13.46	75	48	35.72	24	56	14.04	75	49	47.35	91	2 km	Rawtha
50	R-45	24	54	2.7	75	48	33.82	24	54	3.61	75	49	33.83	90	2 km	Rawtha
51	R-46	24	54	5.13	75	47	23.04	24	54	50.09	75	46	32.13	315	2 km	Rawtha
52	R-90	24	55	7.69	75	49	48.24	24	55	10.15	75	48	37.28	271	2 km	Rawtha
53	D-16	24	46	10.26	76	9	49.33	24	46	9.11	76	11	0.49	91	2 km	Darra
54	D-17	24	47	13.58	76	9	52.54	24	46	29.59	76	9	0.67	226	2 km	Darra
55	D-18	24	46	12.46	76	7	26.4	24	46	58.73	76	8	16.09	46	2 km	Darra
56	D-19	24	47	17.73	76	6	17.59	24	46	33.56	76	5	25.13	226	2 km	Darra
57	D-21	24	45	10	76	2	41.17	24	44	25.78	76	3	32.28	136	2 km	Darra
58	D-22	24	47	21.91	76	2	42.04	24	46	17.35	76	2	43.68	180	2 km	Darra
59	D-23	24	48	26.11	76	2	45.04	24	48	28.9	76	3	56.4	90	2 km	Darra
60	D-24	24	47	25.81	76	0	30.98	24	46	37.83	76	1	8.52	136	2 km	Darra
61	D-25	24	48	28.56	76	1	31.69	24	47	23.37	76	1	31.48	180	2 km	Darra
62	D-26	24	49	30	76	1	34.1	24	48	49.8	76	0	39.27	227	2 km	Darra
63	D-27	24	48	23.7	76	5	5.7	24	47	19.81	76	5	9.3	180	2 km	Darra

S.NO.	transect name	START COORDINATES						END COORDINATES						Bearing	Total distance	Range
		24	47	17.24	76	7	26.44	24	48	4.09	76	8	15.3			
64	D-28	24	48	22.64	76	7	27.8	24	49	9.98	76	8	16.11	46	2 km	Darrah
65	D-29	24	48	20.58	76	6	18.1	24	49	7.01	76	7	7.48	46	2 km	Darrah
66	D-30	24	48	32.43	76	57	56.35	24	49	36.94	75	57	58.08	0	2 km	Darrah
67	D-31	24	49	33.36	76	0	23.55	24	49	35.62	75	59	10.74	272	2 km	Darrah
68	D-32	24	50	42.3	75	55	39	24	49	52.7	75	56	24.6	136	2 km	Darrah
69	D-92	24	48	31.58	75	59	10.38	24	47	26.5	75	59	10.57	180	2 km	Darrah
70	G-9	24	42	55	76	9	46.86	24	42	57.08	76	8	35.7	270	2 km	Gagron
71	G-6	24	38	29.1	76	10	53.1	24	39	17.12	76	10	5.65	317	2 km	Gagron
72	G-11	24	45	4.03	76	10	58.34	24	45	5.06	76	9	47.29	270	2 km	Gagron
73	G-5	24	42	52.35	76	10	55.41	24	42	7.07	76	10	3.9	226	2 km	Gagron
74	G-12	24	43	58.48	76	10	31.23	24	43	58.9	76	11	42.28	90	2 km	Gagron
75	G-13	24	45	7.8	76	7	23.8	24	44	6.08	76	7	22.71	180	2 km	Gagron
76	G-15	24	45	8.8	76	6	14.93	24	45	9.29	76	5	3.34	270	2 km	Gagron
77	G-8	24	44	0.72	76	9	45.75	24	44	4.13	76	8	34.54	271	2 km	Gagron
78	G-91	24	40	46.08	76	8	31.73	24	39	41.53	76	8	28.09	180	2 km	Gagron
79	G-7	24	42	56.12	76	7	23.32	24	41	51.49	76	7	22.43	180	2 km	Gagron
80	G-10	24	44	3.59	76	6	12.56	24	42	58	76	6	12.41	180	2 km	Gagron
81	G-14	24	42	59.89	76	5	0.73	24	44	2.86	76	5	3.09	0	2 km	Gagron
82	G-3	24	40	31	76	7	21	24	41	37.01	76	6	36.52	325	2 km	Gagron
83	G-20	24	46	14.94	76	3	53.07	24	45	10.45	76	3	50	180	2 km	Gagron
84	G-4	24	40	45.26	76	9	43.7	24	41	31.87	76	8	54.54	316	2 km	Gagron

Carnivore Sign Survey Data sheet

Trail Id:

Forest Division: **Range:** **Beat:** **Date:**
Start Time: **End Time:**
Starting Latitude: **Starting Longitude:**
End Latitude: **End Longitude:**
Total distance covered: Time spent in other activities (resting etc.):

Team Members	Name	Designation
1		
2		
3		
4		
5		

Time	Latitude	Longitude	Sign Type	Species	Individual Number	Male	Female	Young	Unknown	Age of Track/sign	Remarks

***Sign types:- Scat/Pellets/Dung-SCT/PLT/DNG, Pugmark_Track-PT, Vocalization-VC, Rake-RK, Scrape-SCR, Rolling-RL, Spray-SPR, Digging-DIG, Kill- K,**
Scat & Scape- SS
**** Age of Track & Sign: Very Fresh- VF, Fresh- F, Old-O, Very Old- VO**

Note: 1. Collect fresh/good scats of tiger, leopard, wild dog, bear, jackal and jungle cat and dung of elephant, gaur, wild buffalo and rhino during the survey.

2. If you get more sign than these, then enter it on another datasheet.

A) Has any tigress with cubs been reported during the past 12 months Yes () No () Approx. Date/Month:

Seen by staff (), B) Pugmarks () C) Reported by local person () D) Seen by official ()

How many cubs: Approx. age of the cubs:

- In case tigers are known to be present in the beat, but no sign was obtained during the sampling period then mention on what evidence was this conclusion made (Pugmark (), Direct sighting (), Scat (), Other sign ())

Approx. Date/ Month: Tiger presence was last recorded in the beat:

• Has any leopard with cubs been reported during the last 12 months: Yes () No () Approx. Date/Month:

A) **Seen by staff** (), B) Pugmarks () C) Reported by local person () D) Seen by official ()

How many cubs: Approx. age of the cubs:

- In case leopard are known to be present in the beat, but no sign was obtained during the sampling period then mention on what evidence was this conclusion made Pugmark (), Direct sighting (), Scat (), Other sign ()

Approx. Date / Month: Leopard presence was last recorded in the beat.....

• How many livestock predation events has been recorded in the past 3 months: by

By other carnivores (specify which carnivores known) No. of events:

Carnivores:

- Comments & remarks:.....

ANNEXURE-7**Number of livestock in and around villages of MHTR.**

Sr. No.	Name of the village	Cow	Buffalo	Sheep & Goat	Total
1.	Jawahar Sagar	30	80	10	120
2.	Amba	240	206	510	956
3.	Nosera	20	40	8	68
4.	Khalgaon	17	32	12	61
5.	Bhunjar Khurd	1077	96	840	2013
6.	Shripura	1400	447	1612	3459
7.	Sanita	300	230	96	626
8.	Javara Kalan	104	57	55	216
9.	Motipura	12	28	16	56
10.	Neem Ka Khera	49	37	28	114
11.	Tholanpur	-	-	-	0
12.	Jagpura	747	292	328	1367
13.	Balapura	28	12	11	51
14.	Madar Chauk	556	91	711	1358
15.	Kolipura	394	497	228	1119
16.	Roopura	38	69	13	120
17.	Chandbawari	772	349	909	2030
18.	Girdharpura	1587	362	900	2849
19.	Kharli Baori	40	27	25	92
20.	Damodarpura	222	108	609	939
21.	Mandargarh	13	15	9	37
22.	Laxmipura	42	106	6	154
23.	Mashalpur	442	223	412	1077
24.	Narayapura	312	137	201	650
25.	Nolav	301	142	223	666
26.	Laxmipura (Prempura)	411	247	252	910
27.	Ghati	225	42	311	578
28.	Borkui	-	-	-	0
29.	Jhamra	-	-	-	0
30.	Mukandra	69	205	91	365
31.	Gagron	191	150	100	441
32.	Kothala Ghati	200	52	99	351
33.	Akhawa	347	500	170	1017
Total		10186	4879	8795	23860

Vehicle List

Sr.No.	Detail of vehicle		
	Four Wheeler	Vehicle No.	Purchase
1	Jeep	RJ-20-UA-1954	2009
2	Jeep	RJ-14-UA-3276	2006
3	Jeep Thar	RJ-20-UA-6247	2014
4	Bolero Invender	RJ-20-U-0539	2005
5	Bolero	RJ-20-UA-3975	2012
6	Bolero	RJ-20-UA-3976	2012
7	Bolero	RJ-20-UA-5870	2014
8	Bolera Camper	RJ-20-GA-9309	2014
9	Cater	RJ-20-GA-9522	2014
10	Bolero	RJ-20-UA-8799	2017
11	Gypsy	RJ-20-UB-0693	2018
12	Gypsy	RJ-25-UA-2909	2018
13	Scorpio Gateway	RJ-25-CA-5283	2018
14	Bolera Camper	RJ-20-CA-5462	2018
15	Scorpio	RJ-20-UB-1377	2019

Sr.No.	Two Wheeler	No. of vehicle
1	Motorcycle	32

Wireless & Hand Set List

Sr. No.	Name of Office	Fix/Base Station	Mobile Station	Hand Set
1.	Mukandra National Park, Kota	1	4	0
2.	Range Forest office, Dara	1	2	25
	Naka Dara Gaon	1		
	Naka Danta	1		
	Naka Sawanbhado	1		
	Gadde Ka Mala Chouki	1		
	Ghati Mata Chouki	1		
3.	Range Forest office, Ranvtha	1	0	7
	Naka Ranvtha	1		
	Naka Chanbawari	1		
	Naka Damodarpura	1		
	Chouki Ghatoli	1		
4.	Range Forest office, Gagron	1	1	11
	Watch Tower, Gagron	1		
	Naka Nolav	1		
	Naka Mashalpura	1		
	Chouki Kanpura	1		
5.	Range Forest office, Borabas	1	1	9
	Watch Tower Naya Gaon	1		
	Nahar Singh Mata Chouki	1		
6.	Range Forest office, Kolipura	1	1	11
	Naka Girdharpura	1		
	Chouki Teen Manzil	1		
	Nagni Chouki	1		
7.	Range Forest office, Jawahar Sagar	1	0	8
	Naka Kheda	1		
	Naka Shripura	1		
	Chouki Borkui	1		
8.	Range Forest office, Flying	0	0	1
	Total	28	9	72

ANNEXURE-10

Information of last five year tourism

Sr. No.	Year	Type of tourists				Income details from various sources			
		Indian	Foreinger	Students	Total	Income from tourist	Income from vehicles	Income from camera	Total Income
1	2	3	4	5	6	7	8	9	10
1	2014-15	8259	68	48	8375	161042	305400	0	466442
2	2015-16	5243	74	9	5326	269830	272800	9000	551630
3	2016-17	5351	26	281	5658	280970	277200	600	558770
4	2017-18	26701	116	18013	44830	2170110	1408160	26200	3604470
5	2018-19	55068	189	24427	79684	4573990	2596670	4800	7175460
Total		100622	473	42778	143873	7455942	4860230	40600	12356772

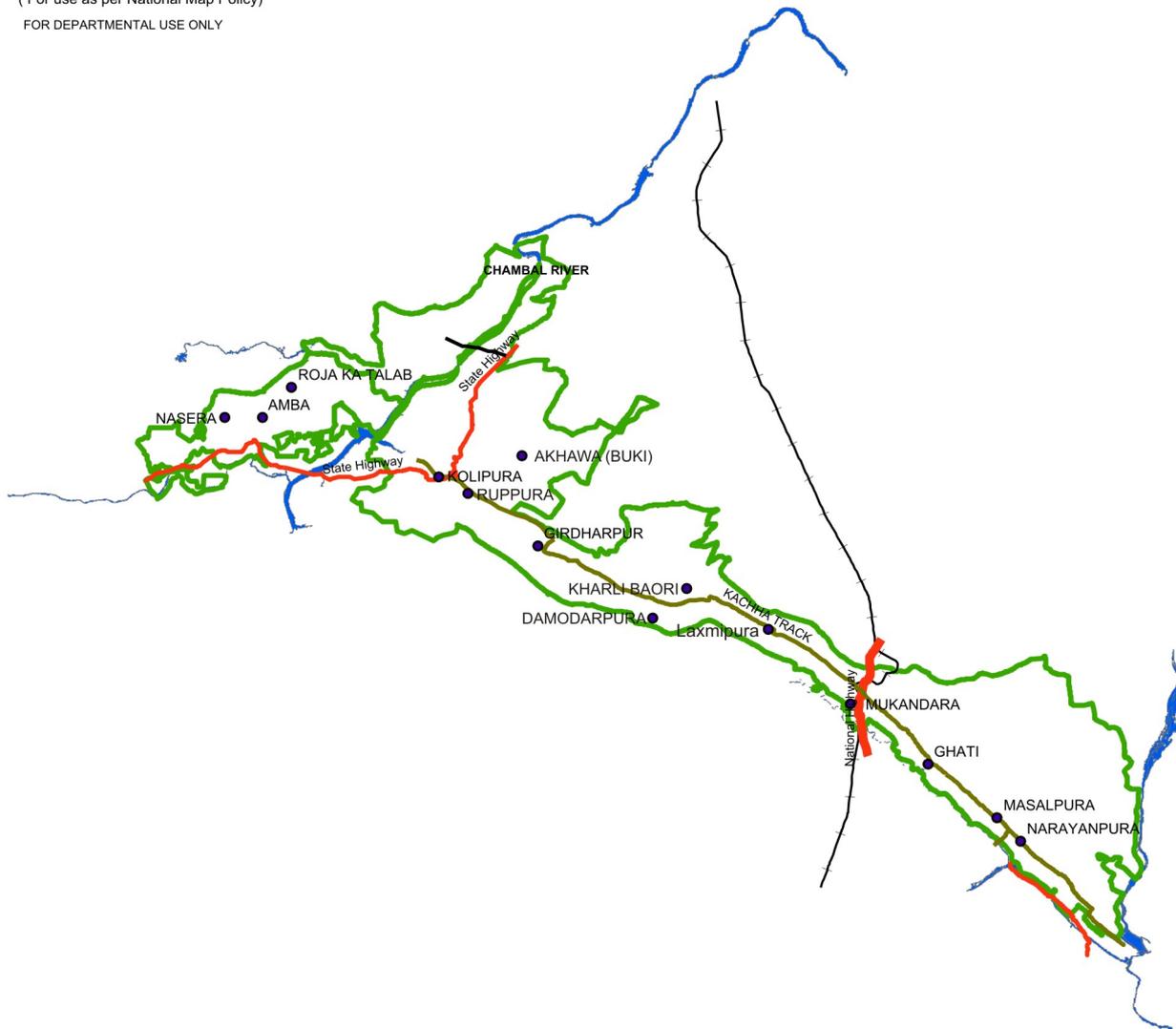
Annexure-11**Area Statement of MHTR**

S.No.	Village Name	Land Type	District	Area(in Ha)
1.	Kharlibawdi	Agriculture	Kota	12.79
2.	Rooppura	Agriculture	Kota	69.54
3.	Laxmipura	Agriculture	Kota	15.84
4.	Giridharpura	Agriculture	Kota	634.60
5.	Damodarpura	Agriculture	Kota	88.58
6.	Kolipura	Agriculture	Kota	40.57
7.	Mukundara (Darrahgaon)	Agriculture	Kota	96.08
8.	Akhava (Bhuki)	Agriculture	Kota	165.83
9.	Ghati	Agriculture	Kota	74.00
10.	RojakaTalab		Bundi	0.00
11.	Jawaharsagar		Bundi	0.00
12.	Mashalpura	Agriculture	Jhalawar	147.00
13.	Narayanpura	Agriculture	Jhalawar	37.00
14.	Ambarani	Agriculture	Chittorgarh	37.21
15.	Nosera	Agriculture	Chittorgarh	29.07
16.	Bhainsrodgarh	Agriculture	Chittorgarh	83.00
			Total (Revenue)	1531.11

MUKANDRA HILLS TIGER RESERVE-KOTA

MAP OF VILLAGE RELOCATION

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Legend

- VILLAGE LOCATION
- District Road
- KACHHA TRACK
- National Highway
- State Highway
- RAILWAY
- RIVER
- CTH_BUFFER_MUKUNDARA_PARIFERY

THIS MAP HAS BEEN PREPARED FOR MANAGEMENT PURPOSES ONLY. FOR LEGAL PURPOSES, FOREST LAND RECORDS SHOULD BE CONSULTED

FOREST DEPARTMENT, RAJASTHAN

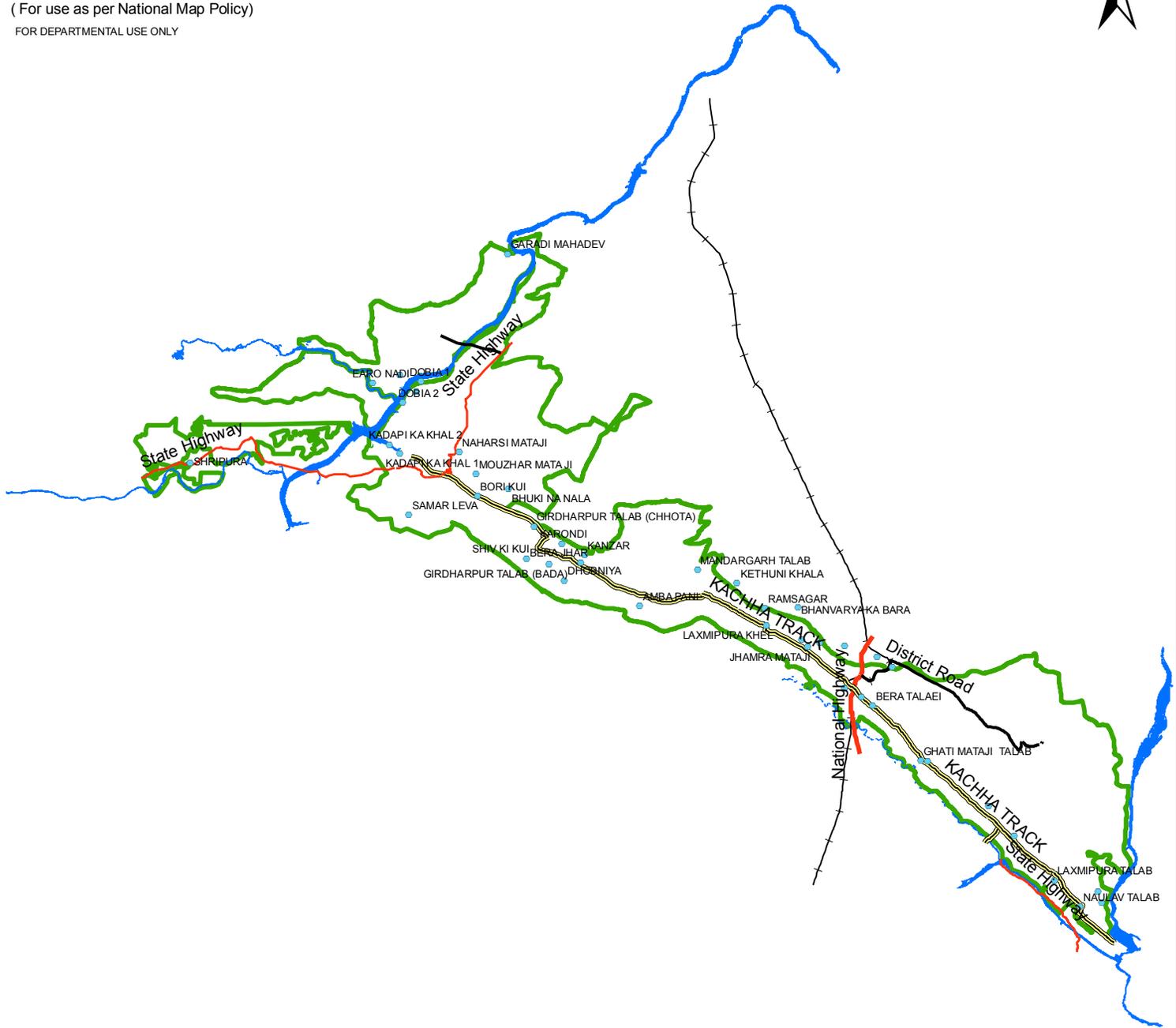


NOT TO SCALE

MUKANDRA HILLS TIGER RESERVE-KOTA

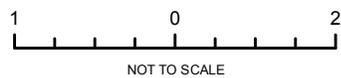
MAP OF WATERHALL

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- Legend**
- DISTRICT ROAD
 - KACHHA TRACK
 - NATIONAL HIGHWAY
 - STATE HIGHWAY
 - RAILWAY
 - RIVER
 - WATERHALL
 - CTH_BUFFER_PARIPHERY

THIS MAP HAS BEEN PREPARED FOR MANAGEMENT PURPOSES ONLY. FOR LEGAL PURPOSES, FOREST LAND RECORDS SHOULD BE CONSULTED
 FOREST DEPARTMENT, RAJASTHAN



Office of Dy. Conservator of Forest (Wildlife) Mukandra National Park, Kota

Annexure- (13-b)

Drinking water supply during pinch period

Sr. No.	Name of Water Point	Range	Water Availability Temporary/ Permanent	Type R/N/T/AW #	Coordinate of water point of column (2)						Source of Water for AWP (Name)	Coordinate Source column (12)						Mode of Transportation
					N			E				N			E			
					D	M	S	D	M	S		D	M	S	D	M	S	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	WHS Bandha	Borabas	Temporary	AW	26	6	52	75	47	31	borwell Banda	25	4	22	75	47	33	Tractor Tenker
2	Gajlar Tiger Bada	Borabas	Temporary	AW	24	59	39	75	39	4	Borwell Borabas	25	2	21	75	42	29	Tractor Tenker
3	Gajlar Beat No.-9	Borabas	Temporary	AW	25	0	56	75	39	57	Borwell Borabas	25	2	21	75	42	29	Tractor Tenker
4	Sothiya Talai	Borabas	Temporary	T	25	8	44	75	45	12	Shivpura water caring station	25	8	49.79	75	48	43.27	Tractor Tenker
5	Gadari Kui	Gagron	Temporary	AW	24	41	29	76	3	33	Mashalpura kua	24	44	10	75	56	42	Tractor Tenker
6	Narayanpura	Gagron	Temporary	AW	24	42	5	76	6	18	Mashalpura kua	24	44	10	75	56	42	Tractor Tenker
7	Amba Pani	Ranvatha	Temporary	AW	24	52	659	75	49	189	Kua Damodarpura	24	52	28	75	52	11	Tractor Tenker
8	Naya Anicut Damodarpura	Ranvatha	Temporary	AW	24	52	21.5	75	52	51.5	Kua Damodarpura	24	52	28	75	52	11	Tractor Tenker
9	Tejaji Ki Khel Ghatoli	Ranvatha	Temporary	AW	24	51	20.3	75	50	54.05	Borwell Ghatoli	24	50	38	75	50	8	Tractor Tenker
10	Ramsagar	Ranvatha	Temporary	AW	24	51	55	75	55	05	Ranvatha Naka	24	52	13.96	75	55	21.75	Tractor Tenker
11	Laxmipura Jhamra	Ranvatha	Temporary	AW	24	50	9	75	57	11	Kua Damodarpura	24	52	28	75	52	11	Tractor Tenker
12	Gajlar Watch Tower	Jawahar Sagar	Temporary	AW	25	06	15.40	75	43	25.04	Gram Karondi	25	26	15.40	75	38	23.88	Tractor Tenker
13	WHS Peermagara	Jawahar Sagar	Temporary	AW	24	59	28.17	75	31	37.17	Naka Shreepura	24	58	46.11	75	29	35.43	Tractor Tenker
14	Earthen Water Pond Peermagra	Jawahar Sagar	Temporary	AW	24	59	0.17	75	30	27.80	Naka Shreepura	24	58	46.11	75	29	35.43	Tractor Tenker
15	Unda Khal	Jawahar Sagar	Temporary	AW	24	59	19.31	75	29	44.68	Naka Shreepura	24	58	46.11	75	29	35.43	Tractor Tenker

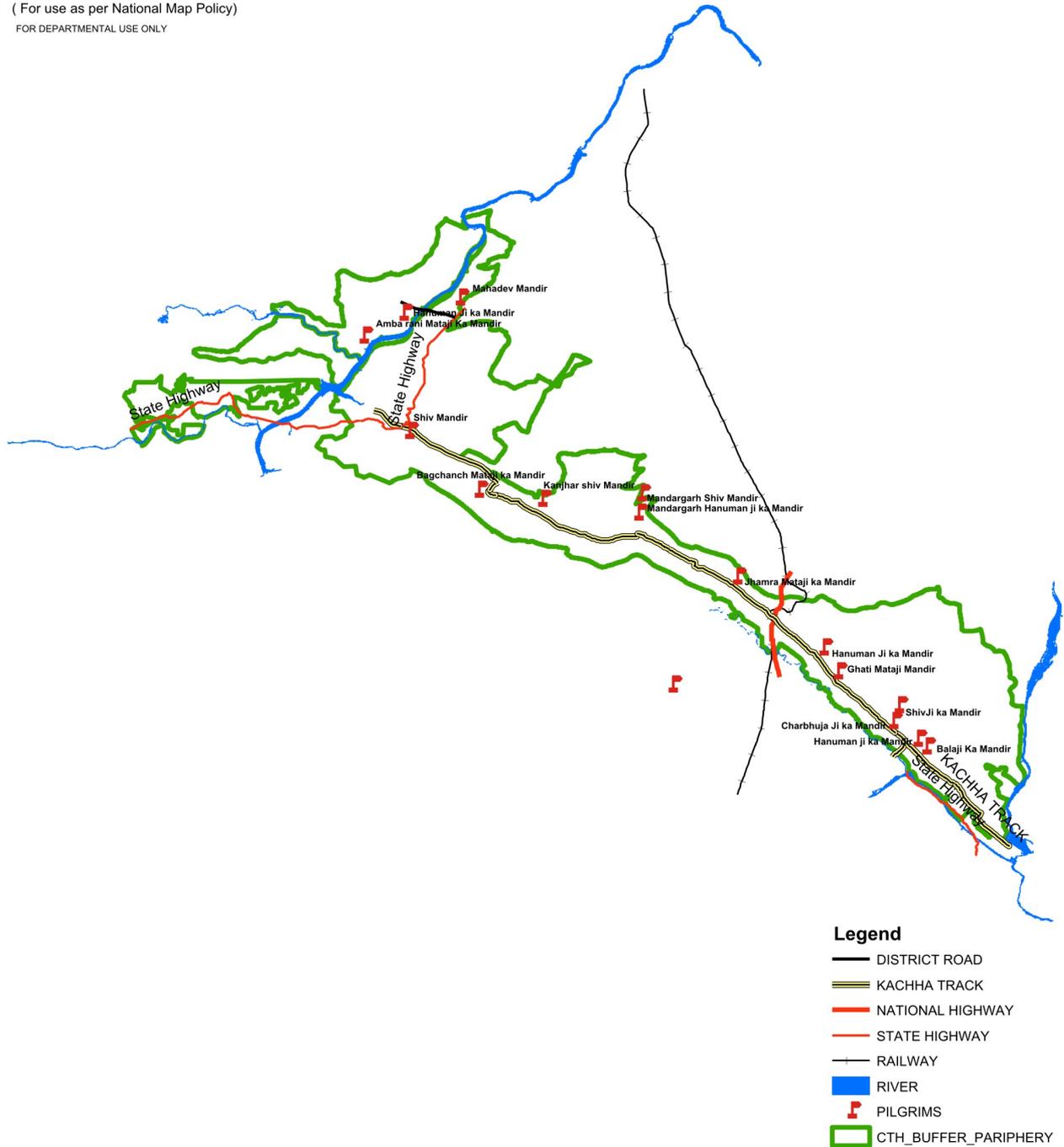
Sr. No.	Name of Water Point	Range	Water Availability Temporary/ Permanent	Type R/N/T/AW #	Coordinate of water point of column (2)						Source of Water for AWP (Name)	Coordinate Source column (12)						Mode of Transportation
					N			E				N			E			
					D	M	S	D	M	S		D	M	S	D	M	S	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
16	WHS Ada Khal	Kolipura	Temporary	AW	24	57	8.9	75	41	19.3	Kua kolipura	24	57	25	75	41	6	Tractor Tenker
17	WHS Fire Line Ke Pas	Kolipura	Temporary	AW	24	57	5	75	41	34.8	Kua kolipura	24	57	25	75	41	6	Tractor Tenker
18	Gajlar Selzar	Kolipura	Temporary	AW	24	58	34	75	40	28	Borwell borabas	25	0	33	75	41	28	Tractor Tenker
19	Cheetal Bada-I	Kolipura	Temporary	AW	24	58	51	75	39	54	Borwell borabas	25	0	33	75	41	28	Tractor Tenker
20	Cheetal Bada-II	Kolipura	Temporary	AW	24	58	51	73	39	53	Borwell borabas	25	0	33	75	41	28	Tractor Tenker
21	WHS Nahar Singh Mata	Kolipura	Temporary	AW	24	58	35	75	40	59	Borwell borabas	25	0	33	75	41	28	Tractor Tenker
22	Hirani Khel	Dara	Temporary	AW	24	47	0.91	76	09	8.63	Haripura dandiya	24	44	10.41	76	7	5.86	Tractor Tenker
23	Bhaisakhal	Dara	Temporary	AW	24	47	30	76	09	15	Kaliya kui	24	49	31	76	2	32	Tractor Tenker
24	Ratiya Talai	Dara	Temporary	T	24	47	30	76	02	40	Kaliya kui	24	49	31	76	2	32	Tractor Tenker
25	Sunderpura Chouk	Dara	Temporary	AW	24	48	44	75	59	46	Kaliya kui	24	49	31	76	2	32	Tractor Tenker

Dy. Conservator of Forest (Wildlife)
Mukandra National Park, Kota

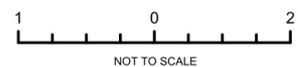
MUKANDRA HILLS TIGER RESERVE-KOTA

MAP OF PILGRIMAGE

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 FOREST DEPARTMENT, RAJASTHAN



Annexure-15

Tiger Monitoring Report - MT.....						
Month -.....						
S.No.	Date	Date of Direct Sighting	Signal - Location	Date of Pugmark record	Assessment by monitoring team and DCF, MHTR	Assessment by CCF & FD, MHTR
1	2	5	6	7	8	9
1						
2						
3						
4						
5						
6						
7						

DCF (WL)
MNP, KOTA

CCF (WL) & FD
MHTR, KOTA

Annexure-16

Mukundara Tiger Reserve - Phase III Camera trapping 2018

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
1	Borabas	25	0	32	75	38	15
2	Borabas	25	0	32	75	38	15
3	Borabas	25	0	56	75	38	56
4	Borabas	25	0	56	75	38	56
5	Borabas	25	1	27	75	39	41
6	Borabas	25	1	27	75	39	41
7	Borabas	25	1	37	75	40	38
8	Borabas	25	1	37	75	40	38
9	Borabas	25	3	12.54	75	42	21.2
10	Borabas	25	3	12.54	75	42	21.2
11	Borabas	25	4	1.6	75	43	15.12
12	Borabas	25	4	1.6	75	43	15.12
13	Borabas	25	5	4.99	75	43	43.18
14	Borabas	25	5	4.99	75	43	43.18
15	Borabas	25	5	56.88	75	44	26.8
16	Borabas	25	5	56.88	75	44	26.8
17	Borabas	24	59	49	75	39	59
18	Borabas	24	59	49	75	39	59
19	Borabas	25	0	54	75	39	59
20	Borabas	25	0	54	75	39	59
21	Borabas	25	1	7	75	40	39
22	Borabas	25	1	7	75	40	39
23	Borabas	25	2	38.91	75	42	1.34
24	Borabas	25	2	38.91	75	42	1.34
25	Borabas	25	0	14	75	39	27
26	Borabas	25	0	14	75	39	27
27	Borabas	24	59	54	75	41	2
28	Borabas	24	59	54	75	41	2
29	Borabas	24	59	37	75	39	59
30	Borabas	24	59	37	75	39	59
31	Borabas	24	59	8	75	40	34
32	Borabas	24	59	8	75	40	34
33	Borabas	24	58	39	75	41	2
34	Borabas	24	58	39	75	41	2
35	Borabas	24	59	30	75	41	22
36	Borabas	24	59	30	75	41	22
37	Borabas	25	0	5.78	75	42	26.64
38	Borabas	25	0	5.78	75	42	26.64
39	Borabas	25	1	0	75	44	10
40	Borabas	25	1	0	75	44	10
41	Borabas	25	0	52.21	75	45	4.82
42	Borabas	25	0	52.21	75	45	4.82
43	Borabas	24	58	44.35	75	41	25.13
44	Borabas	24	58	44.35	75	41	25.13
45	Borabas	24	59	20.3	75	42	29.57
46	Borabas	24	59	20.3	75	42	29.57
47	Borabas	25	0	25.67	75	43	22.57
48	Borabas	25	0	25.67	75	43	22.57

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
49	Borabas	25	0	21.02	75	43	59.07
50	Borabas	25	0	21.02	75	43	59.07
51	Borabas	25	0	3.66	75	45	7.36
52	Borabas	25	0	3.66	75	45	7.36
53	Borabas	24	58	29	75	42	32.09
54	Borabas	24	58	29	75	42	32.09
55	Borabas	24	59	24.21	75	43	15.34
56	Borabas	24	59	24.21	75	43	15.34
57	Borabas	24	57	55.63	75	42	20.82
58	Borabas	24	57	55.63	75	42	20.82
59	Borabas	24	58	44.87	75	43	23.53
60	Borabas	24	58	44.87	75	43	23.53
61	Borabas	24	59	48.34	75	44	11.11
62	Borabas	24	59	48.34	75	44	11.11
63	Borabas	24	58	21	75	43	52.04
64	Borabas	24	58	21	75	43	52.04
65	Borabas	24	59	34.04	75	45	1.03
66	Borabas	24	59	34.04	75	45	1.03
67	Borabas	24	58	4.28	75	43	49.91
68	Borabas	24	58	4.28	75	43	49.91
69	Borabas	24	58	36.92	75	45	12.86
70	Borabas	24	58	36.92	75	45	12.86
71	Borabas	24	57	8.55	75	44	26.86
72	Borabas	24	57	8.55	75	44	26.86
73	Borabas	24	58	49.37	75	46	5.63
74	Borabas	24	58	49.37	75	46	5.63
75	Kolipura	24	59	0.04	75	38	4.16
76	Kolipura	24	59	0.04	75	38	4.16
77	Kolipura	24	59	9.19	75	39	22.66
78	Kolipura	24	59	9.19	75	39	22.66
79	Kolipura	24	57	30.59	75	37	33.56
80	Kolipura	24	57	30.59	75	37	33.56
81	Kolipura	24	58	28.15	75	38	59.04
82	Kolipura	24	58	28.15	75	38	59.04
83	Kolipura	24	57	40.02	75	38	53.8
84	Kolipura	24	57	40.02	75	38	53.8
85	Kolipura	24	58	27.05	75	40	0.19
86	Kolipura	24	58	27.05	75	40	0.19
87	Kolipura	24	56	57.83	75	38	28.08
88	Kolipura	24	56	57.83	75	38	28.08
89	Kolipura	24	56	56.08	75	40	3.06
90	Kolipura	24	56	56.08	75	40	3.06
91	Kolipura	24	57	58.16	75	40	57.12
92	Kolipura	24	57	58.16	75	40	57.12
93	Kolipura	24	57	12.38	75	41	6.69
94	Kolipura	24	57	12.38	75	41	6.69
95	Kolipura	24	57	37.31	75	41	26.66
96	Kolipura	24	57	37.31	75	41	26.66
97	Kolipura	24	57	3.95	75	41	35.64
98	Kolipura	24	57	3.95	75	41	35.64
99	Kolipura	24	56	13.5	75	42	4.92
100	Kolipura	24	56	13.5	75	42	4.92

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
101	Kolipura	24	55	37.4	75	42	8.85
102	Kolipura	24	55	37.4	75	42	8.85
103	Kolipura	24	56	14.1	75	42	30.89
104	Kolipura	24	56	14.1	75	42	30.89
105	Kolipura	24	55	19.11	75	42	34.23
106	Kolipura	24	55	19.11	75	42	34.23
107	Kolipura	24	56	16.25	75	43	26.74
108	Kolipura	24	56	16.25	75	43	26.74
109	Kolipura	24	55	41.52	75	44	7.35
110	Kolipura	24	55	41.52	75	44	7.35
111	Kolipura	24	54	56.48	75	45	32.27
112	Kolipura	24	54	56.48	75	45	32.27
113	Kolipura	24	54	6.16	75	46	10.96
114	Kolipura	24	54	6.16	75	46	10.96
115	Kolipura	24	53	9.1	75	46	9.8
116	Kolipura	24	53	9.1	75	46	9.8
117	Kolipura	24	53	55.12	75	47	14.85
118	Kolipura	24	53	55.12	75	47	14.85
119	Kolipura	24	53	11.51	75	47	52.98
120	Kolipura	24	53	11.51	75	47	52.98
121	Rawtha	24	55	31.8	75	45	12.54
122	Rawtha	24	55	31.8	75	45	12.54
123	Rawtha	24	54	47.95	75	46	14.12
124	Rawtha	24	54	47.95	75	46	14.12
125	Rawtha	24	54	13.62	75	47	10.86
126	Rawtha	24	54	13.62	75	47	10.86
127	Rawtha	24	55	4.4	75	48	15.32
128	Rawtha	24	55	4.4	75	48	15.32
129	Rawtha	24	56	31.81	75	51	75.7
130	Rawtha	24	56	31.81	75	51	75.7
131	Rawtha	24	55	43.11	75	49	5.26
132	Rawtha	24	55	43.11	75	49	5.26
133	Rawtha	24	55	47.28	75	50	34.8
134	Rawtha	24	55	47.28	75	50	34.8
135	Rawtha	24	55	51.6	75	51	20.88
136	Rawtha	24	55	51.6	75	51	20.88
137	Rawtha	24	55	57.36	75	52	9.48
138	Rawtha	24	55	57.36	75	52	9.48
139	Rawtha	24	54	11.88	75	48	26.69
140	Rawtha	24	54	11.88	75	48	26.69
141	Rawtha	24	54	54.09	75	49	44.53
142	Rawtha	24	54	54.09	75	49	44.53
143	Rawtha	24	54	50.17	75	50	20.2
144	Rawtha	24	54	50.17	75	50	20.2
145	Rawtha	24	55	3.51	75	51	22.46
146	Rawtha	24	55	3.51	75	51	22.46
147	Rawtha	24	54	7.22	75	48	37.82
148	Rawtha	24	54	7.22	75	48	37.82
149	Rawtha	24	54	38.69	75	50	46.54
150	Rawtha	24	54	38.69	75	50	46.54
151	Rawtha	24	54	21.94	75	51	9.14
152	Rawtha	24	54	21.94	75	51	9.14

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
153	Rawtha	24	53	32.07	75	49	10.65
154	Rawtha	24	53	32.07	75	49	10.65
155	Rawtha	24	53	33.89	75	49	37.07
156	Rawtha	24	53	33.89	75	49	37.07
157	Rawtha	24	53	20	75	50	44
158	Rawtha	24	53	20	75	50	44
159	Rawtha	24	52	41	75	49	9
160	Rawtha	24	52	41	75	49	9
161	Rawtha	24	52	34	75	48	41
162	Rawtha	24	52	34	75	48	41
163	Rawtha	24	53	0	75	50	45
164	Rawtha	24	53	0	75	50	45
165	Rawtha	24	52	21	75	50	44
166	Rawtha	24	52	21	75	50	44
167	Rawtha	24	51	28	75	54	38
168	Rawtha	24	51	28	75	54	38
169	Rawtha	24	54	47.22	75	53	7.74
170	Rawtha	24	54	47.22	75	53	7.74
171	Rawtha	24	52	30.92	75	53	48.31
172	Rawtha	24	52	30.92	75	53	48.31
173	Rawtha	24	51	44	75	51	41
174	Rawtha	24	51	44	75	51	41
175	Rawtha	24	51	60	75	52	21
176	Rawtha	24	51	60	75	52	21
177	Rawtha	24	51	55	75	53	52
178	Rawtha	24	51	55	75	53	52
179	Rawtha	24	51	8	75	54	2
180	Rawtha	24	51	8	75	54	2
181	Rawtha	24	51	13	75	55	7
182	Rawtha	24	51	13	75	55	7
183	Rawtha	24	51	10.14	75	56	6.12
184	Rawtha	24	51	10.14	75	56	6.12
185	Rawtha	24	51	10.97	75	56	32.82
186	Rawtha	24	51	10.97	75	56	32.82
187	Rawtha	24	50	16.48	75	56	48.04
188	Rawtha	24	50	16.48	75	56	48.04
189	Rawtha	24	50	34.05	75	57	38.94
190	Rawtha	24	50	34.05	75	57	38.94
191	Rawtha	24	50	47.61	75	55	49.49
192	Rawtha	24	50	47.61	75	55	49.49
193	Darra	24	49	40.25	75	57	37.11
194	Darra	24	49	40.25	75	57	37.11
195	Darra	24	48	42	75	58	43
196	Darra	24	48	42	75	58	43
197	Darra	24	49	96	75	59	6.01
198	Darra	24	49	96	75	59	6.01
199	Darra	24	49	31.2	75	59	32.1
200	Darra	24	49	31.2	75	59	32.1
201	Darra	24	49	20.3	75	59	54.3
202	Darra	24	49	20.3	75	59	54.3
203	Darra	24	49	45.9	76	1	34.4
204	Darra	24	49	45.9	76	1	34.4

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
205	Darra	24	48	98.4	76	2	45.2
206	Darra	24	48	98.4	76	2	45.2
207	Darra	24	48	60.6	76	2	34.7
208	Darra	24	48	60.6	76	2	34.7
209	Darra	24	48	6.55	75	58	46.14
210	Darra	24	48	6.55	75	58	46.14
211	Darra	24	48	8.17	75	59	31.83
212	Darra	24	48	8.17	75	59	31.83
213	Darra	24	48	56	76	2	20.2
214	Darra	24	48	56	76	2	20.2
215	Darra	24	48	32.09	76	3	12.96
216	Darra	24	48	32.09	76	3	12.96
217	Darra	24	48	18.9	76	3	37.93
218	Darra	24	48	18.9	76	3	37.93
219	Darra	24	48	20.12	76	4	49.14
220	Darra	24	48	20.12	76	4	49.14
221	Darra	24	48	23.41	76	5	34.94
222	Darra	24	48	23.41	76	5	34.94
223	Darra	24	49	7.01	76	6	28.48
224	Darra	24	49	7.01	76	6	28.48
225	Darra	24	50	6.08	76	7	27.9
226	Darra	24	50	6.08	76	7	27.9
227	Darra	24	49	9.4	76	7	26.28
228	Darra	24	49	9.4	76	7	26.28
229	Darra	24	49	14.34	76	7	57.44
230	Darra	24	49	14.34	76	7	57.44
231	Darra	24	48	19.38	76	6	17.73
232	Darra	24	48	19.38	76	6	17.73
233	Darra	24	47	18.6	76	1	59.7
234	Darra	24	47	18.6	76	1	59.7
235	Darra	24	47	21.85	76	3	35.88
236	Darra	24	47	21.85	76	3	35.88
237	Darra	24	47	49	76	4	31.23
238	Darra	24	47	49	76	4	31.23
239	Darra	24	47	46.32	76	8	7.44
240	Darra	24	47	46.32	76	8	7.44
241	Darra	24	46	42.88	76	1	18.9
242	Darra	24	46	42.88	76	1	18.9
243	Darra	24	46	47.96	76	2	28.75
244	Darra	24	46	47.96	76	2	28.75
245	Darra	24	46	55.22	76	3	38.14
246	Darra	24	46	55.22	76	3	38.14
247	Darra	24	46	59.28	76	9	0.72
248	Darra	24	46	59.28	76	9	0.72
249	Darra	24	46	56.71	76	9	54.29
250	Darra	24	46	56.71	76	9	54.29
251	Darra	24	46	3.19	76	1	35.42
252	Darra	24	46	3.19	76	1	35.42
253	Darra	24	45	47.92	76	2	10.45
254	Darra	24	45	47.92	76	2	10.45
255	Darra	24	46	11.69	76	8	13.85
256	Darra	24	46	11.69	76	8	13.85

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
257	Darra	24	46	13.68	76	9	21.51
258	Darra	24	46	13.68	76	9	21.51
259	Darra	24	46	12.79	76	9	56
260	Darra	24	46	12.79	76	9	56
261	Darra	24	47	1	76	0	23.06
262	Darra	24	47	1	76	0	23.06
263	Darra	24	45	1.52	76	2	56.51
264	Darra	24	45	1.52	76	2	56.51
265	Darra	24	45	35.41	76	8	20
266	Darra	24	45	35.41	76	8	20
267	Darra	24	45	36.16	76	8	58.36
268	Darra	24	45	36.16	76	8	58.36
269	Darra	24	45	38.53	76	10	4.18
270	Darra	24	45	38.53	76	10	4.18
271	Darra	24	44	36.93	76	3	21.73
272	Darra	24	44	36.93	76	3	21.73
273	Gagron	24	45	41.18	76	2	47.71
274	Gagron	24	45	41.18	76	2	47.71
275	Gagron	24	46	9.38	76	4	10.5
276	Gagron	24	46	9.38	76	4	10.5
277	Gagron	24	46	1.56	76	5	0.79
278	Gagron	24	46	1.56	76	5	0.79
279	Gagron	24	45	35.55	76	3	42.87
280	Gagron	24	45	35.55	76	3	42.87
281	Gagron	24	45	37.81	76	5	10.04
282	Gagron	24	45	37.81	76	5	10.04
283	Gagron	24	45	23.72	76	5	27.84
284	Gagron	24	45	23.72	76	5	27.84
285	Gagron	24	43	29	76	5	17
286	Gagron	24	43	29	76	5	17
287	Gagron	24	44	6.41	76	4	9.73
288	Gagron	24	44	6.41	76	4	9.73
289	Gagron	24	44	13.75	76	4	37.33
290	Gagron	24	44	13.75	76	4	37.33
291	Gagron	24	44	32.09	76	5	55.02
292	Gagron	24	44	32.09	76	5	55.02
293	Gagron	24	44	54.41	76	6	17.94
294	Gagron	24	44	54.41	76	6	17.94
295	Gagron	24	44	36.57	76	8	16.49
296	Gagron	24	44	36.57	76	8	16.49
297	Gagron	24	45	17.39	76	10	50.71
298	Gagron	24	45	17.39	76	10	50.71
299	Gagron	24	44	32.35	76	9	1.67
300	Gagron	24	44	32.35	76	9	1.67
301	Gagron	24	44	41.57	76	10	55.28
302	Gagron	24	44	41.57	76	10	55.28
303	Gagron	24	43	25.46	76	4	19.91
304	Gagron	24	43	25.46	76	4	19.91
305	Gagron	24	43	33.53	76	5	8.04
306	Gagron	24	43	33.53	76	5	8.04
307	Gagron	24	43	26.8	76	5	44.28
308	Gagron	24	43	26.8	76	5	44.28

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
309	Gagron	24	43	57.08	76	10	0.39
310	Gagron	24	43	57.08	76	10	0.39
311	Gagron	24	44	0.31	76	10	52.38
312	Gagron	24	44	0.31	76	10	52.38
313	Gagron	24	43	54.7	76	11	44.36
314	Gagron	24	43	54.7	76	11	44.36
315	Gagron	24	43	10.18	76	6	38.79
316	Gagron	24	43	10.18	76	6	38.79
317	Gagron	24	43	11.92	76	10	59.85
318	Gagron	24	43	11.92	76	10	59.85
319	Gagron	24	42	20.25	76	6	3.23
320	Gagron	24	42	20.25	76	6	3.23
321	Gagron	24	42	11.22	76	6	48.65
322	Gagron	24	42	11.22	76	6	48.65
323	Gagron	24	42	13.58	76	7	31.37
324	Gagron	24	42	13.58	76	7	31.37
325	Gagron	24	42	16.33	76	8	29.54
326	Gagron	24	42	16.33	76	8	29.54
327	Gagron	24	42	15.74	76	9	9.24
328	Gagron	24	42	15.74	76	9	9.24
329	Gagron	24	42	21.6	76	10	9.25
330	Gagron	24	42	21.6	76	10	9.25
331	Gagron	24	42	28.09	76	11	13.39
332	Gagron	24	42	28.09	76	11	13.39
333	Gagron	24	41	20.51	76	6	44.18
334	Gagron	24	41	20.51	76	6	44.18
335	Gagron	24	41	12.93	76	7	29.26
336	Gagron	24	41	12.93	76	7	29.26
337	Gagron	24	41	20.4	76	8	18.52
338	Gagron	24	41	20.4	76	8	18.52
339	Gagron	24	41	32.92	76	11	11.81
340	Gagron	24	41	32.92	76	11	11.81
341	Gagron	24	40	53.41	76	7	18.77
342	Gagron	24	40	53.41	76	7	18.77
343	Gagron	24	40	45.77	76	8	34.42
344	Gagron	24	40	45.77	76	8	34.42
345	Gagron	24	40	45.08	76	9	17.8
346	Gagron	24	40	45.08	76	9	17.8
347	Gagron	24	39	51.21	76	9	37.1
348	Gagron	24	39	51.21	76	9	37.1
349	Gagron	24	39	49.83	76	10	13.46
350	Gagron	24	39	49.83	76	10	13.46
351	Gagron	24	38	59.33	76	9	38.96
352	Gagron	24	38	59.33	76	9	38.96
353	Gagron	24	39	1.65	76	10	7.72
354	Gagron	24	39	1.65	76	10	7.72
355	Gagron	24	38	43.73	76	10	18.03
356	Gagron	24	38	43.73	76	10	18.03
357	JawaharSagar	24	59	23.06	75	27	56.39
358	JawaharSagar	24	59	23.06	75	27	56.39
359	JawaharSagar	24	59	4.24	75	27	47.44
360	JawaharSagar	24	59	4.24	75	27	47.44

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
361	JawaharSagar	24	59	11.73	75	28	39.54
362	JawaharSagar	24	59	11.73	75	28	39.54
363	JawaharSagar	24	58	28.9	75	29	53.39
364	JawaharSagar	24	58	28.9	75	29	53.39
365	JawaharSagar	25	0	26.58	75	29	4.88
366	JawaharSagar	25	0	26.58	75	29	4.88
367	JawaharSagar	24	59	35.77	75	29	38.05
368	JawaharSagar	24	59	35.77	75	29	38.05
369	JawaharSagar	24	59	34.43	75	27	33.5
370	JawaharSagar	24	59	34.43	75	27	33.5
371	JawaharSagar	24	59	4.51	75	27	27.46
372	JawaharSagar	24	59	4.51	75	27	27.46
373	JawaharSagar	25	1	7.38	75	31	14.84
374	JawaharSagar	25	1	7.38	75	31	14.84
375	JawaharSagar	24	59	41.53	75	31	11.33
376	JawaharSagar	24	59	41.53	75	31	11.33
377	JawaharSagar	24	59	3.25	75	31	11.83
378	JawaharSagar	24	59	3.25	75	31	11.83
379	JawaharSagar	25	1	18.56	75	31	59.83
380	JawaharSagar	25	1	18.56	75	31	59.83
381	JawaharSagar	24	59	48	75	32	5.03
382	JawaharSagar	24	59	48	75	32	5.03
383	JawaharSagar	25	0	37.3	75	32	48.4
384	JawaharSagar	25	0	37.3	75	32	48.4
385	JawaharSagar	24	59	53.8	75	32	57.6
386	JawaharSagar	24	59	53.8	75	32	57.6
387	JawaharSagar	24	59	0.8	75	33	1.2
388	JawaharSagar	24	59	0.8	75	33	1.2
389	JawaharSagar	25	1	13.35	75	33	45.35
390	JawaharSagar	25	1	13.35	75	33	45.35
391	JawaharSagar	25	0	32	75	33	58.8
392	JawaharSagar	25	0	32	75	33	58.8
393	JawaharSagar	25	0	2.29	75	33	52.98
394	JawaharSagar	25	0	2.29	75	33	52.98
395	JawaharSagar	25	2	7.2	75	34	29.65
396	JawaharSagar	25	2	7.2	75	34	29.65
397	JawaharSagar	25	1	24.96	75	34	33.96
398	JawaharSagar	25	1	24.96	75	34	33.96
399	JawaharSagar	25	0	43.3	75	34	35
400	JawaharSagar	25	0	43.3	75	34	35
401	JawaharSagar	24	59	53.5	75	34	30.54
402	JawaharSagar	24	59	53.5	75	34	30.54
403	JawaharSagar	25	3	2.66	75	35	29.5
404	JawaharSagar	25	3	2.66	75	35	29.5
405	JawaharSagar	25	2	12.12	75	35	9.27
406	JawaharSagar	25	2	12.12	75	35	9.27
407	JawaharSagar	25	1	32.59	75	35	25.08
408	JawaharSagar	25	1	32.59	75	35	25.08
409	JawaharSagar	25	0	45.7	75	38	19.6
410	JawaharSagar	25	0	45.7	75	38	19.6
411	JawaharSagar	25	2	27.93	75	36	16.35
412	JawaharSagar	25	2	27.93	75	36	16.35

S.No.	Range	Lat			Long		
		deg	min	sec	deg	min	sec
413	JawaharSagar	25	1	23.29	75	36	18.33
414	JawaharSagar	25	1	23.29	75	36	18.33
415	JawaharSagar	25	0	30.2	75	36	14
416	JawaharSagar	25	0	30.2	75	36	14
417	JawaharSagar	24	59	59.6	75	36	26.1
418	JawaharSagar	24	59	59.6	75	36	26.1
419	JawaharSagar	25	2	5.45	75	37	9.84
420	JawaharSagar	25	2	5.45	75	37	9.84
421	JawaharSagar	25	1	33.96	75	37	13.44
422	JawaharSagar	25	1	33.96	75	37	13.44
423	JawaharSagar	25	1	0.45	75	36	49.41
424	JawaharSagar	25	1	0.45	75	36	49.41
425	JawaharSagar	25	2	55.71	75	37	49.7
426	JawaharSagar	25	2	55.71	75	37	49.7
427	JawaharSagar	25	1	43.66	75	37	53.32
428	JawaharSagar	25	1	43.66	75	37	53.32
429	JawaharSagar	25	3	54.89	75	38	50.07
430	JawaharSagar	25	3	54.89	75	38	50.07
431	JawaharSagar	25	3	12.2	75	38	37
432	JawaharSagar	25	3	12.2	75	38	37
433	JawaharSagar	25	2	21.44	75	38	34.2
434	JawaharSagar	25	2	21.44	75	38	34.2
435	JawaharSagar	25	1	53.8	75	38	33.67
436	JawaharSagar	25	1	53.8	75	38	33.67
437	JawaharSagar	25	4	0.13	75	39	37.18
438	JawaharSagar	25	4	0.13	75	39	37.18
439	JawaharSagar	25	3	19.3	75	39	38.8
440	JawaharSagar	25	3	19.3	75	39	38.8
441	JawaharSagar	25	2	9.07	75	39	36.15
442	JawaharSagar	25	2	9.07	75	39	36.15
443	JawaharSagar	25	4	4.08	75	40	32.88
444	JawaharSagar	25	4	4.08	75	40	32.88
445	JawaharSagar	25	3	12.28	75	40	32.09
446	JawaharSagar	25	3	12.28	75	40	32.09
447	JawaharSagar	25	4	36.04	75	40	40.85
448	JawaharSagar	25	4	36.04	75	40	40.85
449	JawaharSagar	25	4	10.31	75	41	21.69
450	JawaharSagar	25	4	10.31	75	41	21.69
451	JawaharSagar	25	3	28.41	75	41	59.14
452	JawaharSagar	25	3	28.41	75	41	59.14
453	JawaharSagar	25	6	32.12	75	42	25.03
454	JawaharSagar	25	6	32.12	75	42	25.03
455	JawaharSagar	25	4	53.46	75	42	8.86
456	JawaharSagar	25	4	53.46	75	42	8.86
457	JawaharSagar	25	4	17.4	75	42	8.64
458	JawaharSagar	25	4	17.4	75	42	8.64
459	JawaharSagar	25	6	32.12	75	42	55.88
460	JawaharSagar	25	6	32.12	75	42	55.88
461	JawaharSagar	25	5	6.73	75	42	57.66
462	JawaharSagar	25	5	6.73	75	42	57.66
463	JawaharSagar	25	7	24	75	43	27.06
464	JawaharSagar	25	7	24	75	43	27.06

Annexure-17

Antipoching Camps

	Beat	Naka	Lat	Long
Jawahar Sagar				
shreepura	JS-2	Shreepura	24°58'45.00"N	75°29'33.75"E
Kheda	JS-10	Kheda	25° 3'52.43"N	75°34'40.16"E
Borkui Teen Manjil	JS-14	Jawahar Sagar	25° 4'53.62"N	75°41'26.46"E
Borabas				
Banda	B-8	Bandha	25° 0'35.56"N	75°47'1.96"E
Rath Kankara	B-2	Rath Kankara	25° 3'15.55"N	75°43'31.81"E
Nahar Singh Mata Ji	B-13	Borabas	24°58'55.51"N	75°40'56.07"E
Kolipura				
Kanya Talab	K-9	Kanya Talab	24°57'23.28"N	75°36'13.49"E
Selzer Chowki	K-1	Kolipura	24°58'24.80"N	75°40'40.97"E
Girdharpura	K-6	Girdharpura	24°54'43.73"N	75°44'40.12"E
Ravantha				
Chand Bawari	R-12	Chand Bawari	24°56'0.64"N	75°44'49.00"E
Mandar Garh	R-10	Mandar Garh	24°53'40.48"N	75°51'24.05"E
Ghatoli	R-8	Damodarpura	24°50'38.00"N	75°50'08.00"E
Laxmipura	R-5	Ranvatha	24°51'9.58"N	75°55'8.76"E
Dara				
Gaddhe Ka mala	D-4	Dara Gaon	24°48'45.74"N	75°58'42.51"E
Simliya	D-2,3	Dara Station	24°49'50.59"N	76° 7'32.02"E
Sawanbhadho Dam	D-10	Sawanbhadho Dam	24°48'28.19"N	76° 5'34.45"E
Danta	D-13	Danta	24°47'19.50"N	76°10'9.43"E
Ghati Mataji	D-7	Dara Gaon	24°46'4.32"N	76° 1'27.50"E
Gagron				
Kanpura	G-8	Rajpura	24°44'41.29"N	76°11'31.10"E
Nolav	G-6	Nolav	24°39'10.93"N	76° 9'13.13"E
Mandi Baran	G-1	Mashalpura	24°42'25.99"N	76° 5'29.83"E
Mashalpura	G-2	Mashalpura	24°43'6.54"N	76° 5'11.54"E

कार्यालय उप वन संरक्षक (वन्यजीव) मुकन्दरा राष्ट्रीय उद्यान कोटा
नाका एवं चौकी पुर्नगठन

Annexure-18

नाम रेंज जवाहर सागर

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (हे०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(हे०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
1	श्रीपुरा	भूंजर	12A	56.81	883.95	JS-1	भूंजर	श्रीपुरा चौकी	बफर क्षेत्र		
			5	68.20							
			16	260.10							
			17	314.89							
		खालगांव	A	60.00							
		खालगांव	B	64.68							
		श्रीपुरा	C	59.27							
		श्रीपुरा	A	200.00	1234.66	JS-2	श्रीपुरा	श्रीपुरा चौकी	बफर क्षेत्र		
			B	165.73						बफर क्षेत्र	
		पीरमगरा	27	210.49						कोर क्षेत्र	
			23	215.94						कोर क्षेत्र	
			26	116.50						कोर क्षेत्र	
			24	165.70						कोर क्षेत्र	
			28	160.30						कोर क्षेत्र	
		पीरमगरा	14	132.30	989.00	JS-3	पीरमगरा	श्रीपुरा चौकी	कोर क्षेत्र		
			15	103.00						कोर क्षेत्र	
			16	124.80						कोर क्षेत्र	
			17	35.60						कोर क्षेत्र	
			18	194.90						बफर क्षेत्र	

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			19	64.30					बफर क्षेत्र		
			20	230.30					कोर क्षेत्र		
			25	103.80					बफर क्षेत्र		
योग नाका (है०)					3107.61						
2	भैंसरोड़गढ़	पीरमगरा	9	152.30	1011.57	JS-4	पीरमगरा-II	भैंसरोड़गढ़	कोर क्षेत्र		
			10	86.40							
			11	80.87							
			12	75.90							
			21	140.30							
			22	88.90							
			13	189.40							
		भैंसरोड़गढ़	1	197.50							
		पीरमगरा	4	205.90	1009.63	JS-5	मदारचौक	भैंसरोड़गढ़	कोर क्षेत्र		
			5	55.50							
			6	122.80							
			7	108.80							
			8	115.60							
		मदारचौक	1	110.03							
			2	91.00							
			3	200.00							
		पीरमगरा	1	124.20	623.39	JS-6	बालापुра	बालापुरा	कोर क्षेत्र		
			2	126.30							
			3	83.40							
		बालापुरा	1	289.49							
योग नाका (है०)					2644.59						
3	गुड़ा	गुढाराजपुरा	13	168.25			नौसेरा	नौसेरा	कोर क्षेत्र		

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (हे०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(हे०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			12	198.25	930.87	JS-7					
			11	180.37							
			10	198.00							
			1	186.00							
		गुढाराजपुरा	2	281.25	1089.79	JS-8	नौसेरा-गा	नौसेरा	कोर क्षेत्र		
			3	280.25							
			4	280.00							
			5	248.29							
		गुढाराजपुरा	6	223.75	993.87	JS-9	गुढाराजपुरा	गुढाराजपुरा	कोर क्षेत्र		
			7	263.25							
			8	291.25							
			9	215.62							
					3014.53						
4	खेड़ा	अम्बारानी	1	206.50	1173.50	JS-10	अम्बारानी माता	खेड़ा	कोर क्षेत्र		
			2	195.00							
			3	266.00							
			38	186.25							
			37	163.75							
			9	156.00							
		अम्बारानी	4	113.75	1049.50	JS-11	काला खेत	खेड़ा	कोर क्षेत्र		
			5	165.00							
			6	188.75							
			7	137.50							
			8	150.00							
			10	102.50							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			11	192.00							
		अम्बारानी	13	141.50	1231.50	JS-12	बोरकुई-1	बोरकुई	कोर क्षेत्र		
			12	122.50							
			14	216.25							
			15	143.75							
			16	220.00							
			17	101.25							
			18	286.25							
योग नाका (है०)					3454.50						
5	जवाहर सागर	अम्बारानी	31	157.75	1007.67	JS-13	टपूकड़ा	जवाहर सागर	कोर क्षेत्र		
			32	168.92							
			33	180.00							
			34	185.00							
			35	197.50							
			30	118.50							
		अम्बारानी	20	62.50	1091.25	JS-14	बोरकुई-11	बोरकुई	कोर क्षेत्र		
			26	372.50							
			27	280.00							
			28	200.25							
			29	176.00							
		अम्बारानी	19	258.75	1192.50	JS-15	गराड़िया महादेव	तीन मंजील बोरकुई	कोर क्षेत्र		
			21	138.75							
			22	265.00							
			23	162.50							
			24	205.00							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			25	162.50							
योग नाका (है०)					3291.42						
रेंज जवाहर सागर का कुल ऐरिया है० में				15512.65							
रेंज जवाहर सागर के अधीन 149.28 है० राजस्व भूमि संबधित वनखण्ड एवं बीट के अधीन है।											
नाम रेंज रावठा											
1	रावठा	दामोदरपुरा	4	272.20	583.10	R-1	रावठा	रावठा	कोर क्षेत्र		
			5	102.30							
			13	208.60							
			1	178.20	465.80	R-2	मोहनपुरा	रावठा	कोर क्षेत्र		
			2	97.20						कोर क्षेत्र	
			3	111.40						कोर क्षेत्र	
		डोलिया	57	79.00							बफर क्षेत्र
		दामोदरपुरा	6	119.00	500.60	R-3	भंवरिया	रावठा	कोर क्षेत्र		
			7	61.60							
			8	192.40							
			9	127.60							
		दामोदरपुरा	11	111.40	605.90	R-4	लक्ष्मीपुरा	लक्ष्मीपुरा	कोर क्षेत्र		
			12	143.60							
			16	136.20							
			17	111.40							
		मनोहरपुरा	3	103.30							
योग नाका (है०)					2155.40						

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण
2	दामोदरपुरा	मनोहरपुरा	1	170.00	566.50	R-5	दमोदरपुरा-1	दामोदरपुरा	कोर क्षेत्र	
			2	163.70						
			14	151.80						
			15	81.00						
		घाटोली	1	88.10	632.40	R-6	दामोदरपुरा-11	दामोदरपुरा		
			2	142.00					कोर क्षेत्र	
			3	80.00						
			64	137.70						
			65	184.60						
		डोलिया	62	106.90	629.10	R-7	खरली बावड़ी	दामोदरपुरा	कोर क्षेत्र	
			63	183.00						
			66	196.60						
			67	142.60						
		घाटोली	4	77.00	452.00	R-8	घाटोली	घाटोली	कोर क्षेत्र	
			5	119.00						
			6	132.00						
			7	124.00						
		मनोहरपुरा	6	110.40	522.80	R-9	मनोहरपुरा	घाटोली	कोर क्षेत्र	
			7	134.80						
			8	110.60						
			9	167.00						
योग नाका (है०)					2802.80					
3	मंदरगढ़	डोलिया	50	182.30			मंदरगढ़-ए	मंदरगढ़	बफर क्षेत्र	

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			58	119.50	1072.10	R-10			बफर क्षेत्र		
			59	126.60					बफर क्षेत्र		
			60	240.30					बफर क्षेत्र		
			61	209.00					कोर क्षेत्र		
			68	194.40					कोर क्षेत्र		
		डोलिया	33	167.10	1113.80	R-11	मंदरगढ-बी	मंदरगढ	बफर क्षेत्र		
			34	187.20							
			35	146.20							
			37	95.20							
			38	201.70							
			39	98.50							
			40	101.70							
			51	116.20							
योग नाका (है०)					2185.90						
4	चांद बावड़ी	फरसिया समकिया	1	63.00	680.90	R-12	चांदबावड़ी-ए	चांद बावड़ी	कोर क्षेत्र		
			2	91.30							
		डोलिया	70	145.80							
			71	129.60							
			72	170.10							
			73	81.10							
		डोलिया	41	154.10	748.60	R-13	नयागांव-ए	चांदबावड़ी	बफर क्षेत्र		
			42	178.40							
			47	108.20							
			49	190.40							
			69	117.50							
		डोलिया	31	272.60			नयागांव-बी	चांदबावड़ी	बफर क्षेत्र		
			32	271.00							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			43	209.40	1007.80	R-14					
			46	80.60							
			48	174.20							
योग नाका (है०)					2437.30						
रेंज रावठा का कुल ऐरिया है० में				9581.40							
रेंज रावठा के अधीन 856.94 है० राजस्व भूमि संबधित वनखण्ड एवं बीट के अधीन है।											

नाम रेंज कोलीपुरा

1	कोलीपुरा	बोराबास	13	241.30	865.00	K - 1	बोराबास.k	तीन मंजिल	कोर क्षेत्र			
			18	243.18								
			20	178.02								
			21	202.50								
		थोलनपुर	1	363.01	780.02	K - 2	थोलनपुर	तीन मंजिल	कोर क्षेत्र			
			2	272.01								
		कानिया तालाब आंशिक	1	145.00								
			3									
			4									
		कोलीपुरा	1	253.60	781.70	K - 3	कोलीपुरा	कोलीपुरा	कोर क्षेत्र			
			2	205.00								
		नीम का खेडा	1	106.94								
		रूपपुरा	1	90.16								
			2	50.60								
			3	75.41								
		बोरकुई	1	106.00			बोरकुई	बोरकुई चौकी	कोर क्षेत्र	प्रस्तावित		
			2	178.90								

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
		चांदबावड़ी	9	100.40	930.40	K - 4					
			10	129.60							
			11	84.20							
		बगचांच	1	243.00							
		सांकड	1	50.00							
		श्योदानपुर	1	38.30							
योग नाका (है०)					2492.12						
2	गिरधरपुरा	बगचांच	2	253.60	821.21	K - 5	बगचांच	गिरधरपुरा	कोर क्षेत्र		
			3	156.40							
			4	154.80							
			5	256.41							
		गिरधरपुरा	1	113.60	825.20	K - 6	गिरधरपुरा	गिरधरपुरा	कोर क्षेत्र		
			2	81.00							
			3	113.60							
			4	157.20							
			5	64.60							
			6	137.30							
		करोन्दी	1	100.97							
		कन्झार	1	56.93							
		काला कोट	1	174.50	979.91	K - 7	बुर्जवाली चौकी-1	गिरधरपुरा	कोर क्षेत्र		
			2	101.67							
		बुर्जवाली चौकी	1	62.30							
			2	177.30							
			3	160.40							
			4	240.00							
		बुर्जवाली चौकी-2	1	63.74							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण
		बुर्जवाली चौकी	5	239.00	921.51	K - 8	बुर्जवाली चौकी-आ	गिरधरपुरा	कोर क्षेत्र	
			6	181.30						
			7	243.60						
			8	140.10						
			9	117.51						
योग नाका (है०)					2726.62					
3	कान्या तालाब	कान्या तालाब-आ	1,3,4	77.50	1279.00	K - 9	कान्या तालाब-आ	कान्या तालाब	बफर क्षेत्र	भाषण
			2	90.00						पत्रावलि
			5	222.50						
			6	170.00						
			14	160.00						
			15	187.00						
			16	141.00						
			17	143.00						
			18	88.00						
		कान्या तालाब-आ	7	155.00	1119.00	K - 10	कान्या तालाब-आ	कान्या तालाब	बफर क्षेत्र	
			8	238.00						
			9	50.00						
			10	140.00						
			11	220.00						
			12	177.00						
			13	139.00						
योग नाका (है०)					2398.00					
रेंज कोलीपुरा का कुल ऐरिया है० में				9302.95						
रेंज कोलीपुरा के अधीन 910.54 है० राजस्व भूमि संबधित वनखण्ड एवं बीट के अधीन है।										

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण
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नाम रेंज गागरोन

1	मशालपुरा	मशालपुरा ए	54	111.25	513.89	G-1	मशालपुरा ए	मशालपुरा नाका	कोर क्षेत्र		
			55	126.31						कोर क्षेत्र	
			29	101.22						बफर क्षेत्र	
		खीमच बी	13	175.11						कोर क्षेत्र	
		मशालपुरा बी	18	148.86	906.11	G-2	मशालपुरा बी	मशालपुरा नाका	बफर क्षेत्र	अतिरिक्त प्रभार	
			19	131.33						बफर क्षेत्र	
			20	142.60						बफर क्षेत्र	
			21	156.89						बफर क्षेत्र	
			49	212.63						कोर क्षेत्र	
			60	113.80				कोर क्षेत्र			
		मशालपुरा ए	31	74.97	890.80	G-3	गोलबाव ए	गोलबाव चौकी	बफर क्षेत्र	प्रस्तावित	
			32	150.01						बफर क्षेत्र	
			33	75.04						बफर क्षेत्र	
			34	131.25						बफर क्षेत्र	
			35	150.09						बफर क्षेत्र	
			36	122.60						बफर क्षेत्र	
			53	186.84						कोर क्षेत्र	
		मशालपुरा ए	25	148.01	664.91	G-4	गोलबाव बी	गोलबाव चौकी	बफर क्षेत्र	प्रस्तावित	
			26	40.00							
			27	129.24							
			28	87.47							
			30	260.19							
योग नाका (है०)					2975.71						

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
2	नौलाव	मशालपुरा बी	51	158.82	593.96	G-5	राजपुरा बंधा	नौलाव नाका	बफर क्षेत्र		
			52	187.54							
			54	130.09							
			55	117.51							
		मशालपुरा बी	53	157.58	919.61	G-6	नौलाव	गागरोन चौकी	कोर क्षेत्र	प्रस्तावित	
			56	205.14						कोर क्षेत्र	
			57	170.01						कोर क्षेत्र	
			58	131.25						कोर क्षेत्र	
			63	121.29						कोर क्षेत्र	
		लक्ष्मीपुरा	1	86.55						बफर क्षेत्र	
			2	47.79				बफर क्षेत्र			
		मशालपुरा बी	50	308.91	800.41	G-7	लक्ष्मीपुरा	नौलाव नाका	कोर क्षेत्र	अतिरिक्त प्रभार	
			59	157.58							
			61	165.07							
			62	168.85							
योग नाका (है०)					2313.98						
3	राजपुरा प्रस्तावित	मशालपुरा बी	28	217.57	951.66	G-8	कानपुरा	कानपुरा चौकी	बफर क्षेत्र	प्रस्तावित	
			29	246.37							
			30	117.51							
			31	168.85							
			32	201.36							
		मशालपुरा बी	22	152.56			हरिपुरा / डण्डिया	राजपुरा नाका	बफर क्षेत्र	अ.प्र.	
			23	201.36							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			24	165.07	929.19	G-9					
			25	160.05							
			26	100.06							
			27	150.09							
		मशालपुरा बी	33	270.15	854.24	G-10	बोर का कुआ	राजपुरा नाका	बफर क्षेत्र	प्रस्तावित	
			34	146.31							
			35	312.70							
			36	125.08							
		मशालपुरा बी	44	116.27	708.50	G-11	राजपुरा ए	राजपुरा नाका	बफर क्षेत्र		
			45	187.62							
			46	125.08							
			47	107.55							
			48	171.98							
		मशालपुरा बी	37	175.11	1159.36	G-12	राजपुरा बी	राजपुरा नाका	बफर क्षेत्र		
			38	250.16							
			39	211.47							
			40	150.01							
			41	110.02							
			42	207.54							
			43	55.05							
योग नाका (है०)					4602.95						
गागरोन रेंज का कुल रकबा है०				9892.642							
रेंज गागरोन के अधीन 1174.46 है० राजस्व भूमि संबधित वनखण्ड एवं बीट के अधीन है।											

नाम रेंज दरा

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
क्र०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट	क्षेत्रफल	बीट में सम्मिलित	बीट	बीट का नाम	मुख्यालय बीट		विशेष	
1	दरा स्टेशन	दामोदरपुरा	10	244.500	870.444	D-1	पदमपुरा	पदमपुरा चौकी	कोर क्षेत्र	प्रस्तावित	
		दरा	1	194.800							
			2	128.000							
			3	180.200							
			4	122.944							
2	दरा स्टेशन	मशालपुरा ए	46	102.000	1080.600	D-2	मौरुकला-1	दरा स्टेशन	बफर क्षेत्र	प्रस्तावित	
			47	271.000						बफर क्षेत्र	
			48	269.400						बफर क्षेत्र	
			49	248.100						बफर क्षेत्र	
			50	190.100						कोर क्षेत्र	
3	दरा स्टेशन	मशालपुरा ए	43	269.200	888.170	D-3	मौरुकला-1A	दरा स्टेशन	बफर क्षेत्र	प्रस्तावित	
			44	323.370							
			45	295.600							
		योग नाका (है०)			2839.214						
4	दरा गांव	मनोहरपुरा	4	92.800	602.252	D-4	गड्डे का माला	गड्डे का माला	कोर क्षेत्र		
			5	169.510						कोर क्षेत्र	
			10	178.390						कोर क्षेत्र	
		अमझार-ए		45.424						कोर क्षेत्र	
		अमझार-बी		116.128						बफर क्षेत्र	
5	दरा गांव	मशालपुरा ए	51	69.600	881.800	D-5	दरा गांव	दरा गांव	कोर क्षेत्र		
			58	92.300							
			59	185.300							
		खीमच-बी	1	92.400							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			8	97.400	664.800	D-5					
			9	178.200							
			10	89.300							
			11	80.300							
6	दरा गांव	मशालपुरा ए	52	233.300	658.884	D-6	टीपड़िया महादेव	घाटी चौकी (नाका दरा गांव)	कोर क्षेत्र	प्रस्तावित	
			56	218.400							
			57	207.184							
7	दरा गांव	खीमच-बी	2	105.400	737.140	D-7	घाटी	घाटी चौकी (नाका दरा गांव)	कोर क्षेत्र	प्रस्तावित	
			3	91.440							
			4	94.400							
			5	89.100							
			6	97.400							
			7	145.800							
			12	113.6							
		योग नाका (है०)					2883.076				
8	सावनभादो डेम	मशालपुरा ए	37	230.100	869.200	D-8	सावनभादो डेम-4	सावनभादो डेम	बफर क्षेत्र	प्रस्तावित	
			38	220.100							
			39	188.800							
			40	230.200							
9	सावनभादो डेम	मशालपुरा ए	11	196.000	1046.300	D-9	सावनभादो डेम-3	सावनभादो डेम	बफर क्षेत्र	प्रस्तावित	
			12	175.000							
			13	118.200							
			14	257.000							
			41	133.100							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			42	167.000							
10	सावनभादो डेम	मशालपुरा ए	9	179.100	925.200	D-10	सावनभादो डेम-2	सावनभादो डेम	बफर क्षेत्र	प्रस्तावित	
			10	310.000							
			15	191.200							
			16	93.900							
			17	151.000							
11	सावनभादो डेम	मशालपुरा ए	1	230.100	1323.700	D-11	सीमलिया	सावनभादो डेम	बफर क्षेत्र	प्रस्तावित	
			2	135.700							
			3	204.500							
			4	80.400							
			5	160.200							
			6	98.800							
			7	209.000							
			8	205.000							
12	सावनभादो डेम	मशालपुरा ए	18	126.300	1339.500	D-12	सावनभादो डेम-1	सावनभादो डेम	बफर क्षेत्र	प्रस्तावित	
			19	225.300							
			20	277.000							
			21	182.100							
			22	327.600							
			23	117.000							
			24	84.200							
		योग नाका (है०)			5503.900						
13	दांता	मशालपुरा बी	1	270.300	1264.300	D-13	सीमलिया	दांता	बफर क्षेत्र	प्रस्तावित	
			2	297.400							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			3	400.900	1204.500	D-13					
			5	295.700							
14	दांता	मशालपुरा बी	4	176.800	1183.400	D-14	दांता-1	दांता	बफर क्षेत्र	प्रस्तावित	
			6	340.300							
			7	191.100							
			8	150.700							
			9	324.500							
15	दांता	मशालपुरा बी	10	315.800	1118.500	D-15	दांता-2	दांता	बफर क्षेत्र	प्रस्तावित	
			15	362.200							
			16	160.200							
			17	280.300							
16	दांता	मशालपुरा बी	11	180.200	971.678	D-16	दांता-3	दांता	बफर क्षेत्र	प्रस्तावित	
			12	326.300							
			13	225.300							
			14	239.878							
			योग नाका (है०)		4537.878						
					15764.068						
			दरा रेंज का कुल रकबा है०		15764.068						
रेंज दरा के अधीन 170.08 है० राजस्व भूमि संबधित वनखण्ड एवं बीट के अधीन है।											

नाम रेंज बोराबास

1	रतकाकड़ा	अकैलगढ़	8				अकैलगढ़	रतकाकड़ा	कोर क्षेत्र	
			9							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			11	775.00 आंशिक	775.00	B-1					
			17								
			18								
			23								
				775.000							
		लौहडुंगरी	1	110.200	1013.86	B-2	लौहडुंगरी	रतकाकड़ा	कोर क्षेत्र		
			2	19.400							
			3	232.200							
			4	175.700							
			5	95.600							
			6	95.600							
			7	117.750							
			8	83.750							
			9	32.660							
			10	51.000							
		राडीडंड	1	215.800	1052.5	B-3	राडीडंड	रतकाकड़ा	बफर क्षेत्र		
			2	170.100							
			3	97.200							
			4	153.900							
			5	97.200							
			6	318.300							
		योग नाका (है०)			2841.360						
2	बन्धा	राडीडण्ड	7	257.300			राडीडण्ड II		बफर क्षेत्र		
			8	207.300							
			9	113.400							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (हे०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(हे०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			10	163.600	1062.60	B-4					
			11	81.000							
			12	115.000							
			13	125.000							
		राडीडण्ड	14	105.400	1009.55	B-5	फुटा I		बफर क्षेत्र		
			15	131.200							
			16	111.250							
			17	130.200							
		फुटा	19	202.500							
			20	170.100							
			21	158.900							
		फुटा	7	146.100	911.3	B-6	फुटा II	पाचन कुई चौकी	बफर क्षेत्र	प्रस्तावित	
			12	243.100							
			13	120.600							
			14	149.200							
			15	142.600							
			16	109.700							
		फुटा	17	283.500	955.4	B-7	फुटा III	पाचन कुई चौकी	बफर क्षेत्र	प्रस्तावित	
			18	146.100							
			22	186.300							
			24	121.500							
			25	218.000							
		फुटा	26	81.000			फुटा IV	पाचन कुई चौकी	बफर क्षेत्र	प्रस्तावित	
			27	149.100							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			28	145.800	754.3	B-8					
			29	73.000							
			30	168.200							
			31	92.200							
			32	45.000							
		योग नाका (है०)			4693.150						
3	बोराबास	बोराबास	1	162.000	996.6	B-9	बोराबास-1	बोराबास	कोर क्षेत्र		
			2	162.000							
			3	178.200							
			4	124.600							
			5	81.000							
			6	97.200							
			7	97.200							
			8	94.400							
		बोराबास	9	79.400	1156.4	B-10	बोराबास-11	सेल्जर चौकी	कोर क्षेत्र		
			10	81.000							
			11	162.000							
			12	48.600							
			14	81.000							
			15	231.400							
			16	173.200							
			17	110.400							
			19	189.400							
		चांदबावड़ी	1	141.820			चांदबावड़ी-1	चांदबावड़ी चौकी	कोर क्षेत्र		

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण	
			2	348.820	1087.7	B-11					
			3	232.550							
			5	186.310							
		फूटा	23	178.200							
		चांदबावड़ी	4	325.570	935.31	B-12	चांदबावड़ी-II	सेल्जर चौकी	कोर क्षेत्र		
			6	209.290							
			14	139.530							
			15	260.920							
		चांदबावड़ी	7	43.920	973.793	B-13	चांदबावड़ी-III	सेल्जर चौकी	कोर क्षेत्र		
			8	209.625							
			12	139.530							
			13	136.845							
			16	78.078							
			17	365.795							
		योग नाका (है०)			5149.803						
	रैन्ज बोराबास का कुल ऐरिया है० में				12684.313						

राष्ट्रीय घड़ियाल अभ्यारण्य के अन्तर्गत आने वाली बीट

1	नया गांव	अकैलगढ़	1	आंशिक नदी क्षेत्र		GS - 1	अकैलगढ़-I			
			2							
			4							
			5	10 वर्ग किमी						
			6							
			7							
		सकतपुरा	18	आंशिक नदी क्षेत्र		GS - 2	सकतपुरा			
			19							

क्र० सं०	नाम नाका	ब्लाक का नाम	कम्पार्टमेंट न०	क्षेत्रफल (है०)कम्पार्टमेंट (अनुमानित)	बीट में सम्मिलित कम्पार्टमेंट क्षेत्रफल(है०)(अनुमानित)	बीट संख्या	बीट का नाम	मुख्यालय बीट प्रभारी	कोर / बफर क्षेत्र	विशेष विवरण
			20							
			21							
			22	13.50 वर्ग किमी						
			23							
			24							
			26							
			29							
			30							

ANNEXURE-19

Fire incidents in MHTR

Sr. No.	Name of Range	Name of Forest Block	Date of fire incident	Cause of fire	Area affected put off	Loss due to fire
Year 2016-17						
1.	Gagron	Mashalpura	06.02.16	Unkown	4.00 Ha.	Grasses and Bushes
2.	Gagron	Mashalpura	11.04.16	Unkown	20.25 Ha.	Grasses and Bushes
3.	Gagron	Mashalpura	13.04.16	Unkown	10.15 Ha.	Grasses and Bushes
4.	Kolipura	Kanya Talab	04.05.16	Unkown	1.50 Ha.	Grasses and Bushes
5.		Ambarani	13.11.16	Unkown	10.00 Ha.	Grasses and Bushes
6.	Dara	Mashalpura-A	13.02.17	Unkown	80.00 Ha.	Grasses and Bushes
7.	Dara	Kaliyakui	28.02.17	Unkown	35.00 Ha.	Grasses and Bushes
Year 2017-18						
8.	Kolipura	Girdharpura	14.04.17	Unkown		Grasses and Bushes
9.	Gagron	Laxmipura	27.04.17	Unkown	0.15 Ha.	Grasses and Bushes
10.	Gagron	Prempura	29.04.17	Unkown	0.15 Ha.	Grasses and Bushes
11.	Gagron	Narayanpura	30.04.17	Unkown	0.15 Ha.	Grasses and Bushes
12.	Borabas	Nayagaon (Dear Park) Beat no. B-2	15.04.17	Unkown	2-3 Ha.	Grasses and Bushes
13.	Kolipura	Selzar K-1 & K-2	18.04.17	Unkown	503 Ha.	Grasses and Bushes
14.	Borabas	Borabas (Beat No.-B9)	21.04.17	Unkown	5.00 Ha.	Grasses and Bushes
15.	Borabas	Ranthkankra Beat No. B-2, Loh Dungri	14.06.17	Unkown	0.007 Ha.	Grasses and Bushes
16.	Gagron	Mashalpura		Unkown		Grasses and Bushes
17.	Jawahar Sagar	Ambarani	02.04.17	Unkown	250 m × 300 m	Grasses and Bushes
18.	Kolipura	Girdharpura	14.04.17	Unkown	2.00 Ha.	Grasses and Bushes
19.	Kolipura	Near Foota Chouki	30.04.17	Unkown	2.00 Ha.	Grasses and Bushes
20.	Kolipura	Kanya Talab Beat No.12-10	23.11.17	Unkown	10.3 Ha.	Grasses and Bushes
21.	Jawahar Sagar	Ambarani, Plantation Borkui-III	10.11.17	High-tension light	10-12 Ha.	Grasses and Bushes
22.	Dara	Sawanbhado	25.02.18	Unkown		Grasses and Bushes
23.	Gagron	Nolav	28.03.18	Unkown		Grasses and Bushes
Year 2018-19						
24.	Kolipura	Kanya Talab	22.04.18	Unkown	2 Ha.	Grasses and Bushes
25.	Kolipura	Kanya Talab	03.05.18	Unkown	1 Ha.	Grasses and Bushes
26.	Kolipura	Kanya Talab	14.05.18	Unkown	0.48 Ha.	Grasses and Bushes
27.	Kolipura	Kanya Talab	18.05.18	Unkown	1.28 Ha.	Grasses and Bushes
28.	Kolipura	Kanya Talab, Deeppura Ghata	14.06.18	Unkown	40 mtr. and 44 mtr.	Grasses and Bushes
29.	Borabas		22.11.18	Unkown	15 Ha.	Grasses and Bushes
30.	Gagron	Rajpura & Haripura	19.03.19	Unkown	50 Ha.	Grasses and Bushes

OFFICERS INFORMATION

I. Tenure of Deputy Conservator of Forests (Deputy Field Director) in Mukandara National Park, Kota.

S.No.	Name of The Officer	From	To
1	Mr. Ramlal Bishnoi (RFS)	11-06-2012	29-10-2012
2	Dr. Sunil chidri (IFS)	30-10-2012	01-10-2014
3	Mr. S.R. Yadav (RFS)	27-10-2014	31-05-2016
4	Mr. S.R. Yadav (IFS)	31-05-2016	05-02-2018
5	Dr. T. Mohan Raj (IFS)	05-02-2018	Continue.....

II. Tenure of Chief Conservator of Forests (Wild Life) & Field Director in Mukandara Hills Tiger Reserve, Kota.

S.No.	Name of The Officer	From	To
1	Mr. Anurag Bhardwaj (IFS)	09-08-2011	08-02-2014
2	Mr. Mohanlal Meena (IFS)	09-02-2014	04-03-2014
3	Mr. Pawan Kumar Upadhyay (IFS)	05-03-2014	16-05-2017
4	Mr. Ghanshyam Prasad Sharma (IFS)	17-05-2017	24-02-2019
5	Mr. Anand Mohan (IFS)	25-02-2019	Continue....

कार्यालय प्रधान मुख्य वन संरक्षक (HOFF) राजस्थान, जयपुर

क्रमांक एफ 4 (1) 2009/कार्मिक/प्रमुखसं/

दिनांक : 2014

कार्यालय आदेश

राज्य सरकार की अधिसूचना संख्या प0 3(8)वन/2012 दिनांक 09.04.2013 से मुकन्दरा हिल्स व्याघ्र आरक्षित [Tiger Reserve] अधिसूचित किया गया है। दरा अभ्यारण्य, जवाहर सागर अभ्यारण्य एवं राष्ट्रीय घड़ियाल के 41717.188 हैक्टर क्षेत्र को सम्मिलित करते हुये क्रान्तिक व्याघ्र निवासी क्षेत्र [Critical Tiger Habitat] घोषित किया गया है, जिसमें वन क्षेत्र 40186.078 हैक्टर एवं राजस्व क्षेत्र 1531.110 हैक्टर है। इसके अतिरिक्त कोटा, झालावाड़ एवं चित्तौड़गढ़ जिले के 34282.274 हैक्टर क्षेत्र को बफर क्षेत्र घोषित किया गया है, जिसमें 32552.084 वन क्षेत्र एवं 1730.190 हैक्टर राजस्व क्षेत्र सम्मिलित है। मुकन्दरा टाईगर रिजर्व का कुल क्षेत्रफल 75999.462 है0 (759.99 वर्ग कि0मी0) है।

बाघ परियोजना मुकन्दरा हिल्स के संरक्षण एवं सुरक्षा हेतु रेंज दरा, कोलीपुरा, एवं जवाहर सागर के पुर्नगठन तथा रेंज बोराबास रावठा, एवं गागरोन के नवगठन किये जाने के प्रस्ताव अतिरिक्त प्रधान मुख्य वन संरक्षक एवं मुख्य वन्यजीव प्रतिपालक राजस्थान, जयपुर के पत्रांक 1898 दिनांक 23.06.2014 से प्राप्त हुये है।

अतः राजस्थान फोरेस्ट मेन्युअल पार्ट II के अध्याय 35 में प्रदत्त प्रशासनिक शक्तियों के बिन्दु संख्या 2 के अनुसरण में वन एवं वन्यजीवों के प्रभावी संरक्षण एवं प्रबन्धन हेतु रेंजों के पुर्नगठन एवं नवगठन के आदेश निम्नानुसार प्रसारित किये जाते हैं।

1. **दरा रेंज का पुर्नगठन :-** इस रेंज के अधीन पूर्व में कोटा जिले एवं झालावाड़ जिले का वन क्षेत्र सम्मिलित था, जिसमें से झालावाड़ जिले का वन क्षेत्र हटाकर एवं उप वन संरक्षक कोटा से स्थानान्तरित बफर वन क्षेत्र जोड़ा जाकर दरा रेंज का निम्नानुसार पुर्नगठन किया जाता है :-

क्र.सं.	नाम वन खण्ड	क्षेत्रफल (हैक्टेयर में)		वि0वि0
		आरक्षित	रक्षित	
1	मशालपुरा-ए (कोटा जिला) (क. नं. 50, 51, 52, 56 से 59)	1196.184	-	पूर्व में स्थित। (कोर क्षेत्र)
2	खीमच-बी (कोटा जिला) (क.नं. 1 से 12)	1274.748	-	पूर्व में स्थित। (कोर क्षेत्र)
3	दरा	625.944	-	पूर्व में स्थित। (कोर क्षेत्र)
4	अमझार-ए	-	45.424	पूर्व में स्थित। (कोर क्षेत्र)
5	दामोदरपुरा (क.नं. 10)	244.500	-	पूर्व में स्थित। (कोर क्षेत्र)
6	मनोहरपुरा (क.नं. 4, 5 व 10)	440.700	-	पूर्व में स्थित। (कोर क्षेत्र)
7	अमझार-बी	-	116.128	पूर्व में स्थित। (बफर क्षेत्र)
8	मशालपुरा-ए (कोटा जिला) (क. नं. 1 से 24 एवं 37 से 49)	7282.570	-	उप वन संरक्षक कोटा से स्थानान्तरित बफर वन क्षेत्र।
9	मशालपुरा-बी (कोटा जिला) (क.नं. 1 से 17)	4537.870	-	उप वन संरक्षक कोटा से स्थानान्तरित बफर वन क्षेत्र।
योग		15602.516 + 161.552 =	15764.068 है0	

राज्य सरकार की अधिसूचना दिनांक 9.4.2013 से अधिसूचित मुकन्दरा हिल्स व्याघ्र आरक्षित के निम्नांकित क्रिटिकल टाईगर हेबिटाट(कोर) का राजस्व क्षेत्र भी इस रेंज के नियंत्रणाधीन रहेंगे :-

क्र0सं0	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल है0 में	नाम रेंज	कोर/बफर
1	घाटी	कुकड़ा खुर्द	रामगंजमण्डी	74.00	दरा	कोर
2	मुकन्दरा(दरा गांव)	कोयला	रामगंजमण्डी	96.08	दरा	कोर
योग				170.08		

2. **कोलीपुरा रेंज का पुर्नगठन :-** रेंज कोलीपुरा में उप वन संरक्षक चित्तौड़गढ़ से स्थानान्तरित बफर वन क्षेत्र एवं रेंज जवाहर सागर के अधीन कोटा जिले में स्थित वन क्षेत्र सम्मिलित निम्नानुसार पुर्नगठन किया जाता है :-



कार्मिक
स्व विस्थापन
1.8.14

क्र०सं०	नाम वनखण्ड	वन क्षेत्र का क्षेत्रफल है० में		विवि
		आरक्षित	रक्षित	
1	कोलीपुरा	458.600	—	पूर्व में स्थित। (कोर क्षेत्र)
2	कालाकोट	276.168	—	पूर्व में स्थित। (कोर क्षेत्र)
3	रूपपुरा	—	216.168	पूर्व में स्थित। (कोर क्षेत्र)
4	नीम का खेडा	106.936	—	पूर्व में स्थित। (कोर क्षेत्र)
5	शयोदानपुरा	38.296	—	पूर्व में स्थित। (कोर क्षेत्र)
6	सांकड	50.000	—	पूर्व में स्थित। (कोर क्षेत्र)
7	बोरकुई	284.904	—	पूर्व में स्थित। (कोर क्षेत्र)
8	बगचांच	—	1064.208	पूर्व में स्थित। (कोर क्षेत्र)
9	करौंदी	100.968	—	पूर्व में स्थित। (कोर क्षेत्र)
10	कंझार	56.928	—	पूर्व में स्थित। (कोर क्षेत्र)
11	गिरधरपुरा	667.304	—	पूर्व में स्थित। (कोर क्षेत्र)
12	बुर्जवाली चौकी	1561.512	—	पूर्व में स्थित। (कोर क्षेत्र)
13	बुर्जवाली चौकी-II	—	63.74	पूर्व में स्थित। (कोर क्षेत्र)
14	थोलनपुर	635.016	—	रेंज जवाहर सागर से स्थानान्तरित। (कोर क्षेत्र)
15	कान्या तालाब	145.000	—	रेंज जवाहर सागर से स्थानान्तरित। (कोर क्षेत्र)
16	चान्द बावड़ी (क.नं 9 से 11)	314.200	—	पूर्व में स्थित। (कोर क्षेत्र)
17	बोराबास(क.नं.13,18 ,20 ,21)	865.000	—	रेंज जवाहर सागर से स्थानान्तरित। (कोर क्षेत्र)
18	कान्या तालाब	2398.000	—	उप वन संरक्षक चित्तौडगढ़ से स्थानान्तरित बफर वन क्षेत्र।
योग		7958.832 + 1344.116 = 9302.948 है०		

राज्य सरकार की अधिसूचना दिनांक 9.4.2013 से अधिसूचित मुकन्दरा हिल्स व्याघ्र आरक्षित के निम्नांकित क्रिटिकल टाईगर हेबिटाट(कोर) का राजस्व क्षेत्र भी इस रेंज के नियंत्रणाधीन रहेंगे :-

क्र०सं०	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल है० में	नाम रेंज	कोर/बफर
1	कोलीपुरा	बोराबास	लाड़पुरा	40.57	कोलीपुरा	कोर
2	रूपपुरा	बोराबास	लाड़पुरा	69.54	कोलीपुरा	कोर
3	गिरधरपुरा	बोराबास	लाड़पुरा	634.60	कोलीपुरा	कोर
4	अखावा (भूखी)	बोराबास	लाड़पुरा	165.83	कोलीपुरा	कोर
योग				910.54		

3. जवाहर सागर रेंज का पुर्नगठन :- इस रेंज के अधीन पूर्व में कोटा, बून्दी एवं चित्तौडगढ़ जिलों का वन क्षेत्र सम्मिलित था, जिसमें से कोटा जिले का वन क्षेत्र हटाया जाकर बून्दी एवं चित्तौडगढ़ जिलों का वन क्षेत्र यथावत रखते हुए निम्नानुसार पुर्नगठन किया जाता है :-

क्र०सं०	नाम वनखण्ड	वन क्षेत्र का क्षेत्रफल है० में		विवि
		आरक्षित	रक्षित	
1	गुडा राजपुरा	3014.528	—	पूर्व में स्थित। (कोर क्षेत्र)
2	अम्बारानी	6745.920	—	पूर्व में स्थित। (कोर क्षेत्र)
3	पीरमगरा	3615.00	—	पूर्व में स्थित। (3295 है. कोर क्षेत्र, 320 है. बफर क्षेत्र)
4	मदार चौक	—	401.027	पूर्व में स्थित। (कोर क्षेत्र)
5	बालापुरा	—	289.491	पूर्व में स्थित। (कोर क्षेत्र)
6	भैसरोड़गढ़	—	180.000	पूर्व में स्थित। (कोर क्षेत्र)
7	भैसरोड़गढ़-बी	—	17.000	पूर्व में स्थित। (बफर क्षेत्र)
8	श्रीपुरा -ए,बी,सी	—	425.000	पूर्व में स्थित। (बफर क्षेत्र)
9	खालगांव-ए व बी	—	124.681	पूर्व में स्थित। (बफर क्षेत्र)
10	भुजर	700.000	—	पूर्व में स्थित। (बफर क्षेत्र)
योग		14075.448 + 1437.199 = 15512.647 है०		

राज्य सरकार की अधिसूचना दिनांक 9.4.2013 से अधिसूचित मुकन्दरा हिल्स व्याघ्र आरक्षित के निम्नांकित क्रिटिकल टाईगर हेबिटाट(कोर) का राजस्व क्षेत्र भी इस रेंज के नियंत्रणाधीन रहेंगे :-



क्र०सं०	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल है० में	नाम रेंज	कोर/बफर
1	अम्बारानी	भैंसरोड़गढ़	रावतभाटा	37.21	जवाहर सागर	कोर
2	नौसेरा	श्रीपुरा	रावतभाटा	29.07	जवाहर सागर	कोर
3	भैंसरोड़गढ़	भैंसरोड़गढ़	रावतभाटा	83.00	जवाहर सागर	कोर
योग				149.28		

4. बोरबास रेंज का नवगठन :- जवाहर सागर एवं कोलीपुरा रेंज के आंशिक वन क्षेत्र एवं उप वन संरक्षक कोटा से स्थानान्तरित बफर वन क्षेत्र को सम्मिलित करते हुए निम्नानुसार नवीन रेंज बोरबास का गठन किया जाता है :-

क्र०सं०	नाम वनखण्ड	वन क्षेत्र का क्षेत्रफल है० में		वि०वि०
		आरक्षित	रक्षित	
1	बोरबास (क.नं. 1 से 12, 14 से 17 एवं 19)	2153.008	-	जवाहर सागर रेंज से स्थानान्तरित। (कोर क्षेत्र)
2	चान्द बावड़ी (क.नं. 1 से 8 एवं 12 से 17)	2818.448	-	कोलीपुरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
3	लोह डूंगरी	1013.800	-	कोर 525 है., बफर 488.800 है., बफर क्षेत्र उप वन संरक्षक कोटा से स्थानान्तरित। (कोर क्षेत्र)
4	अकेलगढ (आंशिक)	775.000	-	कोलीपुरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
5	फूटा (क.नं. 23 व 32)	223.400	-	कोलीपुरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
6	राडीडन्ड	-	2593.157	उप वन संरक्षक कोटा से स्थानान्तरित बफर वन क्षेत्र।
7	फूटा (क.नं. 7, 12 से 22, 24 से 31)	3107.500	-	उप वन संरक्षक कोटा से स्थानान्तरित बफर वन क्षेत्र।
योग		10091.156 + 2593.157 = 12684.313 है०		

राज्य सरकार की अधिसूचना क्रमांक प. 11(12) राजस्व/ युप-8/78 दिनांक 16.7.1983 से घोषित राष्ट्रीय घडियाल अभयारण्य का जवाहर सागर बांध से कोटा बैराज तक का क्षेत्र भी इस रेंज के नियंत्रणाधीन रहेगा।

5. रावठा रेंज का नवगठन :- कोटा जिले के पूर्व में दरा एवं कोलीपुरा रेंज में सम्मिलित वन क्षेत्र एवं उप वन संरक्षक कोटा से स्थानान्तरित बफर वन क्षेत्र को सम्मिलित कर नवीन रेंज रावठा का गठन किया जाता है।

क्र०सं०	नाम वनखण्ड	वन क्षेत्र का क्षेत्रफल है० में		वि०वि०
		आरक्षित	रक्षित	
1	घाटोली	-	762.080	दरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
2	डोलिया (क.नं. 61 से 68)	1354.800	-	दरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
3	डोलिया (क.नं. 70 से 73)	526.500	-	कोलीपुरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
4	केसरिया झुमकिया	154.328	-	कोलीपुरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
5	दामोदरपुरा (क.नं. 1 से 9 एवं 11 से 17)	2205.988	-	दरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
6	मनोहरपुरा (क.नं. 1 से 3 एवं 6 से 9)	959.948	-	दरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
7	डोलिया (क.नं. 31 से 35, 37 से 43, 46 से 51, 57 से 60, 69)	3617.900	-	उप वन संरक्षक कोटा से स्थानान्तरित बफर वन क्षेत्र।
योग		8819.464 + 762.080 = 9581.544 है०		

राज्य सरकार की अधिसूचना दिनांक 9.4.2013 से अधिसूचित मुकन्दरा हिल्स व्याघ्र आरक्षित के निम्नांकित क्रिटिकल टाईगर हेबिटाट एवं बफर राजस्व क्षेत्र भी इस रेंज के नियंत्रणाधीन रहेंगे :-

क्र०सं०	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल है० में	नाम रेंज	कोर/बफर
1	खरली बावडी	भवरियां	लाड़पुरा	12.79	रावठा	कोर
2	लक्ष्मीपुरा	भवरियां	लाड़पुरा	15.84	रावठा	कोर
3	दामोदरपुरा	भवरियां	लाड़पुरा	88.58	रावठा	कोर
4	चान्द बावडी	डोलिया	लाड़पुरा	19.98	रावठा	बफर
5	जसपुरा (नयागांव)	डोलिया	लाड़पुरा	116.17	रावठा	बफर
6	हरिपुरा(गैर आबाद)	डोलिया	लाड़पुरा	86.32	रावठा	बफर
7	केशोपुरा	भवरियां	लाड़पुरा	26.38	रावठा	बफर
8	मंदरगढ़	भवरियां	लाड़पुरा	423.53	रावठा	बफर
9	रैल (गैर आबाद)	भवरियां	लाड़पुरा	67.35	रावठा	बफर
	योग			856.94		

6. गागरोन रेंज का नवगठन :- झालावाड़ जिले के पूर्व में दरा रेंज में सम्मिलित वन क्षेत्र एवं उप वन संरक्षक झालावाड़ से स्थानान्तरित बफर वन क्षेत्र को निम्नानुसार सम्मिलित कर नवीन रेंज गागरोन का गठन किया जाता है :-

क्र० सं०	नाम वनखण्ड	वन क्षेत्र का क्षेत्रफल है० में		वि०वि०
		आरक्षित	रक्षित	
1	मशालपुरा-ए (झालावाड़ जिला) (क. नं. 53 से 55)	411.316	-	दरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
2	मशालपुरा-बी (झालावाड़ जिला) (क. नं. 49, 50, 53 व 56 से 63)	2476.60	-	दरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
3	खीमच-बी (झालावाड़ जिला) (क.नं. 13)	181.248	-	दरा रेंज से स्थानान्तरित। (कोर क्षेत्र)
4	मशालपुरा-ए (झालावाड़ जिला) (क.नं. 25 से 36)	692.23	-	उप वन संरक्षक झालावाड़ से स्थानान्तरित बफर वन क्षेत्र।
5	मशालपुरा-बी (झालावाड़ जिला) (क.नं. 18 से 48, 51, 52, 54, 55)	6027.80	-	उप वन संरक्षक झालावाड़ से स्थानान्तरित बफर वन क्षेत्र।
6	लक्ष्मीपुरा		103.448	दरा रेंज से स्थानान्तरित। (बफर क्षेत्र)
	योग	9789.194	+ 103.448	= 9892.642 है०

राज्य सरकार की अधिसूचना दिनांक 9.4.2013 से अधिसूचित मुकन्दरा हिल्स व्याघ्र आरक्षित के निम्नांकित क्रिटिकल टाईगर हेबिटाट एवं बफर राजस्व क्षेत्र भी इस रेंज के नियंत्रणाधीन रहेंगे :-

क्र० सं०	ग्राम का नाम	ग्राम पंचायत	तहसील	क्षेत्रफल है० में	नाम रेंज	कोर/बफर
1	मशालपुरा	गागरोन	झालरापाटन	147.000	गागरोन	कोर
2	नारायणपुरा	गागरोन	झालरापाटन	37.000	गागरोन	कोर
3	बोरकुआ (करनपुरा का मजरा)	गागरोन	झालरापाटन	8.160	गागरोन	बफर
4	हरिपुरा डाडिया	गागरोन	झालरापाटन	148.000	गागरोन	बफर
5	गागरोन	गागरोन	झालरापाटन	320.000	गागरोन	बफर
6	लक्ष्मीपुरा प्रेमपुरा	गागरोन	झालरापाटन	288.300	गागरोन	बफर
7	नौलाव	गागरोन	झालरापाटन	113.000	गागरोन	बफर
8	कोथला घाटी	गागरोन	झालरापाटन	113.000	गागरोन	बफर
	योग			1174.460		

7. विस्थापन रेंज का नवगठन :- मुकन्दरा हिल्स टाईगर रिजर्व के कोर ऐरिया में बसे हुये 14 ग्रामों के विस्थापन कार्य के लिए एक रेंज का गठन किया जाता है। विस्थापन रेंज का मुख्यालय कोटा में रहेगा, जो कि मुकन्दरा हिल्स टाईगर रिजर्व के कोर ऐरिया में बसे ग्रामों के विस्थापन का कार्य करेंगे।

8. उड़न दस्ता रेंज का नवगठन :- मुकन्दरा हिल्स टाईगर रिजर्व में वन एवं वन्य जीव के सुरक्षा के लिये उड़न दस्ते रेंज का गठन किया जाता है। जिसका मुख्यालय कोटा रहेगा।

इस आदेश से नवीन रेंज सृजन/पुनर्गठन के उपरान्त कार्यालय उप वन संरक्षक (वन्य जीव) मुकन्दरा राष्ट्रीय उद्यान कोटा के कार्य क्षेत्र के अन्तर्गत रहे निम्नानुसार होंगी :-

1. दरा।
2. कोलीपुरा।
3. जयहर सागर।
4. बोरबास।
5. रावडा।
6. मानदेन।
7. विस्थापन।
8. उदनदस्ता।

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(राहुल कुमार)
प्रधान मुख्य वन संरक्षक (HOFF)
राजस्थान जयपुर।

क्रमांक एक 4 (1) 2009/कार्मिक/प्रमुखसं/1835-47

दिनांक : 22/7/2014

प्रतिलिपि :- निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है :-

- 1- अतिरिक्त प्रधान मुख्य वन संरक्षक एवं मुख्य वन्य जीव प्रतिपालक राजस्थान जयपुर।
- 2- मुख्य वन संरक्षक (वन्यजीव) कोटा/ उदयपुर।
- 3- मुख्य वन संरक्षक, कोटा/उदयपुर।
- 4- उप वन संरक्षक (वन्य जीव) चित्तौड़गढ़/कोटा/मुकन्दरा राष्ट्रीय उद्यान कोटा।
- 5- उप वन संरक्षक कोटा/झालावाड़/चित्तौड़गढ़/बूंदी।
- 6- रक्षित पत्रावली

Shirna
(शिखा मेहरा)
मुख्य वन संरक्षक (संस्थापन)
जयपुर।

**Fund Requirement for Tiger Conservation Plan Period (Corridor)-MHTR
From 2020-21 to 2029-30 (In Lacs)**

S.No	Item of works	2020-21		2021-22		2022-23		2023-24		2024-25		2025-26		2026-27		2027-28		2028-29		2029-30	
		Phy	Fin																		
A	HABITAT IMPROVEMENT																				
1	Eradication of <i>Prosopis juliflora</i>, and improvement of area by pasture and Plantation activities.	25 Ha.	60																		
B	Development of water sources																				
2	Maintenance & Creation of Water Harvesting structures & Anicuts	L.S.	5																		
3	Maintenance & Creation of earthen ponds/Johad/Anicuts	2	5	3	6	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4
C	PROTECTION																				
4	Organizing joint raids with Police etc.	L.S	2																		
5	Deployment of local work force through EDC's	L.S	4																		
6	Maintenance of vehicles and POL	L.S	6																		
7	Establishment & Maintenance of Wireless Network	L.S	2	L.S	1																
D	Rewards & welfare of staff																				

Fund Requirement for Tiger Conservation Plan Period (Corridor)-MHTR From 2020-21 to 2029-30 (In Lacs)																					
S.No	Item of works	2020-21		2021-22		2022-23		2023-24		2024-25		2025-26		2026-27		2027-28		2028-29		2029-30	
		Phy	Fin																		
8	Rewards to Informers	L.S.	2																		
E	Eco-tourism																				
9	Signages,exhibits	L.S.	2																		
F	ECO-DEVELOPMENT ACTIVITIES																				
10	Livestock Development Programme	L.S.	4	L.S.	5	L.S.	5	L.S.	6												
11	Vaccination of Live stocks	L.S.	2																		
12	Health camps for peripheral villagers & Staff	L.S.	2																		
13	Livelihood activities for Local community.	L.S.	5																		
G	IV. MONITORING AND RESEARCH	L.S.	2																		
I	TRAININGS AND WORKSHOPS																				
14	Traing and Exposure visit for EDC's	L.S.	2																		
15	Compensation for cattle kills & human injuries	L.S.	2	L.S.	3																
J	Development of prey bases																				
16	Rehabilitation of degraded forest	L.S.	6	L.S.	7	L.S.	6	L.S.	6	L.S.	7										
	TOTAL		113		116		113		114		115										

राजस्थान सरकार

वन विभाग

क्रमांक प. 11(1) वन/1978

जयपुर, दिनांक

16 NOV 2017

आदेश

इस विभाग के समसंख्यक पूर्व आदेश दिनांक 01.03.2011 का अधिलंघन करते हुये माननीय राज्यपाल महोदय की ओर से राष्ट्रीय उद्यान/वन्य जीव अभयारण्यों में अथवा उसके बाहर वन्य जीवों द्वारा जनहानि अथवा घायल किये जाने पर तथा राष्ट्रीय उद्यान/वन्य जीव अभयारण्यों के वन क्षेत्रों के बाहर फलतू मवेशियों को मारे जाने पर निम्नानुसार मुआवजा/एक्सग्रेसिया राशि का भुगतान किये जाने की दरों के निर्धारण की स्वीकृति एतद् प्रदान की जाती है:-

क्र. सं०	श्रेणी	प्रकार	राशि
1.	जन श्रेणी	1. जनहानि होने पर	4,00,000
		2. स्थाई अयोग्य होने पर	2,00,000
		3. अस्थायी अयोग्य होने पर	40,000
2.	पालतू मवेशियों की श्रेणी	1. भैंस व बैल	20,000
		2. गाय	10,000
		3. भैंस व गाय का बच्चा	4,000
		4. बकरी/बकरा व भेड़	2,000
		5. ऊँट	20,000
		6. गधा/खच्चर	2,000

(सक्षम चिकित्सा अधिकारी द्वारा इस आशय का प्रमाण जारी होने की शर्त पर)

उक्त मुआवजा/एक्सग्रेसिया की दरों के संशोधन की सहमति संलग्न प्रक्रिया एवं निम्न शर्तों के अधीन निम्न मदशीर्ष से देय होगा:-

2406-वानिकी और वन्यजीवन, 02-पर्यावरण वानिकी और वन्य जीवन, 110-वन्य जीव परिरक्षण, 01 से 05 रणथम्बौर, सरिस्का वन क्षेत्रों का संधारण, घना पक्षी, राष्ट्रीय मरु उद्यान, 08-मुकुन्दरा राष्ट्रीय उद्यान, 16-लघु निर्माण कार्य (केन्द्रीय परिवर्तित योजना)

1. मुआवजा/एक्सग्रेसिया का भुगतान शत प्रतिशत केन्द्रीय प्रवर्तित योजना से वहन किया जायेगा तथा इससे राज्य सरकार पर प्रतिवर्ष कोई वित्तीय भार नहीं पड़ेगा।
2. विभाग इस मद में अब तक व्यय की गई राशि का सम्पूर्ण पुर्नभरण केन्द्र सरकार से प्राप्त करना सुनिश्चित करेगा।
3. विभाग उक्त व्यय करते समय राज्य सरकार द्वारा समय-समय पर जारी दिशा निर्देशों, लक्ष्यबन्धी नियमों व निर्धारित प्रक्रिया की पूर्ण पालना अपने स्तर पर किया जाना सुनिश्चित करेगा।

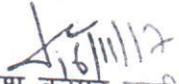
यह स्वीकृति वित्त (व्यय-3) विभाग की आई0डी0 संख्या 171700959 दिनांक 05.10.2017 एवं 171701190 दिनांक 13.11.2017 से प्राप्त सहमति के अनुसरण में जारी की जाती है।

आज्ञा से,

(योगेन्द्र कुमार दक)
शासन सचिव

प्रतिलिपि:-निम्नांकित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है:-

1. प्रधान मुख्य वन संरक्षक (हौफ), राजस्थान, जयपुर।
2. अतिरिक्त प्रधान मुख्य वन संरक्षक एवं मुख्य वन्यजीव प्रतिपालक, राजस्थान, जयपुर।
3. समस्त संभागीय आयुक्त।
4. समस्त जिला कलेक्टर्स।
5. समस्त मुख्य वन संरक्षक, राजस्थान।
6. समस्त मण्डल वन अधिकारी/उप वन संरक्षक, राजस्थान।
7. वित्त (व्यय-3) विभाग, शासन सचिवालय, जयपुर।
8. रक्षित पत्रावली।


(गणेश कुमार वर्मा)
विशेषाधिकारी, वन

राष्ट्रीय उद्यान / वन्य जीव अभ्यारण्यों में अथवा बाहर वन्य जीवों द्वारा जनहानि अथवा घायल किये जाने पर तथा वन क्षेत्रों के बाहर पालतू मवेशियों को मारे जाने पर मुआवजा / एक्सग्रेसिया निम्न शर्तों के अधीन देय होगा:-

जनहानि मामले में :-

1. घटना की सूचना निकटतम पुलिस अथवा वन अधिकारी को देनी होगी। जिसका निरीक्षण उनके द्वारा ही किया जावेगा।
2. घटना के बारे में शासकीय चिकित्सक का प्रमाण-पत्र आवश्यक होगा।
3. प्राण हानि में मृत्यु प्रमाण-पत्र आवश्यक होगा।
4. मृतक के परिवार के सदस्यों में से विधि मान्य उत्तराधिकारी को ही क्षतिपूर्ति राशि प्रदान की जावेगी।
5. यदि व्यक्ति घायल हो जाता है तो उसका उपचार सक्षम चिकित्सा अधिकारी करेंगे तथा प्रमाण पत्र के आधार पर क्षतिपूर्ति राशि देय होगी। घायल व्यक्ति स्वयं क्षतिपूर्ति राशि प्राप्त करने का अधिकारी होगा।
6. यह मुआवजा राशि ऐसे व्यक्ति को देय नहीं होगा जो हमले के समय वन्य जीव (सुरक्षा) अधिनियम 1972 के अन्तर्गत किसी अपराध करने हेतु राष्ट्रीय उद्यान/वन्य जीव अभ्यारण्य में प्रविष्ट हुआ था अथवा किसी स्थल पर वन्य प्राणी सम्बन्धी किसी नियम विरुद्ध कार्य में लिप्त था/सहायक था।
7. मुआवजा/एक्सग्रेसिया राशि का पुनर्भरण केन्द्र सरकार द्वारा शत प्रतिशत केन्द्रीय परिवर्तित योजना के अन्तर्गत किया जावेगा।
8. मुआवजा/एक्सग्रेसिया राशि के भुगतान हेतु मण्डल वन अधिकारी/उप वन संरक्षक/उप मुख्य वन्य जीव प्रतिपालक/उप निदेशक सक्षम होंगे तथा सम्बन्धित क्षेत्रीय वन अधिकारी की अभिरक्षा पर ही मुआवजा / एक्सग्रेसिया राशि देय होगी।
9. राष्ट्रीय उद्यान/वन्य जीव अभ्यारण्य में वैद्य रूप से निवास कर रहे तथा इनके आस-पास व बाहर रह रहे किसी ग्रामवासी को शेर, बघेरे या अन्य हिंसक वन्य जीव द्वारा मृत्यु व स्थायी/अस्थायी रूप से असमर्थ (Incapacitate) करने पर इस आदेश में दर्शायी गयी राशि देय होगी।
10. मृत्यु/अयोग्य (स्थायी/अस्थायी) होने का सक्षम शासकीय चिकित्सक से प्रमाण पत्र आवश्यक होगा।

पशु हानि मामले में :-

1. घटना के 48 घंटों के अंदर सूचना निकटतम वन अधिकारी जो कि वनपाल या सहायक वनपाल से कम स्तर का ना हां उनको मवेशी के मालिक द्वारा सूचना दिया जाना आवश्यक होगा।
2. मारे गए मवेशी के शव को घटना स्थल से तब तक नहीं हटाया जावे जब तक घटना की जांच स्थानीय वन अधिकारी द्वारा नहीं कर ली जाती है तथा उसके मांस में किसी प्रकार का विष अथवा घातक पदार्थ नहीं मिलाया गया हो।
3. अभ्यारण्य/राष्ट्रीय उद्यान के वन क्षेत्र के बाहर मारे गये पशुओं को ही मुआवजा देय होगा। इस हेतु सक्षम पशु चिकित्सक का मृत्यु प्रमाण-पत्र आवश्यक होगा।
4. मुआवजा राशि का पुनर्भरण बाद में केन्द्र सरकार द्वारा यथा संभव शत प्रतिशत केन्द्रीय परिवर्तित योजना के अन्तर्गत किया जावेगा।
5. मुआवजा के भुगतान हेतु मण्डल वन अधिकारी/उप वन संरक्षक/उप मुख्य वन्य जीव प्रतिपालक/उप निदेशक सक्षम होंगे तथा सम्बन्धित क्षेत्रीय वन अधिकारी की अभिरक्षा पर ही मुआवजा / एक्सग्रेसिया राशि देय होगी।