

# *Sariska Tiger Reserve*

## *Rajasthan*



*A Report on the Human Nature  
Interaction  
In and Around the Reserve*

*Cover photograph of Sariska Tiger Reserve taken by Shekhar Singh in 1989.*

**SARISKA TIGER RESERVE  
RAJASTHAN**

**A Report on the Human Nature Interactions  
in and around the Park**

**Sponsored by**

**Ministry of Environment and Forests  
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## **RESEARCH TEAM**

### **Project Director**

Shekhar Singh

### **Consultants**

Angana Chatterjee

Sarita Ghai

Ashish Kothari

Raman Mehta

Avanti Mehta

Pratibha Pande

Vasumathi Sankaran

Farhad Vania

### **Research Associates**

Ravi Bhalla

Shekher Chaturvedi

Gitanjali Singhal

Saloni Suri

Vishaish Uppal

Naveen Vasudeva

### **Logistics**

Anita Bhatt

Dev Bahadur

Vijay Naugain

Des Raj

Neetu Suri

Electronic copy compiled by Chander Kaushal



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# 1. INTRODUCTION

The Sariska Tiger Reserve (STR) is 80,000 ha<sup>1</sup> and contains within it the Sariska Sanctuary (49,200 ha), a part of which (27,380 ha) is the proposed Sariska National Park. It also contains 30,800 ha of reserved forest, most of which is in the buffer zone. The STR is divided into three core zones and a buffer zone.

The zonation of the STR is as follows:

Core zone I	(sanctuary and proposed National Park)	:	27,380 ha
Core zone II	(Sanctuary)	:	12,650 ha
Core zone III	(Sanctuary)	:	9,750 ha
Buffer zone	(Reserved Forest)	:	30,220 ha
<b>Total</b>	<b>(Tiger Reserve)</b>	:	<b>80,000 ha</b>

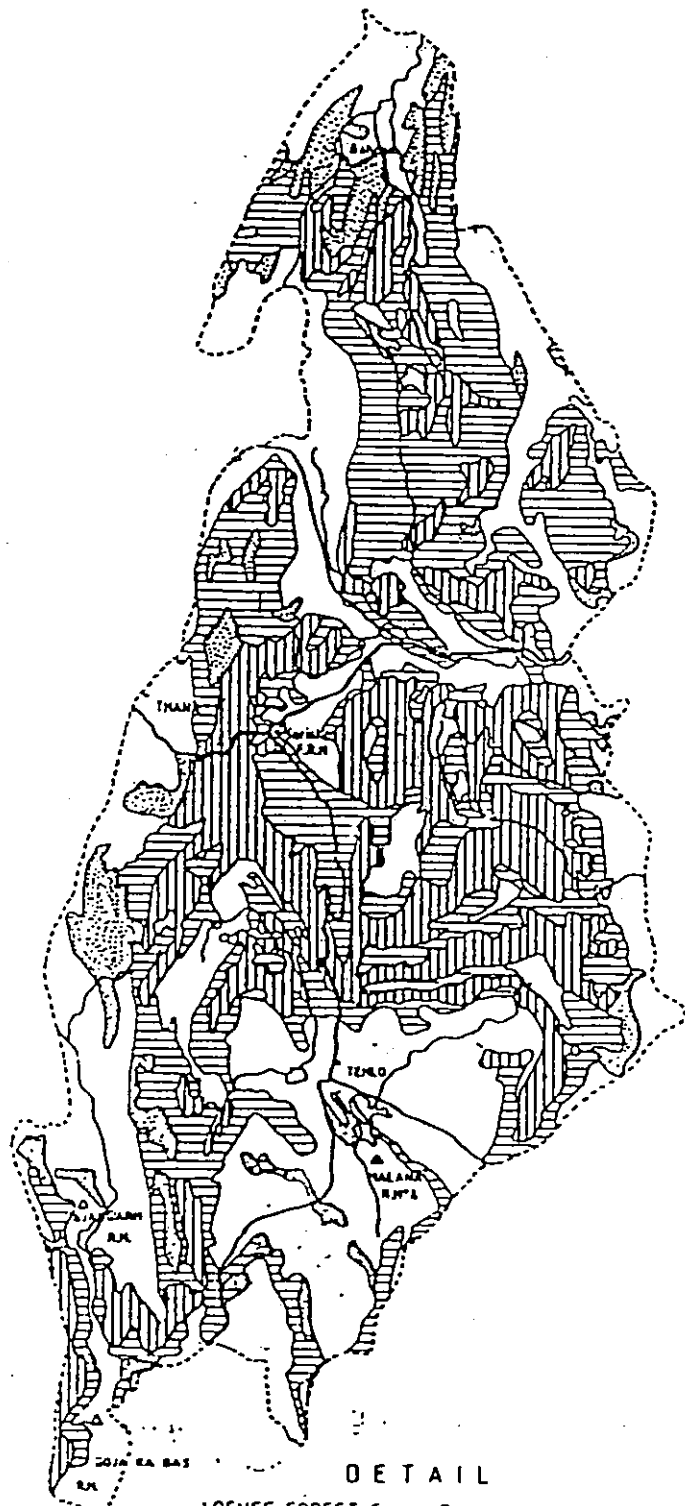
There is also a Tourism zone, which is a linear stretch confined to the sides of the already existing roads, and a part of the other zones.

The maps given on the following pages indicate the boundaries, the zones and some of the important physical features.

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<sup>1</sup> By a recent order the State Government has increased the area of the Tiger Reserve to 86,600 ha, an increase of 6,600 ha. This additional area is all reserved forest and its inclusion in the Tiger Reserve has not altered its legal status. Reportedly the area has been added to the buffer zone.

VEGETATION MAP OF  
**SARISKA TIGER RESERVE, RAJASTHAN**  
 (BASED ON VISUAL INTERPRETATION OF LANDSAT IMAGERY 1987-89)  
 SCALE 1:250,000



**DETAIL**

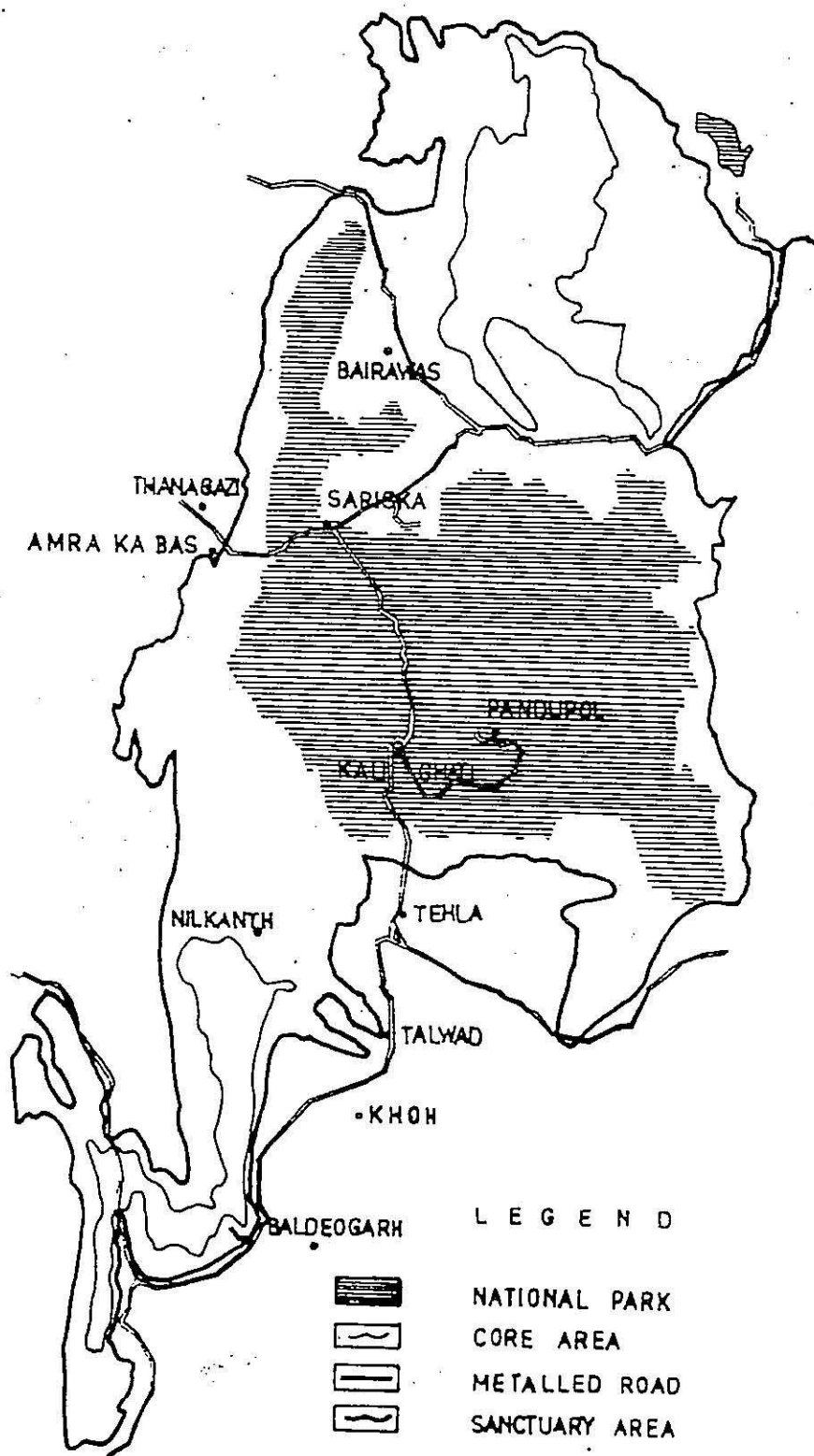
- 1 DENSE FOREST-Crown Density above 40%
- 2 OPEN FOREST-Crown Density 10 to 40%
- 3 MANGROVE
- 4 SCRUB
- 5 FOREST-BLANKS/GRASSY LANDS/P Cultivation (INF) (INCLUDING WATER BODIES)
- FOREST REST HOUSE/ L. D.
- ROAD .....

Symbol	Area in km <sup>2</sup>
	259.89
	366.15
	28.96
	1.31.81

FOREST SURVEY OF INDIA, DEHRADUN  
 76° 15'

76° 30'

# SARISKA TIGER RESERVE



(a) KALU RAM ENCROACHMENT CASE KHASRA 239 IN BIRAWAS VILLAGE

(b) FOREST LAND HANDED TO SOCIAL FORESTRY

AMAR KA BAS - 100, 101, 103, 107, 112

THANAGAZI - 2496/4

TALWAD - 2, 3, 9, 71, 78, 82

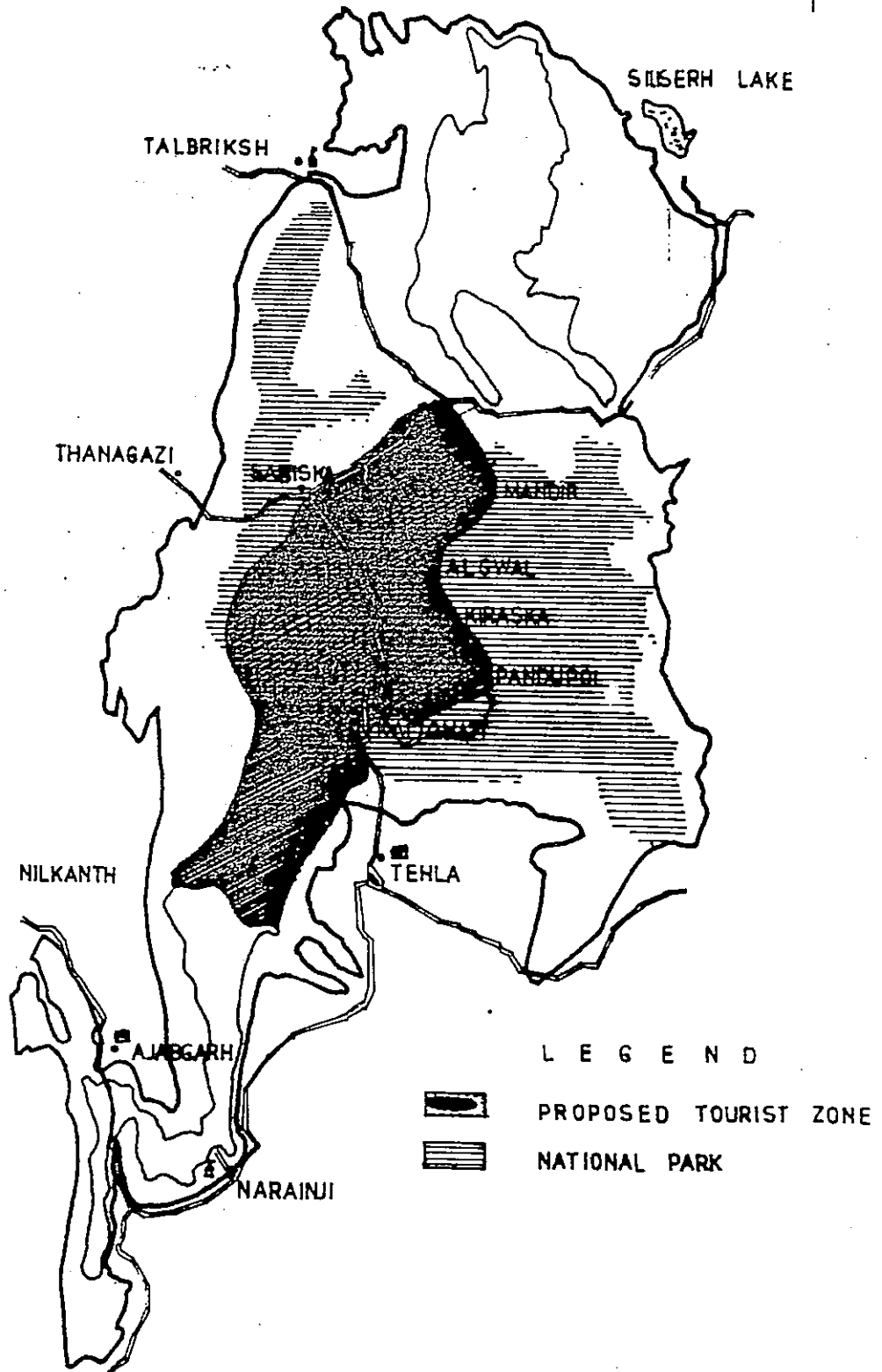
KHOH - 2

(c) MINING - BALDEOGARH, TALWAD

(MAP-1: ENCROACHMENT)

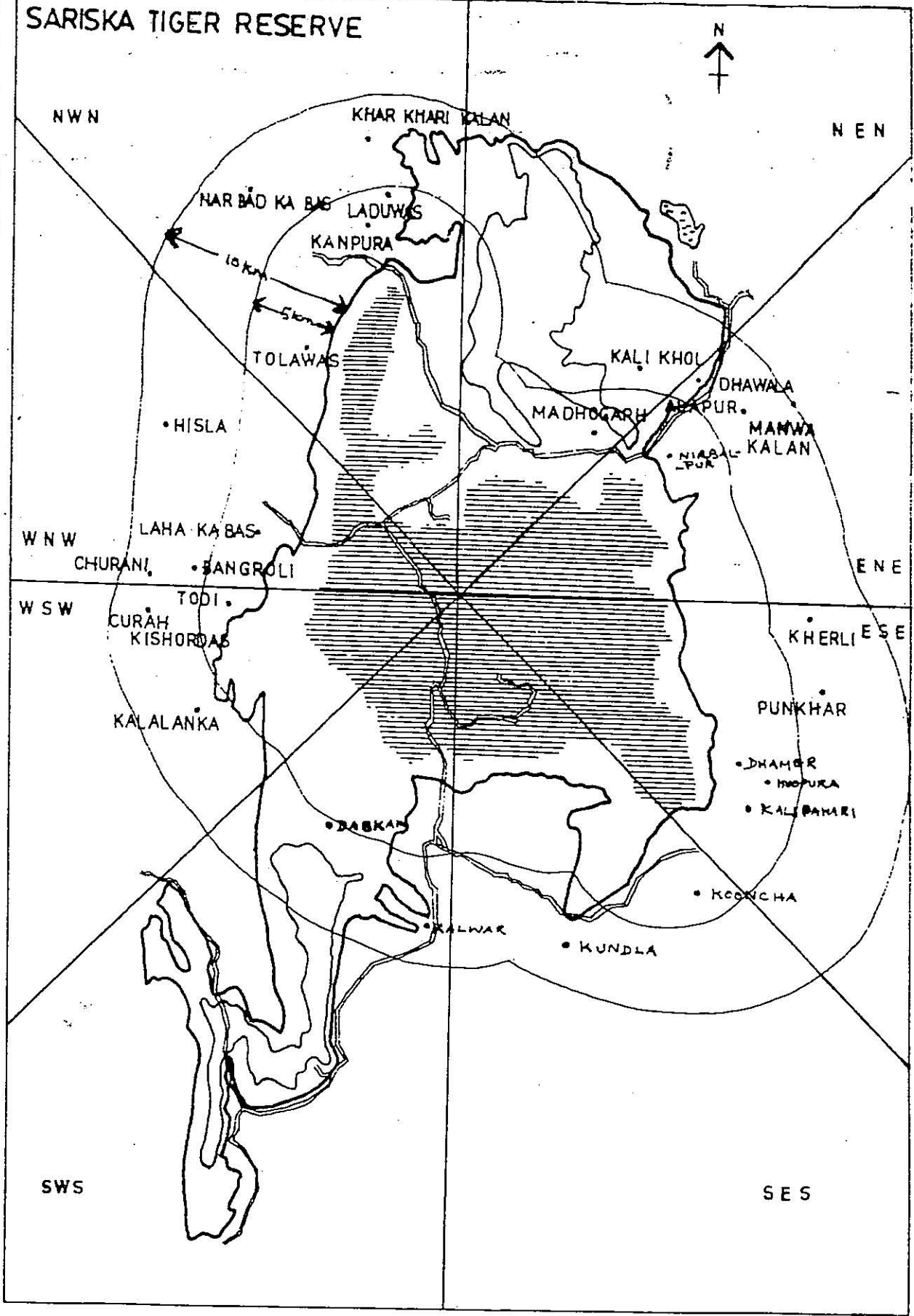
SOURCE: MAP FROM PARK AUTHORITIES

# SARISKA TIGER RESERVE



(MAP-2:TOURISM)

# SARISKA TIGER RESERVE



( MAP-3: SETTLEMENTS )

## 2. SARISKA TIGER RESERVE AND THE ADJACENT AREAS

### 2.1 LOCATION AND APPROACH

The Sariska Tiger Reserve (STR) is located in Alwar, Thanagazi and Rajgarh tehsils of Alwar District, Rajasthan. Stretching from 27°-5' to 27°-33'N and from 76°-17' to 76°-34'E, it is part of the Aravalli Range, on both sides of the Alwar-Jaipur State Highway No. 13, 108 km. from Jaipur, 38 km. from Alwar and 200 km. from Delhi.

### 2.2 BRIEF HISTORY OF THE AREA

The forests within STR were a part of the erstwhile Alwar state, and were maintained as a private hunting ground for the royal family. The management plan [MP] gives an idea of how the use of the forests in the Reserve has changed over the years. Prior to Independence, while these forests were under the exclusive control of the Maharaja of Alwar, felling of trees was regulated and mostly done to facilitate hunting. No one except the ruler and his guests were allowed to hunt in Sariska. Punishment for violating the law included seizure of property and exile from the state of Alwar.

After Independence, the forests became the property of the State Government. They were first notified as a reserve ("Reserved Areas wherein it shall be unlawful to hunt, shoot, net, trap, snare, capture or kill any kind of wild animals") on 7/11/55 under the Rajasthan Wild Animals and Bird Protection Act, 1951 [MP]. The area of the reserve was amended by notification on 5/8/58 [MP]. The reserve was upgraded to a sanctuary in 1959 and was declared a

Project Tiger Reserve in 1979.

Immediately after the formation of Rajasthan State, the forests in the Reserve were leased to charcoal manufactures and firewood contractors (for details, see the section on mining). A period of extensive and unplanned felling followed and continued till 1968. From 1968, for another 13 years, felling were conducted according to working plan prescriptions. These felling have now been stopped, as has the collection of dead wood. However grazing still continues in the Reserve.

After the merger of the State of Alwar with the Union of India in 1949, shooting permits were also issued regularly, but no records of the kills were maintained. This continued till the notification of the reserve, in 1955 [MP].

### **2.2.1 Condition of the Sariska Forests a Century Ago**

In his assessment report of Alwar, Bansur and Thanagazi tehsils in 1898-99, Major P.R Powlett, Settlement Commissioner, gave a brief description of the forests of Sariska during the latter part of the 19th century. According to the report:

"The trees and shrubs which abound the slopes and level tops are chiefly Dhauk and Salar. Game is plentiful in the hilly tract; the scene is often bold and striking; and charming. Well-wooded nooks are frequently met with where springs flow in secluded dells.....

"In the main hilly tract, the Salar (*Boswellia thurifera*) and the Dhauk, large and small (*Anogeissus latifolia* and *pendula*) are usually the commonest trees on the upper part of the slopes and on the table land and the Dhauk (*Butea fondosa*) at the base of the hills and in the narrow valleys. The Tal (*Pentaplera*) forms a very picturesque wood in one place and palms are here and there numerous. Bamboos are plentiful and the Bergat (*Ficus*



*bengalensis*) is here and there conspicuous" [AR 1899].

## 2.3 PHYSICAL DESCRIPTION

### 2.3.1 Altitudinal range and terrain

The Aravallis : The Reserve is situated on the Aravalli Range, which extends for about 700 km from the southwest of Palanpur in Gujarat, north-eastward upto the Delhi Ridge. The Aravallis appear somewhat like two fans, joined handle to handle, meeting near Beawar. They fan out in the form of the Alwar Hills in the north and the Mewar Hills in the south. The hills vary in elevation, ranging on an average between 300 and 900 m above sea level (msl), the highest point being 1290 m. Local relief ranges from 20 to 300 m and dominant slope ranges from 5 to 80%. The width of the mountains is 8 to 30 km in the central part. It widens to 160 km in the southern fan and 172 km in the north.

Sariska and its Immediate Surrounds : Sariska Tiger Reserve is located on a ridge which runs roughly NNE-SSW. It is surrounded on the east by plains and on the west by plains interspersed with small hills. To the north and south continue the Aravalli range.

The Reserve consists of hills, plateaus, steep slopes and valleys, broad and narrow. The altitude ranges from 400 to 777 msl [tp]. The Reserve has a

"topography of undulating plateau lands and wide valleys otherwise unknown in the Aravalli system. Still the hills maintain the Aravalli character of sharp hogback ridges. The slopes are steeper on their southern aspects than in other directions" [MP].

The ridges and plateaus are convoluted and curved, and run in many directions. There is a major valley (henceforth referred to as the "Main Valley") which runs in a general east-west direction through the Reserve. At Khushalgarh in the west, it forks into 2 branches, towards Tulsiwala in the north-west and Sariska in the south-west. At Madhogarh, there is a branch towards Rekha in the north-west. The Main Valley's width ranges from 0.25 km. to 2 km.

Another major valley, the Sariska- Kalighati valley, runs in a general north-south direction. It is narrow, about 0.25 km. wide for a distance of about 5 km., before it broadens out at Karnawas. At Sariska, where it links up with the Main Valley, it is almost 3 km. wide.

The STR consists of the Sariska Sanctuary as well as the proposed Sariska National Park (at present core zone-I of the STR). To the south of Core Zone- I there is a wide valley (1 km.) which runs northwards from Mandalwas to Kaniyawas, near Kankwarhi.

### **2.3.2 Geology, Rocks and Soil**

Geology of the Aravallis : The Aravallis, one of the oldest mountain systems on earth, are fold mountains. The earliest

"belong to the Archean geological cycle that ended more than 2500 million years ago. Since then, the region has undergone a series of mountain building tectonic movements (accompanied by igneous activity, deformation and metamorphism) and upwarping, the last of which occurred nearly 200 million years ago. The periods of quiescence in between were marked by active denudation and peneplanation." [PC 1989]

Structurally, the Aravalli range is defined by a series of folds of stratified rock, the areas of which shift (indicating

later cross folding), to create the shape of two fans joined at their handles at Beawar. In the Alwar-Jaipur-Sikar region, the hills are in the NNE SSW and NE-SW directions. In Sariska, they are in the NNE-SSW direction [PC 1989].

"The Precambrian (earliest) rocks suggest that they have been subjected to at least 3 periods of (folding) to produce the present structure" [PC 1989].

Rocks : The composition of rocks varies through the Aravallis. The Aravallis have an important role to play in determining the soils of the region. From Abu, north- eastward to Ajmer, they stand like a barricade and effectively protect the eastern area from the influx of sand from the west.

"Geologically, the rocks of the Aravallis have been reclassified into (the) Bhilwara (time span more than 2500 million years), the Aravalli (2500 to 2000 million years) and the Delhi (2000 to 1200 million years) Super Groups" [PC 1989].

Sariska, in the northern part of the Aravallis has mainly residual hills, though there is a structural control as well. The residual hills occur as isolated, linear features in line with the trend of the mountains and are separated from each other by wide gaps [PC 1989].

Though gullies have been forming in Thanaghazi Tehsil, there is, however, no mention of gullies in the earlier quoted Assessment Reports.

"A major part of the area is occupied by ancient rocks of the Aravalli and Delhi systems.... Most of the high ridges are comprised of quartzite, conglomerate and grits. The inter-linking valleys consist of limestone, phyllite and schist. Evidence of lava conglomerates is also occasionally met with" [MP].

### Soils :

"Soils differ depending on the underlying rock. The ancient crystalline and metamorphic rocks with gneisses and schists etc. are generally covered by red sandy soils which are generally poor in Nitrogen, Phosphorus and humus, and are generally alkaline in nature. There are comparatively rich, fertile and dark coloured soils in plains and river valleys. The soils resulting from weathering of schistose rocks vary from sandy to heavy loam depending upon the amount of quartzite present in the parent rock" [MP].

#### *2.3.3 Climate and Rainfall*

The Aravalli Mountains lie in the semi arid belt of the country. The mean annual rainfall in the plains adjoining the hills ranges between 733 mm at Dungarpur to about 500 mm in the north. However, because of the elevation, the hilly tract in the southern and central Aravalli have appreciably higher rainfall. Mount Abu records 1640 mm. The rainfall is typically monsoonal in character with the period from June to September accounting for 85 to 90% of the total [PC 1989]. The rainfall data for the region shows that both the annual rainfall and the number of rainy days per year have steadily reduced since 1976, culminating in the drought of 1987. In the past 31 years, between 1957-87, there were 19 drought years, of which eight were in the last 10 years [PC 1989]. Studies in Western Karnataka and parts of Kerala suggest that this phenomenon may be linked to reduced tree cover [PC 1989].

The climate of the Sariska tract is sub-tropical, characterised by distinct winter, summer and monsoon. Spring is short. The diurnal range of temperature is high.

The summer season commences from the middle of March and the heat becomes intense in April. Hot westerly winds, known as "loo" (with a mean velocity of 6.5 km/hr), are common during April, May and June. The days are extremely hot and the nights are pleasant. Rainy season commences in late June and continues till the middle of October. After the first few showers, humidity is high. The winter season is from December to January when the nights get cold and the valleys of Sariska become frosty.

The mean monthly rainfall and the monthly temperature are given in the tables below:

Month	Rainfall in mm
January	1.2
February	4.3
March	21.6
April	19.4
May	-
June	32.1
July	-
August	81.6
September	45.6
October	11.1
November	-
December	7.1

Table 2: Monthly Temperature\*

Month	Mean Max.	Mean Min.	Monthly mean
January	22.1	6.9	14.5
February	28.2	10.1	19.1
March	32.3	15.8	23.9
April	36.2	22.2	29.2
May	40.5	26.2	33.3
June	41.6	30.5	35.5
July	35.9	29.1	32.0
August	33.7	26.9	30.3
September	32.4	24.4	28.4
October	32.4	18.5	25.4
November	28.8	12.7	20.7
December	24.2	8.1	16.1

\*Source: [MP].

History : The extent of rainfall, for the Sariska region, in the years 1966 to 1975, is tabulated below. As can be seen, 1987 was a severe drought year.

Table 3: Statement Showing the Yearly Rainfall in Sariska\*

Year	Mean Average Rainfall in mm <sup>a</sup>
1966	560.0
1967	681.5
1968	864.8
1969	721.2
1970	682.0
1971	804.7
1972	765.4
1973	662.8
1974	693.9
1975	775.0

\*Source: [MP]

@ Mean Average of Alwar, Rajgarh and Thanagazi Stations.

Effect of Aravallis on the Climate of the Region : The Aravallis divide Rajasthan into two zones : north- west of the Aravallis is sandy and almost arid and the eastern part is comparatively well drained and fertile [PC 1989]. The eastern part

of Rajasthan gets appreciably higher rainfall.

"The low pressure developed over the hot deserts used to attract both the Arabian Sea and the Bay of Bengal monsoon currents, which used to blow right up to the foothills of the Aravallis and start ascending the green and the moisture laden hill slopes, causing effective condensation" (Dhabriya, 1988, quoted in PC 1989).

With deforestation over the slopes, evapo-transpiration processes have altered and caused problems. Of late, sheet waters and flash floods have become common occurrences in association with pulsatory rainfall [PC 1989].

As mentioned earlier, the Aravallis also prevent the advance of the desert sands from the north-west. This could also indirectly affect the climate through the type of vegetation it allows.

Current Status : The Aravallis serve as a great watershed divide that separates the drainage to the Bay of Bengal from that of the Arabian Sea. The eastern flanks drain through the Ban Ganga, Dhund and Banas into the Yamuna either directly or through the Chambal River. The run off from the southern as well as the western flanks flows through the Mahi, Sabarmati, West Banas and the Luni into the Arabian Sea [PC 1989]. The Aravallis, therefore, play an important role in the water resources of several states.

Table 4: Rainfall data in the past for the Aravalli region

Year	Rainfall (in Centimeters)	
	Rajasthan East	Rajasthan West
1976	86.29	51.34
1981	68.44	25.98
1983	79.04	57.23
1984	57.81	26.20
1985	64.2	25.5
1986	60.5	24.7
1987	41.2	17.3
Considered Normal Rainfall	70.4	31.4

Table 5: Duration of Rainy Season in the Aravallis: 1973-1987

Year	Duration (No. of rainy days)
1973	101
1974	74
1975	96
1976	71
1977	94
1978	98
1979	88
1980	93
1981	78
1982	64
1983	84
1984	83
1985	64
1986	57
1987	55

(Source: Dhabriya S.S., Eco crisis in the Aravalli Hill Region, 1988-p 21, quoted in [PC 1989]).



**Table 6. Important Parameters of Rainfall**

Station (1)	Mean RF (in mm) (2)	C.V. (3)	Week of adequate AE/PE M.A.I. (4)*	Week of Run off (5)
Alwar (19 years average)	582.9	34%	16 (26th week)	10
Azabgarh (9 years average)	413.9	38%	11 (26th week)	6
Malakerah (19 years average)	532.7	44%	16 (26)	12
Rajgarh (19 years average)	519.0	39%	16 (27)	11
Siliserh (10 years average)	380.8	52%	11 (27)	8
Thanaghazi (19 years average)	646.2	37%	16 (26)	12

Calculated from daily rainfall data collected from the Irrigation Department of the Government of Rajasthan from 1972-1990. WATBAL programme of ICRISAT Andhra Pradesh has been used in Computing the data.

\* Figures in brackets show the starting week of adequate moisture for crop growth.

RF - Rainfall  
 CV - Co efficient of variation in rainfall  
 MAI=AE/PE - Moisture Adequacy Index  
 (Actual Evapotranspiration/ Potential Evapotranspiration)

The table shows an average rainfall of 500-600 mm and C.V. of 34-40% (A C.V. of 52% for Siliserh seems too high and is based only on 10 years data). This indicates that the region may not have highly dependable rainfall. The MAI weeks for crop growth seems reasonable, as the semi arid crop growth season is only about 80-90 days. The weeks of rainfall run off is only 10 week on an average. It shows that the streams may carry water only for about 2 1/2 months. In such a region there is a heavy dependence on groundwater. Surface water harvesting and consequently ground water recharge must be introduced as a part of any eco-development activities.

The area where ground water recharge is likely to occur in hard rock region like the Aravallis, are the areas of surface fractures and faults. The Aravallis have undergone great stress and strain in the past (refer to the section on geology), resulting in 'faults' or the movements of one broken piece of rock against another. Stress and strain also creates 'fractures'. These are the areas where the hard rock has broken up and opened to natural elements and the chemicals in the atmosphere. These elements play their part in breaking up the surface to small particles over time, and a zone of 'weathered' material accumulates. Now the rain water is able to percolate easily and the weathered material acts as a sponge to collect ground water. It is only in these regions that ground water occurs in a hard rock region. The identification of fractures and faults (called 'lineaments') becomes necessary to decide on sites for the location of wells or to construct a check dam in the forest so that water percolates down the lineament till it reaches the outer limits and remains stored in the 'sponge' of the weathered material. The areas in and around Sariska where there is sufficient potential for ground water, according to the lineament, are the region between Tehla and Talao, the Pandupol valley and the Azabgarh region. This is supported by the occurrence of dense forest in the hills above Azabgarh and around Pandupole. But the good potential water resource zone of Tehla-Talao is currently being impacted upon the mining activities in and around Sariska.

#### **2.3.4 Water Resources**

Sariska Reserve is a semi arid tract and water is a scarce resource. A major channel called the Ruparel or Barah Nala originates in the Manawas Protected Forest in the west of the Reserve, and runs in a south- easterly direction till Khushalgarh, where it is joined by a channel from Sariska in the south- west,

and then eastward along the Main Valley. A stream runs northwards down the Kalighati Sariska valley into the channel from Sariska.

There are dry bunded lake beds below Kankwarhi Fort, at Kirashka and at Sukola. At the north-eastern boundary of the Reserve lies a lake called Siliserh Lake and a bunded reservoir called Jaisamand Lake. These are linked by a channel and fed by streams from the catchment both within and outside the Reserve. Jaisamand Lake (presumably used for irrigation) is additionally fed by the Barah Feeding Channel from the Barah Nalah. The overflow of this reservoir again joins the Barah Nala. Along the Barah Nala, there are six dams, of which one is incomplete, one broken, one does not hold water (the Karnawas wall), and two hold water from the monsoon till January- February [MP]. Core Zone- I has 37 perennial and 52 seasonal sources of water. Water is pumped from wells, through under ground pipes, into 12 artificial water holes in Core Zone- I [MP].

History of Water Sources : According to the Assessment Report [AR 1899], Ruparel has some water throughout the year, whereas all other streams flow only in the rainy season.

"The ground water level ranges from 80' (24.32 m.) in hill villages on the South east to 15' (5.1 m.) in villages close to the Ruparel and Siliserh canals. The average for the tehsil is 42' (14.2 m.) while the average depth of water is only 14' (4.67 m.). These figures are based on the returns of 1899-1900... In the Tahla pargana there are water courses flowing from all directions but they do not spread their floods. They, however, keep up the well water level. The village Talao has a tank under, which lies some of the richest irrigated land in the state. At Kho a new bandh has been constructed lately which is especially valuable in raising well water level. The Azabgarh

and Pratapgarh nallahs are the two principal streams in Thanaghazi. Both of these usually run all the year round. These are chiefly valuable for raising water level in wells. Water in the well is rarely as much as 30' (10.2 m.) below the surface, and in Ajabgarh not lower than 15' (5.1).

"The lake of Siliserh is a sizeable water body. Siliserh is formed by a dam nearly 40' high and nearly 1000' long, thrown across an effluent of the Ruparel by Maharao Raja Banu Singh about A D 1844. The lake when full is more than a mile in length and about 400 yds in average width. A small convenient palace is situated on the rocks above it, and it abounds with fish. Boats are kept on the lake. Much animal life is found in its neighbourhood" [AR 1899].

Occurrence of Ground Water : The current status of ground water resources in and around Sariska have been described in 'Assessment of ground water potential of Alwar District' prepared by the Central Ground Water Commission [CGWC 1987]. The occurrence of ground water is mainly controlled by the topographic features and physical characteristics of the rock formation. Ground water in the alluvium occurs in pore spaces and interstitial opening of granular and permeable horizons in the zone of saturation. Water table in the upper most surfaces of the zone of saturation in an unconfined aquifer mainly depends on the topography of the region.

Rajgarh block : The area is divided into three potential zones:

(a) alluvium (78.80 sq. km.).

(b) Quartzites, phyllitas and granites (347.49 sq. km), and

(c) limestone/dolomite (29.66 sq. km).

The depth to water ranges between 4.05 mt to 34.85 mt.

Thanagazi Block: The area is further divided into two potential zones:

(a) for alluvium (168.375 sq. km.), and

(b) for hard rocks, quartzities, phyllities etc. (584.544 sq. km.)

Presently depth to water ranges between 1.10 mt to 30-35 mt.

Umrain block : Here also there are three zones:

(a) The Alluvium zone (684.17 sq. km.).

(b) Zone of quartzite and slates (90.04 sq. km.), and

(c) Zone of Kushalgarh limestone (22.60 sq. km.).

The depth to water ranges between 4.70 mt to 24.55 mt.

### 2.3.5 *Vegetation*

Forests : The hilly areas are more densely forested than the adjacent plains. They consist of Dry Tropical Forest (Dry Deciduous and Thorn Scrub Forest), forest types: 5B, 5/E1; 6B (Champion and Seth's revised classification). Core Zone- I contains some of the best stands of dry deciduous forest, with over 40% canopy cover [MP].

Some idea of the history of the state of the forests may be derived from the section on forestry under "land- use". It appears [MP] that the forests in the region began to degrade only after 1947 and continued to degrade rapidly till 1968. Now, forests within core zone I of the Reserve are reasonably well protected while the remaining, including the adjoining forests, continue to disappear.

One of the factors responsible for the degradation of the forests is the human habitation in the Reserve [Rodgers, et al, 1987]. Around Karnawas, there has been some regeneration in Core Zone- I, possibly due to the moving out of the village in 1975 [fv1].

Grasslands : Except in Core Zone I, there are few remaining natural grasslands in Sariska today. However, this was not so in the past.

According to the Assessment Report

[AR 1899]:

## PASTURES

When the monsoons are favourable the village lands yield a fair supply of grass for 3 or 4 months, and keep the cattle going till the kharif fodder crops, gawar chari and stalks of jawar, bajra and maize (in Thanaghazi) are available. Villages with little or no pasture lands of their own, those in the centre of Alwar tehsil drive their cattle off at this period to the hill villages which have large grazing areas.

The grazing is also supplemented by the leaves of the 'pala' plant or dwarf ber. The hill villages also have a valuable source of fodder in the leaves of the dhak tree (*Butea monosperma*) which are much in demand for milk cattle. Another great resource for the pastures of cattle is use of state runds. In Thanaghazi many of these are permanently leased to the villagers for a moderate sum. While in those which are kept for state purposes after grass is cut and stacked the grazing is thrown open on payment of grazing fees. In these ways the villagers are able to maintain a great number of cattle, greater than what their village would support, and the income from these sources enable the cultivators to pay the heavy rates imposed on their cultivation.

The vicinity of the runds is not however an unmixed blessing. In addition to the damage caused by the wild

"The tracts of land, usually wood and grass reserves, which are regarded as the special property of the 'Dharbar' (the ruling clan) are fifty five in number and 367,758 bighas in extent. They are termed 'runds', and those in which wood alone is preserved, 'bannis.' Some, especially in Thanaghazi tehsil, are let out to the neighbouring villages as the Dharbar has no use for large quantity of grass produced in that part of the state. Thanaghazi had 12 runds and Bannis with an area of 32, 510 bighas, and Rajgarh had 9 runds and bannis with an area of 74,008 bighas. Three runds in Thanaghazi tehsil namely Kalighati or Jodabas, Ajabgarh and Lothabas are directly managed by the Rund Department and after the grass required for the state is cut, the grazing is leased out to the villages. The great facility for grazing enjoyed by the Zamindars of this region enabled them to keep large herds of cattle, sheep and goats and it is this resource which helped them to pay enormously high rates fixed on cultivated area.

Flora : Common trees include *Acacia catechu* (English- Cutch, Hindi- Khair), *Acacia leucophloea* (Hindi- Safed Kikar), *Anogeissus pendula* (Hindi- Dhav, Dhankra, Kala Dhaura, Kardahi), *Boswellia serrata* (English- Indian Olibanum Tree, Hindi- Salai), *Butea*

*monosperma* (Hindi-Dhauk), *Ziziphus mauritiana* (English- Indian Jujube, Hindi- Ber) and others. The prevalent weeds are *Lantana*, *Adhatoda zeylanica* and *Cassia tora* [MP].

*Lantana* and *Adhatoda zeylanica* was reduced but *Cassia tora* and other weed species (eg: *Cleome spp* and *Lufa*) increased greatly [MP, fv1-2], as a result of the 1987 drought.

Assessment Report [1899] speaks of the prevalence of Salar and Dhauk in large abundance in the hilly tracts (Sariska forests) and of Dhauk at the base of the hills and in the narrow valleys. It gives a list of trees common to the hills and valleys.

### 2.3.6 Wastelands

Both in and around the Sanctuary, habitat is badly degraded close to areas of human habitation [Rodgers et al, 1987]. There are 2,334 ha. of "culturable waste" (as defined in the District Census) in the Reserve and 581 ha. in Core Zone- I [MP].

### 2.3.7 Fauna

Sariska forests were the exclusive shooting reserve of the ex- ruler of Alwar and his guests. Since punishment for poaching was severe, hunting was controlled. According to one source:

"The Aravallis used to provide very rich habitat to a wide spectrum of wildlife comprising mammals such as tiger, leopard, wolf, black buck, chinkara and desert fox and avifauna such as the great Indian bustard, migratory common cranes, ducks, coots, pelicans, etc. Now only relics of (such habitat) are found in the protected areas of Ranthambhor, Sariska, Sita Mata, Jai Samand and Kumbhalgarh, whereas similar such habitat was found in ..... extensive tracts" [PC 1989].

In the assessment report compiled a century ago tigers are said to have been abundant in the hilly tracts (which must have been the

Sariska forests), and many were killed every year by the rulers of Alwar and European hunters. Panthers, both large and small were also numerous in the same hills but were found almost every where including the gardens around the city!

"Panthers, both the large and small kind (tendua and baghers), are numerous in the hills, but they are found almost everywhere, and frequent the gardens round the city".

Sambhar and nilgai are said to have been numerous as also the pig.

According to the report, Maharaja Sheodan Singh allowed the villagers to kill pigs. Hares, quail and partridges were also numerous, as also the common peafowl.

Present Condition : It appears that between 1947 and 1955 (when the Sanctuary was declared), wild animals were hunted on a large scale, the management having been quite ineffective [MP].

The census data for some mammals between the years 1981 and 1989 are given below:

The vicinity of these great preserves is not an unmixed blessing. The ravages of the wild animals they harbour - tigers, panthers, hyenas, antelope, nilgai, pigs - are a terrible scourge to the adjoining villages as they not only prey on the crops and cattle, but often endanger life. The villages around Ajabgarh are the greatest sufferers. In two villages Khiraska and bawara Bandipul the cultivation has been abandoned and the villages have ceased to exist and are now included in the adjoining game preserve. Thus the inclusion of the rund of bawara Bandipul in the Ajabgarh valley has endangered the stability of the two adjoining villages bawara Dolawa and Kirathka Bas, and the Zamindars have threatened to abandon cultivation unless they are allowed to protect themselves and their cattle and crops by clearing the jungle within their boundaries, which at present is protected by the state as cover for game [AR 1889].



Table 7: Comparative Statement of Year wise Wild Animal Population#

Species	1981	1982	1983	1984	1985	1986	1987	1988	1989
Tiger	20	17	25	25	34	41	43	45	19
Leopard	13	23	25	32	32	38	42	47	28
Jungle Cat	123	262	773	294	450	650	761	749	243
Hyaena	79	174	187	171	252	309	313	284	188
Jackal	467	1456	1506	1653	1758	2077	2292	2264	1372
Sambar	7064	9131	10665	10360	11292	12987	14752	12336	3766
Chital	2886	4340	4387	4031	3893	5970	7077	7969	3544
Nilgai	4710	5792	6087	7990	7495	9971	10798	11022	5802
Four Horned Antelope (Chousingha)	342	341	381	384	522	470	479	489	100
Chinkara	-	-	-	-	-	8	7	12	50
Wild Boar	3076	3673	4012	4545	4632	5778	6263	4895	2061
Rhesus Monkey	1319	4150	4358	4691	4773	5529	6232	6803	3642
Common Langur	4045	10359	10867	11974	12704	14175	12882	12797	6067
Indian Porcupine	729	461	472	593	693	1009	1149	653	560

# Source: Document signed by fd.

"Deep dense woody areas mainly in the valleys like Kalighati, Siliberi, Jhaj, Naldeshwar, Panidhal, Bandipul, etc. are occupied by Sambar (Cervus unicolor), while outskirts of these valleys with modest slope are liked by Chital (Axis axis), nilgai (Boselaphus tragocamelus) and Wild Boar (Sus scrofa). The scrub level type of forest is liked by four horned antelope, (which) are seen in open patches in Slopka, Kalighati and Siliberi forest area". Langur is common throughout, but concentrated near temples, as are Rhesus monkeys. Hare is common in the plain areas. Porcupine is distributed throughout the Reserve" [MP].

"Tiger (Panthera tigris) and Leopard (Panthera pardus), Caracal (Felis caracal) and jungle cat (Felis chaus) are found in the Reserve. Jackal (Canis aureus), jungle cat, small Indian civet (Viverricula indica), Palm civet (Paradoxurus hermaphroditus), ratel (Mellivora capensis),

mongoose (*Herpestes edwardsi*) and hyaena (*Hyaena hyaena*) are both predators and scavengers. They are common throughout the Reserve. Important tiger niches are Bandipole, Algal, Tarunda, Tuda, Chhailipaj, Ghamodi, Naldeshwari, Siliberi, Udainath, Slopka, Panidhal, Bhagani, Kalighati and Jhaj. Leopards prefer the outskirts of the forest tract, but also live in tiger areas. There is no competition between these as there is little overlap in their food range (limited to fawn of deer and antelope, and piglets)". [MP].

The common mammals are hyaena, jackal, cat, mongoose and ratel. Wild pigs are the most tenacious scavengers, harassing even tigers for their kill. The common griffin and king vulture (*Sareogyps calvus*) are the most efficient cleaning agents in the region [MP].

Peafowl (*Pavo cristatus*) are found in large numbers. They feed on seeds, fruit, growing shoots, insects, white ants, lizards and snakes, but have not been seen feeding on left over carcasses. In turn, they are prey to leopards, caracal and the occasional tigers. Sariska seems to be a breeding ground for the Grey Partridge (*Francolinus pondicianus*) and the Bush Quails (the Jungle Bush Quail) (*Perdicula asiatica asiatica/ Perdicula asiatica punjaubi*) or the Rock Bush Quail (*Perdicula argoondah meinertzhageni*). Pairs of black partridge (*Francolinus francolinus asiae*) are seen but in smaller numbers. Also conspicuous are green pigeons (*Treron phoenicoptera phoenicoptera/ Treron phoenicoptera chlorigaster*) and blossom-headed, roseringed and alexandrine parakeets. Lapwings are seen near waterholes. Night jars and horned and fish owls and owlets are seen at night. The outskirts of the Reserve are full of the Common and the Pintail Sandgrouse [MP].

Wild Animal Habitat : Food - According to the management plan there is enough forage to maintain a high level of herbivore population and ample prey to provide a sustained food supply for the carnivores. However, according to W.A.Rodgers of the Wildlife Institute of India:

"cursory examination of the resources suggests that vegetation is over-utilised and regeneration is lacking" [pers. comm.].

Much of the 800 sq. km. of Sariska Tiger Reserve is seriously impacted by domestic livestock and fuel cutting pressures from villages outside and within the Reserve and Core Zone-I.

Water - The quantum and distribution of water helps determine the pattern of animal numbers and distribution. Sariska being a semi arid tract, water is naturally a limited (and limiting) resource. This has been accentuated by human cultivation and occupancy of valley sites which have most of the water. This limits access to water for the animals. According to Rodgers:

"the present distribution of water and especially 'artificial' water sources is uneven", with most artificial water in the Sariska valley of Core Zone-I.

Salt - Natural salt licks are few. They are in open meadows. Artificial salt licks have been created by providing salt bricks and by spreading common salt at some places in the Tourist Zone, "more for the benefit of the tourists" [MP].

Decimating factors : Hunting and Poaching- Unauthorised hunting occurs in the Reserve and in the area adjoining the agricultural fields. Poachers come from nearby towns and from the cities, as also from the adjacent areas. Local Bawarias and Moghias (tribals) are employed by villagers as crop protectors and sometimes get tempted to sell, the skin and meat of wild animals to the local shops and even in the nearby towns and cities [MP].

Forest fires - Fires have occurred every summer, especially in the grassy plains and in valleys and bamboo glades, and have been known to

sweep right through the forest, burning dry litter, thereby reducing forage reserves. Fires are also a serious threat to gallinaceous birds which breed during this season [MP].

Disease - Domestic livestock entering the Reserve spread various diseases. In 1969-70, a severe attack of Hemorrhagic Septicemia disease killed 90% of the Sambar population. Foot and mouth disease is reported to be common in nilgai [MP].

Obnoxious weeds - Due to uncontrolled grazing of domestic cattle in the open areas of the Reserve (Sariska, Buja, Tarunda, Udainath), weeds like Zynthium zylocama and Acaranthus hispides, Adhatoda vasica and Baru grass have come up. Lantana camera has also escaped from the palace compound [MP].

#### 2.3.8 Land Use

Habitation : In hilly, forested areas inside the Reserve, habitation is less dense than in the adjacent plains. Inside the Reserve, habitation is denser in the wider valleys, which contain streams and presumably have a higher water table and more easily cultivable land. A total of 17,421 ha. of land in the Reserve is taken up for non- forest uses by inhabited villages in the Reserve. Of this, 4,836 ha. are in Core Zone- I.

In recent years, some of the habitation in the sanctuary has been removed. Guaras Kalighati and Slopka were shifted in 1966-67 and village Karna-ka-Bas (karnawas) was shifted in the year 1975 [MP]. Some other villages are now uninhabited or almost so. Kankwarhi and Haripura are slated to be moved out.

After the merger of the princely states, certain lands were demarcated to individual villages to fulfill their needs of fuel, fodder, forage and agriculture.

Agriculture : In the Core Zone at present agriculture is practised in only 3 hamlets in Kirashka. According to Q-I, rights to agriculture exist in 20 sq. km. of the Park. In other villages in and around the Reserve, agriculture is commonly practised. Agriculture in some villages (e.g.: Kankwadi and Pilapani) has been stopped. In Karnawas, cattle have been removed from the park.

Grazing and fuel & fodder collection : Forest lands surrounding human habitation are used for these purposes. According to one source, there are 15361.5 cattle units in the Reserve and 4263.5 cattle units in Core Zone-I [IDPS]. According to another [Q-I], there are 3,677 cattle, 1,000 sheep and 23,016 goats in the Reserve. Rights for local grazing exist in an area of 480 sq. km.

History - The villages having the suffix 'Rundh' were the original grazing grounds for the horses of the royal stable. From these grasslands, fodder was cut and given to the villagers. During full grass growth, a limited number of cattle were allowed to graze for a fee. The grazier's camps must have sprung up nearby [AR 1899].

Mining : Mining operations are being carried out in deep open-cast mines within and around the southern boundaries of Sariska Tiger Reserve. These mines produce marble. Totally, there are about 400 mining plots in the area. Each plot measures about 100 to 125 sq. m. Mining occurs in the area around Khoh, Kushalgarh, Naraingarh, and Baldevgarh. About 100 to 125 sq. km. of area in the Reserve has been affected by mining activities [Rai,

1991]. Quarrying is being carried out in 0.05 sq. km. of the Reserve.

History - Stone quarrying around STR is not new. A historical source reports:

"Stone is quarried in all three tehsils, the quarries being leased out by the State of contractors who charge from Rs. 1 to Rs. 2 per 100 maunds of stone quarried, that for State purposes being free of duty. Slates are quarried near Ajabgarh in Thana Ghazi. In Alwar and Bansur no mines are now worked, but in Thana Ghazi the hills are rich in mineral wealth. The white marble found at Jhirri in Thana Ghazi is said to be the finest statuary marble obtainable in India. The marble is found near the surface and not in deep veins. The quarries are worked by Silawats (stone-workers) living in Jhirri and Kishori, who work up the marble into images for idols, saucers, basins, etc., which they export to Jaipur, Agra, Cawnpure, etc. The distance of Jhirri from the railway and the poor condition of the roads, which are almost impassable even for bullock carts, are constraints for the quarries being worked to the extent that the superior quality of the marble would justify.

At Raiyanwala in Jaipur, some miles to the south of Jhirri, similar marble is found, and this being nearer the railway is worked on a considerable scale, slabs of great size being turned out for export. Copper, iron and lead ore are frequently met with, but are little worked. The lead mine at Jodha Bas near Thana Ghazi, which was opened in 1873 by Colonel Cadell, was given up after a few years as the cost of working was found prohibitive. The ore is only worked Dariba in Rajgarh. Possibly if the recent rise in the price of copper continues it may stimulate the local production.

In 1873, Colonel Cadell wrote : "The manufacture of iron was in former times a great industry in the state, as is testified by the large years, the value of the native iron having been greatly lessened by the large quantities imported from Europe." It appears that at one time there were 200 smelting furnaces at work chiefly in Thana Ghazi. When Colonel Cadell wrote the number had fallen to 37, which were calculated to turn out 18,500 mans or 660 tons a year. The number has now fallen to 11 furnaces, of which three are in the Rajgarh tahsil, one at Rampur in Bansur and the

remainder in Thana Ghazi. The richest ore is found at Dhirora near Bhangarh, but due to excessive transportation costs, the iron though of excellent quality cannot compete with the imported article. It is estimated that to make a maund of iron - value Rs. 3.8.0 - 8 maunds of charcoal are consumed, to make which 32 maunds of wood are required.

The wood for charcoal is given free by the State, and as Colonel Cadell remarked "*if sold would probably realise a larger sum than the profit to the State yielded by the furnaces.*" The smelting furnaces are leased by the State for sums varying from Rs. 60 to Rs. 100 per annum, but this includes the State royalty. The industry cannot be said to be thriving and is mainly kept going by state support in the form of Takavi advances" [AR 1899].

Current Status - The mining operations being carried out within and around the perceived boundary of the Sariska Tiger Reserve have been identified as one of the major problems confronting the Project Tiger Authorities in Sariska. Discussion were held on the various aspects of this issue with Mr. Fateh Singh Rathore - Field Director, Project Tiger, Sariska; Mr. K.G. Gupta - Executive Engineer, Mining Department, Alwar; and Mr. Nakra - owner of 4 out of about 400 mining plots, which are located towards the south of Tehla. All the mines in these areas produce Marble.

Till 1986, when the new Rajasthan Minor Minerals Concession Rules were passed, the Mining Department issued mining leases<sup>1</sup> regardless of the status of land being leased, i.e., forest or revenue.

Since 1986, whenever a forest plot had to be leased in and around Sariska, a no objection certificate was required from the Project Tiger Authorities, stating that the said piece of land did not fall under their

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<sup>1</sup>\* A lease is given on a plot of 100 sq.m. for a period of 10 years. An extension can be granted upto a maximum of 5 terms, each for a period of 10 years.

jurisdiction. A case in point is the Field Director's letter to the Executive Engineer, (Letter No. F/VIVIDH/89-90/1455-59, dated 22/5/89) asking the latter to clarify how a certain number of plots (10), had been cleared for mining, as they were within forest area, and suggested that the mines be disbanded. The Executive Engineer, in his reply, (office copy unnumbered and undated) stated that every mine which had been mentioned in the Field Director's letter to him had been cleared by the previous Field Director. In fact, over 100 such NOC's have been issued so far. Mr. Nakra, the miner who was interviewed, had also allegedly obtained NOC's from the previous Field Director.

In 1988, the Mining Department, with the help of Project Tiger Authorities, drew up a boundary line demarcating the Sariska reserve, and subsequently, all proposals for mining leases inside the boundary were summarily rejected. The mines sanctioned prior to 1988, however, continued to function even within the reserve. This resulted in a situation, where certain plots in an area were being mined, while other plots in the same area were not being worked on, since they were proposed after 1988. It also resulted in suits being filed in the district court against the Mining Department, by the rejected parties, challenging the decision of the Department to deny them the desired leases.

Problems for the Park - Mining operations in and around Sariska are considered to be a problem due to the reasons given below :-

a) Threat to Habitat :

The Field Director stated that, in most cases, the mines are operated in a very haphazard manner, and most of the over-burden is dumped in areas inside the Reserve, damaging the vegetation. Though a complaint



had been lodged with the Mining Department by the Field Director, the Executive Engineer reportedly maintained that if such littering was going on in the Reserve, it was the responsibility of the Project Tiger Authorities to check it.

b) Disturbance to Wildlife :

According to the Field Director, mining operations are a great source of disturbance to the birds and animals since extensive blasting is carried out. The fact that blasting is undertaken occasionally, was confirmed by Mr. Nakra. However, the Executive Engineer denied this, and said that only drilling and hammering of the rock is undertaken since blasting would damage the rock-face, and the earning potential from the mine would go down. The presence of these mines has also blocked the forest corridor connecting core zone I with core zone III, thereby impeding movement of animals from one part of the reserve to another. A potential cause of disturbance could also be the movement of trucks, through the park, on the Sariska-Tehla road, to carry away the marble slabs and tiles extracted in these mines. Although, for some time vehicular movement on this road was not allowed, a suit filed by a local miner in the court asking that he be allowed to use the Sariska - Tehla road to transport his produce might overturn this decision.

c) Others :

According to the Field Director, the owners of these mines are some of the most powerful people in the state of Rajasthan. There is a move, by these people, to have the status of the land under their control changed from forest to revenue, so that their operations are

not threatened. If they succeed, the Project Tiger may lose about 200 sq. km. of its area.

Steps taken to solve the problem - Although the relevant references are not available, the Field director, Project tiger has written to the Mining Department asking for all leases within the Project tiger boundary to be cancelled, and for no new leases to be sanctioned within 200 meters of the boundary. However, the Mining Department has not replied on the plea that, a government notification must be produced to support these demands. the Field Director has also requested the Mining Department to make available a list of all the mines sanctioned earlier.

Justification by the Mining Department - These mining operations are justified by the Executive Engineer on the following grounds :

- a) Revenue : Despite the fact that the inputs by the government into this industry are minimal, as compared to other sectors, mining operations are generating a revenue of Rs.1 crore per annum for the department, apart from the collection of sales and income tax, etc., which are not accounted for. According to Mr. Nakra, on every single plot, Rs.1650/- have to be paid to the mining department every three months along with a share in the turnover.
- b) Employment : There is a great deal of employment generation since each mine requires about 20-25 daily wagers for optimum production.
- c) Linkages : The mines are also supporting ancillaries like the marble chips factories, idol making and transport industries and therefore the spread effect is considerable.

**THE MINING CASE**

On Oct. 11th, 1991, the Supreme Court, in response to the public

interest litigation petition of the Tarun Bharat Sangh, Alwar, directed both the Centre and the Rajasthan government to ensure that all mining activity within the park is stopped from December 31st 1991. The Rajasthan Government was directed to stop granting any mining leases within the Reserve. The Judges set up a five member committee to enforce the legal status of the park as a protected area and to demarcate, latest by December 15th 1991, the boundaries of the protected area. The committee was also entrusted with the task of preparing a list of mining leases and lessees within the protected area, and to make appropriate recommendations to the apex court on the measures needed to restore the land to its original health, along with the financial implications and the agencies which will carry out this task. All the concerned authorities of the Rajasthan and Union Governments were directed to cooperate with the committee and afford all assistance to it and act in aid of its deliberations.

Since it was difficult for the Court to decide the status (forest or revenue) of mining plots on the basis of affidavits alone, the committee was to sort out these matters on the spot with reference to revenue records and the relevant notifications [Mahajan 1991].

The court gave a judgment in 1993 wherein they said;

"At the outset, we may be permitted to clarify an aspect. This is not a case where we are called upon to shut down an activity being carried on lawfully, in the name of higher considerations of ecology and environment. This is a simple case where we are called upon to ensure observance of enacted laws made by the state to protect the environment and ecology of the area. In such a case, we need not be oppressed by considerations of balancing the interests of economy and ecology. That has already been done by the Legislature and Parliament. The grievance of the petitioner is against the executive. Charged with the delegation of implementing the laws of the land, the executive is yet failing to do its duty by law and by people, when faced with the might of money; respect for law is dissolving into respect for mammon, says the petitioner. Let us therefore first find out which laws are violated, if any, and then decide, what are the proper directions to make."

"(A) Section 2 of the Forest (Conservation) Act read with Section 29 of the Rajasthan Forest Act and Rule 4(6) of the Rajasthan Minor Mineral Concessions Rule:-

"Section 29 of the Rajasthan Act empowers the government to declare any forest land or waste land to be a protected forest. Sub-section (1) says that "the State Government may by notification in the official gazette declare the provisions of this chapter applicable to any forest land or waste land which is not included in a reserve forest but which is the property of the State Government or over which the State Government has proprietary rights." It is not disputed in this case that the land over which the listed mines (mines listed in Appendix A and B to the report of the justice M.L. Jain Committee) are situated is the property of the State Government. The State Government is empowered not only to declare any forest land as a protected forest but also any waste land as such. The idea evidently is not only to protect the existing forest but also to bring waste lands under schemes of afforestation. Once declared as protected forest, the distinction between forest land and waste land disappears. The entire area becomes a protected forest. Before, however, declaring any forest land or waste land as a protected forest, the State Government is obliged to make an enquiry into the nature and extent of the rights of the State Government and of private persons in or over the forest land or waste land proposed to be declared as protected forest and record the same at a survey or settlement or in such other manner as the State Government thinks sufficient. This is the requirement of sub-section (3). However, the proviso to sub-section (3) empowers the State Government, in case it thinks that such an enquiry and record will occupy such length of time as in the meantime to endanger the rights of the State Government, it may, pending such enquiry and record, declare a particular area to be a protected forest without, of course, abridging or affecting any rights of individuals or communities. Sub-section (4) empowers the State Government to delete any area from out of the area declared as protected forest. Reading Section 29 as a whole, it appears, the normal rule is to make an enquiry into the rights of the state Government and of the private parties over the land proposed to be declared as protected forest in the first instance, prepare a record there of and then declare it as a protected forest. But in case of urgency, it is open to the state Government to issue such notification forthwith subject, of course, to the existing rights of individuals and communities in the area concerned. In this case, the notification dated

January 1, 1975 issued under the proviso to sub-section (3). Shri Bhandare submits that a notification issued under the proviso to sub-section (3) is only an interim or provisional notification and that after conducting the enquiry contemplated by the main limb of sub-section (1) has still to be issued. Until then, he submits, the declaration as protected forest does not take effect. We are not prepared to agree. Section 29 contemplates only one notification declaring an area as a protected forest. Whether issued after a normal enquiry and record or without enquiry or record, Section 29 contemplates only one notification and not two in any event. Therefore, the notification issued is the valid and effective one. It is not a provisional or preliminary notification. It is not also the case of the mine-owners that leases or licences in their favour were granted prior to January 1, 1975. All of them were granted in the middle of or in the late eighties. The savings clause contained in the proviso to sub-section (3) does not avail them."

In view of the ambiguity prevailing with respect to the precise boundaries of the area or areas declared as protected forest under the notification dated January 1, 1975, the Justice M.L. Jain committee was appointed by this court to demarcate and identify the areas declared as protected forest under the said notification, with the help of the Revenue and Forest departments of the State of Rajasthan. It has done so. Besides being headed by a former Judge of the Rajasthan High Court, it was composed of high officials of the Government of Rajasthan. They have undertaken an elaborate and intensive exercise and have demarcated the areas declared as protected forest with the help of the official maps and records. We see no reason not to accept the said report. The several objections submitted by the mine-owners cannot prevail over the official maps and records. They were represented before the Commission at the time of the said exercise. It is significant to notice that the dissent note appended by the officers of the Government of Rajasthan was not with respect to the demarcation or identification of areas declared as protected forest, but only with respect to the closure of the mines operating within those areas. The report of the committee is accordingly accepted herewith.

Once an area is declared as a protected

forest, it comes within the purview of the Forest (Conservation) Act, 1980. It becomes a forest land within the meaning of section 2. The effect of this position is that no non-forest activity can be carried on in the said area except with the prior approval of the Central Government. Even the State Government cannot carry on any such non-forest activity in the said area without such prior approval. That the mining activity amounts to non-forest purpose is beyond dispute. Thus, the grant of mining leases/licences and their renewal by the State Government, without obtaining the prior approval of the central government, in respect of the mines situated within the protected forest, after January 1, 1975 is contrary to law. All the mines listed in Appendix A to the committee's report do fall within the areas declared as protected forest while the mines listed in Appendix B fall partly within and partly outside such areas. According to rule 4(6) of the Rajasthan Minor Mineral Concession Rules, 1986 too, no mining lease could have been granted or renewed within the forest "without clearance from the Central Government in accordance with the Forest (Conservation) Act, 1980 and the rules made there under". Admittedly, no such prior approval or clearance of central government was obtained. The Chairman of the Committee, Shri Justice M.L. Jain has recommended that 215 mines mentioned in appendix-A to his report, which are situated wholly within the protected forest should be closed forthwith. There can hardly be any valid objection in law to the said recommendation. Similarly, with respect to 47 mines mentioned in appendix-B to the report, the learned Chairman has recommended that they should be closed forthwith in so far as they fall within the protected forest. To this recommendation also, there can be no valid objection in law.

At this stage, it would be appropriate to consider the application filed by State of Rajasthan for permission to delete an extent of 5.02 sq. km. from out of the protected forest. The application is confined only to 208 mines out of 262 listed mines. 54 mines mentioned in para (9) of the application are proposed to be closed; indeed, according to the counsel for the State, they have already been closed. Reliance is placed upon the order dated May 14, 1992 in this behalf. It is pointed out that the said order does contemplate such modification, of course, with the permission

of this Court and for valid reasons. It is pointed out that for such deletion or modification, the prior approval of the central government is not required. No such requirement is prescribed either in the Forest (Conservation) Act or Rajasthan Forest Act, it is submitted. In this context, the submission of Shri M.C. Bhandare may also be considered. He says that there are a number of mines around and outside the area declared as protected forests and that no purpose would be served by merely closing the mines within the protected forest and leaving those outside unhindered. He says that all these mines within and outside, are within the tiger reserve, as per the Rajasthan government map though outside the sanctuary. May be so. But it cannot be forgotten that purpose of Forest Acts and purpose of Environmental Protection Acts may not always be the same. Such closure may not serve the environmental purpose - assuming that factual situation asserted by the learned counsel is true, upon which aspect we need not and do not make any pronouncement - but it may serve the forest purpose. Be that as it may, both the purposes appear to be inter-twined in this case. In this situation, we think it appropriate that the merits of the said proposal be examined by the Ministry of Environment and Forests, Government of India and a report submitted to this court, within three months from today. Orders will be passed on the application for directions filed by the state of Rajasthan after considering the said report.

(B) Notification issued by the Central Government under section 3 of the Environment (Protection) Act, 1986 on May 7, 1992:

This notification expressly prohibits the carrying on of the mining operations, except with the Central Government's prior permission, in the "areas covered under project tiger". The prohibition extends to existing mining leases in Sanctuaries/National Park. All mining operations are prohibited there in. The table appended to the notification particularises the areas where carrying on of the processes and operations fore said is prohibited without the permission of the Central Government. They include all reserve forest, protected forest or any other area shown as forest in the land records maintained by the State Government as the date of the issuance of the said notification in relation to inter alia Alwar

district of the state of Rajasthan. The table also includes "all areas of Sariska National Park and Sariska Sanctuary notified under the Wildlife (Protection) Act, 1972 (53 of 72)". We cannot agree with the learned counsel for mine-owners that the area declared as project tiger in the Alwar district has not been properly identified or that it is not properly identifiable. Both the State Government and Central Government have demarcated them in exactly identical manner. The map produced before us by the State Government is a detailed plan, prepared with great care. There is no reason to presume that it is not prepared by competent persons on the basis of the relevant material. The map delineates the area declared as sanctuary within the area declared as tiger reserve. The location of listed mines is clearly marked. They fall within the tiger reserve - though outside the sanctuary. A publication by the Forest Survey of India, Dehradun, Ministry of Environment and Forest, Government of India, entitled 'Status of Forest covering in Project Tiger Reserve' has been placed before us. At pages 92-94, we find the map of Sariska Tiger Reserve, Rajasthan. The boundaries, shape and dimensions of the said map tally fully and perfectly with the map prepared by the State of Rajasthan. Thus, there can be no legitimate dispute with respect to the correctness of the map produced by Government of Rajasthan or with respect to the area declared as tiger reserve. Both the state government and central government have delineated it. May be that the declaration as tiger reserve was without any statutory authority and is relatable to the executive power of the Union of India - but notification issued under Section 3 of the environment (Protection) Act puts the stamp of statutory authority over it. The central Government has specifically stated in its affidavit that no "prior permission" was obtained with respect to the mines located within the tiger reserve. On this ground, the mining operations being carried on in the tiger reserve, including the listed mines also appears to be contrary to law. Of course, this notification has come only in May, 1992.

Now coming to the appropriate directions to be made in this behalf, it should be borne in mind that there is a distinction between the listed mines and those mines which are situated outside the protected forest but within the tiger reserve. So far as the listed mines are concerned, the very



grant and renewal of those mining leases/licences is itself illegal. These areas were declared as protected forest as far back as January 1, 1975. If so, no mining lease or licence could have been granted in respect of the mines situated within the protected forest without clearance from the central government as required by Rule 4(6) of the Rajasthan Minor Mineral Concession Rules and without prior approval of the central government under section 2 of the forest (Conservation) Act, 1980. It is an admitted fact that all these leases and licences were granted after 1980. There is also the order of this Court dated October 11, 1991 directing that "no mining operation of whatever nature shall be carried on in the protected area" - (protected area does, without a doubt, include the areas declared as protected forest). The recommendation of the Chairman of the Committee, Shri Justice M.L. Jain is also to the effect that the mining activity in the listed mines should be stopped forthwith. Even with respect to the mines in appendix-B (which partly fall within and partly outside the protected forest areas) the recommendation of the Chairman is that they should be closed to the extent they fall within the protected forest. The central government has also taken the stand that the mining activity in these areas is illegal and cannot go on. As against this is the plea of the Rajasthan Government and of the mine-owners that the area covered by these mines should be allowed to be deleted/excluded from the protected forest in lieu of their offer to include an equal extent of area within the protected forest. We do not propose to express any opinion on this plea of the Rajasthan Government and the mine-owners for the reasons recorded here in before. We would like to have the opinion of the central government on the said plea or proposal, as it may be called. Only there after shall we consider the request of the state government. But as on today, the situation is that the mining activity in the listed mines (according to the Rajasthan government, it has already stopped all mining activities in 54 mines specified in its application) is illegal and has to stop. May be that this will have the effect of bringing to half the activity involving a good amount of capital and a large number of workers. But in view of the inherent illegality attaching to them, indicated hereinbefore, we have no option but to close them. We cannot permit them to operate. If and when the central government recommends the plea of the state

government and any of the areas already declared as protected forest are deleted with leave of this court; can the mining activity go on in these areas. It is accordingly directed that all mining activity in the mines mentioned in appendix-A to the report of Shri justice M.L. Jain Committee shall stop forthwith. Similarly, the mining activity in the mines mentioned in appendix-B to the said report shall also stop forthwith in so far as they fall within the protected forest areas. The plea of the Rajasthan government and of the mine-owners shall be considered by Department of Forest and Environment, Government of India and a report submitted to this court within three months. Within this period it shall be open to the concerned mine-owners to approach the Department of Forest and Environment, Government of India for permission to continue the mining operations in these mines only if the central government permits them and subject to the orders of the central government in that behalf. If no permission is obtained from the central government within the said period of four months, the mining activity in the entire area declared as tiger reserve shall stop and cease on the expiry of four months.

For full text of the judgement please see annexures.

Roads : The following roads run within and through the Reserve:

- The Alwar- Jaipur State Highway No 13 (metalled) along the main valley, through Core Zone- I.
- The Sariska- Kalighati- Tehla road (metalled), through Core Zone- I.
- The Kalighati- Pandupole road (metalled), through Core Zone- I.
- The Khushalgarh- Narayanpur road (metalled) along the Barah Nala.
- The Pandupol- Baleta road (unmetalled).
- The unmetalled road linking Kankwarhi to the Kalighati-

Tehla road, in Core Zone-I.

- Unmetalled roads from Sariska and Karnawas into the forest, in Core Zone- I.
- A number of tracks and paths running through the Reserve.

The highway and most of the other roads are used heavily throughout the year by tourists and others.

Development projects : In Haripura village, funds through the Jawahar Rozgar Yojana were used to build a bund.

Other govt. land- based activities : Rajasthan Transport buses ply inside the STR. A Rajasthan State Electricity Board transmission line affects "one corner" of Core Zone- I [Q-I].

Tourism : Apart from the wildlife, temples within the Reserve are also tourist attractions. There are many temples in the reserve, of which some are in the Core Zone. Of these, the ones at Pandupole and Bharthari are major centres of pilgrimage and the Pandupole- Bharthari route is frequently used by pilgrims. Rights to Religious Yatra are allowed on 20 sq. km. of routes in the Reserve.

In 1989, a total of 58,768 people visited Sariska in the first ten months alone.

There are three places in STR which accommodate tourists:

- Forest Rest House (Forest Dept.) at Sariska.
- Sariska Palace Hotel (private) at Sariska
- Tiger Den (RTDC) at Sariska, occupying 2.5 ha [Q-I].

Approximatwly 5,000 ha. (50 sq. km.) of Core Zone- I are open to tourists and motor vehicles [Q-I].

History - According to the management plan (p 31), during the control of the erstwhile princely State, pedestrian and vehicular traffic through the area was strictly regulated. Pedestrian traffic through the Sariska forests was subject to a toll of one rupee in those days.

Current Status - Sariska Tiger Reserve is becoming increasingly popular as a tourist resort. Visitors to the Reserve are of six types :

- pilgrims to the temples (mainly Pandupole and Bharthari)
- culture-history tourists
- foreigners with general interests
- foreigners with special interests.
- wildlife tourists, researchers and students
- weekenders and picnickers

The presence of a tar road from Sariska to Tehla, through the Core Zone, encourages a number of vehicles to pass through the Reserve everyday [MP].

Quantum of visitor and vehicular pressure - Information regarding the number of tourists (Indian and foreign) staying at the hotels ( Sariska Palace Hotel and Tiger Den) was obtained from the records of hotels, from January 1987 through October 1988.

The number of people visiting the Reserve was obtained from the Reception Centre, Sariska. The only other checkpoint, Tehla, does not record the number of people entering.

Information regarding the number of vehicles passing through the Reserve was obtained from the logbooks at the Sariska and Tehla

checkposts. This included the vehicles which were issued passes and those that were allowed in free, as is the practice, on Tuesdays, Saturdays and Full Moon days. Data was obtained for 1988 (whole year) and 1989 (Jan. through October).

The number of pilgrims visiting the Reserve could not be obtained as most of them do not enter through the checkposts and, as such, no records are available. Any gaps in the information have been mentioned in the relevant data tables.

Schedules were prepared for the interviews with the tourism managers and the tourists (see annexures). The following people were interviewed.

- i) The managers of Sariska Palace Hotel (Mr. Jai Singh) and Tiger Den (Mr. Surendar Choudhary).
- ii) The FD (Mr. Fateh Singh Rathore).
- iii) The Receptionist (Mr. Pande) and the Asst. Receptionist (Mr. Ashok Kumar) of the Sariska Tourist Reception Centre.
- iv) The Pandupole temple priest's son (Pappu)
- v) Seven tourists from Sariska Palace Hotel and Tiger Den (Four Indians and three foreigners)
- vi) A British tour organizer (Canon Jones).

Limitations of the data collected :

- i) The number of people entering the Reserve is recorded only at the Sariska Reception Centre. There is no data available from Tehla.
- ii) The actual number of vehicles passing through the Reserve

was not obtained as only the vehicles running on the Sariska-Tehla road are entered in the log books. There were gaps in the data entered in the log books. This was because the old book had been filled up and there was a time lag before the new one was started, during which no records were entered [Sanjay Gupta, pers. comm.].

iii) The number of pilgrims entering the Reserve is not recorded.

iv) Only the total number of vehicles entering the Reserve was available at the Sariska Reception Centre for 1989. The vehicular type and corresponding numbers were not available. Only the data from Tehla has been used when referring to types of vehicles passing through the Reserve.

Findings : The following conclusions can be drawn regarding tourism and visitor pressures in Sariska Tiger Reserve.

i) Visitors : The number of people who visited the Reserve in 1988 and upto 31st October, 1989 is given in Table 7. In 1988, there were 57,283 visitors (44,164 until 31st October 1988). In the first ten months of 1989, there were 58,768 visitors.

The number of tourists staying at Sariska Palace Hotel and Tiger Den has also gone up over the last three years. In 1987, there were 8,848 visitors. In 1988, there were 12,025. In 1989 (January through October) there were 8,494 visitors. The tourist numbers peak in

December-January and March. There was also a peak, in the occupation rates of the hotels, in July 1988.

- ii) Vehicles : The types of vehicles that entered the Reserve were buses, minibuses, jeeps, cars, two wheelers (motorbikes and scooters), and tongas. The last two have been banned from entering the Reserve since December 1988. Three buses ply everyday from Sariska to Tehla and back (six trips).

In 1988, a total of 14,321 vehicles passed through the Reserve (12,880 in the first ten months). In 1989 (January through October), 11,252 vehicles passed through. The peak season for vehicles was August for both years, possibly because of the temple *melas*. During January and February, 1989, there were fewer vehicles passing through the Reserve compared to the same period the previous year.

As shown in the data from Tehla, there seems to be no significant difference in the number of buses and minibuses entering the Reserve in 1988 and 1989. However, the number of cars and jeeps passing through the Reserve increased by 100% in this period.

- iii) Perceptions :

- a) Tourism Managers

Both of the hotel managers interviewed felt that tourism in the Reserve should be increased as far as possible. Mr. Jai Singh (Sariska Palace Hotel)

also felt that the current level of tourist pressure should not be exceeded from the point of view of disturbing the wildlife. It was not clear how these two points of view should be reconciled.

RTDC has plans of expanding Tiger Den and providing accommodation for 70 people as against the current 44 (a 63% increase). There are no known plans for Sariska Palace Hotel.

Both hotels run wildlife tours, taking the visitors around the Reserve in jeeps and minibuses. The drivers act as guides. The Tiger Den trip also includes a 10 km ride through dirt tracks.

Neither of the two hotels has any specific programme for wildlife education of the visitors. The Sariska Palace Hotel does display books on wildlife and has a small library as well. Films are occasionally shown to interested visitors by an arrangement with the Forest Department.

b) Temple priest

The temples in the Reserve are very popular with pilgrims. About one lakh people visit the Pandupole temple each year [temple priest, pers. comm.]. Pilgrims camp overnight by the temple during the *mela*. This reportedly disturbs the wildlife.

There is opposition from pilgrims and the temple trust to the imposition of any restrictions on



pilgrims entering the Reserve, and a case to this effect has been filed by the temple trust in the Alwar court, against the Project Authorities.

c) Forest Department

**Summary of the Management Proposal for Tourism in Sariska Tiger Reserve**

- 1) A ropeway for pilgrims from Bharthari to Pandupole to minimize human pressure on the Reserve
- 2) A series of Wildlife and Historical tours organized by the Forest Department
- 3) Rerouting of the Tehla-Alwar buses so they don't pass through the Reserve
- 4) Regulating the number and type of vehicles in the proposed Park
- 5) Revised Park timings which remove disturbances for 19 hours each day - this seems to clash with the all day historical tour
- 6) Relocation of four 'guadas' - Kankwari, Umri, Kirashka and Haripura
- 7) Perennial and sustained water supply to the Reserve's waterholes by a pump - underground pipe system
- 8) More information on the Reserve and its rules, to the hotels
- 9) Trained guides for the tourists
- 10) An interpretation centre for visitors, with a reception office, Displays and exhibits, library, audio-visual facilities and souvenirs.
- 11) Research into areas of tourist interest.

There are two permanent staff members, a ranger and a receptionist, for issuing passes to vehicles entering the Reserve, and for managing the Forest Rest House. A temporary Assistant Receptionist is also employed at the Reception Center.

Trucks and tractors have been banned from entering the Reserve (Sariska- Tehla road). A similar ban is applicable to motorcycles and tongas, since December 1988.

There are no pamphlets, maps or booklets on the Reserve for sale at the Reception Center. Field equipment like binoculars cannot be hired either. There are plans to set up an education and information

Center costing Rs. six lakhs. [MP].

A Management Proposal for Tourism in Sariska Tiger Reserve, prepared by the current Field Director, has been sent to the Rajasthan State Forest Department for approval (see box).

d) Tourists

Among the tourists interviewed, no one was specifically interested in wildlife. Most seemed to be weekenders, just relaxing. They seemed satisfied with the facilities at the hotels. The length of visits ranged from a day (morning to evening) to about four days. The people who had been on jeep rides into the Reserve appeared quite satisfied. Perceptions on present facilities for wildlife viewing ranged from being totally unaware of any facilities to wanting binoculars and guide books that could be hired, to wanting to stay overnight at a hide.

Table 8  
Visitors Entering the Reserve

Month	1988	1989
January	4478	7840
February	3950	7039
March	5658	6540
April	2600	3071
May	6500	1629
June	5140	2569
July	3137	8130
August	7192	9810
September	3039	7800
October	2471	4340
November	2473	-
December	10645	-

-----  
 Total : 57283      58768  
 (44165 upto 31st Oct.)  
 -----

Source: Sariska Reception Centre  
 Note: Data not obtained for November and  
 December 1989

Table 9 : VISITORS AT TIGER DEN AND SARISKA PALACE HOTEL

Month	1987	1988	1989
January	695	1370	1308
February	1048	1214	1002
March	1308	1235	1290
April	527	662	700
May	698	535	310
June	444	393	473
July	355	1021	592
August	581	698	772
September	650	918	747
October	830	1342	1300
November	682	1214	--
December	1030	1423	--

-----  
 Total :                      8848      12025      \*8494  
                                  \* (7136) \* (9388)  
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Source : Statistics files at the hotels  
 Note : \* Figures for January through October of that year  
 Figures for November and December 1989 not obtained

Table 10 : VEHICULAR TRAFFIC THROUGH SRT (SARISKA-TEHLA ROAD)

Month	Year	
	1988	1989
January	1846*	861
February	1956*	1087
March	372*	927
April	269*	790
May	1006*	497
June	1213*	773
July	1533	1232
August	2502	2404
September	1223	1827*
October	960	854*
November	801	---
December	640	---
Total	14321	11252

Source: Reception Centre, Sariska; Checkpost, Sariska; Checkpost, Tehla

Note: \* Vehicles entering on Tuesdays and Saturdays not recorded at the Sariska checkpost. Two wheelers and tongas not allowed into the Reserve since December 1988.

Year	Bus	Minibus	Jeep/Car	Two Wheeler	Tonga	TOTAL
1988	133 (151)	97 (99)	631 (761)	238 (328)	114 (157)	1213 (1496)
1989	144	74	1299	-	-	1517

Source: Tehla Checkpoint

Note: 1) Figures are for January through October of each year. Figures in brackets refer to the total figures for 1988

2) Two wheelers and Tongas not allowed on the Sariska-Tehla route since December 1989

3) Vehicle types for Tuesdays and Saturdays not recorded at Tehla checkpost

#### 2.4 SOCIAL

During the erstwhile Maharaja's reign, access to the Reserve was limited to the Maharaja and his VIP guests. After the merger of Alwar with the Union of India, entry was regulated. Some *Guaras* or grazing camps were permitted by the Forest Authorities and the inhabitants of these were allowed to use the resources of the forest in return for services rendered in maintaining it. However, more recently, three of the grazing camps or *guaras* have been shifted out, and two more, Haripura and Kankwari, are slated to be moved [Q-I].

#### 2.4.1 Demography

As per census records, there are 1,941 households with a total population of 12,166 persons living within the Reserve. Of these, 413 households with a population of 2,345 are in Core Zone- I.

#### 2.4.2 Caste

The management plan suggests that all the revenue villages in the Reserve are inhabited by Gujjars (OBC) and Meenas (Tribals), and that there is one Bawaria (tribal) household of five or six members [MP]. The management plan also mentions the existence of Moghia tribals.

#### 2.4.3 Religion

Most of the inhabitants are Hindus, with a few Muslims and Jains.

#### 2.4.4 Livelihood and Economic Levels

Major Powlett had the following to say:

"The people are generally prosperous, it cannot be spoken of as degraded or impoverished. Jats and Meos (Muslims) are generally well off though few are wealthy. Gujjars who live by agriculture are in ordinary circumstances, but some of those who have large herds of cattle often accumulate considerable wealth. Brahmins as a rule are fairly industrious and well to do, and in most of their villages one or two men will be found who lend money. Minas though not less industrious than Brahmins, are less prosperous" [AR 1899].

In the Reserve, people practice agriculture and own livestock: cows, goats, buffaloes and sheep. They sell *ghee* (clarified butter) and dung. The local nomadic communities of Bawaria and Moghia tribals residing on the southern and western fringes of the Reserve are traditional hunters. In addition to hunting for food, they are allegedly

involved in organised poaching of tigers and other animals [MP].

The people living in adjacent villages are primarily agriculturalists and though they keep cattle, this is a subsidiary occupation.

#### **2.4.5 Traditional Skills**

Although basket and rope making is done, this is only on a very small scale.

#### **2.4.6 Village Governance**

Alwar state passed and promulgated the Panchayat Act, in May 1920. According to the Act the Tehsildar nominated the members of the Panchayat from among two permanent residents of the village for a period of 2 years. The 'Panchas' elected a 'Sarpanch' who was responsible for arranging and conducting meetings. The Panchayats were given power to decide some revenue, civil and criminal cases. Revenue cases and civil suits not exceeding, in value, Rs 50, could be decided by the Panchayats. Gram Sabha consisted of the entire electorate of the Panchayat area. Every Panchayat was required to convene the meeting of gram sabha at least twice a year. In 1953, the Rajasthan Panchayat Act was enacted to cover the whole state. Every village, or groups of village having a population of 4000-5000, were formed into a Panchayat. The 'Panchas' were now elected on the basis of adult franchise. There was a provision made for the government to nominate, to the Panchayat, representatives of the scheduled caste, if none were elected. Sarpanchas were directly elected by the electorate of the area [Gazetteer].

#### **2.4.7 Social Interactions**

Most of the villages seem to have a cordial relationship with each other, though there are a few caste based tensions, especially in some of the villages adjacent to the Reserve, like Dabkan and Kalwar. Here the Meenas say that they are being mistreated by the Brahmins and Rajputs. Some tension also seems to exist between some of the villagers and some of the local forest department officials. It is alleged that people living in and around the Reserve take the assistance of the Bawaria tribals to kill animals which damage crops or lift cattle.

#### **2.4.8 Religious and Cultural Activities**

People residing in the area regularly make pilgrimages to the Pandupole and Bharthari temples in the Reserve. A fair is held at Bhartari temple in August every year. At Naraini, near Baldeograh, there is a hot spring and a fair is held there on Baisakhi. It is attended especially by the Nai (barber) caste.

### **2.5 MAJOR PROBLEMS OF THE COMMUNITY**

Paucity of water was identified as the most pressing problem for all the villages, whether adjacent or inside the Reserve. The problem was said to be worse in the villages situated inside the Reserve, where villages like Sukhola had no drinking water source. While handpumps have been provided in a number of villages, most villagers complained that the handpumps do not work.

The other problems that the villagers said they were facing were the lack of schools, roads, and electricity.



### 3.OBJECTIVES OF THE RESERVE

The management plan for the Reserve, for the five year period 1983-84 to 1988-89, lists the objectives of the Reserve. It is assumed that these are the objectives of the Sariska National Park as well, as the National Park is contained within the Reserve and no separate objectives seem to have been mentioned for the Park.

The principal objectives of the Reserve, as per the management plan, are :

- i) To ensure the maintenance of a genetically viable population of tigers in India for scientific, aesthetic, and ecological values with special reference to the outer Aravalli ecosystem.
- ii) To preserve for all times to come, the area of such geological and biological importance of the Aravalli series as a national heritage for the education, recreation and other benefits of the people...

Apart for the above listed principal objectives, there were two other subsidiary objectives mentioned :

- iii) The tiger is a predator and essentially subsists on a wide range of herbivorous prey animals, which in turn subsist on a much wider range of vegetation. Therefore for saving the tiger, the herbivores need to be preserved, and for conserving the latter the vegetation has to be preserved.
- iv) The natural features of great importance including the colourful vegetative cover supported by the Aravalli

system..... are intended to be preserved. For conserving the latter, the vegetation and the whole habitat has to be preserved.

In addition to the stated objectives listed above, an unstated objective seems to be the promotion of tourism.

Sariska also has a rich religious and cultural heritage. Some of the important historical sites which are located in the Reserve include the Kankwari fort, and several temples like Bharthari, Pandupole, and Neelkanth, among others.

## 4. PRESSURES ON THE RESERVE

Conservationists are generally aware of the impact of villages on natural resource and conservation values. Village presence frequently leads to overgrazing, spread of weeds, localised deforestation and erosion, they take over key dry season grazing areas and permanent water, they act as centres of potential disease radiation, fire, illicit cutting and poaching ..... Livestock predation and competition for resources between domestic stock and wild herbivores is the result [Rodgers et al 1987].

The human activities which put pressure on the resources of the Sariska Tiger Reserve and which have led to the degradation of the ecosystem, are mainly mining, human habitation, cultivation, grazing, poaching, and fuelwood and fodder collection. Excessive and unregulated tourism has also become a source of disturbance. These

pressures are described in greater detail below, those emanating from within the National Park (core zone I) separately from those coming from the Sanctuary and the buffer zone.

### 4.1 PRESSURES EMANATING FROM WITHIN THE NATIONAL PARK

Pressures on the ecosystem, form within the Park, are primarily due to human habitation, cultivation, grazing, fuelwood and fodder collection and tourism.

#### 4.1.1 Human Habitation

There are 11 villages within the National Park, of these, a sample of five villages, viz. Haripura, Kirashka, Kankwari, Sukhola and Umri, were surveyed as a part of this study. The findings of the survey are summarised below.

Three of the villages surveyed, Haripura, Umri and Kirashka, are linear villages while Kankwari is a scattered settlement.

Sukhola is a clustered settlement. The houses in all these villages are Kutch, mostly made of materials obtained from the forests nearby, including small timber and bamboo for the roof and the walls, and Butea leaves for thatch.

Gujjars are the predominant inhabitants of all the 11 villages. In the five villages surveyed, 91% of the villagers were Gujjars, while 3% each were Rajputs, Brahmins and Meenas.

On an average, there are seven individuals residing in each household. Except in Sukhola, where there is no source of drinking water, the other four villages have wells and johads. The water table, however, is very low and in most villages and hamlets the wells dry up during the summer months.

Residents of both Haripura and Sukhola say that the area under habitation in their villages has decreased because of migration. Residents of Umri and Kirashka are of the view that the population of their villages has increased. The people of Kankwari felt that there was no change in the population of their village. According to the respondents of all the five villages surveyed, restrictions have been imposed by the PA authorities on the construction of new houses in the village. According to them the PA authorities actually want them all to leave.

History - Most of these villages are old and have existed for centuries. The Assessment Report of 1899 [AR 1899] mentions that kankwari, among others, was even then an old settlement.

Legal status - Of the 11 villages situated inside the park, four are revenue villages while seven are forest villages.

According to the park authorities, the various rights of these villages have been extinguished.

Location - The 11 villages are scattered throughout the Park. Only the Kalighati valley is free from habitation.

Socio-economic linkages and justifications - These villages have existed in their present location from much before the notification of the park itself. Strong commensal and family ties exist among the villagers. Villagers in Umri stated that they have blood relations in Pandupole and Bhartari. The relations within and between villages was expressed as cordial and cooperative. There did not seem to be any obvious caste conflict. One of the reasons for cordial relations existing between these villages could be the common problems they are facing, especially the threat of displacement.

Impact of the villages on the park - According to a study conducted by the Wildlife Institute of India, the impact of these villages was felt on 128.8 sq km of the park, which is 56% of the total park area. In some cases, for example in Kirashka, there was competition among the villagers and the wild animals for water.

Domestic livestock from park villages compete with wild animals for fodder. In Haripura, a wall had been built around the village to limit the grazing areas. However, the wall has been broken down by the villagers and signs of extensive grazing and lopping were seen in the portion of the park adjacent to the village.

Cultivation is carried out in the valley, in areas which are fertile and can support forests. Due to human disturbance in the park, most of the animals in Sariska have become concentrated in the main Kalighati valley leading to overgrazing by wild animals [Rodgers et al 1987].

Management Efforts - The park authorities had drawn up a relocation plan for shifting out these villages from the park. The plan has, allegedly, here rejected by the village people since, according to the villagers, they felt they were not being adequately compensated.

Earlier, during the 1970s, the village Karnawas (Karna ka was) was relocated by the park authorities. There was also an attempt during the same period to relocate the families staying in Kirashka. This relocation, however, was not successful since the people came back and settled down in the same place again.

According to the residents of Kirashka, the reason for their coming back to Kirashka was that the land allocated to them by the authorities was already occupied by some others (see box for details).

As for the compensation package 70% of the men were of the opinion that if displaced they would like to be given land averaging about 14 bighas. 15% said they should be given houses also. 38% of the women were of the opinion that they should be given land while 32 % said they also wanted a house. As to whether their life was changed after they heard that their village was to

be displaced, 44% of the men and women said it had, while 56% said no.

A large percentage of men (50%) felt that they had a happier future if they were allowed to remain in the park, while among the women 37% felt that they were happy to be here while an equal percentage felt that they were not happy here and would like to move. As for their relation with other villages, a high percentage of both men as well as women (62%) said that they had cordial relations with other villagers.

All the households of the five villages surveyed were aware of the relocation of Karnawas. According to them, the relocation was a disaster and all the people of that particular village dispersed to other villages and nearby towns. Further, the people also spoke of the failed attempt to relocate Kirashka village, where the people returned to the same village. The villagers of Kirashka spoke of how their houses were broken down and set fire to by the forest and the police authorities.

According to all the respondent households of the five villages surveyed, the reason for shifting them had been the Sanctuary. According to the village folks of Sukhola village, the forest authorities did not give them any reasons for displacement. On the other hand, most of them firmly believed that the wild animals came to no harm because of them and, infact were protected by them. Some expressed the view that "at least cattle provide milk, what do wild animals provide? so why move us out?"

The people of Sukhola alleged that when Tarun Bharat Sangh, a local NGO, had tried to establish a school they were barred from doing so by the forest authorities. It should be noted that this village has no source of drinking water, resulting in a lot of hardships to the people. Many of the villagers felt that all this was a part of the pressure tactics being used by the Forest Department to get people to move out of the proposed National Park.

When asked whether they would be happy staying on where they were, most felt that they would carry on as they have been doing through the years. However, a number of them did express the desire for greater access to educational, health, employment and market facilities.

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#### RELOCATION PROGRAMMES

Although the intention to relocate villages has been voiced since 1982, when the intention to constitute Core Zone - I into a National Park was declared, a concrete plan has been in existence only since 1987. This plan has been approved by the Collector who is expected to release Rs. 50 lakhs in order to put the plan in operation.

Briefly, this plan makes provision for the following :

- a) 5 'bighas' agricultural land to each 'family (all male members above 18 years of age) regardless of how much land they presently own, and even if they own none.
- b) 500 sq. yards for setting up dwelling structures.
- c) Different levels of compensation for existing structures, depending on the size and materials used.
- d) Infrastructural facilities to be provided before hand, including a well, a school, bio gas plants, lavatories etc.
- e) Those presently having agricultural wells will be given Rs. 25,000 in lieu.



The fact that the villages in Core Zone - I are slated for shifting, was known to all the villagers spoken to. They were unclear as to when this would take place, where they were to be taken to and what they would get in terms of compensation.

Inhabitants of different villages seem to have been informed of their having to move out at different times - Kirashka as far back as the mid 1970s (when an actual attempt to forcibly shift it out was reportedly made), Haripura 7-10 years back, Pilapani and Kankwadi 2-5 years ago. The villagers had apparently been given only vague reasons for being asked to shift - "the Government wants to keep animals here." None of them found this to be a justifiable reason, since they firmly believed that the wild animals came to no harm because of them, and were in fact protected by them.

#### Willingness to move

There was an overwhelming antipathy to the idea of being displaced. There were, however, various shades of this feeling. Some, especially the elderly and the women, expressed complete opposition to the idea, rejecting any offers of good resettlement. However, the majority of those antagonistic to displacement, when pressed further, seemed to accept it with certain conditions. The reasons for their antipathy were many. They expressed a feeling of security in their present abodes, even though they admitted to severe hardships. For the pastoralist of all villages the forest was a great source of security, as was the fertile land for the cultivators of Kirashka. Most felt that these could not be adequately replaced elsewhere. Villagers at Haripura were strongest in their expressions of security - they felt that water was adequate even in times of drought, their livestock had enough to eat (before the wall came up), and proximity to Sariska ensured convenient access to markets and other facilities. Many villagers in each settlement also talked of social relations within and between villages, e.g. the trust that allowed free give and take of goods and services, and expressed apprehension that these would be disrupted if they were displaced, some feared hostility from host populations at their resettlement sites. A strong and common sentiment expressed was that livestock would not survive the displacement, especially if it was to an area with little forest. And if that happened, they themselves would perish, so dependent on and close to their livestock they were.

#### Opposition

A number of those opposed to displacement expressed a readiness to fight against it. Most, however, were more willing to struggle for a good resettlement. There were also those who simply expressed helplessness in front of the Government's might. But while the predominant attitude to resettlement was negative, there were a few significant exceptions. A couple of families in Haripura, for example, were quite willing, almost eager, to move out if given

adequate land elsewhere. These families also expressed insecurity in their present abode, recounting with bitterness their misery during the drought and alleged continuous harassment at the hands of the forest staff. They were perhaps the only villagers who also stated that they had no problem getting separated from the rest of the village, provided about 4-5 households were resettled together.

#### Past experience

Antagonism to the idea of displacement also arose from deep mistrust of the Government. This in turn was a result both of the villagers' personal experiences of the past, and of knowledge of the experience of others who had been shifted earlier - Inhabitants of all the villages knew of the disastrous resettlement of Karnawas (Karna ka was) in the 1970's - "they have been ruined" was the common response to the team's question on what had happened to those oustees. The villagers of Kirashka also had personal experience of this - some 12-14 years back the Government cancelled their pattas and asked them to move, and the District Collector reportedly promised them 16 bighas of land per family. Some of them were shown land at a place called Sirawas, but it was rocky and unproductive, and was rejected. Nothing happened subsequently. At the hamlet of Jodi, part of Kirashka village inhabitants narrated an incident when several hundred policemen with some forest staff came and broke up their houses and smashed their belongings, threatening them with worse if they did not leave. This was reportedly some 12-14 years ago.

#### Basic demands

Having knowledge of the experience of the ousters of Karnawas, the villagers were insistent that the resettlement should take place only after land had been identified, prepared, assessed for quality, and pattas issued, all to the satisfaction of the villagers. They also demanded the provision of adequate water sources and housing. Most were very clear that they would not move to a non-forested area since their livestock would not survive. At Haripura a demand to construct a new temple at the resettlement site was also made. When pastoralist were asked how they would take up cultivation, most expressed confidence at being able to learn it quickly, though some women were skeptical.

When asked what sort of resettlement would be acceptable if they had to move, most villagers had a common demand - adequate land. They had been told that each family would get five bighas of land, they thought this meant the entire joint household and felt that the amount was grossly inadequate. There was however no consistent reply as to what was adequate - assessments varied from minimum 10 bighas per adult male's family to a minimum of 100 bighas for the whole household (which could consist of 2-4 nuclear families). Many villagers spoke about places around the Reserve where they would prefer to be shifted, some seemed to have fairly detailed knowledge

of such alternative sites. Very few, however, thought that these sites had adequate land for the whole village to resettle together, which for them was a basic requirement.

#### Impact of delay

There were also indications of development work having been affected due to delays in implementing the plan for relocation. Many villagers claimed that they had thought of converting their 'Kuchha' houses to 'pucca', but decided it was futile to make the investment if they were to be displaced anyway. Perhaps worst affected was Kirashka where 'pattas' to land ownership were cancelled due to impending displacement, some 12-14 years back, and have never been returned. At Kankwadi, plans to build a school were reportedly scrapped and one hand pump removed. But there are also examples of work going on regardless, at Haripura for instance, villagers have managed to get funds from the Panchayat to dig a pond and even commenced work on their own expecting to finish within the year.

#### **4.1.2 Cultivation**

The only village supposedly practising agriculture in the Park area is Kirashka. However, during the field visit the inhabitants of Kirashka said that they had been prevented from practicing agriculture for the past three or four months. The fields looked barren and dry and not cultivated.

Earlier field studies showed that cultivation, where practised, was completely rain fed. The crops said to be grown were jowar, bajra, wheat, corn and mustard. According to the villagers, if the rainfall is normal, two crops are harvested. It was also seen that inputs like chemical fertilizers and pesticides were not used and ploughing was not mechanised.

History and trends - Cultivation was stopped in the Kankwari valley by the park authorities about 25 years ago. The survey of five villages shows that agriculture is not practised in any of these villages, except for Kirashka where, although agriculture was

not being practised at the time of the survey, they do practice it during the rainy and winter season.

Legal Status - In Kirashka, people had 'pattas' for their cultivable land. However, these pattas were reportedly cancelled when an attempt was made to relocate this village during the 1970s.

Location - In Kirashka, the fields are situated around the 'Johad'.

Impact of cultivation on the Park - Apart from changing landuse, agricultural activities within the park can introduce exotics, can change animal's feeding habits, can deplete water resources, and also result in soil erosion. However, currently the cultivation within the Park is so minimal that no significant impact was observed.

Management effort - Periodically efforts are made to stop cultivation within the Park.

#### **4.1.3. Grazing**

Most (90%) of the people living inside and in adjacent areas of the park own livestock, mainly buffaloes, cows and goats. Since the only substantial grazing grounds left in the area are inside the Sariska Tiger Reserve, especially in the National Park, much of the grazing pressure gets concentrated there. As 92% of the inhabitants of the park are pastoralist, grazing is a frequent activity. Most of the inhabitants are Gujjars, who are traditional graziers.

History and trends - Pastoralism has been practised for a number of years by those living inside the park. However, according to the forest authorities, in recent years many of the people living within the National Park have begun keeping more goats than

buffaloes. The reasons for this are not known. (Interestingly, the field survey of five villages did not show this trend).

Legal Status - The grazing rights of the villages inside the park have been extinguished. The inhabitants, however, continue to graze their cattle in this area. In addition, illegal grazing by livestock belonging to villages in the adjacent area of the park also takes place inside.

Location - Only 71 sq km inside the park is relatively free from grazing [Rodgers et al 1987]. Grazing takes place in the rest of the park as well as in the buffer zone. During the survey of the five villages situated inside the park it was found that villagers travelled about 1 km from their villages to graze their cattle. Grazing is usually done in the park area but also in the buffer zone. According to the respondent households of Umri and Sukhola, apart from grazing in the Park, fodder is also collected from there for stall feeding the cattle.

Extent - The villagers living inside the park own a substantial number of livestock. On an average every household owns 1 cow, 2 buffaloes and 2 goats. In addition, there is a cattle population equal to nearly one lakh cow units in areas around the Tiger Reserve [IDPS].

Grazing takes place throughout the year and stall feeding of cattle is rare, except in Umri and Sukhola, where the villagers also stall feed the cattle. Villagers of Sukhola stated that, because of the forest being far away, they stall feed their cattle in addition to grazing them.

Socio-economic linkages and justifications - Pastoralism is one of the two major occupations of people living within and around the park. For many households (71%), pastoralism is the only

occupation while casual labour and cultivation are alternates for 4% and 25% (Kirashka) respectively. In Sukhola, the people expressed their anger at not being allowed to graze goats.

Impact of Grazing on the park - Extensive grazing by livestock has significantly degraded the forests and grasslands of Sariska. Areas around villages like Kirashka, Kankwari and Umri are heavily degraded and barren. Apart from degradation, the other effects of grazing are spread of diseases of cattle to wild animals, scarcity of fodder for the wild animals, and the spread of weeds like Argemone mexicana, especially around Kankwari and some of the other villages. Grazing has also resulted in soil erosion and trampling.

A disastrous epidemic of Haemorrhagic Septicaemia depleted the population of Sambar in 1971. Other epidemics like that of Foot & Mouth disease and Rinderpest have also spread in the Reserve through domestic cattle. At the time of the field survey Hemorrhagic Septicaemia (locally called galgotoo) was prevalent in most of the villages.

However, none of the villagers felt that grazing has led to a degradation of habitat. Infact, according to them, grazing as well as lopping helps to regenerate the forests. Further, they felt that their living in the core area of the Reserve has infact helped the forests to grow and regenerate as, according to them, it is they who actually protect the forests. A number of villagers gave instances of how they had stopped forest fires from spreading to them, it is they who actually protect the forests. A number of villagers gave instances of how they had stopped forest fires from spreading and how they had helped the forest authorities in catching poachers.

Management Efforts - In Haripura, the park authorities have erected a brick wall to confine cattle grazing in an area of 1 km around the village. In addition, illegal graziers are arrested and their cattle impounded.

#### **4.1.4 Extraction of Fuelwood**

The primary cooking fuel for most people living in and around the park is wood. Consequently, a large amount of lopping, cutting and deadwood collection takes place in the park.

From the survey it was gauged that 70% of the households collect fuelwood from the park. On an average, 11 kg of fuelwood per day, normally dry wood, is collected per household. The daily requirement of fuel is high with households requiring upto 21 kg per day. The other fuels used domestically are dung (75%) and kerosene (25%).

Legal Status - Though the rights of villages in the park, for collecting fire wood, have been extinguished, rampant fuelwood extraction continues. However, 17 villages in the buffer zone continue to have rights of fuelwood extraction.

Extent - Fuelwood is collected throughout the year from all over the park, except for 71 sq km [Rodgers et al 1987].

Impact of Fuelwood Extraction on the Park - The entire park, except for areas within and around the Kalighati valley, has been subjected to excessive lopping and/or deadwood collection. Consequently, villages like Kirashka and Kankwari have barren wastelands all around. This excessive lopping and cutting of trees has resulted in decrease in forest density and cover, and stunted and irregular growth of trees. The removal of dead wood has resulted in loss of biomass from the park.

#### **4.1.5 Fodder collection**

Although grazing is widespread, fodder is also collected, especially by residents of Sukhola village, as they live some distance from the forest. Villagers also buy an average of 1600-2000 kg of fodder per annum, per village. An average of 30 kg fodder is consumed per day in each household, while 45 kg per household is collected during the season. The surplus is stored and sometimes sold.

Legal Status - According to the inhabitants of the five villages surveyed, their right to collect fodder from the park has been extinguished. Consequently, all collection is done illegally. According to the villagers, if caught they are fined and also have to resort to giving bribes.

Impact of Fodder Collection on the Park : Collection of fodder from the Park negatively affects its availability for wild animals. It also degrades the ecosystem, especially the grasslands and the forests.

#### **4.1.6 Tourism**

Inappropriate and excessive tourist activities are another threat to the park. These have been discussed in detail earlier, in section 2.3.8.



## 4.2 PRESSURES EMANATING FROM AREAS ADJACENT TO THE PARK

Besides core zone-I and the 11 villages within, there are two other zones in the Sariska tiger reserve. Core zone-II of 12,650 ha. (126.5 sq km) is located to the north of the proposed National Park with one village inside and core zone-III of 9750 ha. (97.5 sq km), to the south, also has one village inside.

The remaining 30,220 ha. (302.2 sq km) is the buffer zone of the Reserve. There are 21 revenue villages in the buffer zone with rights of habitation, cultivation, fuelwood collection, and grazing.

For the purpose of the field survey the area was divided into four geographical zones : north east, north west, south east, south west. The field survey done in these areas has revealed that the villages in core zone II and III and in the buffer zone extensively use the buffer zone for grazing, fuelwood and fodder collection, and cultivation. Further, there have been little or no management inputs to control or reduce these pressures. All this has left the buffer zone of the STR in a severely degraded state.

### 4.2.1 *Grazing*

A very large number of households own buffaloes, cows and goats. The number of buffaloes each household owns varies from 2-6, cows between 1-2 and goats between 6-20, in all the four geographic zones of the Tiger Reserve. Consequently, as fodder is usually available inside the Reserve, grazing is extensively done within the reserve area as also in the proposed National Park.

Legal Status - Grazing is allowed in the buffer zone but not in the National Park.

Location and extent - A large amount of grazing takes place in the buffer zone of the Reserve. However, in the villages situated to the south east, grazing is less in the buffer zone and more in the village area itself. Although present, the degree of grazing is less in the Park area than in the remaining parts of the Reserve [fv]. The north west and north east parts of the Park are grazed more often because of their proximity to the villages. Villagers usually go to a distance of 5 km from their village for grazing their cattle. This would make the buffer zone accessible to all the villages and for villages situated in the north east and north west, it would also mean that a part of the Park area is also accessible. Some villagers, especially in the south west and south east, travel distances from 3-10 km for grazing their cattle.

Periodicity - Grazing commences with the monsoons and lasts till October. The survey showed that 56% of the households in villages situated in the north east, north west and south west graze their cattle during the monsoons. However, households in villages situated in the south-east stated that most of them grazed their cattle throughout the year, with only 14% grazing only in the monsoons.

Socio-economic linkages and justifications - Pastoralism is one of the two major occupations of people living in and around the Sariska Tiger Reserve. Most of the households surveyed reported that pastoralism has been their occupation for generations or since

their village was settled. Apart from using the milk and other livestock products themselves, the villagers sell *ghee*, *khoya* and goats. Milk is not ordinarily sold as it is highly perishable and there is no market or cooperative close by.

Impact of Grazing on the STR - A number of households of the villages situated in all the four geographic zones of the STR felt that grazing has little negative impact on the forests of STR [fv]. On the contrary, they felt that it actually regenerates the forests. However, field investigations showed that much of the STR was badly degraded because of over grazing.

#### **4.2.2 Fuelwood Collection**

Wood is the major source of fuel used by villages situated in and around the Sariska Tiger Reserve. A fair percentage of households (38%) in all the four geographic zones of STR collect more than 30 kg fuelwood per week from STR. The fuelwood collected by a household is only marginally less in the south west of STR where most respondents said that they collect 25-30 kg of fuelwood per week. The daily requirement of fuel wood is quite high especially in the north west and north east where the villagers use more than 10 kg fuelwood per day. A large percentage of households also buy fuelwood in addition to what they collect, except for those villages situated in the north east of STR. A large amount of agricultural residue is also used as fuel, besides dung cakes which are also used as manure. Kerosene is used quite frequently by households of villages in the south east of STR, perhaps because of their greater access to markets. It was also

noticed that corn cobs are used as fuel, especially by villages in the south east direction of STR, like Kalipahari and Bajheda.

Legal Status - 17 villages in the buffer zone have rights of fuelwood extraction. The villagers say that they only collect dry wood. According to them though collection of green wood is not allowed in the Reserve, trees are cut by outsiders and organised groups who come from various towns and cities around the Reserve.

Location and Extent - Fuelwood is collected from all over the buffer zone of the STR. Earlier survey reports indicate that it is also collected from the National Park. According to the Integrated Development Plan for STR:

"Approximately 300 headloads of fuelwood are brought to Thanagazi, Tehla and Akbarpura villages everyday" [IDPS].

Impact of Fire Wood Collection on STR - Heavy lopping and cutting of trees, and collection of deadwood, takes place all over the Reserve but especially in the buffer zone. Consequently, the buffer zone of the Reserve is heavily degraded and disturbed, affecting the habitat of wild animals residing there. According to the villagers, the forests are depleting more due to scanty rainfall than because of fuelwood collection, grazing and fodder collection. However, there is much physical evidence of cut and lopped trees in the buffer zone. Excessive lopping has resulted in stunted and irregular growth of trees.

#### **4.2.3 Fodder Collection**

Fodder collection is usually done by lopping leaves from trees or collecting grass. As stall feeding is a usual practice in the

villages situated in and around the Sariska Tiger Reserve, fodder collection is done on a large scale. Excessive collection in and around the villages (which includes the lopping of trees for fuelwood) has resulted in the areas surrounding most villages becoming barren and devoid of trees and shrubs. According to the survey, the village area was the main area where fodder collection is undertaken. Though in the south west of the reserve, an equal percentage of the villagers collect fodder from the buffer zone as well, collection of fodder in the north west is done mostly in the village common lands and by only 2% of the households.

Extent - All the sample households of villages situated in the four zones, except for the south east, said that they collect less than 30 kg of fodder per week. This is slightly higher in the south east where a sizable percentage of households collect between 30-50 kg per week. While most households buy more than 1000 kg of fodder per annum from the market, in the south east as also in the south west, the percentage of households buying fodder is comparatively low.

Distance covered for collection of fodder is less than 2 km, which would imply that most households collect fodder from in and around the village and also the peripheries of the buffer area.

While most villagers clearly stated that the amount of fodder was not enough for their requirements, respondents from villages situated in the south west of the reserve said that they were content with the amount of fodder they collect.

Collection takes place throughout the year but more during the summer season when availability of grass is minimal in the areas adjacent to the village.

Socioeconomic Linkages and Justification - Fodder collection has been undertaken for generations in nearly all the villages situated in and around STR.

#### *4.2.4 Extraction of Other Natural Resources*

Timber is the other major resource extracted by the villagers from STR. The survey revealed that 76% of the households in villages situated in all the four zones of the Reserve are involved in the collection of timber. According to the inhabitants of these villages, timber is not sold but only used domestically.

Other non timber forest resources (NTFP) are also extracted. 24% of the households in all the four zones collect other house building material. These include stones, clay, twigs, leaves and small bamboo poles.

Extent - Most households (80%) collect more than 100 kg timber per annum, although collection of more than 150 kg per annum is reported in the south west of the Reserve (77% of the households surveyed in the south west said that they collected 150 kg or more). The distance covered for extraction is less than 5 km in most cases. Most of the households renovate their *kucha* houses every five years with materials collected from STR.

### HISTORY

"Most of the wood and grass reserves were established by M.R. Partap Singh. They comprise a large portion of the hilly tract west and south-west of the city ; but, as appears from the above, reserves exist in all parts of the State. The person at the head of this department is Darogha Sheo Bakhsh. Under him are a number of writers (*mutasaddis*), keepers (*rundias*), and rangers (*phirinals*) maintained for the protection and management of the reserves.

Plough wood is usually given gratis, but old ploughs have to be given back; and small cess and a certain amount of grain and fodder is collected from the neighbouring villages of each reserve by the forest officials.

Wood for other agricultural purposes is supplied at the following prices:

	Rs.	An
Clod - leveller ( <i>Mez</i> ) of "babul"	1	4
Clod-leveller ( <i>Mez</i> ) of "khejra"	0	8
Well-wheel stand ( <i>Dabna kucha</i> )	5	0
Well-wheel stand ( <i>Dabna pucca</i> )	2	8
<i>Mahchak</i> , on which the well-masonry stand ( <i>Dhauk</i> the best wood for this)	5	0

Where wood is suitable for charcoal around Rs. 2 an axe is levied from the cutters.

Uncut fuel has been charged to the railway at from Rs. 2-8 to Rs. 10 per 100 maunds.

For fencing, 5 seers of grain per bigha has been taken, and the same, plus a bundle of fodder for "donchi," or erection for crop-watchers. The village chamars supply shoes to the rangers, for which they receive the bark of trees in exchange. Rangers, & co., also get food from villagers on occasions of marriages, and they have other advantages, which seem to vary in different places. In some localities, where wood is plentiful, cess and prices are lower than those mentioned, and people are allowed to cut wood for burning lime and for other purposes. Villagers are usually not prohibited from picking up dead wood, but sometimes it is sold at about 10 maunds for a rupee. Raj servants are allowed wood and *dhauk* leaves from the reserves for marriages, but special permission has in each case to be obtained.

The arrangements for cutting and storing the grass vary. In some places the zamindars employed to cut it receive half. In some the cutting is apportioned off to certain neighbouring villages, who receive on an average Rs. 1 for 25 maunds on completing the operation. Occasionally the cutting is performed through a contractor.

Heavy losses are frequently sustained from the jungle fires in the hills, which spread to ricks in their neighbourhood." [AR]

#### 4.2.5 Other Impacts of the People on STR

A very large percentage of the respondents (91%) said that they were not responsible for the degradation of the Reserve. Infact, many of them felt that their presence actually regenerates the forests. Only 7% of the respondents felt that the forests were receding because of the habitation of villages in and around the Reserve. As for going to religious places like Pandupole and Bhartari, 90% of the respondent households from all the four zones said that they visited these places once or twice a year. The route to these pilgrimage centres is via the Reserve as also through the National Park.



### 4.3 IMPACT OF HUMAN ACTIVITIES ON THE HABITAT

An assessment of the habitat quality of the Reserve was done with the objective of finding out the impact of human pressure on it.

The areas assessed included village pockets inside the Core Zone, the Core Zone - Buffer Zone boundary and parts of the Buffer Zone.

Methods used to assess habitat quality included the two step transect method and visual surveys.

#### 4.3.1 Buffer Zone

The Buffer Zone appears to be degraded throughout. Observations at Siliserh, Kalachara, Udhaynath and Karnakawas showed that the habitat quality was uniformly bad in these four places. It also appeared that there was a lack of Buffer Zone management by the Project Authorities.

##### Eg.1 Kalachara

Kalachara is a revenue village in the Buffer Zone, on the Kushalgarh-Narainpur road.

The land for 2 km around or more was bare and almost treeless. Tree density was about 2 - 4 for a 10 m radius. The trees were mostly *Butea monosperma*, all badly lopped. Bushes of *Ziziphus* spp. were all less than 50 cm. *Adhatoda zeylanica*, *Calotropis* spp. and *Indigofera* spp. were also present. Grass cover was less than 5%.

The livestock from this village is sent out to graze every day. The women and children make two and a half hour treks into the jungle to carry back headloads of fuel and fodder.

Eg. 2 Siliserh area

The slopes behind Kishanpur village, a little to the South of it, in the Siliserh area, were surveyed.

Along the lower contours, the trees were mainly *Anogeissus pendula*, (about 3 m in height) and *Butea monosperma* (3-4 m in height). Both were lopped to a considerable extent. Almost all the *Anogeissus pendula* trees were coppices. Tree density was approximately 10-15 trees per 10 m radius. The other trees present were *Capparis sepiaria*, *Acacia senegal* and *Acacia leucophloea*. Undergrowth included *Adhatoda zeylanica* (20-25/10 m radius), *Ziziphus* spp. (18-24/10 m radius), and *Salvadora oleiodes*.

Grass cover was around 10-15% and grass height between 0-10 cms.

A typical trend in lopping noticed was that trees (mostly *Anogeissus pendula*) were lopped and the branches left at the site. It was not possible to confirm if the wood was abandoned, or left to dry, or if the villagers had evolved some sort of territorial rights to the various areas of the buffer zone.

Animal droppings were observed. Some wildlife dung (unidentified) was also observed.

Further up, the height of *Anogeissus pendula* was greater (3.5 - 4 m). Both *A. pendula* and *Acacia senegal* were the prominent tree species. *Adhatoda zeylanica* slowly thinned out with altitude. Tree density mid way up the slope was about 10-20 trees/10 m radius.

Grass cover was around 10-15% and was better than lower down. Grass height was over 10 cm. The ground was generally rubbly with a lot of paths criss-crossing each other indicating that the area is frequently used.

*Boswellia serrata* grows in the upper third of the slope. Grazing signs were not observed, but lopping was observed on *B.serrata*.

A hare and a family of Bush Quails were seen.

No tree regeneration was observed in this area.

A boundary wall of small boulders exists across the foot of the slope - apparently this was used as a means to separate forest areas allotted to the various villages during the merger of the princely states. Although this wall is not in use currently, it does have management potential if the Forest Department goes into active Buffer Zone management.

## VILLAGES IN THE BUFFER ZONE

Besides Core Zone - I and the 11 villages within, there are two other Core Zones in the Reserve. Core Zone - II of 12,650 ha. (126.5 sq km) is located to the north of the proposed National Park with one village inside and Core Zone -III of 9750 ha. (97.5 sq km) to the south also with one village inside. According to the authorities these zones are presently existing only as management concepts, more specifically as buffer zones to the proposed National Park. The basis for deciding the boundaries of these zones is not known.

The remaining 30,220 ha. (302.2 sq km) comprises the actual Buffer Zone of the Reserve. There are 21 villages in this zone but the total human and livestock populations are not known. All 21 are revenue villages with rights of habitation, cultivation, fuelwood collection, grazing etc.

Although no systematic assessment of the state of the Buffer Zone was carried out, there appeared to be enough evidence to believe that, on one hand the area was being extensively used by villages in this zone and also by those adjacent to the Reserve, to meet their local needs. On the other hand little or no management inputs to control, or reduce, these pressures have left the Buffer Zone in a severely degraded state.

A training exercise in rapid habitat assessment methods, in the area around Siliserh lake, indicated a high level of grazing and lopping but very little evidence of wildlife. Several trees had been lopped, often wastefully, with most of the leaves being left unutilised. The proximity of the lake for water along with grass, shrubs and trees on the hillside for fodder, made it a convenient area to graze livestock. Fuelwood and fodder were being extracted by villagers even at the time of the visit.

An old rubble wall, broken at several places, was explained by the locals to have been erected many years ago when land rights of the Maharajah of Alwar were settled. These walls had for sometime thereafter indicated the area of forest land given to each village to meet their local needs. Now they have fallen into disrepair and almost no one paid any heed to what they were initially meant to demarcate.

On another occasion an attempt was made to observe the extent of impact of Haripura village, while moving out towards the Buffer Zone in the direction of Udainath. It was seen that the impact tended to decline while still in the Core Zone then rose again sharply as one got closer to the Buffer Zone. The presence of a wall demarcating the two zones did not seem to have made a significant difference in the use of the forest by people living adjacent to the Reserve.

This was confirmed on a visit to Amara ka Bas village outside the Reserve 3 km from Udainath. All the families in the village had agricultural land and their incomes were further supplemented by keeping livestock for sale of milk and other by-products. They had no rights to the forest, which began 2 km away at the Reserve boundary, but reported that they frequently went there for collecting fuelwood, house building and repair material and grazing.

#### 4.3.2 Core Zone

The areas around villages in the Core Zone were badly degraded, judging from assessments at Haripura.

Lopping and grazing were evident. Ground cover was 0-5%. The presence of a boundary wall did not seem to have much effect in preventing habitat usage in the Core Zone.

Villagers were seen moving about freely in the Core Zone area. On one occasion, two women from Haripura were observed in the Core Zone, with headloads of grass, just cut. Apparently, this is quite a common practice.

#### 4.3.3 Core Zone - Buffer Zone

The Core Zone is being encroached into by villages in the Buffer Zone, for lopping and fodder cutting purposes. For

instance, at the Udhaynath boundary wall, habitat quality in the Buffer Zone, and for 1.9 km into the Core Zone from the wall, is

Core Zone - I of the Reserve with an area of 27,380 ha. (273.8 sq km) constitutes the proposed National Park. There are 11 villages (4 Revenue and 7 Forest) in this zone with a total of 304 families, though the exact population figures are not known. Comprising largely of the main Sariska - Kalighati valley, Core Zone - I contains the best stands of dry deciduous forests in the Reserve, as well as some of the highest concentrations of wild animals.

Grazing, lopping, collection of fuelwood and minor forest produce, fodder and small timber extraction are the main pressures on the forest of this zone. The WII has conducted periodic studies and training exercises in the Core Zone and their results have shown a steadily increasing impact on the habitat. For example, data collected over a period of one year from 1984-85 for Haripura and other villages suggest a rough circle of 2 km radiating out from the settlement site where the impact is most severe. When this is applied to all the villages in and around the Project Tiger Reserve area of 800 sq km, it leaves only 71 sq km 'free' of any kind of disturbance. [Rodgers et al., 1987]

the same. The *Butea monosperma* trees all showed bad signs of lopping, undergrowth was markedly less than the preceding section of forest in the Core Zone and grass height was about 0-10 cms.

The presence of a boundary wall does have an effect on habitat usage as seen in Karnakawas. There was a marked difference between Core Zone and Buffer Zone here. It was evident that the Core Zone had regenerated since the village relocation in 1975. The habitat quality in the adjacent Buffer Zone was poor (see Boxes below).

Core Zone - Buffer Zone Comparison in Karnakawas

	Core Zone	Buffer Zone
Tree Lopping	Absent	Present
<i>Ziziphus spp.</i>	> 1 2 m in height, full of fruit	< 50 cms in height, few fruit
Grass height	50 cms	< 5 cms
Ground cover	15-20%	0-5%
Presence of cattle dung	Absent	Present

HABITAT ASSESSMENT OF CORE ZONE - BUFFER ZONE AT KARNAKAWAS

(2 Step Transect Method)

ZONES	Grass	Litter	Bare Ground	Dung
CORE	18%	54%	26%	Absent
BUFFER	11.7%	43.3%	36.7%	5%

## VILLAGES IN THE CORE ZONE

### Past and Existing Rights

None of the 5 villages in Core Zone - I visited by the team had any existing rights to forest resources. However, the villagers claimed that they had not been informed that their earlier rights had been extinguished. In any case, they were still using the forests to meet their basic needs. All the villagers stated that before the area was declared a "sanctuary many years ago" they had full rights to the forest.

They could also freely graze their livestock for a fee, till about "3 to 5 years ago". Access to the forest is now limited to areas immediately adjacent to these villages. In the case of Haripura, a wall has been built by the Reserve authorities to enforce this restriction. In the case of Kankwadi and Pilapani, cultivation by villagers on the bed of the reservoir below Kankwadi fort and around it had been forcibly stopped about two decades ago.

There were complaints of Forest Guards confiscating livestock and levying arbitrary fines even when cattle had not strayed into areas restricted from grazing (See also section 'Offences'). Earlier the fines ranged from Rs 4 for goats to Rs 11 for cattle. As of 1989 the fines went up to Rs 51 for all livestock.

## 5. IMPACT OF THE NATIONAL PARK ON THE LOCAL PEOPLE

Most often, studies on human interactions around wildlife protected areas focus only on the impacts that the local people have on the PA. What is thereby forgotten is that the setting up and management of the PA also has impacts, sometimes significant negative impacts, on the lives of the local people living in the area. The major negative impacts of Sariska National Park, on the people living in and around, are:

- i) Loss of livestock due to predation by wild animals.
- ii) Damage to crops due to wild animals.
- iii) Restriction of access to biomass and other resources within the PA.

## 5.1 VILLAGES INSIDE THE NATIONAL PARK

As already mentioned, there are 11 villages inside the National Park. Of these, a sample of five were surveyed for this study. Some of the major impacts of the National Park, on these villages, are described below.

### 5.1.1 *Cattle Lifting*

The five villages surveyed all reported incidence of cattle lifting. 57% of the respondent households in these five villages reported cattle lifting by wild animals. According to 75% of them the incidence of cattle lifting occurred more during the rainy season. Further, in most cases the cattle had been lifted while they were grazing. 86% of the respondent households said that the incidence of cattle lifting had increased during the past three-four years. As for predators, 69% said it was the tiger while 31% said it was the tiger and the leopard which lifted cattle. 75% households said that cattle lifting took place in the Park area while 25% said it took place in the buffer zone. As for compensation, 86% said that they had not asked for compensation because they did not know whom to ask. All the respondents said that they did not receive any compensation.

### 5.1.2 *Crop Damage*

Except for Kirashka, none of the villages surveyed practised cultivation. Even in Kirashka, at the time of the survey agriculture was not being practised. However, according to the villagers of Kirashka, when they grow crops 85%-90% are eaten up by animals such as the nilgai and the wild boar.



### **5.1.3 Restrictions on Grazing**

All the respondent households (100%) of the five villages surveyed said that restrictions are imposed on grazing of cattle in the Park. Many respondents said that they had to constantly and frequently bribe the forest guards to let them graze their cattle. According to the respondents, the problems arising out of these restrictions were shortage of fodder for the cattle, fines and bribes, and constant harassment by the forest authorities.

### **5.1.4 Restriction on Fuelwood Collection**

Nearly all respondents of the five villages surveyed said that there were severe restrictions on collection of fuelwood. This was especially so with green wood. 40% of the households said that they were not even allowed to collect deadwood. Fines, according to the villagers, ranged from Rs. 100 to Rs. 500. Constant harassment, especially of the women folk, was a common complaint.

### **5.1.5 Restriction on Fodder Collection**

Like fuelwood, villagers complained of restriction on fodder collection too. However, fodder collection is not done on a large scale as most of the villagers send their animals to the village forest or the Reserve for grazing.

## **5.2 VILLAGES IN THE ADJACENT AREAS**

There are 23 villages in core zone II and III, and in the buffer zone. The deprivations that inhabitants of these villages feel because of the PA are described below.

### 5.2.1 Crop Damage

A very high percentage of the respondents (92%) from all the four geographic zones complained that their crops were regularly damaged by wild animals, especially by the nilgai. Most of the households (60%) felt that the damage caused by wild animals was more than 50%, and 91% of the households were of the opinion that the damage to their crops has increased in the last few years.

Nearly all respondents felt that it had increased since the sanctuary was made. Consequently, there appeared to be hostility among the villagers towards the PA.

As for steps taken to keep away wild animals, the bursting of crackers and making other noises was the most popular method used by the villagers (55%). A fair number of households considered killing animals as the best way of protecting their crops. However, in light of the stringent rules regarding killing of wild animals in the Reserve, most of them expressed their inability to do anything about the problem. This was especially so among the villages situated in the south west of the Reserve.

Compensation was also an issue here. People claimed they were not aware of compensation rules. In most cases (96%), compensation was not asked for and in all cases (100%), reportedly none had been paid. One of the reasons for not asking for compensation, which was repeatedly cited by most respondents (68%) was that nobody listens to them.

Effects of crop damage were found equally in all the four geographic zones of the Tiger Reserve and, to a large extent, the

effects were more or less the same.

### **5.2.2 Cattle Lifting**

Complaints of cattle lifting were comparatively fewer in the areas around the Reserve. On an average 34% said cattle was lifted. 33% of the respondents said that cattle are lifted from the village area itself. 25% (all from the north east) said that cattle are lifted from the park while 64% said they were lifted from the buffer area. 50% (all from the north west of the reserve) said that they were lifted from the park as well as the buffer. As for periodicity, monsoon was cited as the season when cases of cattle lifting were the most. This could be because of the fact that maximum grazing takes place during this season.

As for the wild animals that lift cattle, 72% of the respondents were of the opinion that the leopard as well as the tiger were the most common predators. Among the steps taken to stop the wild animals lifting cattle, making noise seemed to be the most popular (61%), followed by keeping livestock in enclosures (30%). Quite a large percentage of households (52%), except for the villages in the south east, expressed their desire to kill the wild animals responsible for cattle kills, if they were allowed to do so. It was noticed that, compared to the reluctance expressed for killing the animals causing crop damage, the respondents seemed far more willing to kill the animals lifting cattle, although the losses due to crop damage were higher. Perhaps this was because the nilgai, which damages the crop most, is not killed or hunted by the people as it is considered to be a cow and, therefore, sacred.

Cattle lifting, on the other hand, is done mostly by tigers and leopards, towards whom no such sentiments exist

Most of the households (77%) did not ask for compensation because they did not know whom to ask. Compensation, according to them, has in any case never been given.

### *5.2.3 Other Impacts of the PA on the People*

Incidence of animal attacks on humans seems to be very rare, with some stray cases in the villages in the north east and south east.

As for restrictions on fodder collection, a major complaint was on the fines imposed, which were stated as anywhere between Rs 51 and Rs. 200. Allegations of bribes taken by forest guards were also heard. Consequently, a major problem expressed was shortage of fodder. This was seen to be especially acute in the north east of the Reserve. Because of this shortage, a fair percentage of the respondents (51%) said that they were forced to steal fodder.

As for grazing, a major restriction was fines imposed on those who grazed their cattle in the reserved zones. The complaints were especially high in the south east of STR. However, personal observations during field visits showed a large number of cattle in the Reserved area as also in the proposed National Park area.

A very large percentage of households (50%) said that there was restriction on collection of fuelwood in the Reserve (especially in the south west). One of the problems expressed was shortage of fuelwood, which was seen to be high in the south east direction.

As for restrictions on steps to ward off animals from damaging crops and lifting cattle, a fair percentage of respondents expressed their inability to ward off the animals because of the stringent rules. Many of them, especially those who had lost their cattle due to cattle lifting by wild animals, expressed a desire to kill the animals. Some respondents said that they were not allowed even to burst crackers.

## 6. PAST AND PRESENT MANAGEMENT STRATEGIES

### 6.1 MANAGEMENT PROFILE

#### 6.1.1 *Legal Status of STR*

The entire area was notified a Reserve under the Rajasthan Wild Animals and Bird Protection Act, 1951, vide Government notification Miscellaneous No. F.39(2) for 55. dated 7th November, 1955. The boundaries were later amended vide Notification No. F.39(2) Rev. A/58 dated 5th August, 1958. It was declared a sanctuary in 1959 and a Project Tiger Reserve on 1.4.1979. The notification under section 35 of the Wild Life Protection Act, 1972, has been issued by the State Government vide order No. F.11(22) Ref-8/78/JPR dated 27.8.82 notifying the intention to declare the core area-I as a National Park.

Completion of Legal Procedures : The final notification constituting core zone-I as a National Park has not yet been issued. The collector of Alwar, under Section 21 of the Wild Life Protection Act, 1972, issued a proclamation vide order no 30-2(1) Raj/72/part II/1272, dated 27.1.83, to enquire and determine the existing rights and concessions in the proposed Park. However, no further action appears to have been taken towards completing the procedures required to constitute a national park.

At present there are seven *gudas* (cattle camps) and four villages situated in core zone I. Though the forest department is under the impression that all rights applicable to core zone-I have been extinguished and that habitation and other activities there are illegal, it is not certain whether the due process, prescribed

by law, has been followed. In any case, the people living within the area claim that it has not. Until the legal process has been completed, it is not possible to issue the final notification. In case the procedure has been completed, it is not clear why the final notification has not been done.

With the amendment of the Wild Life (Protection) Act, in 1991, that portion of core zone\_I which is a Reserve Forest can be immediately notified into a national park, without any further formalities. However, as described below, the boundaries of the forest areas around Sariska are themselves under dispute.

Area and Zoning : The Project Tiger Reserve is divided into three zones: Core Zone, Buffer Zone and a proposed Tourism zone. The core zone is further subdivided into three.

* Core zone I (proposed National Park) :	27,380 ha
* Core zone II :	12,650 ha
* Core zone III:	9,750 ha
* Buffer zone :	30,220 ha
* Total area of the Project Tiger Reserve :	80,000 ha

There is also a Tourism zone, which is a linear stretch confined to the sides of the already existing roads, and a part of the other zones.

There are 47 forest blocks, which constitute the already notified Wildlife Sanctuary of Sariska. The total forest area according to the Management Plan 1983-84 and 1988-89 is as follows:

Total Reserve forest area	31,378	hectares
Total Protected forest area	13,790	"
Total Unclassed forest area	4,670	"
	-----	
	49,838	"

### 6.1.2 Unclear Legal Status of Forest Land

One of the biggest problems being faced by the Project Tiger authorities in Sariska is the unclear legal status of land falling under their jurisdiction.

Origins of the problem: The problem of unclear legal status of land is not confined to Sariska Tiger Reserve or the district of Alwar, but exists in the entire state of Rajasthan. It can be traced back to 1947, when the princely states of Rajasthan, along with Alwar, were merged into the Union of India. Since rights on land were non-existent, the government decided to record rights of local people according to the history of land use in the area, and to demarcate forest or revenue lands. This process of recording of

rights is known as "Amaldaramad" or mutation, and is carried out by the Revenue Department, since legal status of land is defined on the basis of revenue records. The basis for mutation is a notification issued by the government, in which a specific piece of land or "khasra" is stated to have been transferred to a certain department or individual.

A notification, settling rights on land, was issued by

In order to be able to understand the problems concerning the unclear status of the forest land, the following individuals were interviewed :

- \* Mr. Bharat Tehmne, A.C.F on probation, Sariska.
- \* Mr. Lakshman Singh, A.F.D, Sariska Tiger Reserve.
- \* Mr. Bhagwan Sahay Gupta, Tehsildar, Thanagazi.
- \* Mr. Kalicharan Sharma, Tehsildar, Alwar.
- \* Mr. Ratan Singh Singhvi, Collector, Alwar.

This report is largely based on information provided by them.



the Government of Rajasthan in 1953, in which most of the forest land in Alwar District - formerly the Princely State - was identified and transferred to the Forest Department. This transfer of land was recorded by the Forest Department, but for some reason not by the Revenue Department. Consequently, the mutation of forest land was not done.

This has resulted in a situation where the same "*khasra*" is listed, in the records of both the Forest and Revenue Departments, as being under their respective jurisdiction.

Problems due to Legal Status: The resultant confusion about the status of land has given rise to a special set of problems, listed below, which are being faced by the authorities in Sariska:

- a) Unclear Boundaries: Sariska was first notified as a Reserve, in 1955, and the area was further amended in 1958. In 1959, the Sariska Reserve was upgraded into a Sanctuary. In 1979, Sariska was declared a Project Tiger Reserve and some more areas from the forest blocks, as specified in Forest Department records, adjoining the sanctuary were also included in the Project Tiger Reserve. The status of this additional land, i.e., whether it is forest or revenue land, is also disputed.

Since boundary pillars have not been maintained by the Forest Department (though budgetary provisions have been made for such maintenance in the past), unclear legal status of land has led to confusion about the extent of the boundary of both the Sanctuary and the

Tiger Reserve. Confusion also prevails about the boundaries of Core Zone - I, which is intended to be declared a National Park, since the legal status of this area is also under dispute.

b) Allotment of Sanctuary land by the Revenue Department: Another problem arising out of the dispute in legal status of Sanctuary land, is one of land being allotted by the Revenue Department to other government departments or Individuals. For example:

i) Between 1986 and 1988, land belonging to the Sariska Tiger Reserve, in four villages of the Thanagazi and Rajgarh tehsils, was allotted for purposes of social forestry (see table below). This allotment was done by the Sub Divisional Officer, Alwar, in Thanagazi tahsil, and by the A.D.M, Rajgarh, in Rajgarh tahsil. Though the Field Director, Sariska protested, the matter could not be easily resolved because of the unclear legal status.

Village	Tehsil	"Khasra" nos.	Area
1. Amara Ka Bas	Thanagazi	101/1, 103, 107, 112 112	103 bighas, 10 visvas
2. Thanagazi	Thanagazi	2496/1	5 bighas
3. Talwad	Rajgarh	2, 3, 9, 71, 73, 78, 82	207 bighas
4. Khoh	Rajgarh	2, 51	28 bighas

- ii) On 25.8.89, Shri Kalu Singh, an inhabitant of Baiyarawas village, filed a suit against the Field Director, Sariska, and others in the court of the civil judge, Alwar. He is suing to get possession of 15 bighas of land on "khasra" no. 239. This piece of land had been allotted to his father, Mr. Narain Singh, an ex-serviceman, on 10.7.68, by the Revenue Department. According to the P.T. authorities, "khasra" no. 239 has already been handed over to the Forest Department in 1956, and is within the boundary of the Sanctuary. The P.T. authorities have complete possession over the said piece of land and a checkpost with a wireless set was established here quite some time ago.
- c) Encroachment and Illegal felling: These problems have become especially acute in the case of Sariska Tiger Reserve, because of the problem of legal Status. There are mainly two kinds of encroachment:
- \* Encroachment for habitation by nomadic tribes like the Banjaras.
  - \* Encroachment for agriculture by farmers on the edge of the reserve.

In both cases, due to unclear legal status and the absence of any boundary pillars, it becomes difficult for the P.T. authorities to establish their right over the encroached land. The matter

then has to be taken to court, which in turn results in a delay, and might even encourage potential encroachers.

Areas which are reserved forests according to the Forest Department records, but are under dispute, can also not be protected fully since in case of illegal felling, the offenders can not be prosecuted under provisions of the Indian Forest Act, 1927. They can only be asked to pay a nominal fine which is not enough of a deterrent.

- d) Mining: This is another major problem which the Reserve is up against, and is to a large extent caused by the problem of legal status. It is discussed in detail in another part of this report.

Steps taken to solve the problem: Although the problem of legal status has existed since the very beginning, the Sanctuary, and later, the P.T. authorities, have not made any serious effort to solve this problem. Recently, however, a few constructive steps have been taken. The Field Director has compiled a list of all the "khasras" under dispute, along with references to notifications through which these "khasras" were transferred to the Forest Department. This list has also been sent to the Collector, Alwar, along with copies to the Tehsildars of Alwar, Rajgarh, and Thanagazi Tehsils. (D.O. No.\VIDE\88-89\9397, dt. 10.3.89; D.O. No.\VIDE\89-90\BPS\1012, dt. 6.5.89; D.O. No.\VIDE\89-90\1017, dt. 6.5.89).

### 6.1.3 Research and Monitoring

Research : The objective in looking at research and monitoring in the Reserve was to assess their present status and see if they

are in keeping with the Project Tiger objectives. An attempt was made to define some of the problems of research the Reserve faces and comment on the future plans.

Mr. L.K.Sharma, the research officer in 1979-'80, initiated four projects. These were not completed due to his transfer. The project titles were:

- i) Frequency of Wild Animals at Water Holes
- ii) Role of Saltlicks in the Aravalli Ecosystem
- iii) Flight Distance of Wild Animals
- iv) Predation Percentage of Tiger on each Species of Deer and Antelope

Although Sariska has been a Project Tiger Reserve since 1979, the Project Authorities have not completed any research study as yet.

Checklists of mammals, birds and vegetation are available [MP]. These are not exhaustive and have not been updated.

No maps of the Reserve are available for aspects such as vegetation and animal distribution. To date, the research officer has prepared a map of the water hole distribution in Sariska. This was an outcome of the April 1989 census.

Research personnel : The Research Wing at Sariska Tiger Reserve has sanctioned posts of a Research Officer, a Junior Research Officer and an Assistant Research Officer.

There have been only two research officers in Sariska since the setting up of Project Tiger in 1979.

Mr. L.K. Sharma held office in 1979-'80. Dr. S.S. Chandiramani, was appointed after a gap of nine years in April 1989.

Research Facilities and Equipment : A full fledged research unit is yet to be set up. At the moment, an old building is in the process of being converted into a laboratory.

The equipment available includes:

- a tranquilizing gun
- a range finder
- a slide projector
- a pair of binoculars
- a microscope
- a stopwatch

Monitoring : Apart from the annual animal census conducted by the Forest Department since 1979, there has been no monitoring of any physical or biological resources in the Reserve.

Meteorological data (temperature and rainfall) has not been recorded for the Reserve. The data from Alwar is used [Laxman Singh, AFD, pers. comm.]. This may be a meaningless exercise since there is great variation in weather parameters within the Reserve itself [Shankar, pers. comm.]. The research officer has plans of setting up apparatus to record weather data in the Reserve.

The water hole census done every year to estimate animal populations in the Reserve, seems to need a closer look.

The census data for tiger and chital from 1979-'89 shows an increase in both populations. According to the census, the number of tigers increased from 1983 on. There was a sharp decrease

between 1988 and 1989 from 45 to 19. Similarly, the chital census showed a figure of 5 in 1979 and by 1988 it was 7969. The 1989 census showed a drop to 3544.

SARISKA TIGER RESERVE CENSUS DATA FOR TIGER AND CHITAL											
Animal	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Tiger	20	16	20	17	25	25	34	41	43	45	19
Chital	5	2196	2886	4340	4387	4031	3893	5970	7077	7969	3544

Source: Sariska Tiger Reserve, Management Plan (1983-'84 to 1988-'89)  
Sariska Tiger Reserve Wildlife Census Report (1989)

This decrease in population between 1988 and 1989 may be because of the Project Authorities tending to record increasing animal numbers in the past years and the fact that the 1989 census was apparently done with far more care and efficiency than the ones in the preceding years [Rathore, pers. comm.].

During the 1989 census, surprise checks at night, on randomly chosen census takers showed that some personnel were asleep and quite a few did not have torches [Shankar, pers. comm.]. Additionally, the fact that animals may visit water holes more than once or visit more than one water hole in a 24 hour period, is not taken into account in the final tally. This may also affect the census findings.

Future Research Plans : Apart from plans of building up a research infrastructure, the future research plans of Sariska Tiger Reserve do not seem in keeping with the wider objectives of the Reserve and Project Tiger.

For example, there is no provision for the Research Wing to carry out a census of the Reserve livestock. The research officer

maintains that he has a file of livestock data from the villages inside the Reserve (at the time of visit the file was not available). He has plans of updating this every year.

Research by outside organizations : The WII, Dehra Dun, has been involved in three projects at Sariska, carried out by staff or students as research exercises. The projects include:

- The preparation of a computer map of the proposed Sariska National Park showing forest compartments, on the basis of the Gazette Notification of the Park (V.B. Mathur)
- 'Spatial and Temporal Patterns of Debarking done by Porcupines in Sariska Tiger Reserve' (Diwakar Sharma, M.Sc dissertation)
- Feeding ecology and resource partitioning of fodder among the three principal ungulates of the Reserve - Chital, Sambar and Nilgai (K. Shankar, PhD dissertation)
- Shri Shankar is additionally building up a bird list for Sariska and has recorded about 150 species. He has also been recording meteorological data at Sariska and Kalighati since July-August 1989.

#### **6.1.4. Personnel**

The Project Tiger Reserve at Sariska is headed by a Field Director (DyCF). He is assisted by an Assistant Field Director (ACF), a Research Officer (ACF), 7 Range Officers and other field staff. There is also a flying squad which has jeep at its disposal (See Table below).



Table 1

Sl. No.	Designation	No. of Posts	
		1983-84	1989
1.	Field Director	1	1
2.	Asst. Field Director	1	1
3.	Research Officer	1	1
4.	Range Officer	4	7
5.	Forester	5	12
6.	Forest Guard	30	62
7.	Tracker	10	10
8.	Wireless Technician	1	1
9.	Wireless Operator	1	1

Training : The ranger at Akberpur had not undergone any training when he joined the forest service. But on becoming a Ranger he attended a Ranger's Training Course at the Ranger College, Chandrapur.

None of the forest guards or cattle guards interviewed had undergone any specific wildlife training, though some of the others had reportedly gone for training. Incidentally, the guard at Kalighati felt experience was more important than any training.

Allocation of Work : The Range Officer's normal duties include

- Allocating work to personnel in the naka's and beats in his range (the Field Director allocates any special duties).

- Meeting the Field Director every week.

The Forest Guard's normal duties are to

- Protect the tigers and look after the habitat.
- Fill the waterholes in his beat.
- Any other work allocated by the Field Director or Range Officer.

The Cattle Guard's main duties are to

- Patrol the area of his beat (with night duty sometimes).
- In an emergency, to act without waiting for orders.

Example 1. Kankwarhi Cattle Guard - Dilip Kumar

Patrols 3-4 km a day on either side of his beat and sometimes has night duty also. He takes his own initiative when the need arises e.g. with the help of the villagers he fought a forest fire for 25 minutes till the flying squad arrived. His beat includes the following landmarks to mark the area of his patrol. To the south is the Mughal Monument (a darwaza); to the east is the first ridge; to the west is the village Kaniyawas and to the north it is the first ridge in the Reserve Forest boundary.

Caliber and dedication : The personnel interviewed knew a lot about their job and though none of them had undergone any special training, they had a lot of practical experience. They felt the objectives of the park were to 'look after' the habitat and protect the tigers.

Staff Morale : The staff that was interviewed had the following grievances :

- Despite being entitled to a Project Tiger allowance, they do not get it.
- No accommodation is provided for their families.
- There are no dispensaries nearby and the school at Sariska is not good.
- There are no market facilities at Sariska, the nearest being at Thanagazi or Tehla.
- When they have to give evidence in court they are not given any leave to do so and lose their pay.

Perceptions of the junior personnel : The personnel interviewed have the following perceptions :

- Since the number of offences has increased, the number of lower posts should be increased as patrolling needs to be intensified. Instead, the Government has increased the number of higher posts.
- They are not provided with enough uniforms and warm clothes. As a result, When patrolling at night, in cold weather, they have to wrap blankets around themselves and consequently find it difficult to chase offenders.
- The guards go patrolling alone and if in danger can not always get help. Even otherwise, they live under constant threat.

**Examples**

Bhawar Singh, Asst. Forester at Tehla was attacked by a villager and his arm was hurt badly.

The Forest Guard at Pandupole was surrounded by villagers and threatened with dire consequences if he took any action against them.

- They felt the park objectives were being met to the best of their abilities but if the issues regarding the legal status of the area were settled once and for all, it would make things easier.
- System of promotion was very bad and therefore there was no incentive for better work. Earlier they got the same salary as their equivalent rank in the police. Now the police get Rs. 80/- more.
- If they catch a poacher the park authorities do not support them in any way.
- Since there are many cases of illegal offences pending they feel there should be a separate magistrate to deal with these cases.
- The villagers from the Thanagazi 'kashas' destroy the jungle. If the Government educated the villagers in the park there would be no need for relocation.
- Their TA was Rs. 10/- which they felt was too little; they felt it should be atleast Rs. 15/-.

The guard in-charge at Kalighati caught a poacher and had to give evidence in Court. He was not entitled to any leave and lost his pay for the days he appeared in court. In addition, he spent Rs. 3000/- from his savings to pay for transport and for the court fees (the poachers filed a suit of assault against him). He has asked for a transfer as he has been threatened by the poachers.

### 6.1.5 Offences and other illegal activities.

The problem of offences was looked at with the following objectives:

- Nature and extent
- Constraints in detection and disposal
- Management efforts to control

Data on the number of offences registered by the Reserve authorities from 1986-87 to 1988-89 was obtained through an examination of records available for these years.

Procedure for forest and wildlife cases : Most of the forest and wildlife cases are filed under the category of either summons or non-police

warrant cases. In all cases charges are framed under the Wildlife (Protection) Act, 1972 or the Rajasthan Forest Act, 1953.

Investigation into an offence and collection of evidence has to be done by Reserve authorities. Once the case is prepared and filed, only the trial takes place in court. Most of the prosecution is done by Rangers who, on occasion, are asked by the

Perceptions on the problem were taken through interviews with the Project Tiger staff. Following up on the legal process beyond the Reserve, interviews were also held with the Munsif Magistrate and Veterinary Doctor at Thanagazi. Those interviewed included:

- Shri Fateh Singh Rathore, Field Director, Sariska Tiger Reserve
- Shri Lakshman Singh, Assistant Field Director.
- Shri Babulal Saini, Forester i/c Crime Branch.
- Shri Dileep Kumar Sharma, Forest Guard, Kankwadi.
- Shri Ramprasad Sharma, Forest Guard, Kalighati.
- Shri Sanjay Gupta, Cattle Guard, Sadar Gate.
- Shri Brij Mohan Gupta, Munsif Magistrate Thanagazi Tahsil.
- The Veterinary Doctor, Thanagazi.

Munsif Magistrate to enquire into details and verify facts, before the case is accepted. This is done in order to avoid having too many counter cases filed. The nature of the offence and the socio-economic status of the offender, determine the severity of punishment.

Nature and extent of offences : The Reserve authorities have classified offences occurring in the area, as per the provisions of the Rajasthan Forest Act, 1953. These are :

1. Hunting
2. Grazing
3. Felling
4. Encroachment
5. Others

Hunting : The category includes poaching and trapping of all animals. Those killed on the roads inside the Reserve by traffic are also considered as hunted and offenders similarly charged. Poaching is reported to be at its height after the monsoons and through winter.

Two basic motives for hunting animals have been reported. One is to deter crop damage and cattle lifting, and the other is for trafficking in skins, meat and other by-products.

Poaching of tigers and leopards has been a major problem, though it is now reported to be on the decline. The local community of Bawarias, residing on the fringes of the Reserve, are generally regarded as being responsible for most cases of hunting inside the Reserve, but offenders from towns and cities elsewhere

in the state are also known to hunt in Sariska.

Hunting is reportedly more prevalent in those areas of the Reserve which are outside the proposed National Park (CZ-I). This was attributed to better patrolling and greater vigilance by the Reserve authorities in CZ-I. However, the fact that CZ-I has a buffer zone around it might also contribute to this.

Constraints :

- i. Connivance - There are examples of poachers being aided by Department personnel, as in the tiger poaching case of December 1988 (see EXAMPLE - A). An impression was also gathered that people living in and around the Reserve sought the assistance of 'Bawarias' to poach wildlife when crops were damaged or cattle lifted. The 'Bawaria's' are traditionally a hunting community whose services are also allegedly used for larger and organised poaching. Besides the more serious problem of connivance, there was reportedly a declining sense of commitment among the newer staff. This was reflected in interviews with the senior members of the Reserve authorities.
- ii. Extent of area and terrain - The size of the area to be patrolled was also identified as a limiting factor. Even the smallest administrative unit of a beat, with an average size of 10-12 sq km, was sometimes too large for a guard to effectively cover singly or with assistance. The terrain of Sariska, with flat valleys and steeply sloping sides that have to be traversed on a beat, was

also stated as being difficult to patrol. The general impression was that it is more difficult to patrol in the hills than in the plains, although the area assigned to guards on a beat was the same in both types of terrain.

- iii. Inadequate equipment - Department personnel are not permitted the possession or use of firearms and are often confronted by poachers armed with sophisticated weapons. There are cases of guards being injured in such encounters. This discourages others from taking such risks. The lack of vehicles to rapidly cover large areas and a system of communication to seek aid at short notice were also seen as constraints. At present, wireless sets have been provided only at the points of entry into the Reserve and at a few other key places within.
- iv. Lack of incentives and Departmental support - For guards and other personnel posted in remote areas of the Reserve, threats to life and property by offenders have been reported and have proved to be detrimental for general morale. Once cases against offenders do get registered it then becomes the responsibility of the person filing, to see them through the legal process. Sometimes counter cases are also filed against the Department staff and these become an additional burden to be taken care of from personal resources. In both the above mentioned circumstances, of threats and



counter-cases, there is little support given by the Department.

Constraints specified by the Veterinary Doctor, Thanagazi-

When wildlife in the Reserve are found dead, poached or otherwise, a statement has to be obtained from a Veterinary doctor. According to the Veterinarian, the Reserve authorities are given to visiting or calling in vets only from those dispensaries where they know they can obtain statements of diagnosis as per their own requirements.

Often unnecessary delays in being called for post mortem leads to a high rate of decomposition of the carcass. Under such circumstances it becomes nearly impossible to analyse internal organs and make definite statements as to the likely cause of death. The reasons for these delays were not known.

EXAMPLE - A : Tiger Poaching Case of December, 1988

On the night of 24th December, 1988, Ramdhan Bawaria shot and killed one tiger, one panther and wounded a tigress. In all 9 'shikaris' were arrested along with 3 Project Tiger personnel. 13 others who have also been accused in the case are still absconding. Of the 9 shikaris, 5 have been bailed out. Ramdhan Bawaria and the 3 Forest Department personnel have been chargesheeted in court.

Investigations have revealed that this group of poachers was one of the largest operating in the area and responsible for most of the poaching cases in the Reserve since 1980-81. The final destination of tiger and panther skins lies somewhere outside the country with the disposal route via Delhi or Bombay where there exist contacts with big businessmen. The bones of these animals reportedly, sell at about Rs.2,500/- per kg and are smuggled to China and the Far East. They are apparently used in the preparation of a wine priced at Rs.3,000/- per bottle.

Further investigations into the case are still pending and additional chargesheets have yet to be filed. Reportedly, this is the first wildlife case to have reached the Rajasthan High Court.

Illegal Grazing : Grazing permits are issued by the Field Directors office at the following rates per head of livestock :

- Buffalos                      Rs. 5
- Cows                              Rs. 3
- Goats/Sheep                  Rs. 2
- Camels                          Rs. 6

Grazing inside the proposed National Park has been more stringently controlled, despite the presence of seven forest villages, all of which are exclusively dependent on their livestock. The incidence of grazing and lopping is maximum in the buffer zone.

Cattle guards have been posted on beats around villages and in other areas where grazing is known to occur. Holding pens have

been provided at some places to keep impounded cattle. The exact number and location of guards and pens is not known. A specific measure to control grazing has been the erection of stone walls at certain places in the Core Zone. Their maintenance is an ongoing problem with the walls being regularly breached by the villagers or by the cattle themselves.

Constraints :

- i. Facilities and expertise - Impounding illegally grazing cattle is reportedly a rather specialised operation. Livestock will not usually allow themselves to be herded into a cattle pen by anyone other than their actual owners. Also, if they suspect the intentions of a person they scatter in different directions into the jungle, when approached.

Cattle pens to hold impounded cattle are few and far between. For example, if livestock from Kirashka are caught grazing in the forests around, the nearest pen is at Karnakawas, 6 km away. Cattle can also not be held for more than 24 hours at a time and in that period they are the exclusive responsibility of the Reserve authorities, who have to provide fodder and water. The villagers are apparently aware of this provision, and if not caught red handed, do not come forward to claim their cattle. After 24 hours, when the forest department are forced to release the cattle, the owners reclaim them without any penalties, once the guards have ceased to

watch over them.

- ii. Contact between villages - All the cattle, grazing illegally in the Reserve, are not always the property of the people living inside. Reportedly villagers living inside also look after, along with their own cattle, cattle belonging to villages in the periphery. This practice is at most common during the monsoons when both fodder and water are available inside the Reserve and the weather makes proper vigil by guards difficult. With the coming of the dry season, when competition for resources increase between livestock and wildlife, these 'borrowed' animals are sent back to their original owners.
- iii. Grazing in excess of permitted numbers - Livestock owners are known to obtain permits for a certain number of heads of livestock but actually graze many more. Effective monitoring of cattle numbers is very difficult and time consuming, especially when only a small number of staff are available.
- iv. Refusal to acknowledge ownership - Ownership of cattle is sometimes disclaimed if the cattle are caught grazing illegally. This is deliberately done in order to avoid being charged for the offence.
- v. Socio-economic factors - The Department staff are well aware of the fact that no matter how many times cattle are impounded, it is usually not long before they are back to being illegally grazed. Dependence on livestock

for survival, especially for villages in the proposed National Park, is nearly total. While fixing fines for illegal grazing, reportedly the amount is usually determined by the offenders economic capacity to pay up, because if the actual rules were to be strictly applied the offender would be clearing the amount for the rest of his life.

This fact, as also the problems, described above, especially regarding the impounding of cattle, understandably make the guards somewhat indifferent to illegal grazing and discourages action, especially strict action. Consequently, in most cases cattle are not impounded but driven away from the areas they are not supposed to be in.

Illegal Felling and Wood Extraction: This includes removing headloads for firewood, lopping, felling for timber and building-poles etc. All these are offences anywhere in the Reserve, except where specific rights have been assigned. Illegal felling is rampant and a number of cases have been booked. Atleast one gang of organised wood poachers is caught nearly every month. Reportedly, there are several more that get away. These organised gangs involve people from villages and towns well outside the Reserve. Such an operation could last from two to five days, following which the wood is transported in small quantities to a predetermined pickup point. From here it is transported to nearby towns by truck.

Constraints:

- i. Connivance - A beat has to be regularly patrolled to check on the incidence of felling and to apprehend offenders. As in the case of hunting, illegal felling is another offence reportedly taking place in connivance with some guards and other Department personnel. This is especially true of organized wood poaching, which takes place on a large scale in the Reserve.
- ii. Mode of Operations - The actual felling of trees, for organised gangs, is done by groups of 10 or more women working together. They are usually accompanied by a few men who act as lookouts and generally supervise the operation. The men are almost never caught, as they are the first to know of an approaching guard. The women too are instructed to pretend that they are collecting wood for their own needs and that they are not aware that felling is not allowed there. This is done in the hope that they may be let off with a fine, or allowed to go free altogether.
- iii. Legal Status - Given the existing problems (described earlier) relating to the determination of boundaries and legal status of forest blocks, incidents of illegal felling have often to be compounded as minor offences. This happens in most of the blocks in the Reserve, especially those which are along the boundary, where the problem is most severe.

Encroachment : The real extent of encroachment will not be known till the question of legal status is resolved and clear boundaries marked for the Reserve. Three different kinds of encroachment have been identified by the Reserve authorities. These are encroachment by other government agencies, by non-agricultural settlers and by agriculturalists.

A process of clarification of the real legal status of land in the Reserve has been initiated but is likely to take a long time before it is completed.

Constraints :

- i. Legal Status - Problems of encroachment in the Reserve appear to stem at least partly from the unclarity over the legal status. It is not clear how to classify human habitation on disputed land, but there are also some clear cut cases of encroachment on undisputed Reserve land. Mining and cultivation activities were not questioned till recently. When the legal status of the land began to be re-examined, some of these activities were seen as being illegal. However, the stopping of these activities has been extremely difficult, for reasons stated earlier.
- ii. Encroachment by other government departments - The final statement on the status of land is made by the Revenue Department. Going by what their records show, the department has handed over land within what is understood to be the Tiger Reserve, for various activities such as

agriculture, mining, plantations etc.

Under the poverty alleviation programmes of the government, agricultural land has been given for private ownership along the Reserve boundaries. In some cases, land has been allocated within the Reserve for agricultural purposes. In a case where the Reserve authorities have been accused of denying ownership to an individual, they now have to prove their own claim over the same plot of land (For details see EXAMPLE - A). Similarly other plots have been given to the Social Forestry Department for plantation work. This was protested by the Field Director to the District Collector, Alwar, stating that all the plots allotted were actually Tiger Reserve land. Mining for dolomite and limestone marble, to the south of the proposed National Park, is also reportedly taking place on Reserve land. The Field Director has sought clarifications on 10 such mines which have been confirmed by the Executive Engineer (Mining), Alwar to be on Reserve land. They are operating under the cover of NOC's (No Objection Certificates) issued by Project Tiger authorities in the past (For details see section on Mining).

- iii. Settlers - Local communities of 'Banjaras' and 'Bawarias' are reported to settle on Reserve land for indefinite periods before migrating to other areas. They are not a major problem for the authorities as encroachers, but are



suspected to poach wildlife during their stay in or around the Reserve.

- v. Encroachment by existing agriculturalists - Farmers along the Reserve boundary and in the revenue villages inside are reported to indulge in encroachment using a fairly novel method.

In the season prior to the monsoons they run a plough over a desired plot and wait to see if it goes unnoticed. At this stage, if they are caught, they usually claim to have had no prior knowledge that they were actually encroaching. The next stage is to plant crops after which they are not entirely unwilling to fight cases of ownership in court. Till such time as the court orders otherwise, the person can continue to cultivate the land. Once again the onus of providing proof of ownership comes on the Reserve authorities.

Others : Offences that cannot be classified directly under the above four categories are generally regarded as other offences. These include illegal entry, causing fire hazards, disturbance, violation of entry or vehicle restrictions, etc.

A system of visit timings, vehicular restrictions, and speed limits have been enforced for vehicular traffic and visitors inside the proposed National Park area. Entry is allowed only after sunrise and the Park is closed after sunset. Visitors can either use their own vehicles or those belonging to Tiger Den and Sariska Palace Hotel. Both vehicles and visitors require to obtain an

entry permit from the reception at the Reserve headquarters. The maximum speed limit for vehicles inside the Park is 20 km per hour. Other rules and regulations are prominently displayed at Sadar gate and Tehla gate, the two main entry points to the Park.

Constraints :

- i. Disregard for local rules and regulations - On one hand there seems to be a certain level of ignorance among locals and tourists as to the rules of the Park and the Reserve while, on the other hand, there is also an attitude of doing as one pleases until checked by the authorities. All visitors to the National Park are informed of the basic rules about timings, restrictions on movement by vehicle and on foot, and about other restrictions, at the reception where entry permits are issued. In most instances offenders are let off with a warning under the assumption that violation of a rule was inadvertent and not deliberate. Only if the offence is of a serious nature, or if it is committed repeatedly, is it registered as an offence.
- ii. Lack of public support - Public support for the enforcement of the rules of the Reserve is often lacking. This is especially so when rules and regulations, proposed or enforced, go against popular sentiments. For example, access to temples in the Reserve was sought to be restricted but objections were raised by people in the surrounding areas, and by the temple management. In the

past, the Sariska-Tehla road through the proposed National Park was most convenient for miners to ply their trucks on. When this was disallowed, a case was filed by one of the miners, reportedly the biggest operator in the area, against the Reserve authorities for stopping his trucks from passing through.

- iii. Lack of support from local administration - All the functionaries of the local administration spoken to said that the objectives of Project Tiger had never been officially communicated to them, and that they only had limited contact with the Reserve authorities. The Collector, infact, mentioned that he proposed to meet the Field Director about complaints from tourists and pilgrims over the imposition of local rules and regulations. For example, the Field Director had banned two wheelers from entering the Park, but the restriction had to be withdrawn on the Collectors orders, prior to the elections.

The table given below gives figures for offences registered in the Reserve 1986-87 to 1988-89.

Table VI.1  
Offences Registered in Project Tiger Reserve, Sariska  
1986-87 to 1988-89

1986-87

	Total No. of cases	No. of cases compounded	No. of cases filed in court	No. of cases being investigated
Felling	349	123	5	221
Hunting	19	6	6	7
Grazing	269	144	2	123
Encroachment	1	-	-	-
Others	215	176	-	39
<b>Total</b>	<b>853</b>	<b>449</b>	<b>13</b>	<b>390</b>

1987-88

	Total No. of cases	No. of cases compounded	No. of cases filed in court	No. of cases being investigated
Felling	715	125	56	535
Grazing	365	165	19	181
Hunting	16	6	10	-
Encroachment	40	-	23	17
Others	346	71	4	271
<b>Total</b>	<b>1483</b>	<b>366</b>	<b>112</b>	<b>1004</b>

1988-89 (till October, 1989)

	Total No. of cases	No. of cases compounded	No. of cases filed in court	No. of cases being investigated
Felling	284	*	*	*
Hunting	24	*	*	*
Grazing	149	*	*	*
Encroachment	35	*	*	*
Others	65	*	*	*
<b>Total</b>	<b>557</b>	<b>*</b>	<b>*</b>	<b>*</b>

\* information not available

The above figures have been provided by the Sariska Project Tiger Reserve authorities.

Other Constraints :

According to the Munsif Magistrate, Thanagazi, Local Reserve regulations, including the special status of core/buffer zones or park/sanctuary boundaries, were inapplicable in the Munsif Magistrate's court. The Magistrate was not aware of any special provisions with respect to offences in the Park or Reserve, nor had there been any official communication to him on Project Tiger objectives.

Also, due to a large backlog, there were delays in clearing cases and this created problems as not only did older cases have fewer witnesses available, transfer of guards and officials to other areas also delayed in clearing of cases.

Management Efforts to Control Offences : The management efforts described below pertain to the whole Reserve. Where measures have been taken to tackle specific problems, their scope has been specified.

- i. Patrolling and communications
- ii. Flying squad
- iii. Crime Branch

Patrolling and Communications : The entire area of the Reserve has been covered through a system of beats, 'nakas' and ranges. Guards are posted at all the beats with a minimum of two guards per beat. Depending upon the problems likely to be encountered on a beat, the number of personnel can be increased. The average size of a beat is 10-12 sq km. Checkposts and barriers have been set up at 10 points through the Reserve of which 5 are manned. There are

7 fixed wireless sets and one mobile set functioning to provide a rapid system of communications in the Reserve. Regular night patrols and surprise checks are also carried out.

Flying Squad : There is one flying squad for the Reserve comprising of one forester and two forest guards. They are stationed at the Reserve Headquarters and have at their disposal one jeep with a mobile wireless set. It is not clear what the specific functions of the flying squad are or how far its jurisdiction extends. It has proved to be extremely useful in detecting cases of poaching and felling and in investigation of poaching cases beyond the Reserve.

Crime Branch : Although there is no official sanction for this one-man branch, it was especially created for Sariska in 1982. This was done because of the competence and knowledge of wildlife laws and acts of the forester presently incharge.

The main function of the Crime Branch is to take up cases in court on behalf of the Reserve authorities. Decisions in all the 525 cases tackled since 1982-83 have gone in favour of the Reserve. Besides the presence of the Flying Squad and Crime Branch, and the existing powers vested in the staff at various levels, there are still over 5000 cases pending in the four ranges of the Reserve. Some of these are upto 10-12 years old.

## 6.2 RESOURCE MANAGEMENT

Wildlife resources can conveniently be divided into three categories :

Physical: water, soil, landscape.

Vegetation: plant communities and species - individually and as habitat for animals.

Animals: communities and species.

This section discusses "problems" perceived with these resources and the actions or lack of action being taken by management to overcome these problems.

### 6.2.1 Perception of Resource Problem

It is not easy to see problems with the resource if there is no stated policy or management plan setting out the desired state of resources. As the two draft management plans which have been written to date do not comment on goals or objectives for resources, it is not possible to perceive in an objective manner, problems in the present status of resources.

#### Example : What is a resource problem ?

The past censuses for Sariska Wildlife state there are less than 50 chinkara (Indian gazelle) in the whole tiger reserve. Conventional conservation biology states that this is not a viable population and unless conditions change, the population will become extinct. Is this a problem? Should Sariska undertake specific management to increase the chinkara? No one can tell unless an approved management plan sets out the desired objectives for component resources.

Cursory examination of the resource suggests the vegetation is over utilised and regeneration is lacking, water resources are managed in a problematical way and that many animal populations are

too low to be viable in the long term. Without stated goals for the reserve we cannot state with certainty that the current resource levels are acceptable or not. We presume they are unacceptable, but we stress that the lack of an approved plan stating resource goals is a problem itself.

#### **6.2.2 Physical Resources**

Water : Sariska is a semiarid tract and water is naturally a limited (and limiting) resource. This has been accentuated by the human cultivation and occupance of valleys which have most of the water sites. The quantum and distribution of water helps determine the pattern of animal numbers and distribution.

The present distribution of water and especially management created 'artificial' water sources is uneven, most artificial water being in the restricted Sariska Valley of Core zone I. This water development is considered to be done to support tourism rather than ecological objectives.

#### Example : Water policies in drought prone semi-arid protected areas

The 1985-87 drought in Sariska led to great concentration of animals around the four permanent (artificial) water sources in one valley system. This led to even greater pressure on scarce fodder resources, malnutrition and deaths. Management reaction was ambivalent, being unable to decide if additional water sources should be opened to disperse animals or if additional fodder (artificial) should be provided or if nature should take its course.



There was little debate on the policy issues of providing artificial water in the first place - how many and where they should be. Policies are absent, managers could do largely what they wish.

The central Sariska-Kalighate-Umri turn off valley had at one stage seven artificial waterholes along 17 kilometers. There were virtually no other artificial water sources in the entire project area. Part of the reason lies in accessibility and water facilities, the valley has a black top road, there are deep wells with water pumps which can supply water. A tractor-trailer unit and a truck supplied water to concrete 'saucer' waterholes at the road side. This design was later changed with the 1988 change of Field Director, using a pipe gravity feed system from wells to saucers further away from roads. Again no policy, no plan, just individual action.

The severe drought in 1987-88 led to the initiation of drought prone relief programmes in Sariska. The then Field Director started six dams (anicutts and bunds) all again in the main valley from kilometer 0 to 16. Of these dams : one was discontinued (km. 13) two broke (km. 16, and Tarunda: Tarunda was then repaired) and one does not hold water (Karnakabas wall) and two hold water from the monsoon until probably January-February. Again "development" was done with no policy, no objectives. Larger issues of why water should be where are ignored.

### 6.2.3 Vegetation

Much of the 800 km<sup>2</sup> of Sariska Tiger Reserve is seriously impacted by domestic livestock and fuel wood cutting pressures from villages outside the reserve, in the buffer zone and a few in the core zone. These pressures and their effects on the vegetation are discussed elsewhere in the report.

This section discusses some of the parameters of the vegetation in the core zone.

#### a) Vegetation Cover - Tree layer

There has been no vegetation description or cover types map of the tree layer since protected area status. Vegetation monitoring plots suggested to all Project Tiger Reserves have not been established. Preservation plots, free from all grazing and disturbance, which could be used to evaluate vegetation status have not been established. Several tree species, supposedly common constituents (1970s management plan), are rare - Sterculia, Garuga.

#### b) Regeneration - Tree layer

Available data on regeneration rates with WII show an almost complete lack of regeneration in Zizyphus, Butea, Anogeissus and Boswellia communities. This lack is of all seedling and sapling stages for most species, but is also due to heavy browsing pressure on Anogeissus. Management undertakes no regeneration surveys and no policy discussions on how to increase regeneration have been initiated.

#### c) Vegetation Cover - Shrub layer

Much of the dry season fodder reserve is in the shrub layer : e.g. Capparis sepiaria regeneration is very limited.

d) Vegetation Cover - Ground layer

e) Weeds

Several "weed species" are found in Sariska. Lantana was abundant in the Bandipul valley, some was reduced by the 1987 drought. Adhatoda, extensive on moister lower slopes, again was reduced by drought. Cassia tora is abundant on the flat alluvial valley bottoms under Butea and Zizyphus. It and other weed species e.g. Cleome spp. and Lufa (a climber) greatly increased during the drought.

There has been no monitoring of weed pressure or status. Earlier weed eradication (e.g. Adhatoda in 1984-85) has not been monitored or followed up.

#### 6.2.4 Animals

Sariska Tiger Reserve does have populations of several rare and endangered large mammals (chousingha, caracal, wolf, hyena). No attempt has been made to ascertain status, trend or even approximate distribution.

Monitoring of other more common species has been problematical. There are suggestions that counts pre 1988 are impressionistic, and insofar as they include sex information for python, porcupine etc, blatantly untrue. The 1988 census, using same methods has a very much lower total.

This means that no rational monitoring of resources can take place. Despite obvious doubts about census data, there has been no

critical comment on the results from either Project Tiger, Delhi or from the CWLW, Jaipur. Supervisory agencies must examine data on resource status and evaluate such information. Lack of critical feed-back is poor management.

Predator populations in Sariska give cause for concern. 'Tiger' the apex species of Project Tiger in general and of Sariska, illustrates that :

- a) Census data are questionable - what is the real population status.
- b) Present population is below suggested figure for population viability (50 as a minimum to avoid inbreeding etc.).
- c) Concern if Sariska could support 50 tigers, without very much greater ability to improve buffer and subsidiary core zones.
- d) In the 1984-88 period a great deal of effort (staff, time, money) went into collecting pugmark evidence by plaster cast. Hundreds of casts were collected and yet no analysis, no report has been produced.
- e) Despite the protection afforded in Project Tiger, several tiger were poached in the 1987-88 period. No convictions have been secured.

In 1986, wild dog were seen in Sariska for the first time in years. Two animals were reported then a litter of pups. "Discussion" went on about bringing in further animals. Animals died, now only a single female remains. Still the question of reintroduction is discussed and yet no report, project, scheme has been proposed.



## 7. RECOMMENDATIONS

### SUMMARY OF RECOMMENDATIONS FOR SARISKA TIGER RESERVE

ISSUES	RECOMMENDED STRATEGIES
<p>Unclear legal status of the land in and around STR, resulting in:</p> <ul style="list-style-type: none"> <li># Allocation of land for social forestry.</li> <li># Illegal mining.</li> <li># Encroachment and illegal felling, which cannot be adequately controlled as the status of land is disputed.</li> </ul>	<p>The demarcation of boundaries and the reconciliation of revenue and forest department records needs to be taken up as a priority. The State Government should urgently appoint a settlement for the purpose.</p>
<p>Disturbance by excessive tourist pressure, especially in the core zone which overlaps with the designated tourist zone.</p>	<p>The core zone should be free of all disturbances including tourist traffic. The tourism zone should be adequately monitored to keep down the level of disturbance, especially by banning the entry of private vehicles and determining and enforcing an optimal level of tourism. A detailed tourism plan should be drafted, considering promotion of tourism is an objective of the national park. However, this objective should be reconsidered and certainly prioritized in relation to other perhaps more important objectives.</p>

<p>Disturbance due to heavy traffic of pilgrims.</p> <p># There are five temples inside STR and yearly fairs are held in two of them.</p>	<ul style="list-style-type: none"> <li>- Regulation of Pilgrim traffic.</li> <li>- Strict enforcement of rule regarding denial of permission to stay overnight.</li> <li>- Employment of extra guards during the fair season.</li> <li>- Implementation of proper waste management plans.</li> </ul>
<p>Presence of eleven villages inside the proposed National Park.</p>	<p>The villages need to be moved to forest areas outside but adjacent to the Park. However, the shifting must be voluntary and based on participatory planning and implementation : by involving the villagers and getting their approval for the alternate site. A clear agreement should be drawn up with the villagers regarding the compensation package.</p>
<p>Grazing in the Park and over grazing in the sanctuary and buffer.</p> <p># Only 71 sq kms of the Park is relatively free from grazing.</p> <p># 17 villages in the buffer zone have grazing rights over 480 sq km of the park.</p> <p># There is a cattle population equal to 1 lakh cow units in the adjacent areas.</p>	<p>Alternate grazing grounds need to be developed outside the STR so that grazing can be diverted from the Park area and the pressure lessened in the sanctuary area. Also, joint management of neighbouring degraded alternate methods of income generation have to be introduced to divert dependence on livestock. Some dairy development work, along with schemes to encourage stall feeding of livestock also need to be implemented. The buffer area and parts of the sanctuary, which are currently very degraded, must be helped to regenerate by soil and water conservation work and rotational closing from grazing.</p>

<p>Poaching of Tigers and other wild animals.</p>	<p>The Department must strengthen its management capacities by acquiring greater mobility and communication facilities. In addition, it must work at winning the support of the local people, whose help and cooperation are essential for any effective curb on poaching.</p>
<p>Fire during dry months</p>	<p>The effective control of fires again requires the goodwill and cooperation of the local people both as a preventive measure and for early control of fires. The Department must recognise this and actively solicit their cooperation. The Department also needs to cur more fire lines and construct some more watch towers.</p>
<p>Shortage of water during the dry season.</p>	<p>Sariska has a semi-arid climate with a natural paucity of water, especially in the summer months. The habitat of the Reserve has adapted to this. Therefore, the provision of artificial water sources for wild animals in the Reserve must be ordinarily discouraged for it disturbs the natural ecosystem. However, in special cases where natural water resources have been depleted due to human activities or where a conscious decision has been made to artificially raise the carrying capacity of an ecosystem, artificial water systems can be introduced. Nevertheless, they must invariably be based on a study of the ecosystem and must be accompanied with other required measures to prepare the ecosystem for such an intervention.</p>



<p>Spread of epidemics among wild herbivores due to infection transmitted by domestic cattle.</p>	<p>The PT authorities have sporadically tried vaccinating the domestic livestock. This activity has to be taken up more seriously. Also, with the proposed control of grazing, especially in the core zone, the incidence of disease should go down.</p>
<p>Disturbance due to mining.</p>	<p>One of the causes of illegal mining is the dispute over the legal boundary. The settlement of boundaries would partly solve this problem. Some of the issues have already been settled by the Supreme Court in its judgement on the Sariska mining case. However, to minimise resentment against STR, especially among those local people who might lose their livelihood because of the closure of mines, the PT authorities should design and implement a participatory ecodevelopment programme to provide socially and environmentally sustainable alternatives to such people.</p>

<p>Local hostility towards the Tiger Reserve.</p>	<p>One of the greatest problems of STR is the hostility of the people towards it. Though efforts to raise the awareness of the local population to the value of the STR and the need to conserve it may help to some extent, much more needs to be done. In general, the PT authorities must make a much greater effort to minimise the negative impacts of the Reserve on the local communities. They must also help the local communities to develop viable alternatives to the resources of the Reserve, if the Reserve has to be saved. Institutional mechanisms also need to be developed where the local communities can participate in the management of the Reserve and also have a mechanism to speedily redress their grievances.</p>
<p>Collection of fuelwood, fodder and other NTFP.</p> <p># More than 300 headloads of fuelwood are brought to Thanaghazi, Tehla and Akbarpur villages everyday.</p>	<p>JFM should be encouraged and established in all other forest lands. Social forestry has already started. Village woodlots either under village committee or Panchayat could be started with the technical inputs from PTA. Improved 'chulas' should be introduced and PTA should popularise biogas, as stall feeding of cattle increases.</p>

<p>Cattle lifting by predators.</p> <p># Incidence of cattle lifting occurs more during the rainy season.</p>	<p>Various measures to protect the livestock of the neighbouring villages must be taken, including the building of physical barriers, where appropriate. The development of alternate grazing lands outside the park and sanctuary would also reduce the incidence of cattle lifting. Adequate and speedy compensation must also be paid for the loss of livestock.</p>
<p>Damage to crops by wild animals.</p>	<ul style="list-style-type: none"> <li>- Enforce a proper method to quantify damage and pay adequate and speedy compensation.</li> <li>- Village committees must be encouraged to discuss the issue and be helped to formulate a proper plan for protection through using crop watchers and other harmless methods, like fire crackers etc.</li> <li>- Where appropriate, physical barriers, like fences, should be provided for by the STR authorities.</li> </ul>

Developing alternates to STRs resources

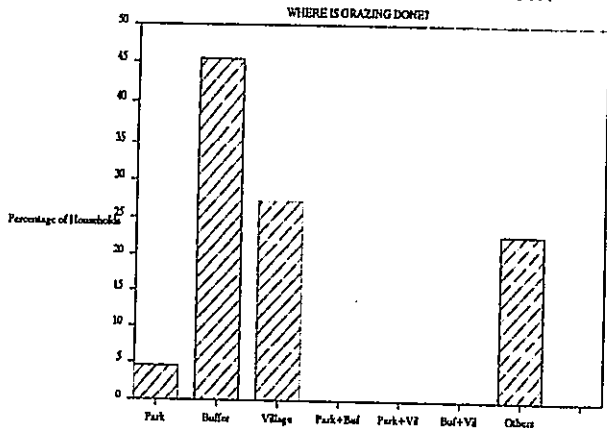
In the ultimate analysis, conservation of STR is dependent on effective management and on the ability and willingness of the local people to cooperate in this endeavour. But the people would be unlikely to be either able or willing unless viable alternates to STRs resources, for biomass and incomes, are identified and developed. Also, the local communities must be involved in the management of the STR and have the first, perhaps the exclusive, right to the economic benefits flowing out of STR. For the purpose ecodevelopment activities around STR must be rapidly developed.

Whereas a wide range of income generation activities are possible, and are described in the detailed recommendations, it must be stressed here that for STR one major focus must be the development of water resources in the areas adjacent to the PA. Site specific plans must be developed and implemented for this purpose.

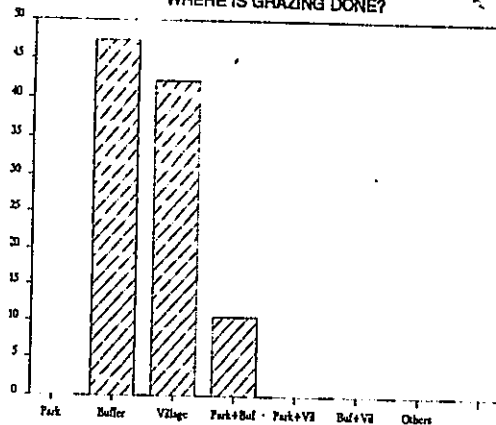
Another area of focus is tourism. Contrary to current practice, tourist activities in and around STR must be for the financial benefit of the local people and not for profiteering by corporations.

Finally, great attention needs to be urgently paid to the reforestation and re-vegetation of the degraded land inside and around STR.

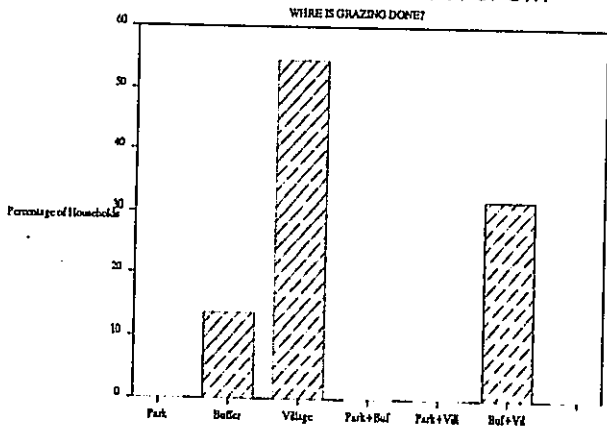
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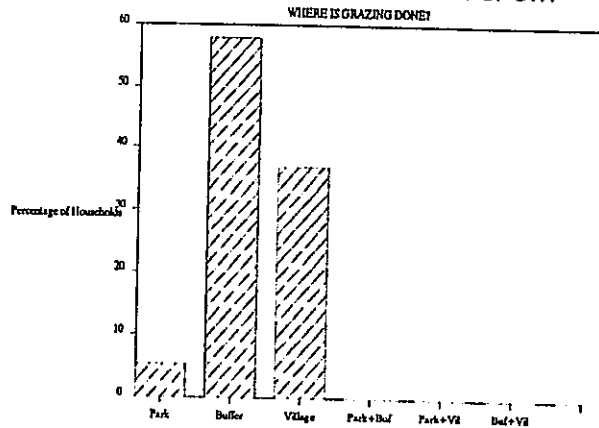
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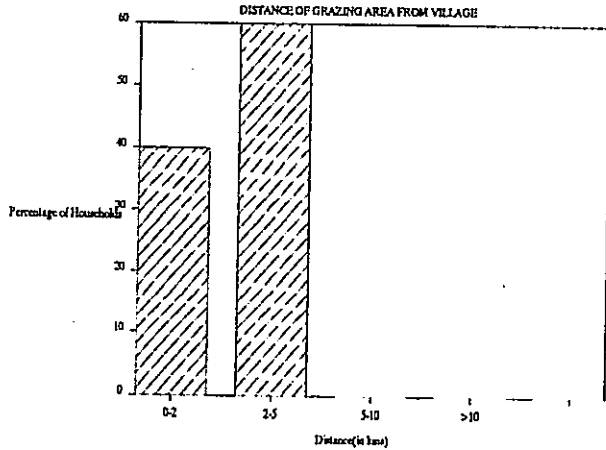
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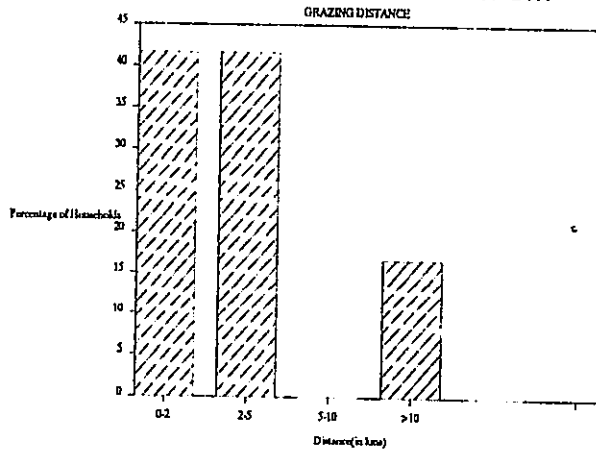
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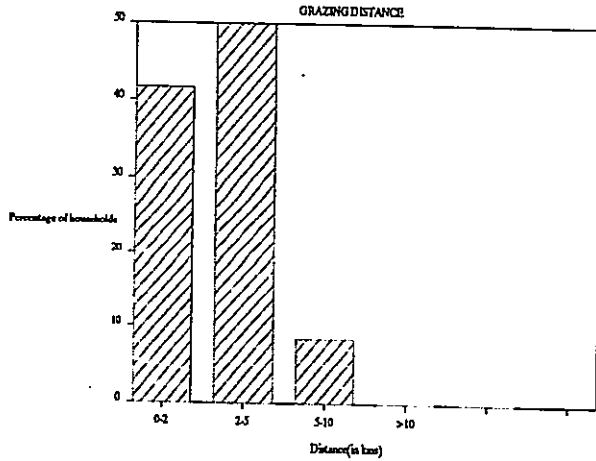
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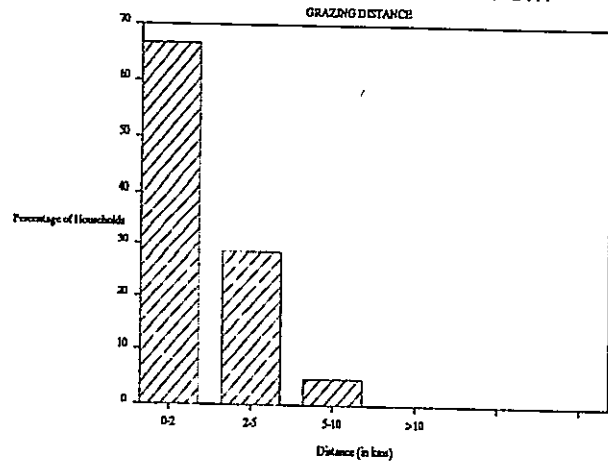
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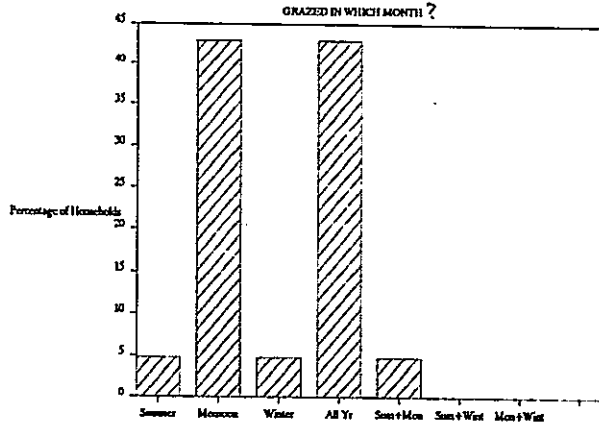
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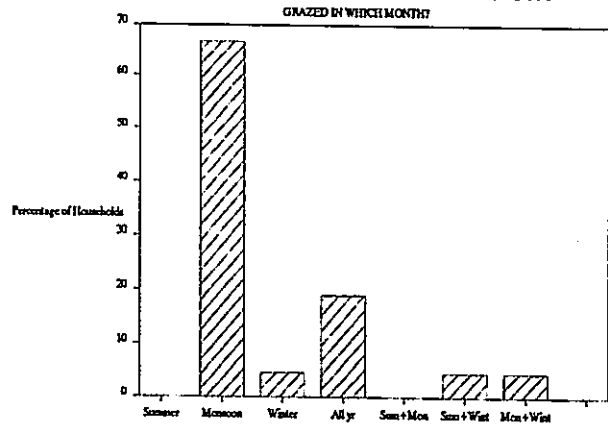
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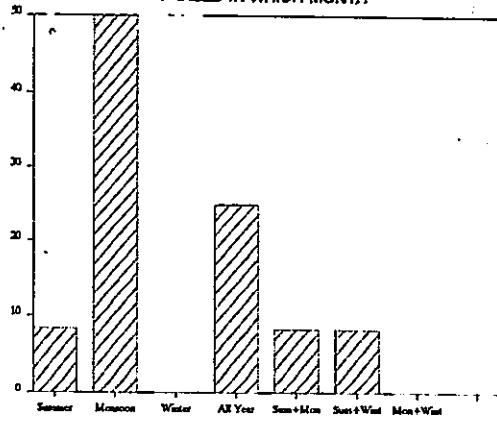
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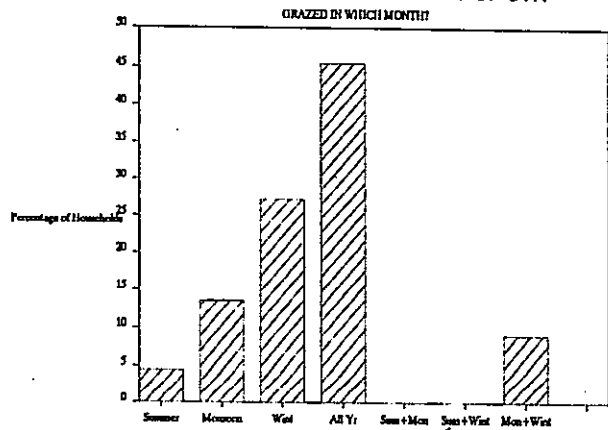
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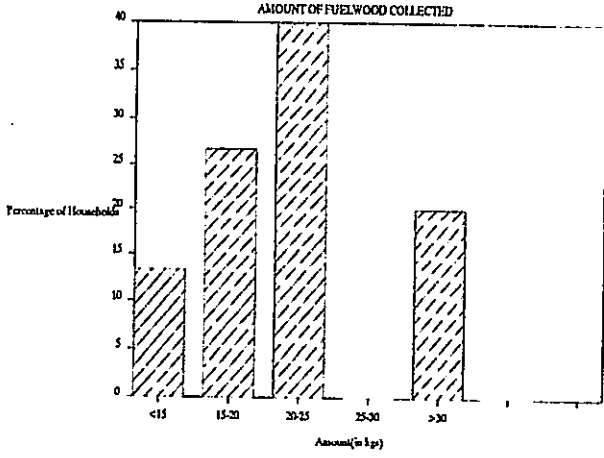
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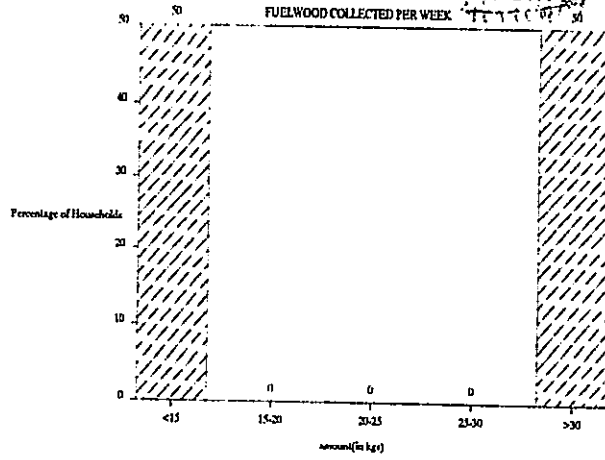
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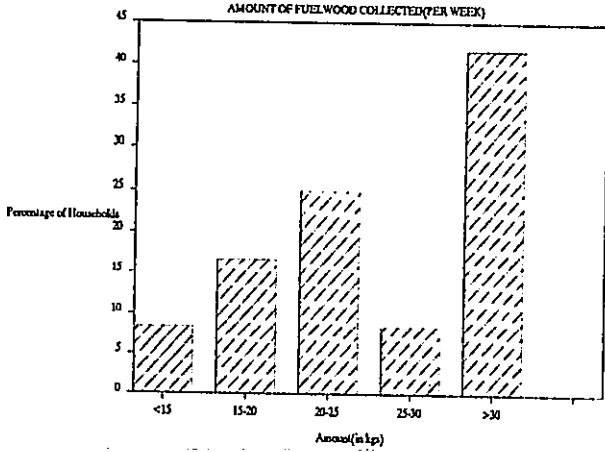
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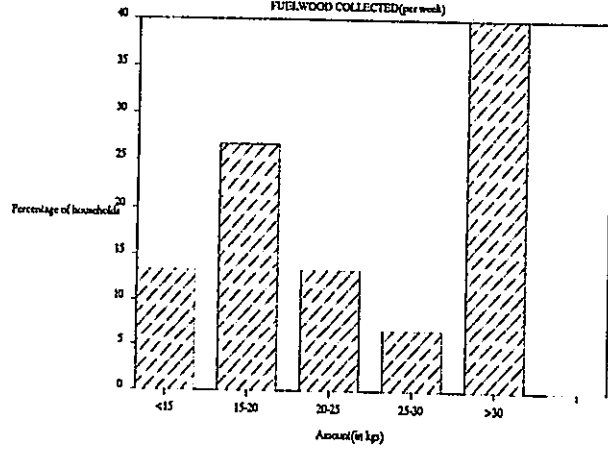
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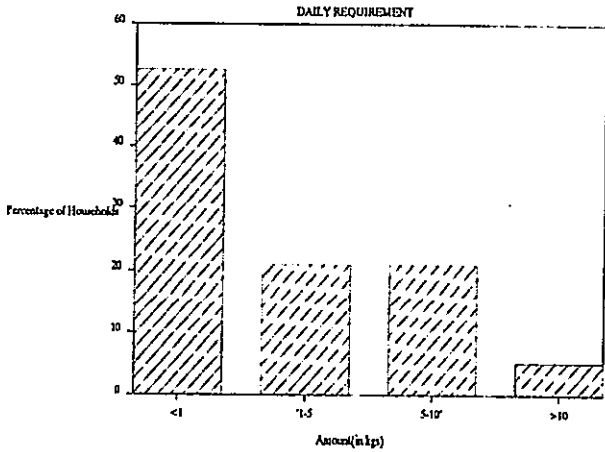
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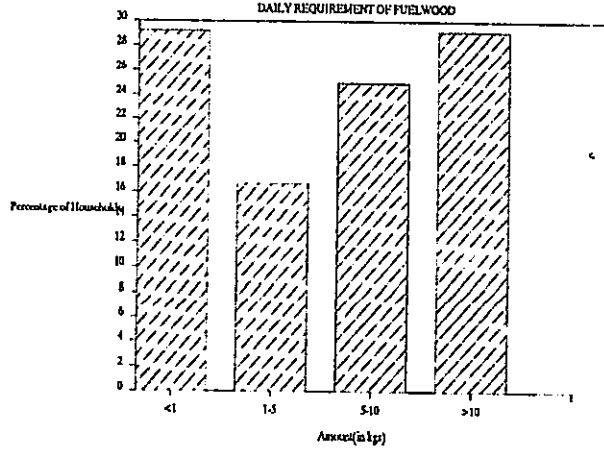
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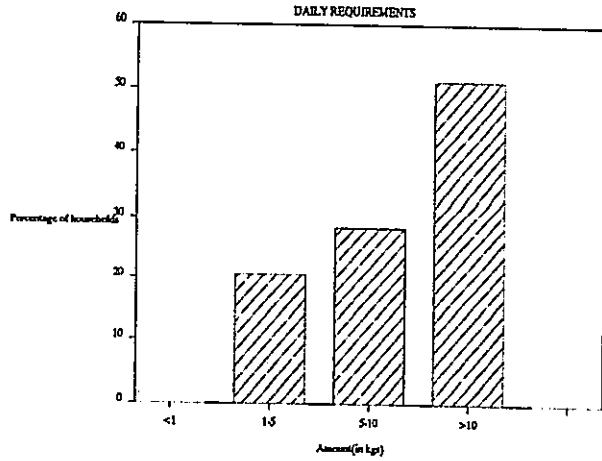
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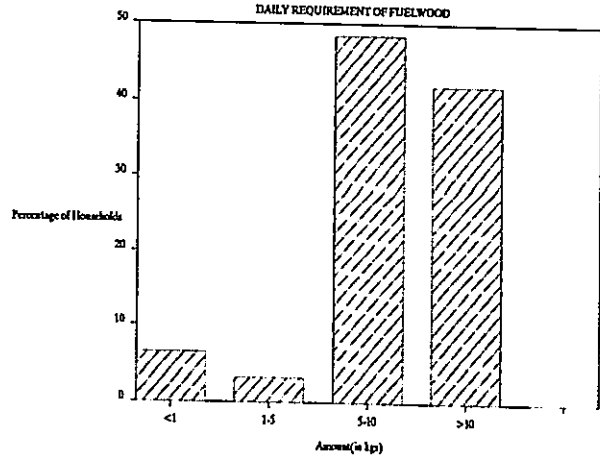
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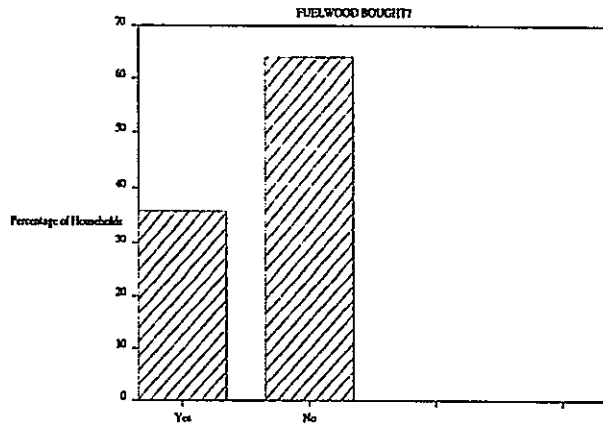
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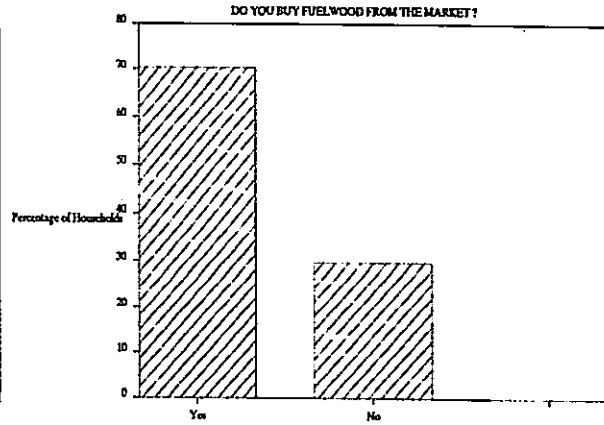
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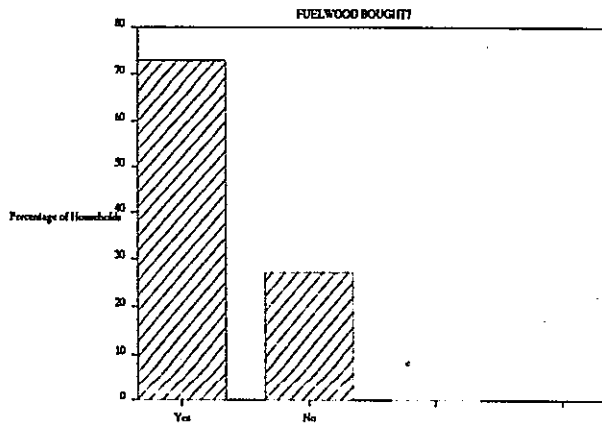
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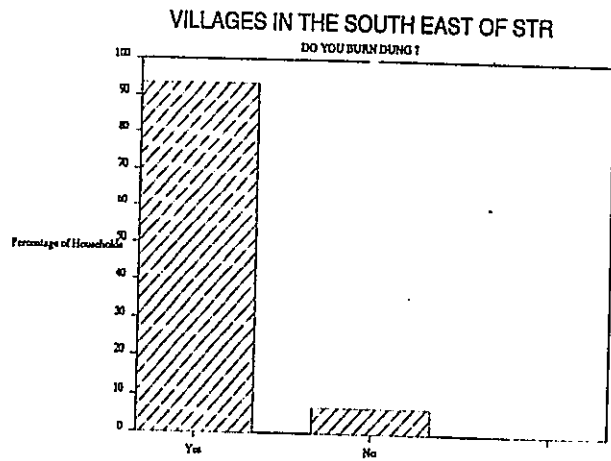
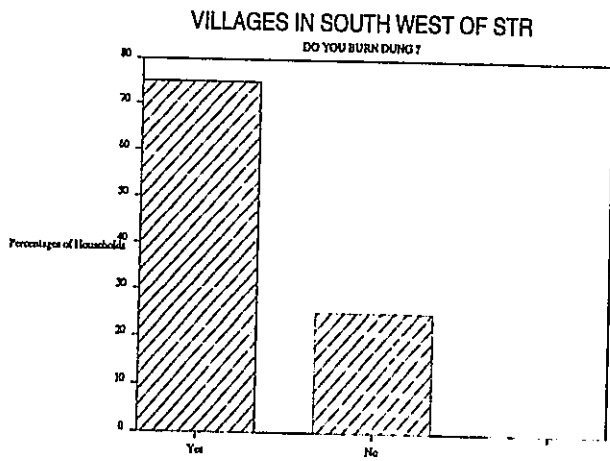
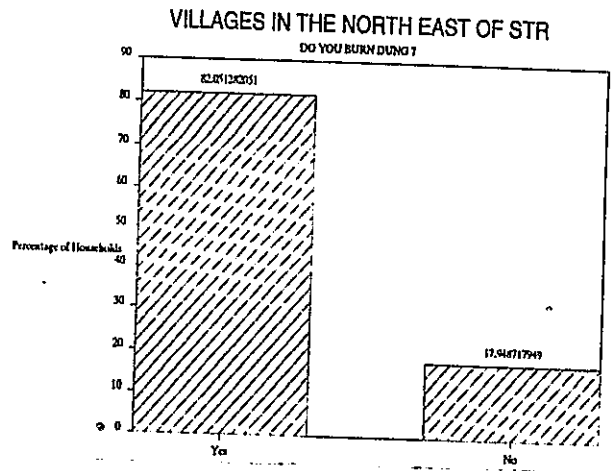
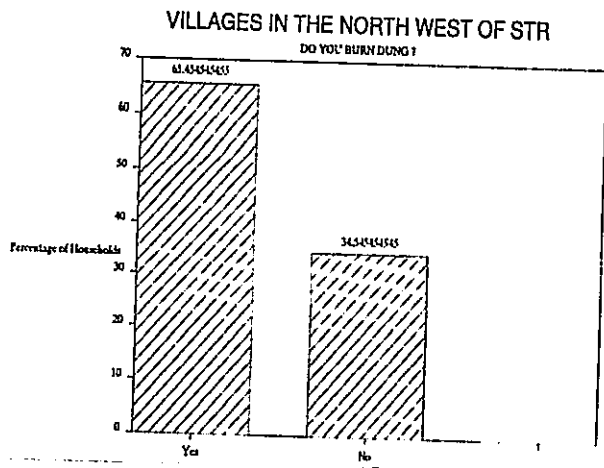
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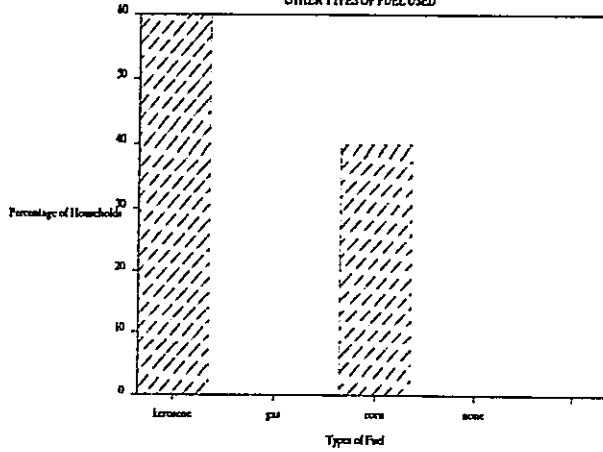






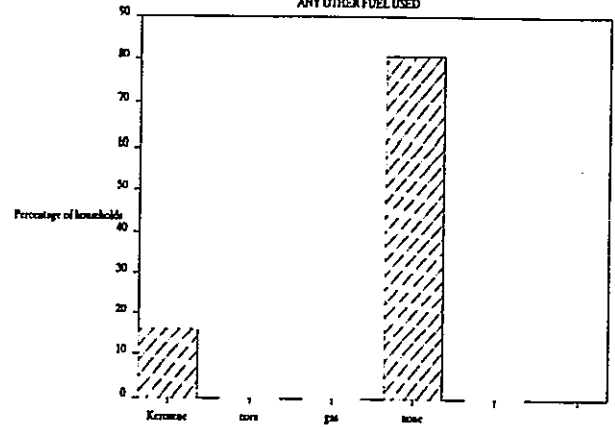
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OTHER TYPES OF FUEL USED



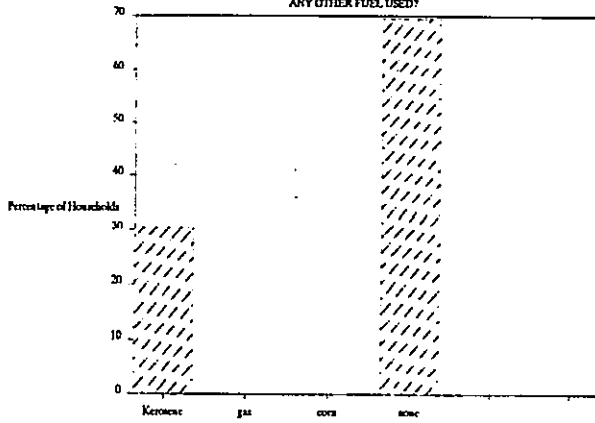
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ANY OTHER FUEL USED



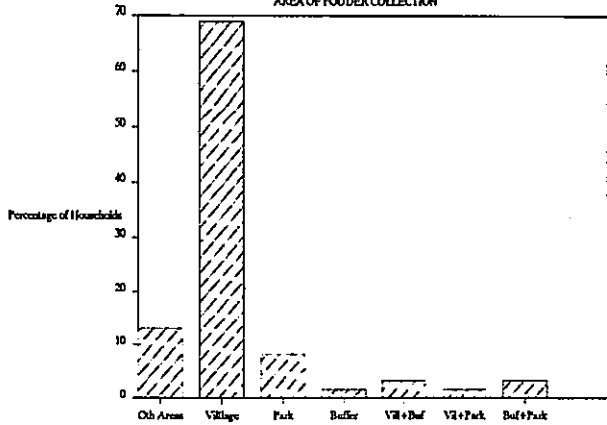
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ANY OTHER FUEL USED?



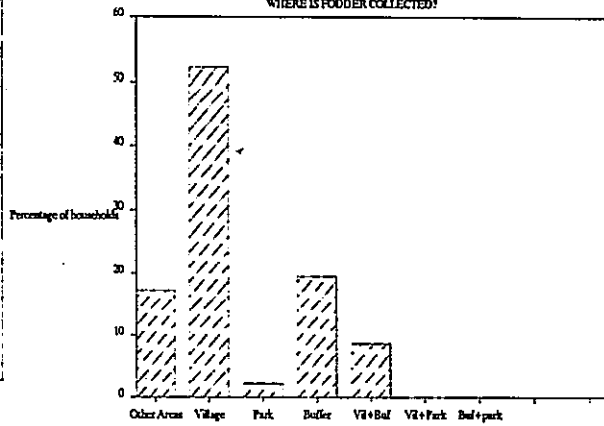
VILLAGES IN THE NORTH WEST OF STR

AREA OF FODDER COLLECTION



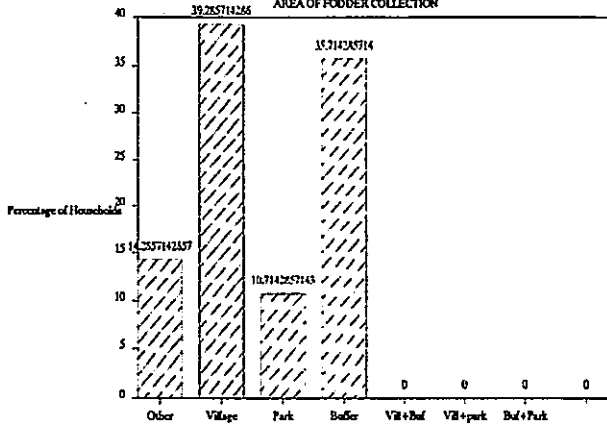
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WHERE IS FODDER COLLECTED?



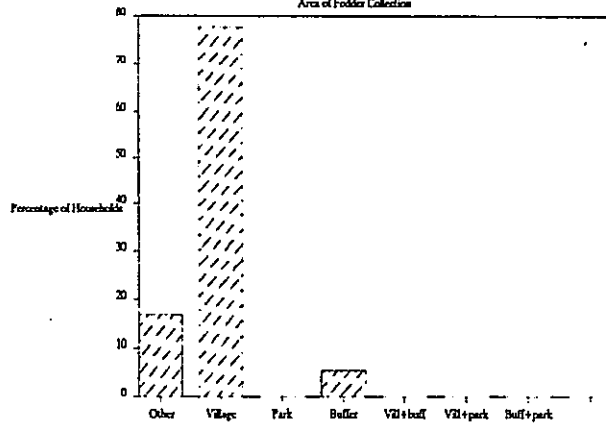
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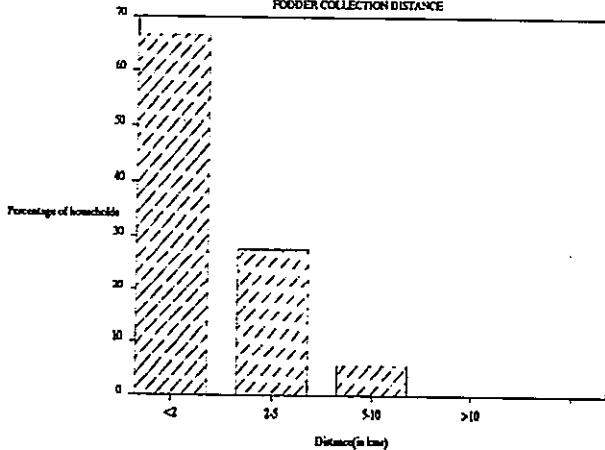
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Area of Fodder Collection



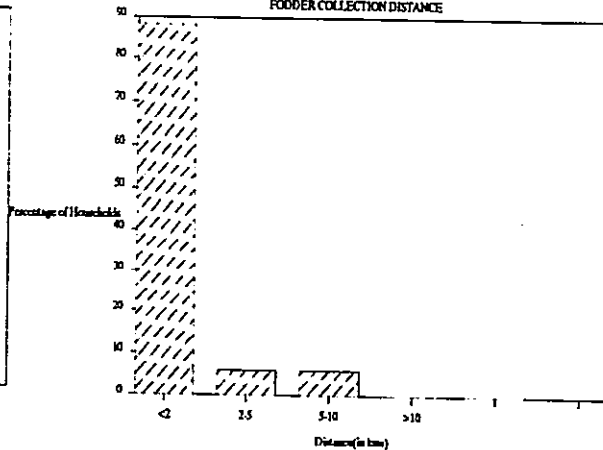
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FODDER COLLECTION DISTANCE

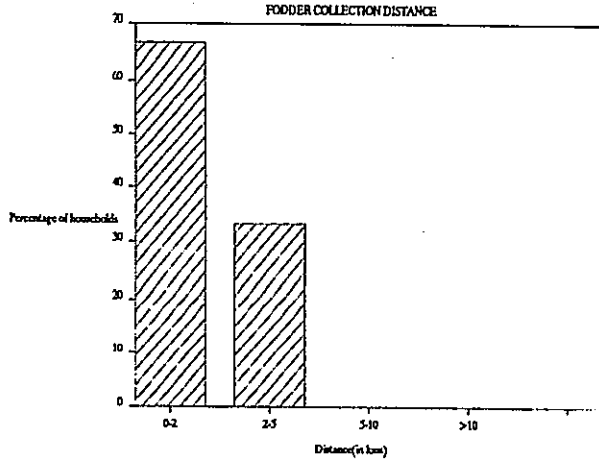


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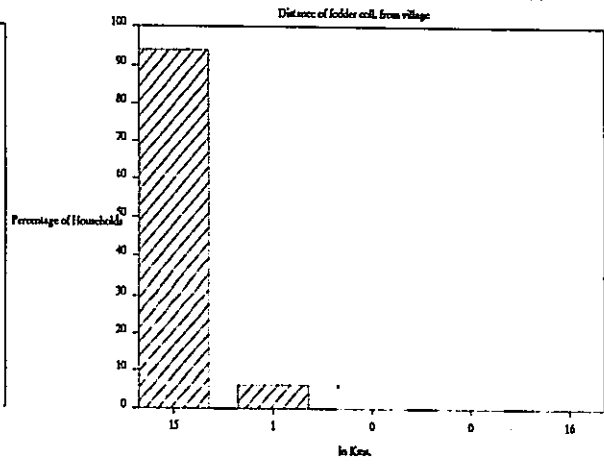
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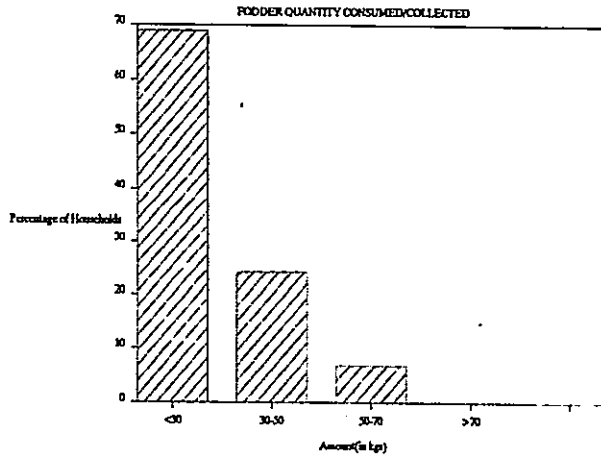
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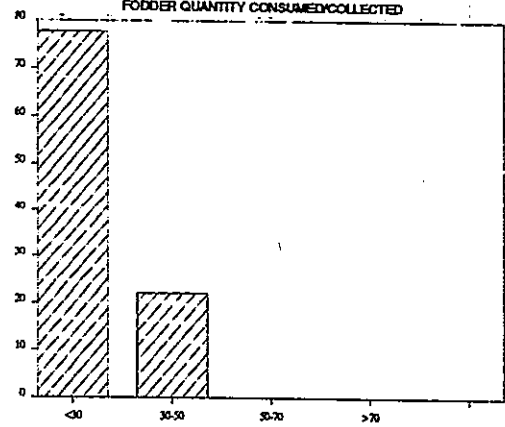
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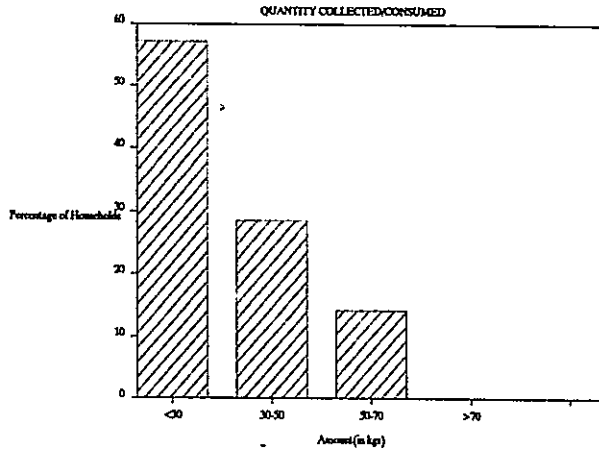
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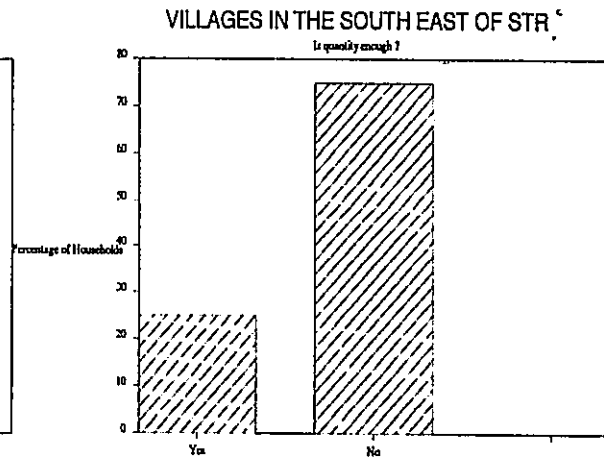
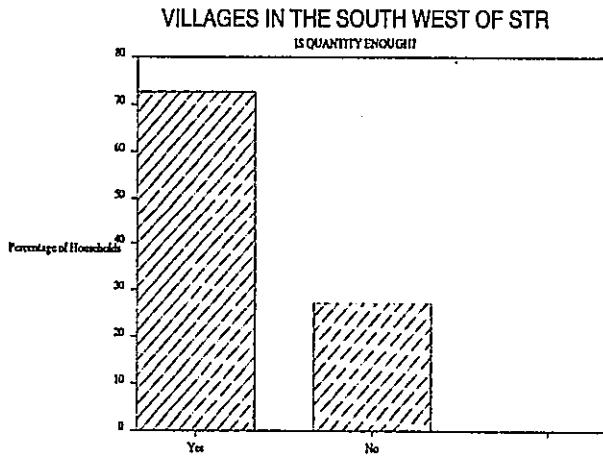
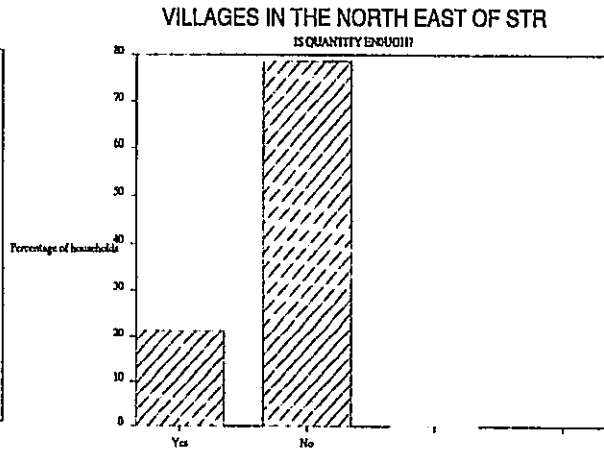
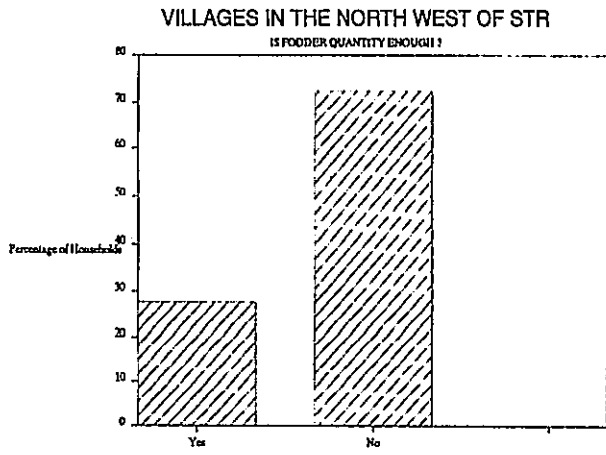


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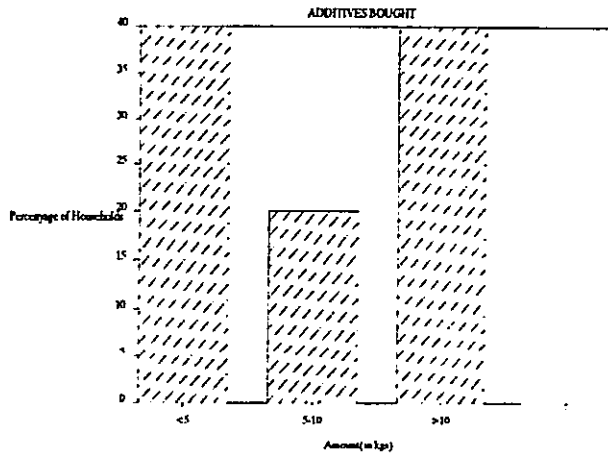


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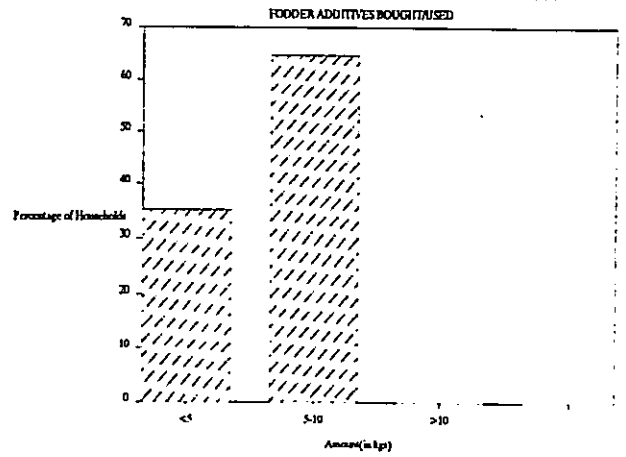




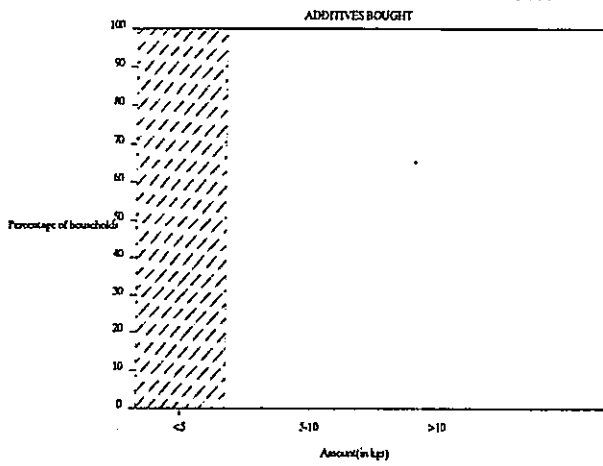
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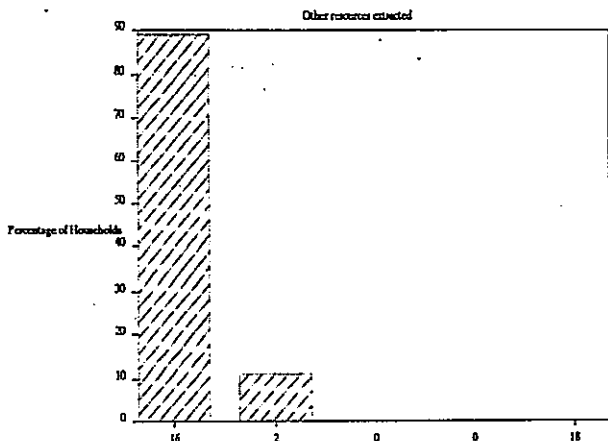
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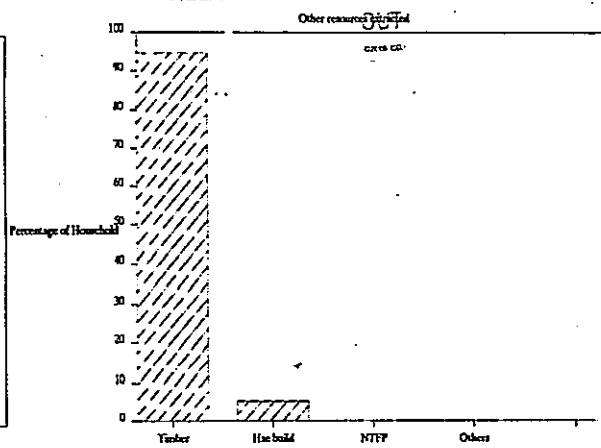
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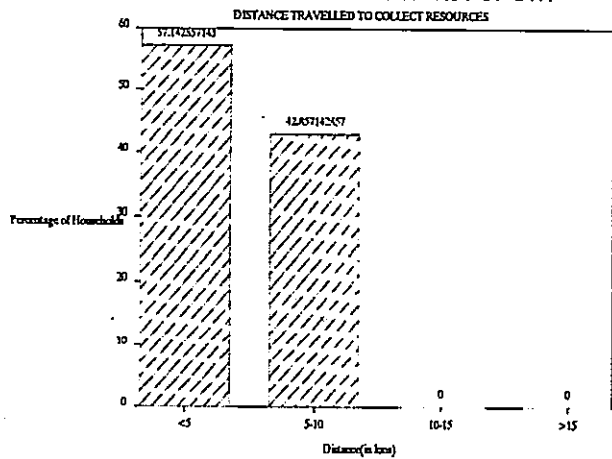
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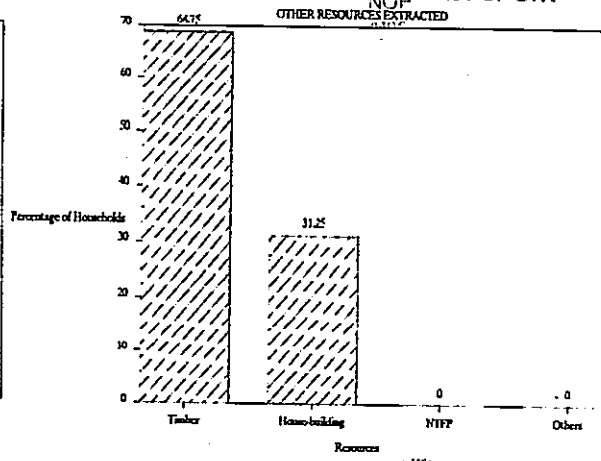
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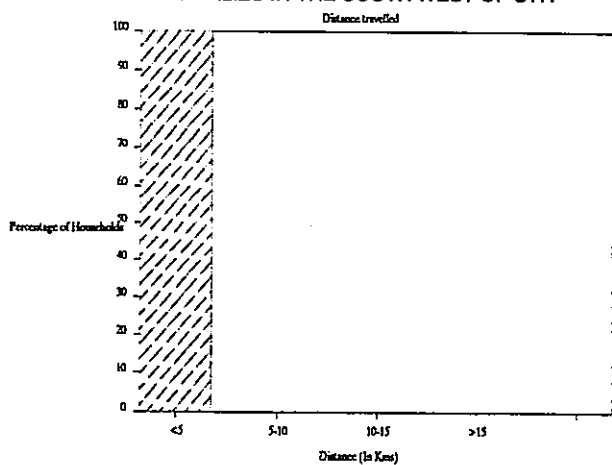
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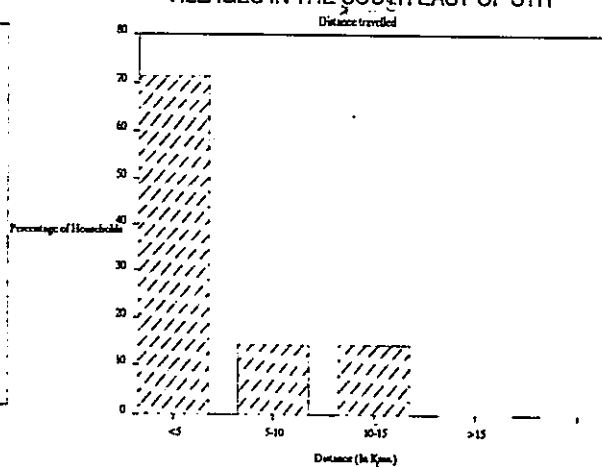
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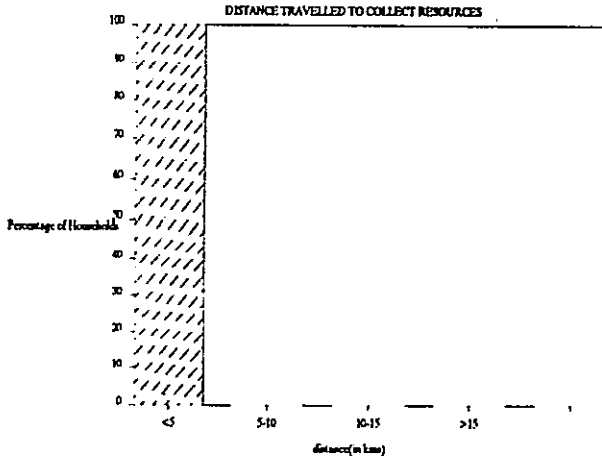
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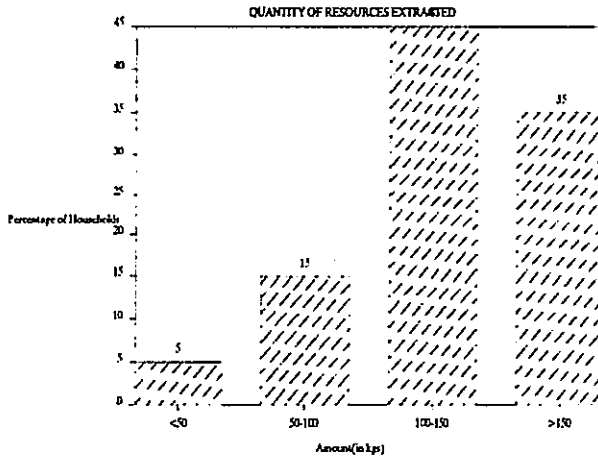
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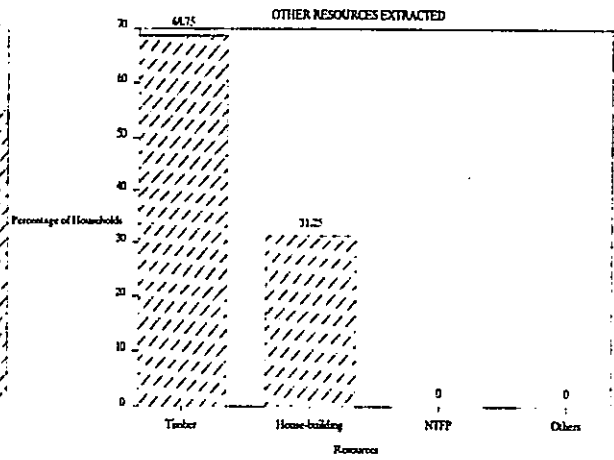
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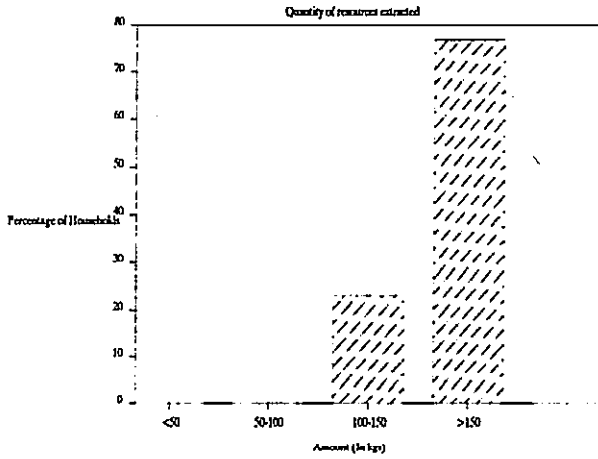
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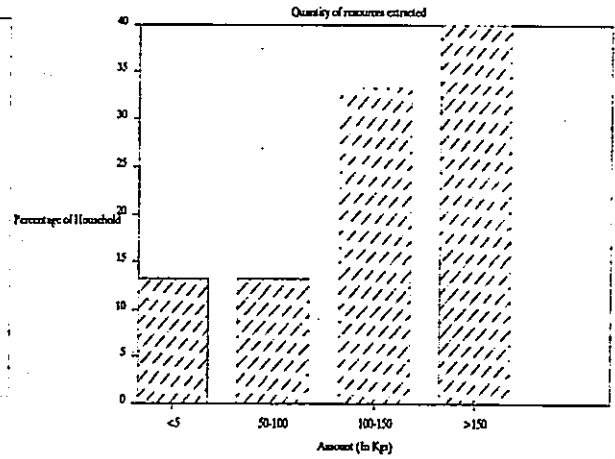
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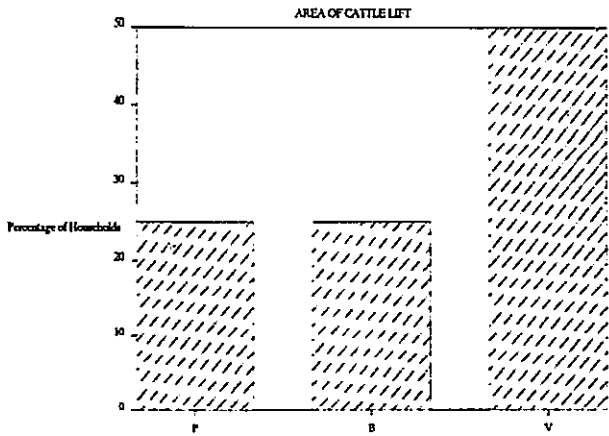


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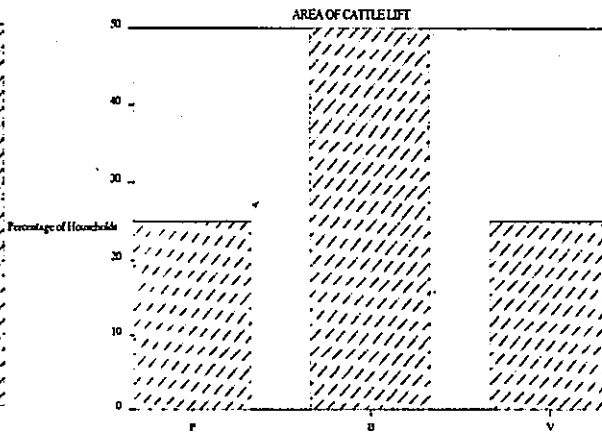




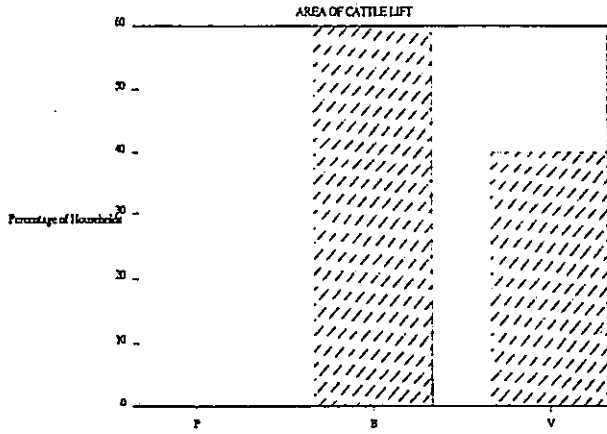
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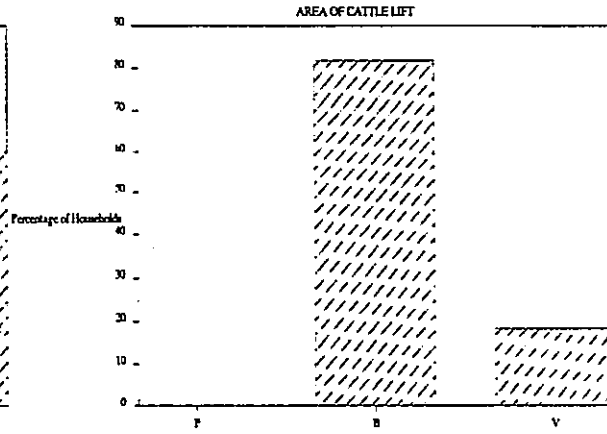
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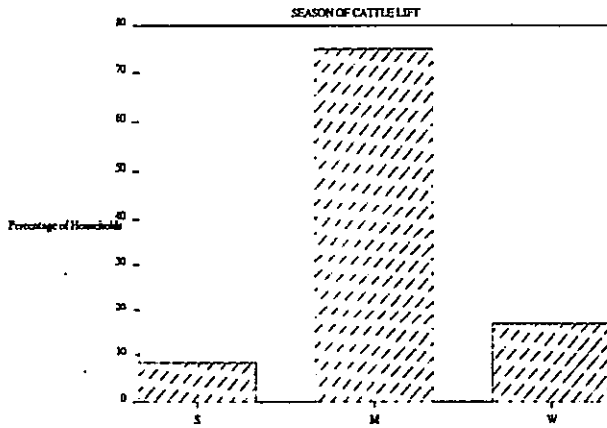
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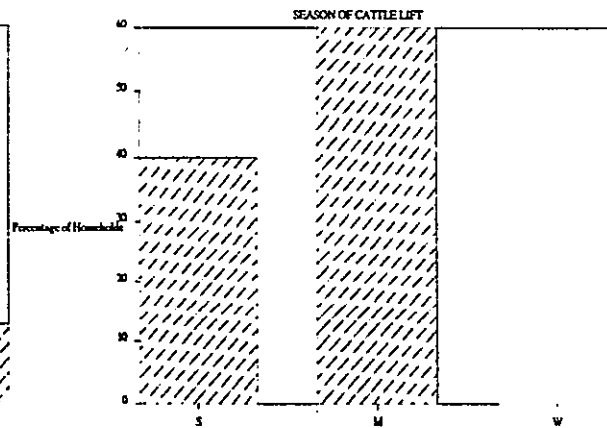
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VILLAGES IN THE NORTH WEST OF STR

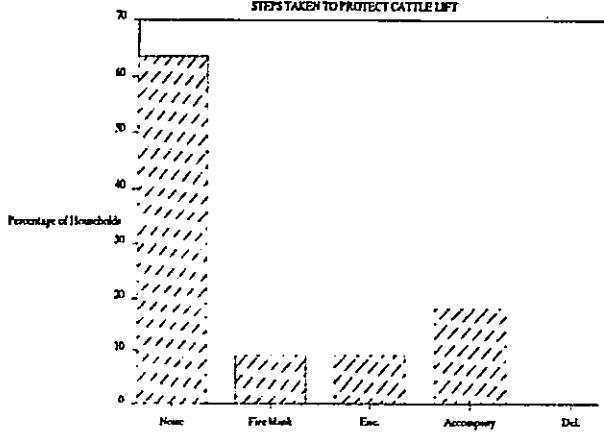


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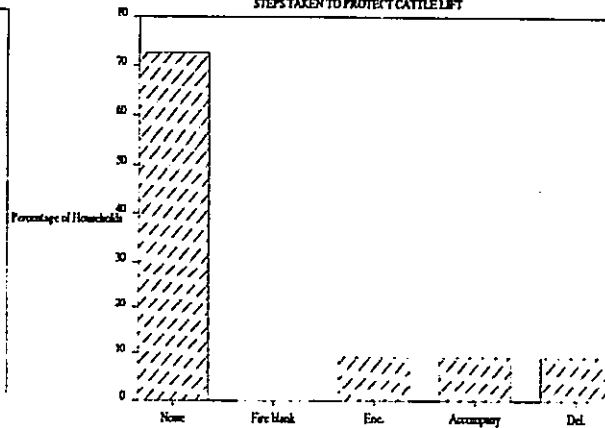
VILLAGES IN THE NORTH WEST OF STR

STEPS TAKEN TO PROTECT CATTLE LIFT



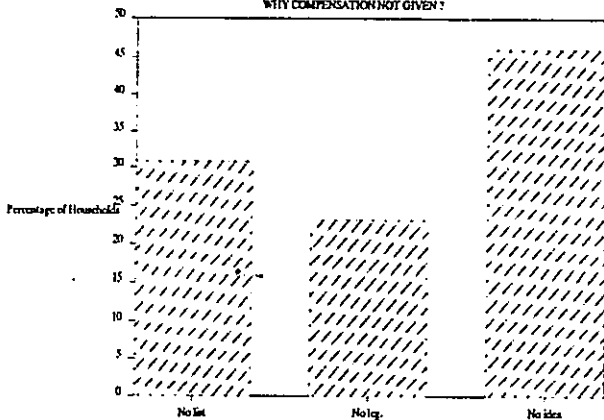
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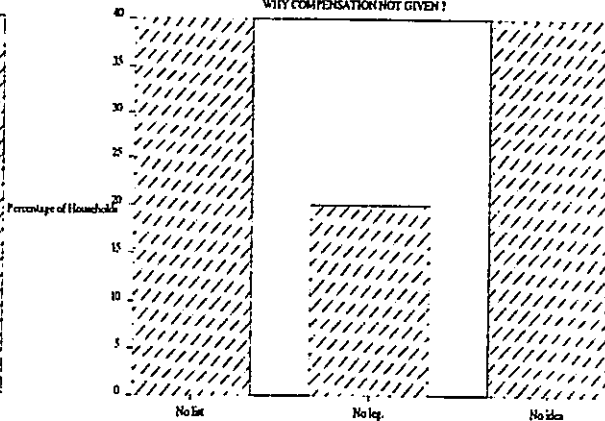
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WHY COMPENSATION NOT GIVEN?



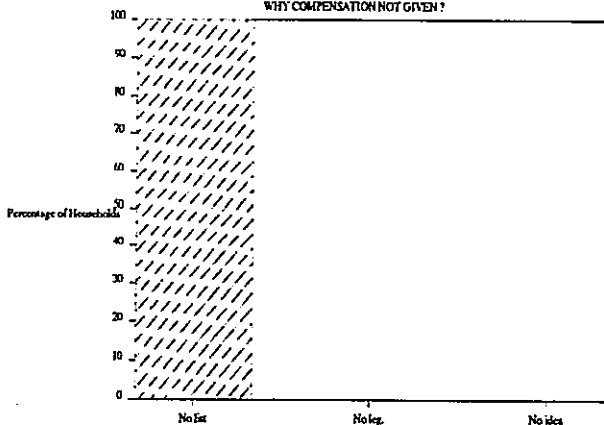
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WHY COMPENSATION NOT GIVEN?



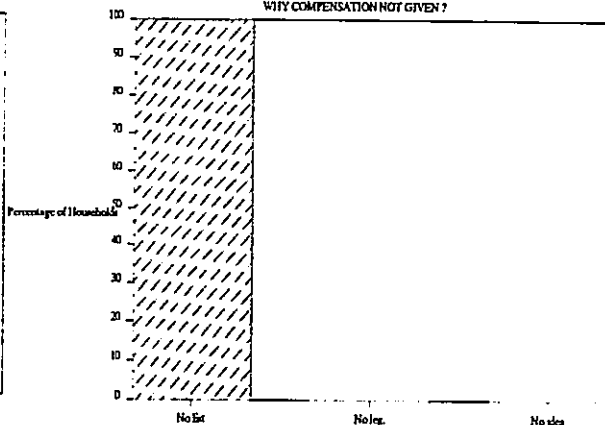
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WHY COMPENSATION NOT GIVEN?

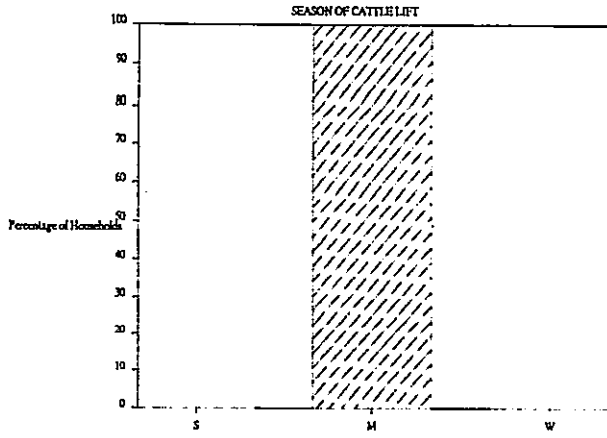


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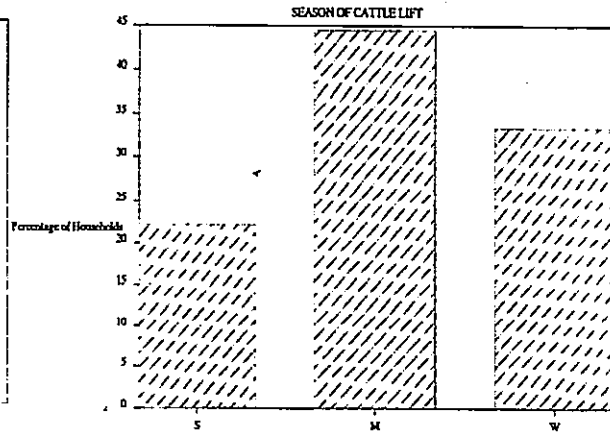
WHY COMPENSATION NOT GIVEN?



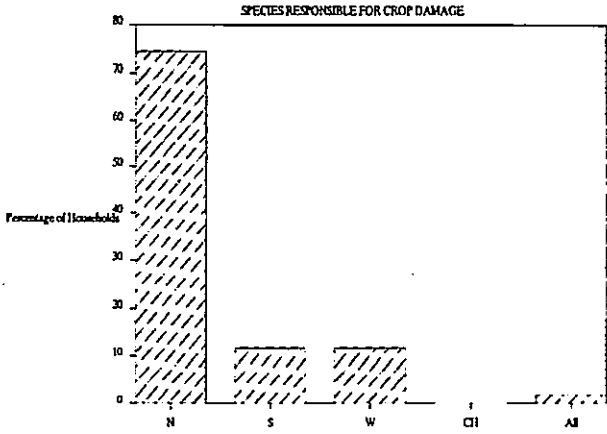
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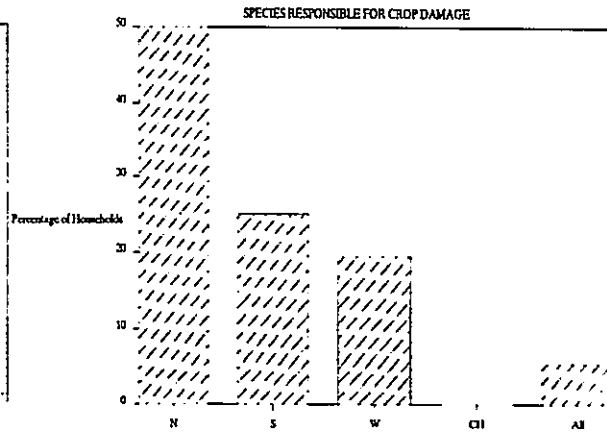
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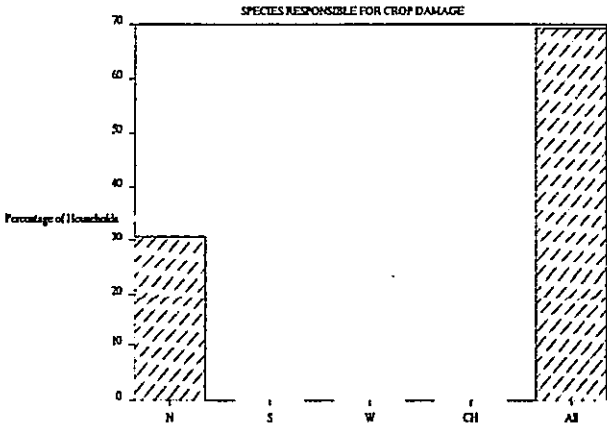
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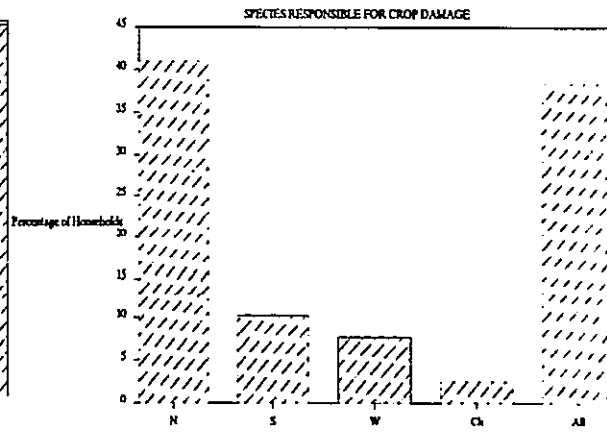
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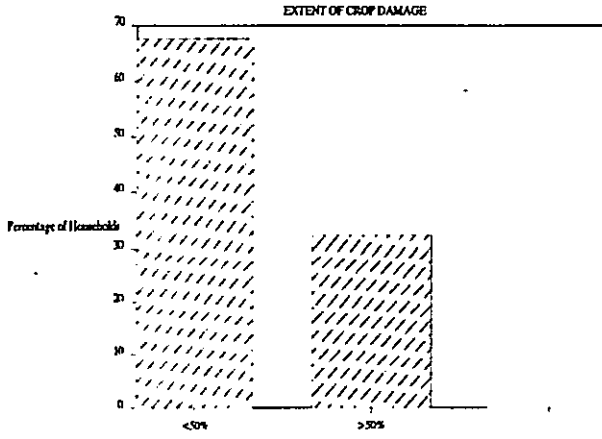
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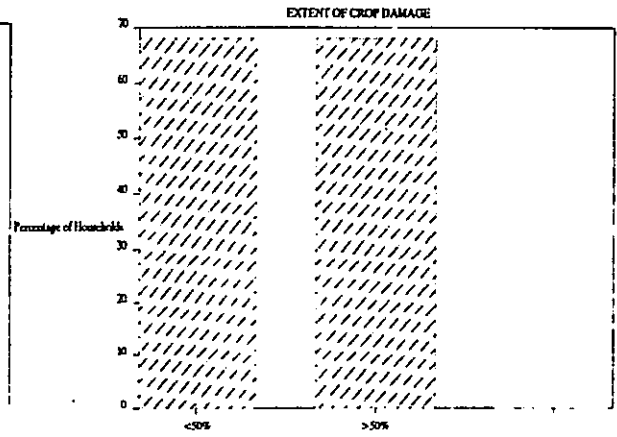
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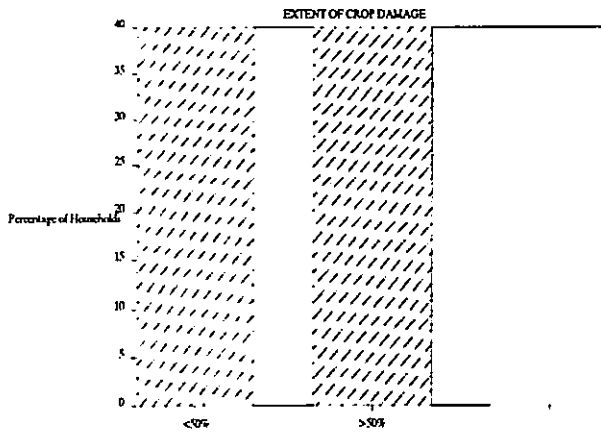
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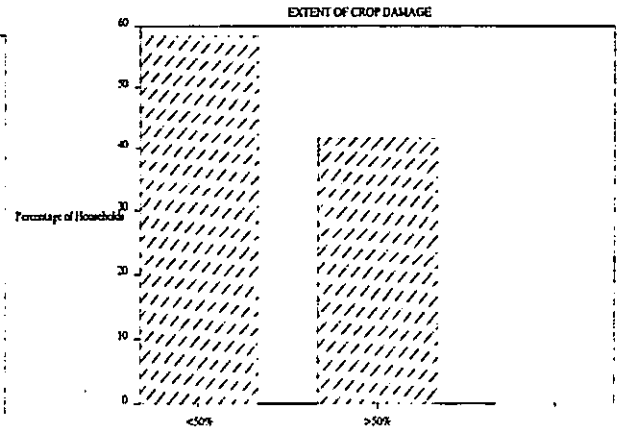
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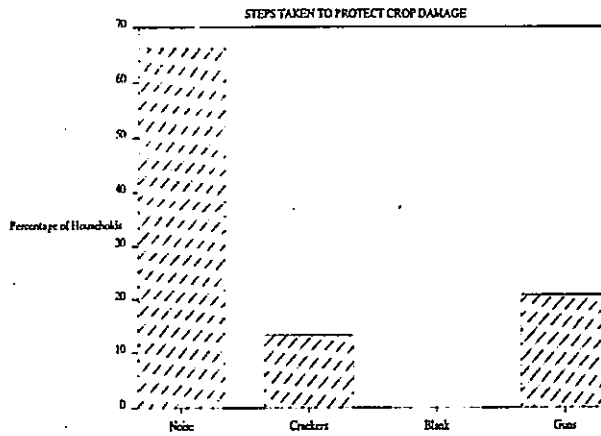
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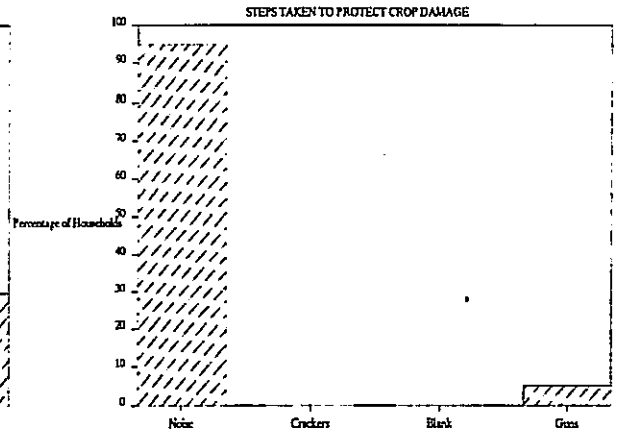
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VILLAGES IN THE NORTH WEST OF STR

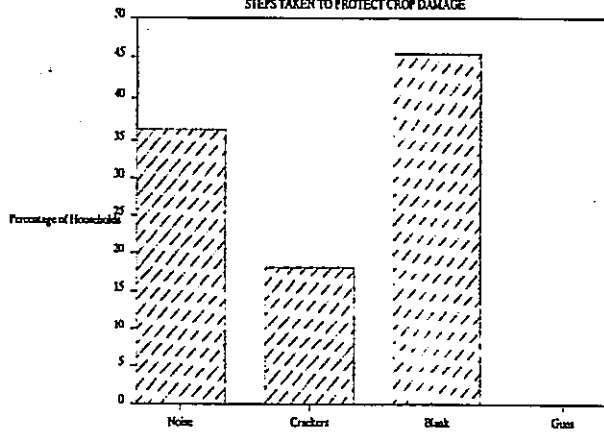


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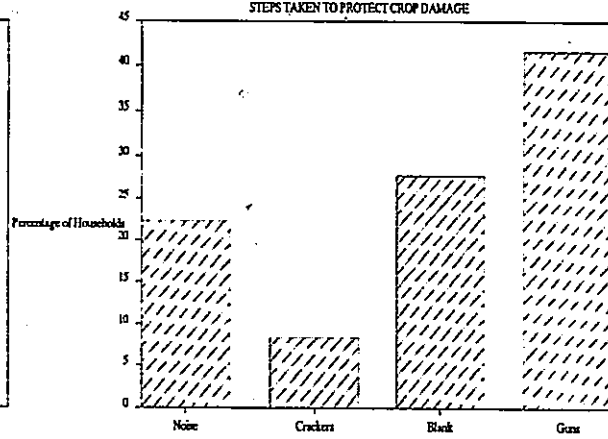
### VILLAGES IN THE SOUTH WEST OF STR

STEPS TAKEN TO PROTECT CROP DAMAGE



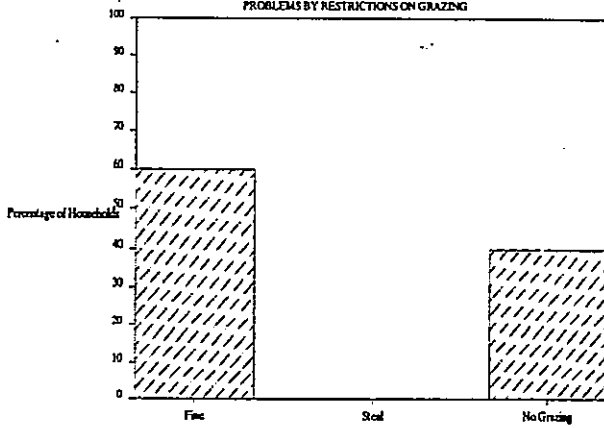
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STEPS TAKEN TO PROTECT CROP DAMAGE



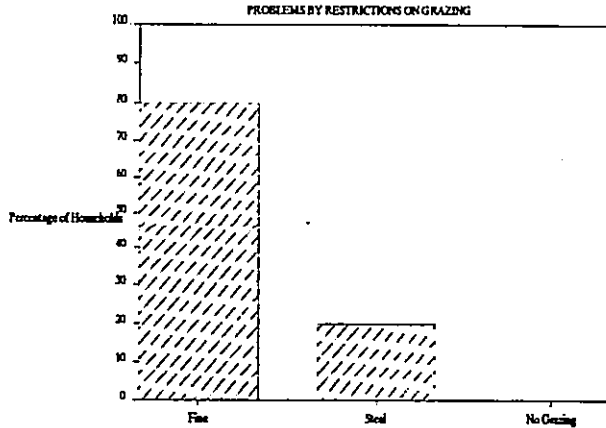
### VILLAGES IN THE NORTH EAST OF STR

PROBLEMS BY RESTRICTIONS ON GRAZING



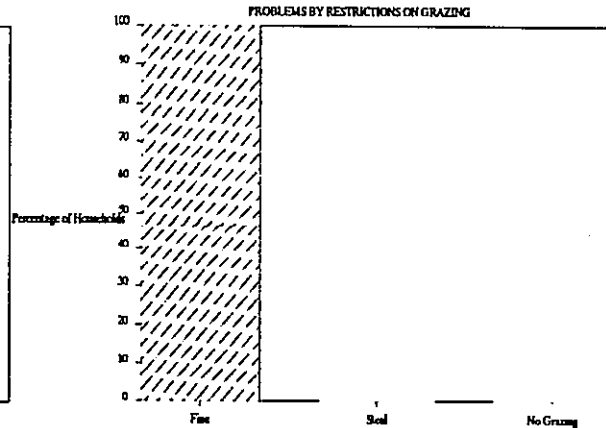
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PROBLEMS BY RESTRICTIONS ON GRAZING

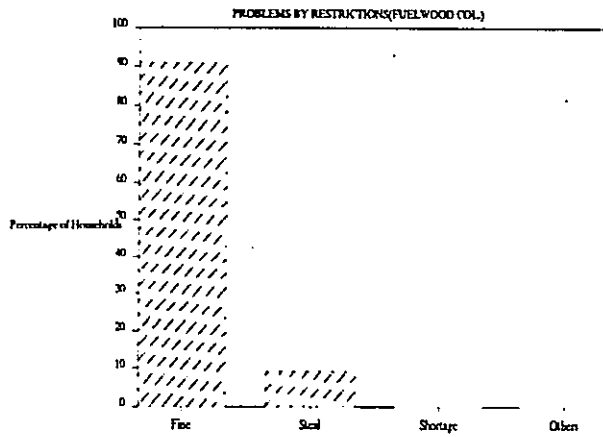


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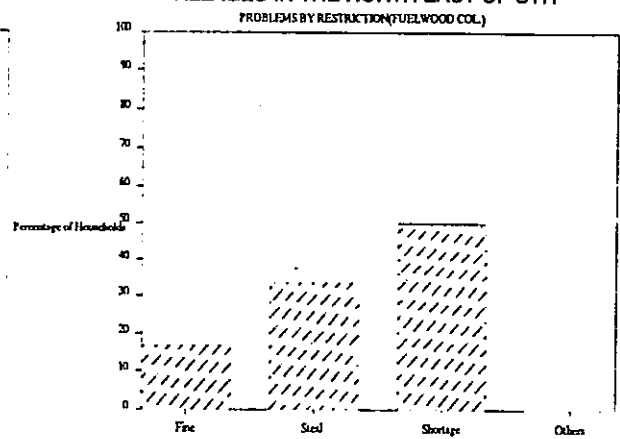
PROBLEMS BY RESTRICTIONS ON GRAZING



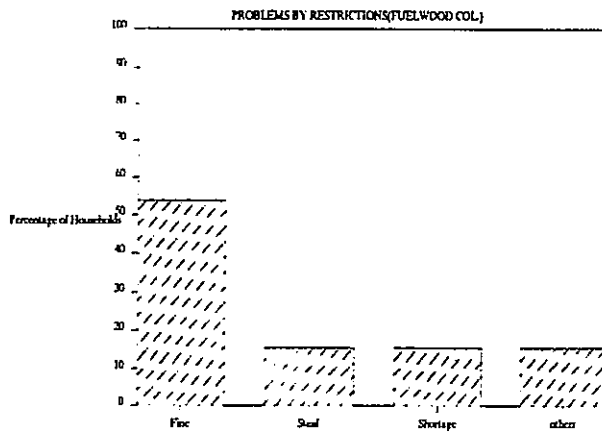
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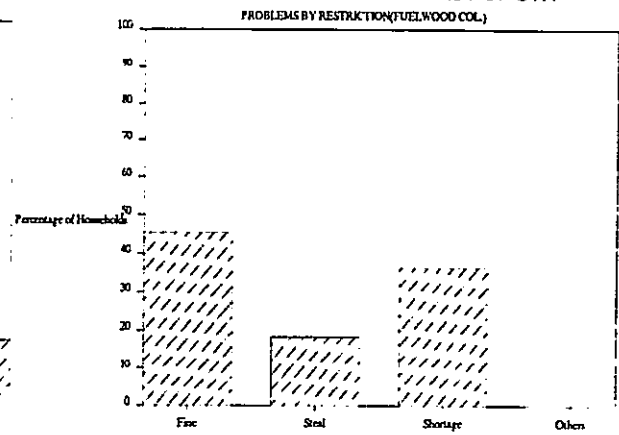
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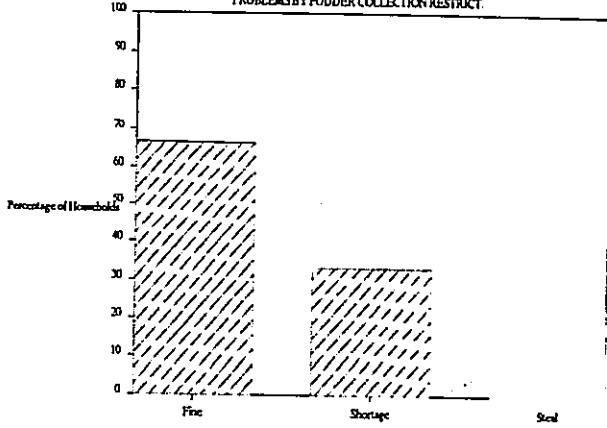


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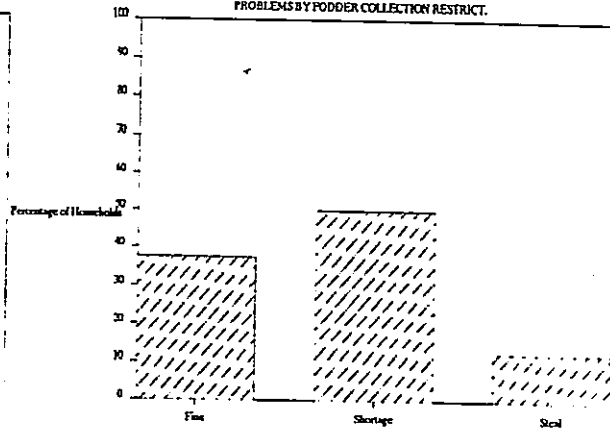
VILLAGES IN THE NORTH WEST OF STR

PROBLEMS BY FODDER COLLECTION RESTRICT.



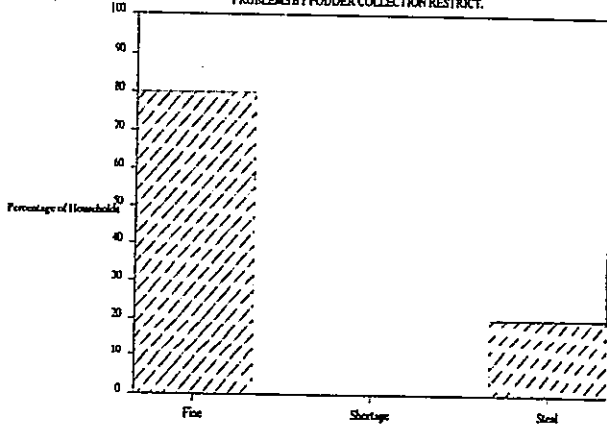
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PROBLEMS BY FODDER COLLECTION RESTRICT.



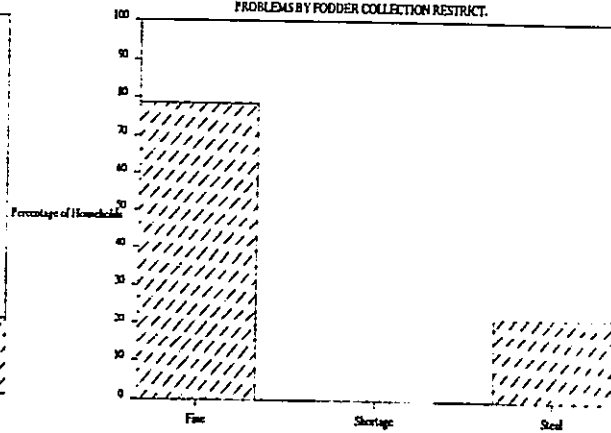
VILLAGES IN THE SOUTH WEST OF STR

PROBLEMS BY FODDER COLLECTION RESTRICT.



VILLAGES IN THE SOUTH EAST OF STR

PROBLEMS BY FODDER COLLECTION RESTRICT.



## **ANNEXURE I**

### **The Report of the Field Visit to Sariska National Park, Rajasthan**

**2 to 5 July, 1989**

#### **Field Visitors:**

Farhad Vania, Himraj Dang, Alan Rodgers, Shekhar Singh

#### **Persons met:**

Shri Fateh Singh Rathore, Field Director, Sariska Tiger Reserve

Shri Shankar, Lecturer, Wildlife Institute of India

Shri Divakar, Research Student, Wildlife Institute of India

Shri Rajinder Singh and others of Tarun Bharat Sangh, NGO at Bhikampura, Thanagazi

Shri Sunil Arora, Collector, Alwar District

Villagers from Umri, Haripura, Kirashka, Udaynath and Gopalpura

On the first day i.e. 2nd July, 1989 the project team arrived at the Sariska National Park at 1.00 p.m. Contact was made with the Field Director and a preliminary discussion was held.

#### **Afternoon of 2 July, 1989: The Kalighati Valley**

Dr. Alan Rodgers arrived a little later and the team drove into the national park till a point 8 km. beyond Kalighati. A high concentration of wild animals was seen along this main road, including Peacocks, Nilgai, Sambar, Spotted deer, Wild boar and Monitor lizards. Discussions with the Wildlife Institute personnel that the valley along this main road is perhaps the most densely populated area of the national park, as far as wild animals are concerned. Subsequent discussions with the Field Director suggested that this is atleast partly due to the fact that during the past many years most of the water holes have been concentrated along this road. This has resulted in an animal density much higher than the rest of the park. Another reason for this density was suggested by the Wildlife Institute personnel who mentioned that starting from the ridges on both sides of this valley, there were high human pressures which ensured the concentration of the animals in this valley.

Subsequent discussions with the Field Director indicated that there were plans to shift the water holes from the road side further up the ridges (many had already been shifted). The Field Director felt that the concentration of water holes next to the road resulted in a separation of the tiger from its prey. This was because most of the other animals moved down to the road side, while the tiger which dislikes human disturbance did not follow these animals. Subsequently, according to the Field Director, the tiger moved out of the national park in search of food.

#### **Morning of 3 July, 1989: Umri**

The next morning we drove to Umri village on the eastern side of the sanctuary. This village is a forest village (cattle camp) located within the designated Core Zone I of the Tiger Reserves in the N.P. The village is located just across the Silberi Nala on flat open land at the base of a hill rising behind the village about two to three hundred feet. The village has about 20 households, 300 cattle and between 50 to 60 goats. The villagers claim to have lived in this village for generations and subsist by selling ghee (clarified butter) and cow dung. In fact, the evening before we had seen 5 trucks loaded with cow dung, and perhaps some fire wood, driving back from Umri.



## Relocation

We spoke only to one family in the village where the conversation was dominated by the old father. (who had been a soldier in the army of the Raja of Alwar and had traveled to different parts of the world including Suez Canal). He did not seem averse to shifting but wanted a better deal than what he understood was being given. As he understood it, 5 bighas of land were being given per family. He felt that this was totally inadequate to sustain a family, some of which had upto 20 members. The Field Director later clarified that, on shifting, all adult males (over 18 years of age) would get 5 bighas of land each.

The Umri villagers were also apprehensive because they felt that the earlier relocation of Karnawas village had been unsuccessful and that most of the villagers had either come back to other villages in the Park and adjacent to it, or were very badly off.

This was a constant theme in our conversation with villagers from different villages. In general, the apprehension of these villagers seemed well founded. The earlier relocation programme had reportedly failed because either the land given was not adequate, or it was not cultivable, and there were charges of corruption against the concerned officials who had allegedly only paid a small proportion of the compensation money and had replaced the land originally earmarked for resettlement by inferior land. Allegedly some of the land was taken away by absentee claimants. The bad experience of these villagers seemed the single most important factor deterring the other villagers from agreeing to be relocated.

The village itself appears to be very poor, and the villagers live in thatched huts and have no land for cultivation.

This village has been under threat of relocation for some years and land has also been identified and prepared for their resettlement. However, this land was discovered to be, at the last moment, forest land and despite wells having been dug and some other infrastructure provided the shifting has been postponed (see also discussion on demarcation of boundaries). The file, requesting the required permission under the Forest Conservation Act, is reportedly pending with the Ministry of Environment and Forests, Government of India.

### **Impact on the environment**

Even without a detailed study, it was obvious that the livestock in Umri had an impact on the surrounding vegetation. The vegetation on the hill side behind the village was visibly degraded and as we drove away from Umri we could, for many miles, see the nearly bald patch in contrast with the rest of the hills. We also stopped at a few places within grazing range of Umri livestock to examine the state of the habitat and the regeneration of species. Alan Rodgers pointed out that you could not see a single regenerating Dhak tree. The few very small Dhak plants that we saw were coppicing from the stumps of earlier trees. We also saw that most of the trees in the area had been lopped and that the bushes (mainly *Capparis spp.*) were heavily grazed. There were many weeds in evidence and the area was heavily eroded. The grass cover was also very sparse. This was despite the fact that the area had had rainfall for many days before our visit.

### **Afternoon of 3 July, 1989: Haripura**

That afternoon we visited another village, Haripura, which is just a little off and west of the main Sariska-Kalighati road, inside the national park. This is also a forest village located within the designated Core Zone I and next to a large well and a temple.

## **Impact on the Environment**

As this village was subsequently studied in detail by the next team, our cursory observations might not be of much value. However, we did go around the periphery of the village, looking at the impact of the livestock, and again saw evidence of heavy grazing and lopping on the trees, bushes and grass in the area.

## **Relocation**

We spoke to some of the villagers who seemed generally against shifting out of their village. They also claimed that they did not negatively affect the forests and in fact ensured that no poaching or illegal felling occurred in their area. Interestingly, this was the only village which claimed that no cattle was lost during the drought of 1988 (this was later contradicted by the detailed survey). According to them they bought fodder from the market to feed their cattle and they were able to do this as they were relatively close to the main road.

One of their main arguments against shifting out was that they had traditional connections with people in the region and as such were extended credit when they needed to buy fodder for their cattle. If they shifted out to a new place then who would help them when they were faced with such calamities?

Haripura, unlike Umri, had a beautiful setting, located among lush green forests on top of a ridge, with a cool breeze blowing through the village. I think we all felt a little overawed by the dignity of the village and the villagers, and very uncomfortable at our temerity to even consider shifting them out.

## **Morning of 4 July, 1989: Kirashka Village**

On the morning of 4 July we drove to Kirashka village via Algwai (Aigwal) Spring. Kirashka is a revenue village situated in the eastern part of Core Zone I and within the designated national park. The village has three hamlets, Pehlagaon, Dahini and Jodi, the latter is separated from the other two by a narrow intervening forest area. There are two ponds, one near the former two adjoining hamlets and another next to Jodi.

We visited Dahini and also the neighbouring forest area. As this village was also subsequently visited by the second team, only brief comments are given here.

## **Relocation**

There were extensive agricultural lands between the two hamlets of Pehlagaon and Dahini, extending to the edge of the pond, to the south. There were walls around the fields which were mainly to keep out Nilgai, Spotted deer, Sambar, Wild boar, and occasional Porcupines.

These villagers also kept cattle and goats and claimed that a large number of their cattle had died in the drought last year. They expressed their inability to purchase fodder for their cattle as they were very far from the main road and, therefore, transportation of the fodder would have been expensive.

The villagers here were also not very keen to be relocated though they did not have access to facilities like electricity, schools, and medical care. During discussion with the villagers it seemed that they were not confident of getting a fair deal or of being able to ensure a fair deal for themselves as there were no educated persons in the village and an expressed lack of unity.

## **Impact on the environment**

The neighbouring forest showed distinct signs of degradation due to grazing, lopping, fuel cutting etc.

### Afternoon of 4 July, 1989: Udaynath

In the afternoon we went to the temple at Udaynath and then to an area adjacent to the Udaynath village. Though we did not go into the village, some of the villagers came to talk to us.

#### **Buffer zone management**

This village is situated in the western part of the park and is in the designate buffer zone. On our drive to the village we saw many kilometers of the buffer zone which were almost uniformly degraded. The area had obviously been over-grazed and over-utilized for many years, and we were informed by the villagers that cattle from many neighbouring villages came to this area for grazing. We were told that fire wood was extracted from this area not only for local village use but also for sale in neighbouring towns and villages. There seems to have been no effort at buffer zone management or even control at least in this area. The villagers also confirmed that they had not witnessed plantation or other conservation work ever since they could remember.

### Morning of 5 July, 1989: Gopalpura and Talwadi

On the morning of 5th July the team visited Bhikampura and Gopalpura via Talwadi.

#### **Mining**

We saw extensive dolomite and marble mining at the edge of the national park, in the Talwadi and Kalwad area. We visited one valley which had about 15-20 open faced pits. These valleys were very heavily degraded and the over-burden from the mines had been dumped all over the valley and was further degrading the vegetation and soil of the area. The Field Director, who was with us on this visit, expressed apprehension on the impact of these mines on the national park. He also said if this mining was stopped and the area protected from grazing, it could easily regenerate into a forest once more providing corridors to Core Zone - I.

#### **Rehabilitation of Bonded Labour Families**

We next visited Bhikampura, the headquarters of Tarun Bharat Sangh a voluntary organisation working in the villages of the area including some inside the Sanctuary and Park.

Along with the NGO representatives we visited the site near Gopalpura where six bonded labour families were being rehabilitated. The land which had been allotted to these six families was revenue land but had been enclosed by a wall by the villagers from Gopalpura, and protected over the last three years. The villagers had also recently planted some saplings on the land and it was quite obvious that this enclosed land was much greener than the neighbouring areas.

On the morning of our visit we saw that some shrubs had been uprooted over a small area. We were told that this had been done by the bonded labour families who had come there the day before. Apparently the cleared area had been selected by them for making their huts.

The area appeared to us to be incapable of supporting cultivation and, considering the grazing pressures already existing in the area, it did not seem likely that it could support further livestock. The villagers also informed us that there was no water in the area and that a well which had been recently dug was abandoned after reaching 120 feet. We were, therefore, worried how the six families to be located there would support themselves. The Field Director also was apprehensive that as the area was very close to the national park, these people might indulge in trapping and poaching to support themselves.

The Tarun Bharat Sangh representatives told us that though they had protested to the district authorities, their protests had not been successful. We, therefore, decided to try and meet the Collector of Alwar on our way back to Delhi later in the day.

On the way back to Delhi we stopped at the Collector's office in Alwar and had a discussion with him on the relocation of the six bonded labour (Banjara) families. The Collector informed us that these families had

earlier been allotted some land which had later to be canceled. He also said that he had not received any objection to this resettlement location from the Field Director, Sariska National Park. He assured us that in case such an objection was raised he would re-examine the issue on its merits. (The Collector also informed us that he had given Rs.9 lakhs in 1988-89 to the park for building water conservation structures in the park).

Accordingly, a letter was written to the Collector and to the Field Director on our return to Delhi.

### **General Comments**

Apart from visiting different parts of the national park each day, the afternoons were utilised in discussions with the Field Director and his staff, and in filling up the detailed questionnaire for the national park. Some of the major issues that emerged are summarised below:

#### **1. Demarcation of Boundaries**

The Field Director informed us that the boundaries of the Sariska Sanctuary and National Park were not clearly demarcated as the notifications were not clear about the boundaries. We ourselves tried to plot the boundaries on the toposheet using the notifications but found it an impossible task.

The task of identifying the boundaries was further complicated by the fact that there was confusion concerning the demarcation of the forest land in the area. The Field Director informed us that though in the settlement made in the 1950s, forest areas had been demarcated, for some reason many of these areas were still shown as revenue land in the revenue records. According to him, the mines that we saw on the last day were actually in forest area and as such illegal. The land that had been identified to resettle villagers from Umri, and for resettling the six bonded labour families earlier to Gopalpura, was also discovered to be forest land which had been wrongly classified in the revenue records. Though the Wildlife Institute of India has drawn up a map of the Project Tiger area, the project area in this map was scattered and there were many isolated bits which were surrounded or separated by revenue land, thereby making the management of the area and the movement of the animals difficult.

It seems obvious that the reconciliation of these problems and the drawing up of proper boundaries for the park should be a first priority and is a pre-requisite to the proper management of the project area.

#### **2. Shifting of Villagers**

The Field Director felt that the national park could not be properly managed till the various forest and revenue villages inside the park were shifted out. So far only one village, Kamawas and two cattle camps Kalighati and Slopka have been shifted out. The first one way back in 1976 and Kalighati some years back. It was now proposed to shift out Umri and then the other villages in the area. Our discussions with the Collector. Alwar revealed that money for the relocations of some villages was lying unspent with the district authorities, though actual shifting had been held up for reasons earlier discussed.

It is time that the issue of relocating the villages inside Sariska was seriously examined. Some of the questions that need to be asked are:

- (a) Whether the national park's boundaries should be re-drawn excluding the existing villages?
- (b) Should the villagers be allowed to stay where they are, within the national parks, and to live as they are living?
- (c) Should the villagers be allowed to remain where they are, but their activities, and consequently their impact on the forest, modified?
- (d) If the villagers are to be shifted, what should be the pre-conditions and circumstances?

### 3. Poaching

The Field Director felt that there had been significant amount of poaching, especially of tigers, in the reserve. He had information on the modus operandi of the poachers, and had already closed down some hides which he felt were preferred sites for tiger poaching. He also felt that villagers in and around the park often invited professional Shikaris to shoot tigers who had attacked their livestock. They apparently offered Rs. 200 to the Shikari for shooting the tiger and an additional Rs.7,500 was earned by selling the bones of the tiger, and Rs. 1,800 by selling its skin.

The Field Director felt that the earlier discussed alienation of the tiger from its prey aggravated this situation.

### 4. Grazing

A large number of livestock graze in and around the park, especially in areas where there is habitation. Though grazing inside the national park is technically illegal, it is mostly tolerated. Many of the villagers complained that every once in a while Forest Guards confiscated their livestock, or fined them. Earlier the fines ranged from Rs.4 for goats to Rs.11 for cattle. From this season the fines were to go up to Rs.51 for cattle.

This problem is closely connected with the earlier discussed problem of habitation in and around the park. The solution of this problem would be dependent upon how the habitation problem is tackled.

### 5. Census of Animals

The census for various species of animals for this year have just been completed and the results were very revealing. Most of the species had significantly declined in population as compared to last year's census. For example, as opposed to 45 Tigers last year there were only 19 this year, Leopards 47 to 28, Sambar 12336 to 3766, Wild boar 4895 to 2061, and Pythons from 78 to 11. Of all the species listed only the Chinkara had grown from 12 to 50.

The Field Director felt that this year's census was far closer to the real picture and that in the past census figures were not very reliable.

## ANNEXURE II

### PRELIMINARY SURVEY OF VILLAGES ADJACENT TO SARISKA NATIONAL PARK

Dates of the visit: From 11 to 25 February, 1992.

Field Visitors: Angana Chatterjee, Geetanjali Singhal, Meera Warriar, Ravinder Bhalla, and Raman Mehta.

**Objective of the Visit:** The objective of this visit, after having made an earlier visit to Sariska for field testing of schedules, was to do a preliminary survey of 10 villages located in the adjacent areas of the Sariska National Park (a 10 km radius from the Park boundary makes up the adjacent area). All the villages<sup>1</sup> scheduled to be surveyed by the team during this field visit, were visited, and all schedules, with the exception of a household schedule in Laduwas, were filled.

**Criteria for Selection:** The main criteria for the selection of villages were:-

- a) Location of a village in relation to the Park. 8 locational zones viz. NNW, NNE, ENE, ESE, SSE, SSW, WSW, and WNW were identified.
- b) Distance of the village from the boundary of the Park. Two distance zones viz. less than or equal to 5 km from the Park, and greater than 5 km and upto 10 km from the Park were defined.

From each locational zone, two villages, one in each distance zone, were chosen. Three locational zones viz. NNE, SSE, and SSW were not considered. This is because the marble mines, which have become controversial after a case in the Supreme Court was filed, are located in zones SSE, and SSW, and this area is very tense at the moment. NNE has only four villages in it, and it was felt that it could be covered later.

In addition to the two main criteria listed above, the other subsidiary criteria, information on which was available from the District Census Handbook, were as follows:-

1) Population of the village:

- a. Less than or equal to 500 people.
- b. Greater than 500 and less than or equal to 1000 people.
- c. Greater than 1000 and less than or equal to 2000 people.
- d. Greater than 2000 people.

2) Amenities available in a village. These included electricity, schools, medical facilities, Post offices, and Communication ie; bus connections. The categories were:

- a. None or only 1 amenity available.
- b. 2 or 3 amenities available.

---

<sup>1</sup> Village here refers to the unit of habitation defined as a village in the District Census Handbook. The definition of a village in the District Census Handbook is coterminous to that of a revenue village.

c.4 or 5 amenities available.

3) Distance from the nearest town:

a. Less than or equal to 20 km from the town.

b. Greater than 20 km and less than or equal to 40 km from the town.

c. Greater than 40 km from the town.

4) Per capita agricultural and common land holding in a village:

a. Less than or equal to 0.5 ha.

b. Greater than 0.5 and less than or equal to 1.0 ha.

c. Greater than 1.0 ha

Most of the above listed categories were represented by the 10 villages which were selected for the survey. These villages were:-

- |                       |                      |
|-----------------------|----------------------|
| 1. Nirbalpura (03)    | 2. Heensla (04)      |
| 3. Narbad Ka Bas (05) | 4. Laduwas (06)      |
| 5. Laha ka Bas (07)   | 6. Todi Luharan (08) |
| 7. Kalalanka (09)     | 8. Alapur (10)       |
| 9. Punkhar (11)       | 10. Dhamrer (12)     |

On an earlier visit for field testing of schedules, the team had visited two more villages viz. Khataka (01), and Bangroli (02).

[The numbers given in brackets are the village schedule codes]

**Findings, Observations and Impressions:** Although the data collected has not been processed yet, some tentative findings, based on impressions gathered by talking to people and also observing areas surrounding the villages where we went, are discussed below.

1. **Degree of Dependence on the Park/Sanctuary:-** People's needs from the Park/Sanctuary can be divided up into three broad categories. These are a) needs for fuelwood, b) needs for fodder, and c) needs for timber for house building. Except in the case of Heensla and Narbad Ka Bas, these needs of the people were being catered to from the Park or Sanctuary. There was, however, a difference between villages, and, within villages among different households, in the degree of dependence on the Park or Sanctuary. This degree of dependence was in turn a function of size of land holding, agricultural productivity, and alternate sources of income like wage labour. In general, it was observed that villages situated to the east of the Park, seemed to have a lower degree of dependence as opposed to villages situated to the west. This may have been because the quality of soil, and therefore the productivity of agriculture is much better in the eastern region. Within a village, the degree of dependence on the Park/Forest was almost always a function of the size of land holding of a household, as well as income from other sources like wage labour which made it possible for people to buy fodder or fuel.

2. **Crop Damage by Wild Animals:-** In every village which we went to, a very high incidence of crop damage was reported. The species damaging crops was mainly Nilgai. Wild boar were also reported to damage crops quite significantly, as also were Sambar and Chital. Estimates of damage varied from 10% to 50%, but most people reported about 25% crop damage by wild animals. At the moment, no crop compensation is being given by the

Park authorities. Although crop damage by wild animals was always there, it seems to have assumed alarming proportions in the past 2 or 3 years

3. Sinking Water Table:- The main source of irrigation in this region is groundwater. However, due to consistently poor rains over the past decade, the groundwater is not being recharged. Another reason due to which groundwater is not getting adequately recharged might be increased deforestation. Also, according to some people, the high yielding variety of seeds which were introduced in the region about 10 to 15 years ago, need more water than the traditional variety of seeds. Since groundwater extraction has continued unabated for purposes of irrigation, people are now beginning to face problems. A very large percentage (anywhere between 50% and 90%) of the wells which were used for irrigation in the past have now gone completely dry. In some places the groundwater level i.e; the watertable has gone down to about 300 feet. In the past 5 years, in all the places we went to, the groundwater level has gone down atleast by 50 feet. In some places the level was reported to have decreased by even 100 feet or more.

4. Linkages between Agriculture, Pastoralism, and the Domestic Sector:- Agriculture and pastoralism are occupations which go hand in hand. Crop residues from wheat and barley for instance, are fed to buffalos and cows. Mustard residues are used both for fodder, as well as fuel, by most households. The kharif crops in the region which include jowar, bajra, and corn, are also used for fodder. Dung is used as manure in the fields. In some households, it is also used as fuel. Due to increasing shortage of water, and the consequent decline in productivity of agriculture, the livestock numbers in all the villages we visited have declined. Another reason for declining livestock holdings is also the increasingly difficult access to the forests of the Park as well as the Sanctuary. Some people who were not happy with the new high yielding variety seeds also felt that fodder availability had declined due to the switchover from traditional to new seeds for certain crops like wheat. The new seeds have an added disadvantage in that they need more water than traditional seeds in order to grow properly.

5. Very Low Level of Traditional Skills or knowledge:- Traditional handicrafts and artisanal skills were conspicuous by being almost totally non-existent. There were a few exceptions however. In a few households, some women have the skill of spinning threads. Some women also make plates from *Butea* leaves. We did not come across anyone who had knowledge of the medicinal herbs found in the Park or how to use them.

6. State of the Forests Within the Park:- According to the villagers, productivity of the forests inside the Park/Sanctuary had declined, and forest cover had been reduced primarily due to the drought. Some villagers also felt that the increasingly stringent restrictions being imposed on their activities were destroying and not helping the Park. They argued, that since most of their activities are now carried out surreptitiously instead of legally, they have become much less careful about preserving the forests than before. This is because now when they enter the forest, they are always afraid of getting caught. In such a situation it makes sense for example, to quickly cut a tree instead of spending time to collect deadwood for fuel.

7. Attitude of the People Towards the Park:- In general, the people were antagonistic towards the Park. This resentment stemmed from the restrictions imposed on resource use of local people from the forests of the Park, as well as from the relatively recent spurt in crop damage by wild animals for which no compensation is available.

8. Problems, Potentials and Alternatives:- The local people living adjacent to the Sariska National Park depend on it for their biomass requirements. The main requirements are those for fuel and fodder. Some of the above mentioned requirements are also met through agricultural residues. However, due to the prevailing shortage of water, agricultural productivity has declined. One side effect of this declining productivity in agriculture is increased dependence on the Park/Sanctuary for fuel as well as fodder. But the productivity of the forests inside the Park/Sanctuary is also declining due to the lack of rains. In addition, increased restrictions on the activities of people within the Park/Sanctuary, have made forest use difficult for the local communities.

People were asked what according to them were solutions to their problems, mainly shortage of water, and as a result the shortage of biomass, which they are currently facing. The initial response in most cases was to say



that the government should sink very deep (*paataal torh* was the term used quite often) tubewells into the ground and ensure a regular power supply, so that proper irrigation of crops could be ensured. This they felt, would solve most of their problems. When asked whether there was any potential for making dams or anicuts in the area, a positive response was forthcoming from most of the villages where we went.

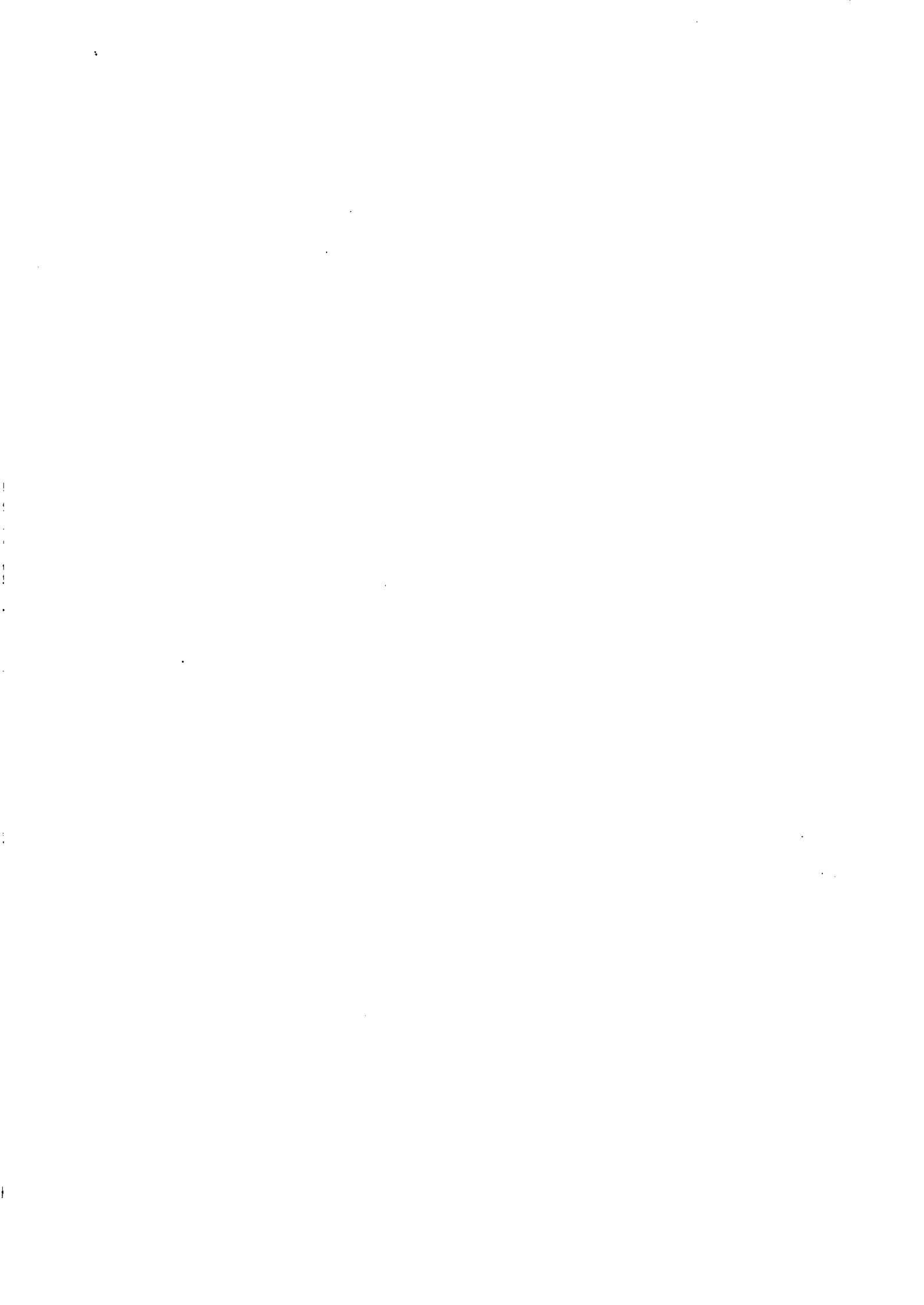
In most of the villages where we went, JFM seemed to be technically viable in so far as there seemed enough land available for the purpose. However, it seemed socially viable only in a few places which essentially means that the village community was not confident about being able to sink its differences and work together. The villages which come readily to mind are Kalalanka, Dhamrer, Laha Ka Bas, and Todi Luharan.

Most people knew about biogas plants, but were skeptical about whether they could be successfully installed in their village. In some villages, one or two households had smokeless *chulas*. However the rest of the villagers did not seem very keen to have them installed, even though the households using them expressed satisfaction with their performance.

#### What Needs to be Done:

1. Completion of the ongoing adjacent areas village survey. At least another 20 villages need to be surveyed.
2. After the preliminary survey is over, some follow up visits might have to be undertaken to either fill up gaps in information or to do an indepth study of a few villages and/or communities.
3. Survey of villages located within the National Park.
4. Administer schedules to groups of graziers and fuelwood collectors within the Park. For this, schedules have to be prepared.
5. Go into the Park with people from adjoining villages, and see how far they walk, and how much fuel or fodder they extract.
6. Transects to be undertaken in the same areas where transects were done in 1989, to confirm or contradict the impression that vegetative cover inside the Park has deteriorated. Maybe someone from WII can be involved in this.
7. Get information on illegal extraction of fuelwood and timber for commercial purposes. Also get linkages of these activities.
8. Get latest figures on livestock, land, and people from the Revenue Department for the villages we are interested in. Also, superimpose the FSI and NWDB maps on the maps of the region to get an idea of potential for JFM.
9. Talk to experts and read up about other eco-development options like biogas plants and smokeless *chulas* among others. Also, talk to some agricultural expert who has knowledge of this region, about the relative merits of traditional as opposed to the green revolution agricultural technologies.
10. Contact the Project Director DRDA, Alwar, and make a trip to the sites where he said JFM is being tried under similar conditions in Banswara District in Rajasthan. Also visit sites where plantations have been done in Alwar District.
11. Contact Valmik Thapar, and talk to him about eco-development strategies being used around Ranthambhore. Also, make a trip to Ranthambhore

Village Name	Distance From Park (In Km)	Location Of The Village	Amenities Available	Nearest Town And Distance (In Km)	Per Capita Landholding (In Ha)	Population
Khataka (01)	5	ENE	1	ALWAR(31)	0.40	396
Bangroli (02)	10	WNW	4	ALWAR(45)	0.24	1339
Nirbalpura (03)	5	ENE	1	ALWAR(5)	0.21	219
Heensla (04)	10	WNW	3	ALWAR(51)	0.28	1138
Narbad Ka Bas (05)	10	NNW	2	KOTPUTLI(36)	0.19	423
Laduwas (06)	5	NNW	2	ALWAR(50)	0.48	527
Laha Ka Bas (07)	5	WNW	0	THANAGAZI(1)	0.82	231
Todi Luharan (08)	5	WSW	0	THANAGAZI(5)	0.66	270
Kalalanka (09)	10	WSW	1	ALWAR(57)	0.50	510
Alapur (10)	10	ENE	2	ALWAR(18)	0.32	965
Punkhar (11)	10	ESE	4	ALWAR(30)	0.42	2313
Dhamrer (12)	5	ESE	4	RAJGARH(9)	0.28	2502



### ANNEXURE III

#### CHRONOLOGY OF EVENTS FOR FIELD VISIT TO TEST VILLAGE AND HOUSEHOLD SCHEDULES

20 Jan 1992:

- 0615: Started off from Gulmohar Park and picked up Meera and Ravi on the way. Stopped at a service station to put 20 litres of diesel in a jerry can.
- 0945: Reached Alwar and stopped to have breakfast.
- 1140: Reached Sariska. Introduced ourselves to the Field Director who had no clue about our visit. Rajinder Singh Yadav was also there in the FD's office. Tarun Bharat Singh and the Park authorities are cooperating on the mining issue and it was being discussed.
- 1430: We went to Kishori with Rajinder Singh Yadav since we had to discuss whether he would cooperate with us in quantification of resource use from the Park by villages in the adjacent areas. Also, we thought we could get a copy of the TBS petition regarding mining.
- 1530: Reached Kishori. Had a look at the petition along with some of the responses by the Park authorities who have been made a party to the case. Also asked Rajinder Singh whether he would cooperate with us in the study. He was non-committal, and wanted to discuss things a little more. He was also busy as he had to go to Gopalpura for some work. We decided to accompany him since everyone had heard of this village!
- 1615: Reached Gopalpura and went around with Rajinder Singh. Also talked to a local TBS activist. Were forced to have tea with the villagers.
- 1810: Left Gopalpura and went back to Kishori to drop Rajinder Singh. He offered us dinner and shelter for the night. We declined because the next morning we had to go to Khataka. Also, the arrangements for our accommodation were not very clear, and we had left behind our luggage in the Park HQ. Since nothing concrete had been discussed regarding the study, we fixed up to meet Rajinder Singh on 23-1-1992 because he was leaving for New Delhi the next day.
- 1930: Reached Sariska. Pitched our tent and put our luggage into one of the rooms in the FD's residence.
- 2015: Went to Bharthari for dinner.
- 2110: Came back to Sariska and slept off.

21 Jan 1992:

- 0500: Woke up, unpitched our tent, and got ready to leave for Khataka.
- 0600: Started off. Lost our way a little. The road to Khataka was very rough.
- 0730: Reached Khataka. Asked for the Headman of the village and went to his house. Administered the village schedule to him.
- 1010: It was too late to go to individual houses in the village since most of the people had already left for their fields etc. However, there was some work to be done in Alwar, and some information to be gathered from the collectorate, so we decided to go there.

- 1135: Reached Alwar. Shobi had made a list of gaps in our information by hand. This had to be given in for typing. Before that, it also had to be edited.
- 1150: After giving the additional queries for typing, we went to the collectorate.
- 1200: Reached the collectorate. Went to various places but got nothing from anywhere.
- 1300: Had lunch.
- 1345: Collected the additional queries from the typist and started off for Khataka.
- 1500: Reached Khataka. Went to meet the Pradhan again. Went around the village. it was still too early for starting off administering of the household schedule.
- 1800: Started administering schedules. Finished doing about six.
- 2100: Finished schedules for the day. Had dinner at a respondents house.
- 2130: Started back for Sariska.
- 2210: Reached Sariska and pitched tent. Decided to stay the next morning and afternoon in Park HQ to try and get queries answered and fill up schedules from field notes.
- 2300: Slept off.

22 Jan 1992:

- 0630: Got up and unpitched tent etc.
- 0730: Went to Bharthari for breakfast.
- 0815: Started filling up schedules.
- 1015: Went to Park office. Were told that the FD was in Jaipur. AFD also was not in office.
- 1450: Went into the Park towards Pandupole.
- 1620: Came out of Park and headed for Khataka.
- 1720: Reached Khataka and started administering schedules.
- 2040: Started off for Sariska after again having been fed by the household which gave us dinner the previous day, and saying goodbye to the Pradhan.
- 2130: Reached Sariska. Met the FD who had returned from Jaipur. Fixed up to meet him at 1500 the next day.
- 2200: Slept off.

23 Jan 1992:

- 0530: Woke up.
- 0630: Left for Bhangroli.
- 0700: Reached Bhangroli just as dawn was breaking.
- 0730: Started administering the village schedule. Went and saw degraded forest and common land around the village. also saw a check dam which has not been completed in the past several years.
- 1215: Left Bhangroli after having been given breakfast, and went to Kishori. Discovered that Rajinder Singh was still in Delhi.
- 1305: Left Kishori for Sariska. Decided to go via Tehla to take a look at the mines and whether they are being operated or not. Also, according to the toposheets, there is a much larger area which is forested, and could be used for JFM.
- 1500: FD not in his office. Meet the AFD, who is also holding charge as RO Tehla. He has our queries, and is enthusiastic about answering them since it raises his information level about the Park also. But he is busy at the moment, and he has a court case to go to the next day. We fix up an appointment with him for 25-1-1992 morning. Since there is nothing else to do for the moment, we decide to go to Bharthari for Lunch.
- 1640: We check again at the Park office and the FD is there. But a lot of time is wasted, since he is catching up on paper work.
- 1800: RM tells the others to go to Bhangroli while he is busy with the FD.
- 1915: FD offers RM a jeep ride to Bhangroli, which RM accepts with alacrity!
- 1930: RM reaches Bhangroli, and finds the others busy administering schedules. In all four household schedules are administered.
- 2100: Leave for Sariska, after yet again having been given dinner in the village.
- 2130: Reach Sariska.
- 2200: Sleep off.

24 Jan 1992:

- 0530: Get up and get ready.
- 0630: Leave for Bhangroli.
- 0700: Administer the remaining schedules.
- 0930: Head back for Sariska.
- 1000: Go to Kankwari, after meeting the Pradhan of Haripura whom we had met in 1989.
- 1430: Go to Bharthari after reaching Sariska for Lunch.

1530: Come back and start filling up schedules.

2030: Go to Bharthari for dinner.

2130: Sleep off.

25 Jan 1992:

0700: Get up and get ready.

0800: Go to Bandipul for a walk.

0930: Go to Bharthari for Breakfast.

1030: Come back to the Park office to find both FD and AFD missing.

1130: Finally decide to start back for Delhi, since there is not much chance of completing queries on this day. Also, if we start now, we will be able to get back before it gets dark. Leave a note for FD to send us the queries at the earliest.

1600: Reached Nirula's at Vasant Vihar and had lunch.

1700: RM dropped off everyone and reached back home at 1900.

## ANNXURE IV

### Sariska Field Trip February 11-25, 1992

The first group discussion took place in Nabhadkakas village, our third on this trip, in a cluster of Mali households. 5 women (4 mali and 1 Thallus) sat down for a discussion. After initial introductions and some general conversation, the discussion started. Questioned each of the women in turn on every query.

Though the women were asked to speak in turn, on the basis of thin seating, there would be occasions when the women would respond out of turn - in these case their responses were recorded against their names. This happened for questions 2, 3 and 7. For question 6, 1, 4, 5, 6 and 8 the order of answering was maintained.

#### Methodology used for Group discussion

Village: Naibhadkabas  
Date: February 14, 1992  
Interviewee: Women  
Numbers: 5  
Names:

1. Koili (caste - Mali) [Owns 1-1/2 bigha of land 2 age - 30children; livestock - Yes]
2. Kamla (caste - Mali) [family owns 1 bigha of land, age - 14works as field labourer. Lives with mother, father. Married. Livestock - Yes]
3. Dhanni (caste - Mali) [owns 3 bighas of land, husband age - 20and 2 children, Livestock - Yes]
4. Parbo (caste - Mali) [owns 1 bigha of land, age - not certain, husband, 3 chidren. Livestock - no] around 35
5. Bachna (caste - Thakur) [owns no land, occupation - age - 35labourer. 2 goats, 1 cow. No family]

#### Question 1

What are the main problems you face?

#### Replies

1. (Irrigation water), Lack of fuelwood, fodder, hospital, forest department harrasment.
2. Irrigation water, lack of fuelwood, fodder, medicine.
3. Irrigation water, lack of fuelwood, electricity for pumping,forest department harrasment.
4. Lack of fuelwood, Irrigation water, dai, forest department harrasment
5. Lack of fuelwood, fodder, security.

#### Question 2

How do you tackle your problems?

1. Regarding forest department harrasment we go to the park in groups.
2. No reply
3. Buy fuelwood when required.
4. Same as (1)



5. What solutions can I find. I am alone.

### Question 3

What could be a solution to your problems?

1. De-notify the Park maybe! Somehow give us our jungle back and make provisions for water, so that we can grow
2. Don't know
3. Allow us to collect from the park.
4. Give me some more land for agriculture, fuelwood, fodder.
5. Allow us to collect fuelwood from the park.

### Question 4

Where do you collect (a) fuelwood, (b) fodder from?

1. a) Mamonka (b) Kheti mostly
2. a) Around the village only
3. a) Mamonlla and around the village. Sometimes buy (b) Not required.
4. a) Bilanilea (b) Not required
5. a) Around the village (b) From around the village

### Question 5

Is degraded land available for common use for growing fuelwood and fodder

1. Yes, the Goachar that the forest department took away, also 100 bighas of unproductive land.
2. Don't know.
3. Not enough
4. Don't know
5. Don't know

### Question 6

Is there enough social unity in your village for co-operative ventures?

1. yes
2. Don't know
3. May be
4. Yes
5. No

### Question 7

If the above were to be done, what problems do you foresee?

1. No one will allow us women to decide anything. We will only be made to work like ass's.
2. No reply
3. There will be high-low caste conflict on who will take how much wood, fodder, etc. And who will listen to us as we are poor.
4. Can't anticipate.
5. Men will decide everything and as I am alone, who will be fair to me while distributing wood, fodder shares.

### Question 8

Being a women, do you have any particular handicap in this society.

1. We are not given land as dowry.
2. No reply
3. Everyone takes from women - we do all the work, we get beaten up by the guards, we can't even speak up at home or our own men leave us.
4. Women are manhandled by men.
5. My main handicap is being alone and poor.



**ANNEXURE V**

**PARK VILLAGE SCHEDULE**

Schedule No. : RAJ/N/SAR

Interviewer :

Place :

Time : to

Date :

Name of the village/hamlet/cluster: \_\_\_\_\_

Village located inside or outside the park? \_\_\_\_\_

Designation, Name, Age, and Sex of Person(s) talked to: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**2. DESCRIPTION OF THE VILLAGE AND SURROUNDS**

Visual Description of the village by the team. Also ask the villagers to draw a map of the village and its surrounding areas. Take pictures of the village and its surrounds.

Visual Description \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Legal status: Revenue/Forest/Other (define) \_\_\_\_\_

\_\_\_\_\_

1. What is the settlement pattern of the village (Map to be made by the villagers)?

- clustered
- scattered

2. How has the pattern evolved?

- natural
  - topography
  - climate
  - Others (specify)

- social
  - caste
  - class
  - religion
  - others (specify)

- economic
  - occupation
  - others (specify)
  - political

3. How much area does the village occupy?

\_\_\_\_\_ settlement

\_\_\_\_\_ agricultural land

\_\_\_\_\_ fallow land

\_\_\_\_\_ grass land

\_\_\_\_\_ forest land

\_\_\_\_\_ water bodies

\_\_\_\_\_ others(specify)

Total \_\_\_\_\_ (specify/define units)

4. Amenities available (nearest available) for the village:

Electricity (Number, use, and composition of households)

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Roads

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Water

- river/stream
- pond/lake
- handpump
- well/tubewell
- other (specify)

School

- primary
- secondary
- higher secondary

Hospital

- Sub Health Centre
- Primary Health Centre

Market

- Regular/Periodic
- Location
- Duration
- Frequency
- Commodities sold/bought/exchanged
- System (Free/controlled - types of control)

5. Have any development works been promised/carried out in the village? What have these been?

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When

- By whom: Park authorities  
Other government agencies  
Panchayat/Gram sabha  
Private bodies  
Others (specify)

6. Are there any industrial, mining, forestry or other (specify) activities with a possible impact on the environment, going on in and around your village?

Activities	Location	Area (in Ha.)	Number of people employed	Government/ Private/ Cooperative	Impacts (Social/Environmental/ Other)

7. Animals Seen Numbers Seasons Locations Trends


2.2 SOCIAL

2.2.1 History

1. How old is the present settlement: \_\_\_\_\_ years  
\_\_\_\_\_ generations (define)

2. Give a brief historical description of the settlement

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3. Has there been any change in the topography of the area around the village eg. disappearing of forests, clearing of grasslands etc? If yes, then please give details \_\_\_\_\_

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4. Have there been any major natural calamities like floods, earthquakes etc which you can remember? If yes, then please give details \_\_\_\_\_

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5. Has there been a major outbreak of epidemics or diseases? If yes, then please give details \_\_\_\_\_

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6. Have any major demographic changes taken place in the village (eg. massive population outflows and/or inflows, epidemics, conversion to a different religion, or any other changes)? If yes, then please give details \_\_\_\_\_

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### 2.2.2 Demography

1. Population size: \_\_\_\_\_ individuals  
  \_\_\_\_\_ families  
  \_\_\_\_\_ households



Population composition:

	Males	Females	Total
Infants (under 1 year)	_____	_____	_____
Children (1 to 14 years)	_____	_____	_____
Adults (15 to 60 years)	_____	_____	_____
Aged (61 and above)	_____	_____	_____

2. What is the level of literacy in the village?

Number of people Who can read and write \_\_\_\_\_

Studying in school \_\_\_\_\_

Passed High School \_\_\_\_\_

Educated upto B.A. \_\_\_\_\_

Other qualifications (specify) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

2.2.3, 2.2.4, and 2.2.6

Religion	Caste/ Sub-group	Occupation	Land holding	Livestock holding [Cows (C), Buffalos (B) Goats (G), Sheep (S), Others (OT)]	House ownership
Hindu	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____
Muslim	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____

Christian				
Sikh				
Others (specify)				

**2.2.5 & 2.2.6 Occupation and Economic Levels and Traditional Skills**

Occupation	Households Engaged in Activity listed in Column 1	Yearly household income from this activity	For how many households is this the only occupation	Seasons/months when this activity is undertaken (underline peak months)
Cultivation				
Pastoralism				
Poultry				
Carpentry				
Shoe-making				
Shop-keeping				
Pottery				
Weaving				

Occupation	Households Engaged in Activity listed in Column 1	Yearly household income from this activity	For how many households is this the only occupation	Seasons/months when this activity is undertaken (underline peak months)
House Building	_____	_____	_____	_____
Govt. Service	_____	_____	_____	_____
Forest Deptt. Labour	_____	_____	_____	_____
Other Govt. Labour	_____	_____	_____	_____
Farm Labour	_____	_____	_____	_____
Others (specify)	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____

2. Are there any skills which are special/traditional?

Type of skill	Religion/ Caste	Gender/ Age	Types of products/ services	Current Domestic/ Commercial use
Weaving	_____	_____	_____	_____
Spinning	_____	_____	_____	_____
Wood work	_____	_____	_____	_____
Medicine	_____	_____	_____	_____
Pottery	_____	_____	_____	_____
Basketry	_____	_____	_____	_____
Stone/Metal	_____	_____	_____	_____
Rope making	_____	_____	_____	_____
Other skill (specify)	_____	_____	_____	_____
	_____	_____	_____	_____

3. Land Holding (In hectares)	Number of village households	Outsiders if any
Landless	_____	_____
Less than 1.01	_____	_____
1.01 - 2.02	_____	_____
2.03 - 4.04	_____	_____
4.04 - 10.12	_____	_____
10.13 and above	_____	_____

4. Type of animal	Maximum number with a household	Number of households owning above 66% of stock in column 2	Number of households owning between 34% and 65% of stock in column 2	Number of households owning below 33% of stock in column 2
Goats	_____	_____	_____	_____
Sheep	_____	_____	_____	_____
Cows	_____	_____	_____	_____
Buffalos	_____	_____	_____	_____
Others (specify)	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**2.2.7 & 2.2.9 Interactions and Culture**

1. Are there social/cultural ties with other villages of the area?

Kind of ties	Details (Frequency of contact and other aspects)	Manifestations
Kinship	_____	_____
Religious	_____	_____
Marriage	_____	_____

Kind of ties	Details (Frequency of contact and other aspects)	Manifestations
Festivals	_____	_____
Others	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

2. How many households are Non-vegetarian \_\_\_\_\_  
 How many households are Vegetarian \_\_\_\_\_

**2.2.8 Village Structure**

1. What panchayat (or other form of local administration-define) does the village come under? What kind of interaction do they have with Government officials (eg Forest or Revenue Department)?

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**2.2.10 Problems**

6. What do you perceive as the major problems which the village is facing, and what do you see as solutions to these problems?

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**4. PRESSURES ON THE PARK BY VILLAGERS**

[The activities/occupations which are, or might in the future become, pressures on the park include Habitation, Agriculture, Grazing, Herb collection, Fodder collection, Fuelwood collection, MFP collection, etc]

4.1 1. What are the rights, leases, privileges, concessions, etc which the village is/was entitled to?

Nature of activity	Is/was it a right (R), lease (L), concession (C), privilege (P)	Who has/had these rights/leases? (individuals/ other villages)	Extent of the area in which such rights exist any other)	Location of the Area	If R/L/C/P then date of extinguishing	Mode of extinguishing (compensation/ alternatives/
Grazing	_____	_____	_____ ha	_____	_____	_____
Hunting	_____	_____	_____ ha	_____	_____	_____
Fishing	_____	_____	_____ ha	_____	_____	_____
Collection of Timber	_____	_____	_____ ha	_____	_____	_____
Collection of Fuel Wood	_____	_____	_____ ha	_____	_____	_____
Collection of Minor Forest Products	_____	_____	_____ ha	_____	_____	_____
Quarrying	_____	_____	_____ ha	_____	_____	_____
Agriculture	_____	_____	_____ ha	_____	_____	_____
Habitation	_____	_____	_____ ha	_____	_____	_____
Religious Yatra	_____	_____	_____ ha	_____	_____	_____
Religious Monuments	_____	_____	_____ ha	_____	_____	_____
Religious Fair	_____	_____	_____ ha	_____	_____	_____
Burial Grounds	_____	_____	_____ ha	_____	_____	_____

<sup>2</sup> Also specify when and where R/L/C/P were recorded/settled.

Right of Way (other than yatra)	_____	_____	_____ ha	_____	_____
Other (please specify)	_____	_____	_____ ha	_____	_____
	_____	_____	_____ ha	_____	_____
	_____	_____	_____ ha	_____	_____
	_____	_____	_____ ha	_____	_____

2. Are permits issued for specific activities which are undertaken inside the park?

Permits issued for which activity	Who issues the permit?	Whom are permits issued to	For which part of the park	Duration of the permit	Amount paid	Terms of renewal and transfer
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

4.1.1 HABITATION AND SHELTER

4.1.1.1 Description

1. What are the kinds of houses (according to materials used) which people live in?

Types Of Houses	Numbers	Ownership according to Religion/Caste/Class/ Occupation/others	How long do they last	How often are repairs needed (eg. change of roof, new wall change of main beam, others)
Pucca [Brick/stone walls with RCC/RBC/Stone roof]	_____	_____	_____	_____
Semi-pucca [Brick/Stone walls with timber and tile roof or timber and thatch roof]	_____	_____	_____	_____
Kuccha [Mud walls with timber and thatch roof or timber and tile roof]	_____	_____	_____	_____
Other [Please specify]	_____	_____	_____	_____

2. Size of houses (general classification only)?

	Largest house	Number of houses having more than 67% of built-in or floor area in column 2	Number of houses having between 34% and 66% of built-in or floor area in column 2	Number of houses having less than 33% of built-in or floor area in column 2
Built-in-Area	_____	_____	_____	_____
Floor Area	_____	_____	_____	_____

3. What is the water supply /sanitation pattern of the village?

a) Water sources	Season	Proportion of requirement	Distance from village	Use
Wells	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
Ponds	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
Lakes	_____	_____	_____	_____
	_____	_____	_____	_____
Rivers	_____	_____	_____	_____
	_____	_____	_____	_____
Water holes (for livestock)	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
Others (specify)	_____	_____	_____	_____
	_____	_____	_____	_____



b) Sewage	Method of disposal	Location of disposal	People doing disposal	Enduse if any
Domestic liquid	_____	_____	_____	_____
Domestic solid	_____	_____	_____	_____
Collective liquid	_____	_____	_____	_____
Collective solid	_____	_____	_____	_____
Human excreta	_____	_____	_____	_____

**4.1.1.2 History and Trends**

1. Give details of area under habitation and any increase or decrease in the past few years? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Describe changes in size or number of dwelling units, in the past few years? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Describe changes in techniques or material of construction in the past few years? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**4.1.1.9 Impact on Park**

1. Has the location of the village resulted in cutting off migration of wild animals or their access to some important sources of water, food, nesting grounds, etc? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Do the villagers indulge in illegal activities?

Improper entry? \_\_\_\_\_

Improper conduct? \_\_\_\_\_

Hunting? \_\_\_\_\_

Causing fire hazard? \_\_\_\_\_

Illegal weapons? \_\_\_\_\_

Use of explosives? \_\_\_\_\_

Non-registration of arms? \_\_\_\_\_

Destruction of habitat? \_\_\_\_\_

Grazing/entry of cattle? \_\_\_\_\_

3. Are there any rivers/streams/other water flows which drain pollutants into the park from the village?

Details

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Any other impacts:

a) Resource depletion \_\_\_\_\_

\_\_\_\_\_

b) Pollution \_\_\_\_\_

\_\_\_\_\_

c) Disturbance \_\_\_\_\_

\_\_\_\_\_

d) Threats like fire \_\_\_\_\_

\_\_\_\_\_

e) Concentration of animals around habitation? \_\_\_\_\_

\_\_\_\_\_

f) Others \_\_\_\_\_

\_\_\_\_\_

7. Any positive impacts:

a) Vigilance \_\_\_\_\_

\_\_\_\_\_

b) Help in putting out fires \_\_\_\_\_

\_\_\_\_\_

d) Others \_\_\_\_\_

\_\_\_\_\_

5.1.1 RESTRICTIONS RELATED TO HABITATION AND SHELTER

5.1.1.1 Description

1. What restrictions have been imposed on you with regard to habitation/shelter (eg. use of wood, leaves, grasses, stones, new house sites, or any other resource)? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5.1.1.2 History

1. How long have these restrictions on been in existence?

\_\_\_\_\_

\_\_\_\_\_

2. When and how were these restrictions applied? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5.1.1.3 Area Affected

1. Are these restriction partially/fully imposed in all areas where you used to carry on activities related to your habitation/shelter (Also mark areas on map)? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**5.1.1.4 Population Affected**

1. Is the entire community of your village partially/fully affected by these restrictions or are some members of the community "spared"? \_\_\_\_\_

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**5.1.1.5 Impact**

1. What are the impacts these restrictions have on your life

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**5.1.1.6 Alternatives**

1. What alternatives have the villagers considered to restrictions related to habitation and shelter?

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2. If alternatives have been considered, have the villagers been able to practise/execute these alternatives?

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3. Have any alternatives been provided by the park authorities or the local administration? What was the nature of these alternatives?

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**4.1.2 AGRICULTURE AND CULTIVATION**

**Profile of the Activity**

4.1.2.1, 4.1.2.4, 4.1.2.5, and 4.1.2.6

1. What is the cropping pattern of the area including that of fodder species if any?

Crop name	Number of crops per year	When sown	When harvested	Yields (per acre)	Area occupied (in acres)	Uses of the crop	Legal status of cultivated land	Cultivation authorised/ unauthorised
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

**4.1.2.1 Description**

Crop	Method and source of irrigation	Is composting done	Organic fertilisers used	Chemical fertilisers used	Biological pest control	Chemical pest control
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

4.1.2.2 **History and Trends**

1. How long has cultivation been carried out in the area? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

2. Has area under cultivation increased, decreased, or remained unchanged? Has its location changed (give details)?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Describe changes in the cropping pattern, and give reasons for the change \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4.1.2.6 **Periodicity**

1. What is the annual agricultural cycle?

Employed in Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
agriculture [Indicate in terms of Peak (P), Medium (M), Low (L), Absent (A)]

Men \_\_\_\_\_

Women \_\_\_\_\_

Children \_\_\_\_\_

4.1.2.7 **Socio-economic Linkages and Justification**

1. Is labour employed for any agricultural activity? If yes, Please give details regarding:-

Total number of people employed \_\_\_\_\_

Number of people from outside village? \_\_\_\_\_

Seasons/Months in which they are employed \_\_\_\_\_

Number of days in an year in which labour is employed \_\_\_\_\_

Where do they live and for how long \_\_\_\_\_

Wages paid for Men \_\_\_\_\_ Women \_\_\_\_\_ Children \_\_\_\_\_

2. Economics of agriculture (Turnover)

Crop name	Total output	Quantity sold in the market	Price in in the market (cash/Kind)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3. Economics of agriculture (Costs)

Crop name	Cost of Seeds if bought from the market	Cost of fertilizer/ pesticide if bought from the market	Number of people engaged or employed	Other costs if any
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

4. Economics of agriculture (Marketing)

Crop name	Location of Market	Distance from village	Type of Market (eg weekly/daily) (units)	Mode of transport	Cost of transport

4.1.2.9 **Impact on Park**

1. Has the cultivated area in the park resulted in cutting off migration routes of wild animals, or their access to some important sources of water, food, breeding/nesting grounds etc (details)? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Has cultivation in the park resulted in the introduction of any exotic floral species, weeds, or floral diseases in the park (details)? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Has there been any soil erosion due to this activity? Is there any run-off of silt or chemical fertilisers into the park from agricultural fields (details)? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



4. Are crop protection guns used? Are they surrendered during periods when there is no crop? If yes, to whom, and during which period? \_\_\_\_\_

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5. Does cultivation within the park affect animal populations, eg. concentration around the fields of species which like to feed on crops? \_\_\_\_\_

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6. Does the irrigation of agricultural fields lead to diversion of water resources from the park? other impacts like water logging? \_\_\_\_\_

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7. Other pressures if any? \_\_\_\_\_

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5.1.2 RESTRICTIONS RELATED TO AGRICULTURE

5.1.2.1 Description

1. What are the restrictions that have been imposed by the park authorities on your agricultural activities? \_\_\_\_\_

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2. Have you been stopped from driving away, or killing animals damaging crops? (details) \_\_\_\_\_

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5.1.2.2 History

1. How long have these restrictions been in existence? \_\_\_\_\_

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2. When and how were these restrictions applied? \_\_\_\_\_

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5.1.2.3 Area Affected

1. Are these restriction partially/fully imposed in all areas where you used to carry on agricultural activities? (Also mark areas on map)? \_\_\_\_\_

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**5.1.2.4 Population Affected**

1. Is the entire community of your village partially/fully affected by these restrictions or are some members of the community "spared"? \_\_\_\_\_

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**5.1.2.5 Impact**

1. Has crop damage by wildlife increased? (details)

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2. Is crop compensation available? (Details) \_\_\_\_\_

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3. Any other impacts? (details) \_\_\_\_\_

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**5.1.2.6 Alternatives**

1. What alternatives have the villagers considered to restrictions related to agriculture?

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2. If alternatives have been considered, have the villagers been able to practise/execute these alternatives?

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3. Have any alternatives been provided by the park authorities or the local administration?

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4. What was the nature of these alternatives?

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4.1.3 PASTORALISM AND LIVESTOCK [Includes Fodder Collection]

1. Grazing (4.1.3.1, 4.1.3.5, and 4.1.3.6)

Type of animal	Total number present in the village	Number owned by the villagers	Season/ months when grazed (underline peaks)	Number authorised	Grazing fee	Area and location of grazing	Which plants/ grasses are grazed
Goats	_____	_____	_____	_____	_____	_____	_____
Sheep	_____	_____	_____	_____	_____	_____	_____
Cows	_____	_____	_____	_____	_____	_____	_____
Buffalos	_____	_____	_____	_____	_____	_____	_____
Others (specify)	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____

2. Fodder collection (4.1.3.1, 4.1.3.5, 4.1.3.6 and 4.1.3.7)

Type of animal	Number stall fed	Season when stall fed	Species of fodder collected	Quantum of collection	Seasons when fodder is collected	Area and location of fodder collection	Labour involved in fodder collection
Goats	_____	_____	_____	_____	_____	_____	_____
Sheep	_____	_____	_____	_____	_____	_____	_____
Cows	_____	_____	_____	_____	_____	_____	_____
Buffalos	_____	_____	_____	_____	_____	_____	_____
Others (specify)	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____

3. Are grazing/fodder collection grounds rotated periodically? If so, then what is the cycle of rotation? Are there any other methods of fodder regeneration used? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4.1.3.2 **History and Trends**

1. For how long have grazing and fodder collection been undertaken in the park? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Has the area in which grazing or fodder collection takes place shifted, increased, decreased, or remained unchanged? (details) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Has the number of livestock grazing in the park increased, decreased, or remained unchanged? Give details

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4. Has the grazing of livestock and collection of fodder been affected after the area was notified as a Park? If so, in what way?

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4.1.3.6 Periodicity

1. What is the annual pastoral employment cycle?

Employed in    Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
pastoralism    [Indicate in terms of Peak (P), Medium (M), Low (L), Absent (A)]

Men            -----

Women        -----

Children      -----

4.1.3.7 Socio-economic Linkages and Justification

1. Economics of Pastoralism (Turnover and Marketing)

Livestock maintained for subsistence/commercial	Products used (Proportion/Quantity)	Products sold	Price of the product	Location of Market (units)	Distance from village	Mode of transport	Cost of transport
Goats	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
Sheep	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
Cows	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
Buffalos	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
Others	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____

2. Economics of Pastoralism (Costs)

Type of animal	Cost of inputs (eg. medicines, fodder etc. if bought from the market)	Number of people engaged or employed (hired/household labour)	Cost of hired labour if employed	Other costs if any
Goats	_____	_____	_____	_____
Sheep	_____	_____	_____	_____
Cows	_____	_____	_____	_____
Buffalos	_____	_____	_____	_____
Others(specify _____)	_____	_____	_____	_____
_____	_____	_____	_____	_____

3. Apart from economic reasons, what other reasons do you have for keeping of livestock? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4.1.3.9 Impact on Park

1. Is there any impact of grazing observed on the habitat (eg. the growth of weeds, effect of trampling by livestock, effect of droppings of livestock etc)? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Has the wildlife of the area been affected by this activity (eg. diseases, cross breeding with livestock, effect on availability of water and food to wild animals, effect on movement of wildlife etc)? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



3. Has the collection of fodder had an impact on the park? (eg. lopping of trees, growth of weeds etc)? \_\_\_\_\_

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5. Any other Impacts? \_\_\_\_\_

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### 5.1.3 RESTRICTIONS RELATED TO PASTORALISM

#### 5.1.3.1 Description

1. What restrictions have been applied to activities relating to the keeping and grazing of livestock? \_\_\_\_\_

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#### 5.1.3.2 History

1. How long have these restrictions been in existence? \_\_\_\_\_

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2. When and how were these restrictions applied? \_\_\_\_\_

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**5.1.3.3 Area Affected**

1. Are these restriction partially/fully imposed in all areas where you used to carry on activities related to livestock (Also mark areas on map)? \_\_\_\_\_

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**5.1.3.4 Population Affected**

1. Is the entire community of your village partially/fully affected by these restrictions or are some members of the community "spared"? \_\_\_\_\_

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**5.1.3.5 Impact**

1. Has the incidence of cattle lifting increased after the notification of the park? \_\_\_\_\_

2. Is compensation for livestock given?(Details) \_\_\_\_\_

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3. What species are responsible for loss of livestock? \_\_\_\_\_

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4. Are steps taken for protection of livestock? \_\_\_\_\_

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5. Has there been an increase in the fees/payments which have to be made in order to get permission for grazing in the park? \_\_\_\_\_

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6. Any other impacts? \_\_\_\_\_

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**5.1.3.6 Alternatives**

1. What alternatives have the villagers considered to restrictions related to Pastoralism?

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2. If alternatives have been considered, have the villagers been able to practise/execute these alternatives?

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3. Have any alternatives been provided by the park authorities or the local administration?

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4. What was the nature of these alternatives?

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#### 4.1.4 FUELWOOD COLLECTION

##### 4.1.4.1 Description

1. What is the method used for collecting fuelwood (eg. lopping, deadwood collection, felling, driftwood collection etc)? \_\_\_\_\_

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2. What are the preferred species of fuelwood? \_\_\_\_\_

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3. How many headloads (weigh one load) of fuelwood are used by the village in a day? Any seasonal difference? Is this enough for the requirements of the village? \_\_\_\_\_

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##### 4.1.4.2 History and Trends

1. For how long has fuelwood collection been undertaken in the park for? \_\_\_\_\_

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2. Has the quantum of fuelwood extraction increased, decreased, or remained unchanged over the past few years?

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3. Has there been a change in the species collected for fuel over the years? \_\_\_\_\_

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4.1.4.4 **Legal Status**

1. How much of the fuelwood collection in the Park is authorized (R/L/C) and how much unauthorized? \_\_\_\_\_

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2. Has there been any illegal cutting of trees for fuelwood?

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4.1.4.5 **Location and Extents**

1. How far away from the village do you have to go for collecting fuelwood? \_\_\_\_\_

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2. Can you collect fuelwood anywhere in the park? If not, then specify forest blocks from where fuelwood is collected? \_\_\_\_\_

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**4.1.4.7 Socio-economic Linkages and Justification**

1. How much of fuelwood collection is for domestic purposes and how much for sale or barter, if at all? \_\_\_\_\_

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2. Who do the fuelwood collectors sell the fuelwood to if at all? \_\_\_\_\_

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3. What is the price of fuelwood at the nearest market?

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4. Is outside labour employed for the collection of fuelwood? \_\_\_\_\_

5. Who undertakes collection of fuelwood i.e. men, women, children? \_\_\_\_\_

**4.1.4.9 Impact on Park**

1. Have there been changes in availability of fuelwood species in the park? Has for example, availability of certain species become scarce? \_\_\_\_\_

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2. Has there been any incidence of soil erosion and other ecological impacts due to excessive exploitation of fuelwood? \_\_\_\_\_

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5.1.4 RESTRICTIONS RELATED TO FUELWOOD and M.F.P.

5.1.4.1 Description

1. What restrictions have been imposed relating to the collection of fuelwood and other M.F.P.? \_\_\_\_\_

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5.1.4.2 History

1. How long have these restrictions been in existence? \_\_\_\_\_

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2. When and how were these restrictions applied? \_\_\_\_\_

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5.1.4.3 Area Affected

1. Are these restriction partially/fully imposed in all areas where you used to carry on activities related to collection of fuelwood/MFP (Also mark areas on map)? \_\_\_\_\_

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5.1.4.4 Population Affected

1. Is the entire community of your village partially/fully affected by these restrictions or are some members of the community "spared"? \_\_\_\_\_

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5.1.4.5 **Impact**

1. What problems have come up because of these restrictions?

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3. **VALUES AND OBJECTIVES OF THE PARK**

1. Are you aware of the existence of the national park in your area? \_\_\_\_\_

2. If yes, do you know when, and for what objective(s) it was notified? \_\_\_\_\_

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3. Do you think a park should have been notified in this area? Is it in any way useful to you? \_\_\_\_\_

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4. What according to you should have been the objectives of the park? \_\_\_\_\_

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5. Were you consulted before the park was established? Is so, how and when? \_\_\_\_\_

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5.2 DISPLACEMENT

HISTORY

1. Are you aware that this village is due for displacement? \_\_\_\_\_

2. When did you first hear of plans for displacement of your village

Date \_\_\_\_\_

From whom \_\_\_\_\_

3. Were you given reasons for your displacement \_\_\_\_\_

If yes, what reasons \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

By whom \_\_\_\_\_

In what form, if at all, were you consulted in the matter \_\_\_\_\_

\_\_\_\_\_

RESETTLEMENT AND REHABILITATION PLANS AND PROCESS

1. What is your perception towards displacement, and resettlement and rehabilitation? Give reasons \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Is there a difference of opinion on this issue among different sections of the village (men, women, aged, different occupations/ caste/religious groups). Ifso describe these \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Are you aware of any plans for relocation? If yes, what are the features of the plan (land, wells, houses, schools, roads)? Do you know where you are to be relocated? \_\_\_\_\_

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4. Were you involved in the planning process? If yes, were your suggestions incorporated in the plan? \_\_\_\_\_

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5. What would your demands be if displacement is inevitable? Have any organised moves been made to negotiate with the authorities? \_\_\_\_\_

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#### IMPACT OF IMPENDING DISPLACEMENT

1. How has your life changed since news came of impending displacement (maintenance, loans, schools, roads, other development schemes which may have been stopped)? \_\_\_\_\_

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2. What do you feel is your (family, community) future here if you remain here? \_\_\_\_\_

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3. Do you have relations to other villages slated for displacement? If yes what kind of relations (social, cultural, economic, political) How often do you meet other villagers? \_\_\_\_\_

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4. In what ways do you feel your (individual, community) life would change because of displacement

Ties to the land/forest \_\_\_\_\_

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Ties to neighbouring villages \_\_\_\_\_

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Ties to nearby markets \_\_\_\_\_

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Ties to religious locations \_\_\_\_\_

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5. Do you know people in the proposed resettlement sites? Are they friendly/hostile/indifferent? \_\_\_\_\_

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#### OPPOSITION TO DISPLACEMENT

1. Do you know of other villages displaced? \_\_\_\_\_

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2. What happened to those people? \_\_\_\_\_

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3. Give details of discussions with other villages you have relations with on their stand on this issue? \_\_\_\_\_

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**7. ALTERNATIVES TO PRESSURES OF VILLAGERS [RECOMMENDATIONS]**

[One of the alternatives to Habitation within the park is rehabilitation and resettlement of the villagers staying inside the park. This is covered under the schedule on displacement]

Activities	People involved/ having knowledge	Raw materials/ inputs needed	Skills/training existing/needed	Implements/technology existing/needed	Finance/capital existing/needed	Markets existing/ needed
Existing	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
Existed in the past	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
Other possibilities or skills available	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____

Linkages of the activities with each other

	Agriculture	Pastoralism	Herbs	Fuelwood	Domestic	Others→	Total outputs		
Agriculture	_____	_____	_____	_____	_____	_____	_____	_____	_____
Pastoralism	_____	_____	_____	_____	_____	_____	_____	_____	_____
Herbs	_____	_____	_____	_____	_____	_____	_____	_____	_____
Fuelwood	_____	_____	_____	_____	_____	_____	_____	_____	_____
Domestic	_____	_____	_____	_____	_____	_____	_____	_____	_____
Others	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
Total inputs									

4.1.1.5 Location and Extent (Resource use table)

1. What is the level of consumption of resources like fuel wood, fodder, etc by the village?

Resource	Species/Type	Use	Who uses	Quantities per year	Collected in which season	Collected from where	Is the collection a right	Cost of collection if any	Are any alternatives available
Wood	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
Grasses	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____

Resource	Species/Type	Use	Who uses	Quantities per year	Collected in which season	Collected from where	Is the collection a right	Cost of collection if any	Are any alternatives available
Leaves	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
Fruits	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
Flowers	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
M.F.P	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
Mud/clay	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
Stone/rock	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
Others (specify)	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____	_____



**ANNEXURE VI**

Schedule No.:

**PARK VILLAGE HOUSEHOLD SCHEDULE**

RAJ/N/SAR

Interviewer:

Place:

Time: to

Date:

Name of village:

Name of head of household: \_\_\_\_\_ Religion: \_\_\_\_\_ Caste \_\_\_\_\_

Map reference for household:

Persons spoken to:

2.2.1 History

1. How long has the respondent been settled in this village? Why did the respondent (respondents ancestors) choose to settle here?

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2. Has there been a major outbreak of epidemics or diseases in the household? If yes, then please give details

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3. Have any major demographic changes taken place in the household (eg. massive population outflows and/or inflows, epidemics, conversion to a different religion, or any other changes)? If yes, then please give details \_\_\_\_\_

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2.2.2 Demography

1. Household size: \_\_\_\_\_ individuals  
 \_\_\_\_\_ families

Population composition:

	Males	Females	Total
Infants (under 1 year)	_____	_____	_____
Children (1 to 16 years)	_____	_____	_____
Adults (17 to 60 years)	_____	_____	_____
Aged (61 and above)	_____	_____	_____

Name	Relation to HH	Sex	Age	Literacy level P/M/S/C/others
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

2. What is the level of literacy in the village?

Number of people Who can read and write \_\_\_\_\_

Studying in school \_\_\_\_\_

Passed High School \_\_\_\_\_

Educated upto B.A. \_\_\_\_\_

Other qualifications (specify) \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

2.2.3 Caste

What caste do you belong to? What is its traditional significance? Have there been any changes in this significance

\_\_\_\_\_

### 2.2.4 Religion

What in your natural surroundings do you consider sacred? Since when? Why? What significance do they have in your daily life and how is this manifested?

Forest \_\_\_\_\_

Hills \_\_\_\_\_

Rocks \_\_\_\_\_

River/stream \_\_\_\_\_

Plants/trees \_\_\_\_\_

Animals/birds \_\_\_\_\_

Others \_\_\_\_\_

### 2.2.5 Other Traditional Skills

1. Are there any skills which are special/traditional?

Type of skill	Gender/ Age	Types of products/ services	Current Domestic/ Commercial use
Weaving	_____	_____	_____
Spinning	_____	_____	_____
Wood work	_____	_____	_____
Medicine	_____	_____	_____
Pottery	_____	_____	_____
Basketry	_____	_____	_____
Stone Metal	_____	_____	_____
Rope making	_____	_____	_____
Other skill (specify)	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

2.2.6 Occupation and Economic Levels

Land holding	Livestock holding [Cows (C), Buffalos (B) Goats (G), Sheep (S), Others (OT)]		House ownership	Others
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Occupation	Yearly household income from this activity	For how many households is this the only occupation	Seasons/months when this activity is undertaken (underline peak months)	
Cultivation	_____	_____	_____	
Pastoralism	_____	_____	_____	
Poultry	_____	_____	_____	
Carpentry	_____	_____	_____	
Shoe-making	_____	_____	_____	
Shop-keeping	_____	_____	_____	
Pottery	_____	_____	_____	
Weaving	_____	_____	_____	
House Building	_____	_____	_____	
Govt. Service	_____	_____	_____	
Forest Deptt. Labour	_____	_____	_____	
Other Govt. Labour	_____	_____	_____	
Farm Labour	_____	_____	_____	
Others (specify)	_____	_____	_____	
	_____	_____	_____	

**2.2.7 & 2.2.9 Interactions and Culture**

1. Are there social/cultural ties with other households of the your own village and other villages in the area?

Kind of ties	Details	Frequency of contact	Manifestations
Kinship	_____	_____	_____
Religious	_____	_____	_____
Marriage	_____	_____	_____
Festivals	_____	_____	_____
Others	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

2. Is the household vegetarian or non-vegetarian? \_\_\_\_\_

\_\_\_\_\_

**2.2.10 Problems**

6. What do you perceive as the major problems which the village and the household is facing, and what do you see as solutions to these problems? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

#### 4. PRESSURES ON THE PARK BY VILLAGERS

[The activities/occupations which are, or might in the future become, pressures on the park include Habitation, Agriculture, Grazing, Fodder collection, Fuelwood collection, MFP collection, etc]

4.1 1. What are the rights, leases, privileges, concessions, etc which the respondent is/was entitled to?

Nature of <sup>3</sup> activity	Is/was it a right (R), lease (L), concession (C), privilege (P)	Who has/had these rights/leases? (in the house- hold)	Extent of the area in which such rights exist	Location of the Area	If R/L/C/P extinguished then date of extinguishing	Mode of extinguishing (compensation/ alternatives/ any other)
Grazing	_____	_____	_____ ha	_____	_____	_____
Hunting	_____	_____	_____ ha	_____	_____	_____
Fishing	_____	_____	_____ ha	_____	_____	_____
Collection of Timber	_____	_____	_____ ha	_____	_____	_____
Collection of Fuel Wood	_____	_____	_____ ha	_____	_____	_____
Collection of Minor Forest Products	_____	_____	_____ ha	_____	_____	_____
Quarrying	_____	_____	_____ ha	_____	_____	_____
Agriculture	_____	_____	_____ ha	_____	_____	_____
Habitation	_____	_____	_____ ha	_____	_____	_____
Religious Yatra	_____	_____	_____ ha	_____	_____	_____
Religious Monuments	_____	_____	_____ ha	_____	_____	_____
Religious Fair	_____	_____	_____ ha	_____	_____	_____
Burial Grounds	_____	_____	_____ ha	_____	_____	_____
Right of Way (other than yatra)	_____	_____	_____ ha	_____	_____	_____

<sup>3</sup> Also specify when and where R/L/C/P were recorded/settled.

Other (please specify)

_____	_____	_____ ha	_____	_____
_____	_____	_____ ha	_____	_____
_____	_____	_____ ha	_____	_____

2. Are permits issued for specific activities which are undertaken inside the park?

Permits issued for which activity	Who issues the permit?	Whom are permits issued to in the household	For which part of the park	Duration of the permit	Amount paid	Terms of renewal and transfer
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

4.1.1 HABITATION AND SHELTER

4.1.1.1 Description

1. What are the kinds of houses (according to materials used) which people live in?

Types Of Houses	Numbers	How long do they last	How often are repairs needed (eg. change of roof, new wall change of main beam, others)
Pucca [Brick/stone walls with RCC/RBC/Stone roof]	_____	_____	_____
Semi-pucca [Brick/Stone walls with timber and tile roof or timber and thatch roof]	_____	_____	_____
Kuccha [Mud walls with timber and thatch roof or timber and tile roof]	_____	_____	_____
Other [Please specify]	_____	_____	_____

2. Size of the respondents house(s) (Built in, Floor area of houses to be estimated in the field, and then classified as large/medium/small)?

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3. What is the drainage/sanitation pattern of the household?

a) Water sources	Season	Proportion of requirement	Distance from household	Use
Wells	_____	_____	_____	_____
_____	_____	_____	_____	_____
Ponds	_____	_____	_____	_____
_____	_____	_____	_____	_____
Lakes	_____	_____	_____	_____
_____	_____	_____	_____	_____
Rivers	_____	_____	_____	_____
_____	_____	_____	_____	_____
Others (specify)	_____	_____	_____	_____
_____	_____	_____	_____	_____

b) Sewage	Method of disposal	Location of disposal	Enduse if any
Domestic liquid	_____	_____	_____
Domestic solid	_____	_____	_____
Collective liquid	_____	_____	_____
Collective solid	_____	_____	_____
Human excreta	_____	_____	_____

4.1.1.9 **Impact on Park**

1. Do people in the household indulge in illegal activities?

Improper entry? \_\_\_\_\_

Improper conduct? \_\_\_\_\_

Hunting? \_\_\_\_\_

Causing fire hazard? \_\_\_\_\_

Illegal weapons? \_\_\_\_\_

Use of explosives? \_\_\_\_\_

Non-registration of arms? \_\_\_\_\_

Destruction of habitat? \_\_\_\_\_

Grazing/entry of cattle? \_\_\_\_\_

5.1.1 RESTRICTIONS RELATED TO HABITATION AND SHELTER

5.1.1.1 **Description**

1. What restrictions have been imposed on the respondent with regard to habitation/shelter (eg. use of wood, leaves, grasses, stones, new house sites, or any other resource)? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5.1.1.2 **History**

1. How long have these restrictions been in existence?

\_\_\_\_\_  
\_\_\_\_\_

2. When and how were these restrictions applied? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



5.1.1.3 Area Affected

1. Are these restriction partially/fully imposed in all areas where activities related to habitation/shelter used to be carried out. (Also mark areas on map)? \_\_\_\_\_

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5.1.1.5 Impact

1. What are the impacts these restrictions have on the respondents life

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4.1.2 AGRICULTURE AND CULTIVATION

Profile of the Activity

4.1.2.1, 4.1.2.4, 4.1.2.5, and 4.1.2.6

1. What is the cropping pattern of the respondents land holding including that of fodder species if any?

Crop name	Number of crops per year	When sown	When harvested	Yields (per acre)	Area occupied (in acres)	Uses of the crop	Legal status of cultivated	Cultivation authorised/ unauthorised land
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

4.1.2.1 Description

Crop	Method and source of irrigation	Is composting done	Organic fertilisers used	Chemical fertilisers used	Biological pest control	Chemical pest control

4.1.2.2 History and Trends

1. How long has cultivation been carried out in the area? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Has area under cultivation increased, decreased, or remained unchanged? Has its location changed (give details)?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Describe changes in the cropping pattern, and give reasons for the change \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**4.1.2.6 Periodicity**

1. What is the annual agricultural cycle of the respondent?

Employed in agriculture    Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
 [Indicate in terms of Peak (P), Medium (M), Low (L), Absent (A)]

Men \_\_\_\_\_

Women \_\_\_\_\_

Children \_\_\_\_\_

**4.1.2.7 Socio-economic Linkages and Justification**

1. Is outside labour employed for any agricultural activity? If yes, Please give details regarding:-

Total number of people employed M \_\_\_\_\_ F \_\_\_\_\_ C \_\_\_\_\_

Seasons/Months in which they are employed \_\_\_\_\_

Where do they live and for how long \_\_\_\_\_

Wages paid for Men \_\_\_\_\_ Women \_\_\_\_\_ Children \_\_\_\_\_

2. Economics of agriculture (Turnover)

Crop name	Total output	Quantity sold in the market	Price in the market (cash/Kind)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3. Economics of agriculture (Costs)

Crop name	Cost of Seeds if bought from the market	Cost of fertilizer/pesticide if bought from the market labour)	Number of people engaged or employed (hired/household	Other costs if any

4. Economics of agriculture (Marketing)

Crop name	Location of Market	Distance from village	Type of Market (eg weekly/daily)	Mode of transport	Cost of transport	Time taken

4.1.2.9 Impact on Park

4. Are crop protection guns used? Are they surrendered during periods when there is no crop? If yes, to whom, and during which period? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5.1.2 RESTRICTIONS RELATED TO AGRICULTURE

5.1.2.1 Description

1. What are the restrictions that have been imposed by the park authorities on the respondents agricultural activities? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Has the respondent been stopped from driving away, or killing animals damaging crops? (details) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5.1.2.2 History

1. How long have these restrictions been in existence? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

2. When and how were these restrictions applied? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

5.1.2.3 Area Affected

1. Are these restriction partially/fully imposed in all areas where the respondent used to carry on agricultural activities? (Alsomarkareason map)? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

5.1.2.5 **Impact**

1. Has crop damage by wildlife increased? (details)

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---

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2. Is crop compensation available? (Details) \_\_\_\_\_

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4.1.3 PASTORALISM AND LIVESTOCK [Includes Fodder Collection]

1. Grazing (4.1.3.1, 4.1.3.5, and 4.1.3.6)

Type of animal	Total number owned by the house-hold	Season/ months when grazed ( <u>underline peaks</u> )	Number authorised	Grazing fee	Area and location of grazing	Which plants/ grasses are grazed
Goats	_____	_____	_____	_____	_____	_____
Sheep	_____	_____	_____	_____	_____	_____
Cows	_____	_____	_____	_____	_____	_____
Buffalos	_____	_____	_____	_____	_____	_____
Others (specify)	_____	_____	_____	_____	_____	_____

---

2. Fodder collection (4.1.3.1, 4.1.3.5, 4.1.3.6 and 4.1.3.7)

Type of animal	Number stall fed	Season when stall fed	Species of fodder collected	Quantum of collection	Seasons when fodder is collected	Area and location of fodder collection	Labour involved in fodder collection
Goats	_____	_____	_____	_____	_____	_____	_____
Sheep	_____	_____	_____	_____	_____	_____	_____
Cows	_____	_____	_____	_____	_____	_____	_____
Buffalos	_____	_____	_____	_____	_____	_____	_____
Others (specify)	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____

3. Are grazing/fodder collection grounds rotated periodically? If so, then what is the cycle of rotation? Are there any other methods of fodder regeneration used? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4.1.3.2 History and Trends

1. For how long have grazing and fodder collection been undertaken in the park? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Has the area in which grazing or fodder collection takes place shifted, increased, decreased, or remained unchanged? (details) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Has the number of livestock in the park increased, decreased, or remained unchanged? Give details \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Has the grazing of livestock and collection of fodder been affected after the area was notified as a Park? If so, in what way? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4.1.3.6 **Periodicity**

1. What is the annual pastoralism employment cycle?

Employed in      Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
pastoralism      [Indicate in terms of Peak (P), Medium (M), Low (L), Absent (A)]

Men                      \_\_\_\_\_

Women                    \_\_\_\_\_

Children                   \_\_\_\_\_

4.1.3.7 **Socio-economic Linkages and Justification**

1. Economics of Pastoralism (Turnover and Marketing)

Livestock maintained for subsistence/commercial	Products		Price of the product	Location of Market	Distance from village	Mode of transport	Cost of transport (units)
	used	sold (Proportion/Quantity)					
Goats	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
Sheep	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
Cows	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____



Buffalos	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
Others	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____

2. Economics of Pastoralism (Costs) [If out side labour is employed, get cost of labour also]

Type of animal	Cost of inputs (eg. medicines, fodder etc. if bought from the market)	Number of people engaged or employed (hired/household labour)	Other costs if any
Goats	_____	_____	_____
Sheep	_____	_____	_____
Cows	_____	_____	_____
Buffalos	_____	_____	_____
Others(specify)	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

3. Apart from economic reasons, what other reasons do you have for keeping of livestock? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

5.1.3 RESTRICTIONS RELATED TO PASTORALISM

5.1.3.1 Description

1. What restrictions have been applied to activities relating to the keeping and grazing of livestock? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

5.1.3.2 **History**

1. How long have these restrictions been in existence? \_\_\_\_\_

---

---

2. When and how were these restrictions applied? \_\_\_\_\_

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5.1.3.3 **Area Affected**

1. Are these restriction partially/fully imposed in all areas where the respondent used to carry on activities related to livestock (Also mark areas on map)? \_\_\_\_\_

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5.1.3.5 **Impact**

1. Has the incidence of cattle lifting increased after the notification of the park? \_\_\_\_\_

2. Is compensation for livestock given?(Details) \_\_\_\_\_

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3. What steps has the respondent taken for protection of livestock? \_\_\_\_\_

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4. What species are responsible for loss of livestock?

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5. Has the fees/payments for grazing in the park been increased after notification? (details) \_\_\_\_\_

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6. Any other impacts? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4.1.4 FUELWOOD COLLECTION

4.1.4.1 Description

1. What is the method used for collecting fuelwood (eg. lopping, deadwood collection, felling, driftwood collection etc)? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4.1.4.2 History and Trends

1. How much fuelwood is collected/used? Total \_\_\_\_\_

From Park \_\_\_\_\_ Other areas \_\_\_\_\_

2. For how long has fuelwood collection been undertaken in the park for? \_\_\_\_\_

\_\_\_\_\_

3. Has the quantum of fuelwood extraction increased, decreased, or remained unchanged over the past few years?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4.1.4.4 Legal Status

1. How much of the fuelwood collection in the Park is authorized (R/L/C) and how much unauthorized? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Has there been any illegal cutting of trees for fuelwood?

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4.1.4.5 Location and Extents

1. How far away from the village does the respondent have to go for collecting fuelwood? \_\_\_\_\_

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2. Can fuelwood be collected anywhere in the park? \_\_\_\_\_

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4.1.4.6 Periodicity

1. Is there any seasonal variation in the amount or method of fuelwood collected? \_\_\_\_\_

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4.1.4.7 Socio-economic Linkages and Justification

1. How much of fuelwood collection is for domestic purposes and how much for sale or barter, if at all? \_\_\_\_\_

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2. Who do the fuelwood collectors sell the fuelwood to if at all? \_\_\_\_\_

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3. What is the price of fuelwood at the nearest market?

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5.1.4 RESTRICTIONS RELATED TO FUELWOOD and M.F.P.

5.1.4.1 Description

1. What restrictions have been imposed relating to the collection of fuelwood and other M.F.P.? \_\_\_\_\_

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5.1.4.2 History

1. How long have these restrictions been in existence? \_\_\_\_\_

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2. When and how were these restrictions applied? \_\_\_\_\_

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5.1.4.3 Area Affected

1. Are these restriction partially/fully imposed in all areas where you used to carry on activities related to collection of fuelwood/MFP (Also mark areas on map)? \_\_\_\_\_

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5.1.4.5 Impact

1. What problems have come up because of these restrictions?

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**5. IMPACT OF AND RESTRICTIONS ON ACTIVITIES OF VILLAGERS BY PARK AUTHORITIES.**

**5.1 RESTRICTIONS ON PEOPLE LIVING WITHIN THE PARK**

1. What are the restrictions that have been imposed on the respondents activities due to the establishment of the Park apart from the ones already discussed? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**5.2 DISPLACEMENT**

**HISTORY**

1. Is the respondent aware that this village is due for displacement? \_\_\_\_\_

2. When did the respondent first hear of plans for displacement of the village

Date \_\_\_\_\_

From whom \_\_\_\_\_

3. Was the respondent given reasons for your displacement \_\_\_\_\_

If yes, what reasons \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

By whom \_\_\_\_\_

In what form, if at all, was the respondent consulted in the matter

\_\_\_\_\_

**RESETTLEMENT AND REHABILITATION PLANS AND PROCESS**

1. What is the respondent perception towards displacement, and resettlement and rehabilitation? Give reasons \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Is there a difference of opinion on this issue among different sections of the village (men, women, aged, different occupations/ caste/religious groups). Ifso describe these \_\_\_\_\_

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3. Is the respondent aware of any plans for relocation? If yes, what are the features of the plan (land, wells, houses, schools, roads)? Do you know where you are to be relocated? \_\_\_\_\_

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4. Was the respondent involved in the planning process? If yes, were the respondents suggestions incorporated in the plan? \_\_\_\_\_

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5. What would the respondents demands be if displacement is inevitable despite your opposition to it? Have any organised moves been made to negotiate with the authorities? \_\_\_\_\_

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#### IMPACT OF IMPENDING DISPLACEMENT

1. How has the respondents life changed since news came of impending displacement (maintenance, loans, schools, roads, other development schemes which may have been stopped)? \_\_\_\_\_

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2. What does the respondent feel is the (family, community) future of remaining here? \_\_\_\_\_

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3. Does the respondent have relations to other villages slated for displacement? If yes what kind of relations (social, cultural, economic, political) How often do you meet other villagers? \_\_\_\_\_

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4. In what ways does the respondent feel (individual, community) life would change because of displacement

Ties to the land/forest \_\_\_\_\_

---

Ties to neighbouring villages \_\_\_\_\_

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Ties to nearby markets \_\_\_\_\_

---

Ties to religious locations \_\_\_\_\_

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5. Does the respondent know people in the proposed resettlement sites? Are they friendly/hostile/indifferent? \_\_\_\_\_

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OPPOSITION TO DISPLACEMENT

1. Does the respondent know of other villages displaced? \_\_\_\_\_

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2. What happened to those people? \_\_\_\_\_

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5. Give details of discussions with other villages with whom relations exist, on their stand on this issue? \_\_\_\_\_

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3. VALUES AND OBJECTIVES OF THE PARK

1. Is the respondent aware of the existence of the national park in the area? \_\_\_\_\_

2. If yes, is it known when, and for what objective(s) it was notified? \_\_\_\_\_

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3. Does the respondent think a park should have been notified in this area? Is it in any way useful to the respondent? \_\_\_\_\_

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4. What according to the respondent should have been the objectives of the park? \_\_\_\_\_

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5. Was the respondent consulted before the park was established? Is so, how and when? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**7. ALTERNATIVES TO PRESSURES OF VILLAGERS [RECOMMENDATIONS]**

[One of the alternatives to Habitation within the park is rehabilitation and resettlement of the villagers staying inside the park. This is covered under the schedule on displacement]

Activities	People involved/ having knowledge	Raw materials/ inputs needed	Skills/training existing/needed	Implements/technology existing/needed	Finance/capital existing/needed	Markets existing/needed
Existing	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
Existed in the past	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
Other possibilities or skills available	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Linkages of the activities with each other

	Agriculture	Pastoralism	Herbs	Fuelwood	Domestic	Others—>	Total outputs
Agriculture	_____	_____	_____	_____	_____	_____	_____
Pastoralism	_____	_____	_____	_____	_____	_____	_____
Herbs	_____	_____	_____	_____	_____	_____	_____
Fuelwood	_____	_____	_____	_____	_____	_____	_____
Domestic	_____	_____	_____	_____	_____	_____	_____
Others :	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
Total inputs	_____	_____	_____	_____	_____	_____	_____

4.1.1.5. **Location and Extent** (Resource use table)

1. What is the level of consumption of resources like fuel wood, fodder, etc by the respondent?

Resource	Species/Type	Use	Quantities per year	Collected in which season	Collected from where	Is the collection a right	Cost of collection if any	Are any alternatives available
Wood	_____	_____	_____	_____	_____	_____	_____	_____
Grasses	_____	_____	_____	_____	_____	_____	_____	_____
Leaves	_____	_____	_____	_____	_____	_____	_____	_____
Fruits	_____	_____	_____	_____	_____	_____	_____	_____
Flowers	_____	_____	_____	_____	_____	_____	_____	_____

Resource	Species/Type	Use	Quantities per year	Collected in which season	Collected from where	Is the collection a right	Cost of collection if any	Are any alternatives available
Herbs	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____
Other M.F.P.	_____	_____	_____	_____	_____	_____	_____	_____
Mud/clay	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____
Stone/rock	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____
Others(specify)	_____	_____	_____	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____	_____	_____	_____



## ANNEXURE VII

### TOURIST SCHEDULE

1. Name
2. City:
3. Occupation:
4. Nationality:
5. Is the the first visit?  
- If not, how many previous visits and when?
6. Single/Group/ or with family
7. Mode of transport to Park
8. If private vehicle, will it be used in the park?
9. Objective of visit
10. Length of visit

1. Facilities

Opinion on

- Facilities available at hotel
- Facilities available for viewing wildlife
- Jeep ride into park
- Guide
- Availability of information

2. Were all question answered?

3. Awareness of rules and regulations

- If so how?



## ANNEXURE VIII

### Schedule for Tourism Managers

1. Name
2. Designation
3. Tenure of present post
4. Objectives of tourism in the park
5. How long has the hotel existed?
  - Area of land
  - Legal status
6. Facilities in the hotel
  - No. of rooms
  - Catering
  - Bar
  - WL tours + trips
  - Others (swimming pool etc.)
  - Facilities for staff
  - No. of staff currently working
  - AV center for WL films, slide shows
7. Sight seeing
  - No. of vehicles for WL TOURS
  - No. of trips per day
  - Capacity of each vehicle
  - No. of guides
  - Charge per trip
8. Plans to expand tourism
9. Problems or constraints to tourism
10. Does the concerned State Tourism Department have a Tourism Management Plan/List of rules and regulations esp. for WL tourism.  
If no - then do they follow Forest Department's rules
11. Relationship with the Forest Department officials.
12. Statistics - No. of tourists in last 2-3 years, monthwise.
13. Other comments and observations
  - dependence on forests for basic resources
  - water supply
  - garbage disposal
  - sewage, sewerage and sullage disposal





## ANNEXURE IX

### Personnel Schedule

(Forest and Cattle Guard)

Interviewers

NP Code

Date :

1. Name                      Designation
2. Beat              Naka              Range
3. Villages  
    Forest Blocks  
    No. of other personnel to the Beat
4. Approximate Area Couered
5. Tenure at Present Post  
    Tenure in the Park
6. Equipment Related to Protection Work
  - Arms
  - Communication equipment
  - Vehicle
  - Others
7. Need for Additional Equipment?
8. Facilities Accommodation
  - Special allowance
  - Amenities
  - Water
  - Electricity
  - Fuel
  - Provisions
  - Uniform and accessories
  - External amenities
  - Market
  - School
  - Health
  - Other amenities desired
9. Work Allocation
  - Normal duties (daily)
  - Additional allocation of work
  - Who allocates work
  - How is work related to park objectives
  - System of transfers

10. Monitoring and Evaluation
  - Communication and contact with higher persons
  - Frequency of contact
  - Mode of contact
  - Response of higher persons to suggestions
  - security of tenure
11. Problems
  - At work
  - Outsiders
  - Staff
  - Locals
  - Personal
  - Welfare programs for personnel
12. Relation with Locals
  - Acknowledgement of locals RTS
  - Level of authority to deal with offences
  - Relations with locals
13. Training Programs
  - Yes/No
  - Nature of training (Diploma/capsule....)
  - Duration
  - Institution/Dept. where training was received
14. Previous Posting/Next Posting Specific Reasons for Transfer  
(Only for Range Officer)
  - Special problems of the range
  - Possible solutions, implementation
  - List of offences for last 3 years
  - Range
  - Naka
  - Beat
  - Personnel with designations
  - Map of range or important landmarks of limits
  - Flying squad

## ANNEXURE X

### Flora List from Assessment Report

- Khair* (Acacia catechu). Yields ebony.  
*Khairi*. Yields a gum ; the implement called *musal* is made of its wood.  
*Kadhu* (Sterculia urens). Yields *Katra* gum.  
*Chaparan or Harsingar* (Nyctanthes arbortristis). used for baskets, and the flowers are offered in temples.  
*Kariala or Amaltas* (Cassia fistula).  
*Gurjen*. A light pretty wood, sometimes used for furniture  
*Banasa*.  
*Dasa*. Used in heges.  
*Atan or Zarkher*. Its fruit eaten by poor.  
*Kikar* (Acacia arabica). Another name for *babul*.  
*Kombher*. Sarangis (a musical instrument), & c., made from it.  
*Anola* (Phyllanthus emblica).  
*Dolia*. Shrub, with alternate spikeate shoots, bearing small ovate alternate leaves.  
*Bhera*.  
*Harh* (medicinal)  
*Tendu* (Diospyros melanoxylon). Furnished ebony.  
*Chonkar or Kiyra* (Prosopis spicigera).  
*Gujrend*. A fig; leaves like "bargat," and with similar habits. It is equal to "binola" as a food for cattle.  
*Simal* (Bombyx). Cotton-tree. Monkeys eat the flowers before they open ; "musla" (as roots are called) much used in medicine.  
*Un*. A large tree.  
*Hingot* (Balanites roxburghii).  
*Gular* (Ficus virgata).  
*Ganger the Chabeni* of Karaulf (Grewia populifolia). Leaves alternate; something like young ilex. Has a drupe which tastes like a hip; makes good walking-sticks.  
*Jaman* (Syzygium jambolanum).  
*Aila*. Root and bark and fruit used in medicine.  
*Arla*. Has a very acid seed in a pod. (Low tree)  
*Kala Kura*. Do.  
*Kadam* (Anthocephalus or Nauclea kadamba).  
*Jiwapot*. Rosaries made from its berries.  
*Ber* (Zizyphus hortensis)  
*Papri* (Pongamia glabra [?]).  
*Gugal* (Balsamodendron mukul). Furnishes gum (Bdellium or myrrh), offered at "dhup" to Thakur, e.e., at 9 a.m., to Shri Khrishan.  
*Jhal*. Green branched, prickly.  
*Moria or Umra*. (Large-leaved handsome shrub, in damp valley.  
*Papar. Kadam*. Bushes.  
*Kakond*. A tree.  
*Jinger*. Small tree, like Kachinar.  
*Gular*. handsome large-leaved shrub.  
*Komher*. Large pipal-shaped leaves; wood excellent for furniture. In the plains the following trees are the commonest :-  
*Khejra*.  
*Jent* (Sesbania)  
*Khair*.  
*Nim* (Melia indica).  
*Kikar* (Acacia arabia). Very numerous.  
*Pipal*. Fig.

*Bargat*. Fig.  
*Jhal* (Salvadora).  
*Farash* (Tamarisk).  
*Shishum* (Dalbergia).  
*Rubera* (Tecoma).  
*Pilu* (Salvadora)  
*Am* (Mango)  
*Imli* (Tamarind).  
*Senja* (Moringa).  
*ber* (*Zizyphus jujuba*).

The most valuable of the abundant trees are :-

*Kikar*. For its timber (which is that chiefly used by the Darbar) ; its pods and its bark used in dyeing and in distilling spiri.

*Dhank* and *Salar*. Used for charcoal mostly. (See Mines and Quarries)

*Bamboos*. Much used for Raj purposes, and produces a revenue of Rs. 3000 besides. They are inferior to the imported bamboo.

*Palms*. Used for pankahs, fruit, and mats ; yields a trifling sum to Raj. Toddy is not produced.

*Dhak* or *Chila*. leaves universally used as platters ; bring a small revenue.

*Lac*. Bring a revenue of about Rs. 300. The contract is sold annually. It is chiefly produced on pipal-trees. That on others is of an inferior quality.

Of shrubs, the *Ber* bushes ("pala") are the commonest and most valuable, especially in light soils. "Arusa," which grows in rocky raviny ground, makes the best charcoal for gunpowder, but it is not conserved. The *Ak* 9 (*Calotropis*) is seen everywhere, but its strong fibre and soft down is scarcely utilised. *Khimp*, found in light wastes, is used for ropes, baskets, and food. The best wild vetch, especially abundant in the Tijara hills, is the *Soneji*. It is said to be as good as cultivated pulse for goats and camels. It has ternate opposite leaves, and roundish two-seeded ventrous pods, very numerous in the axiles of the leaves. A creeper called *Gilor* is spoken of as a valuable medicinal herb; and another, called *Machechi*, is valued for its esculent flowers.

## ANNEXURE XI

### GRASSES LIST FROM ASSESSMENT REPORT

*Pula* (the high jungle grass). Collected from grass preserves in large quantities.

*Surwala*. Spear grass ; the commonest grass in the hills and plains.

*Serin. badger*. Common in hills ; inferior to *Surwala*.

*Baru*. The large reed-like looking grass.

*Jaranga*. Better than *Surwala*; often seen on field borders where there is much water ; grows four feet high.

*Anjan*. "Matmard" is the villagers name for it.

*Gandlul. Lamp*. See Karauli Gazetteer.

*Kans*. The well-known land-impoverishing grass.

*Dab or Dub*. The rich grass of lawns.

*Bharut*. The prickly-husked grass. See "Bikanir Gazetteer". Little used for human food in Ulwur.

*Chant, Labdan, Philan, Sarwali, Guwan* - Are other grasses.

*Mota* (?), *Sawank* (*Panicum colonum*). *Makara* (*Dactyloctenium egyptiacum*), are, I believe, the grasses the seeds of which are chiefly eaten by the people in times of scarcity.

*Bathua* and *ub* are the principal wild vegetables of the early part of the year, and *Panucar, Cholai, Losua* after the rains.



## ANNEXURE XII

### BIRDS OF SARISKA TIGER RESERVE, RAJASTHAN, INDIA

LATIN NAME	LOCAL NAME
<i>Accipiter badius</i>	Shikra
<i>Accipiter nisus</i>	Eurasian Sparrowhawk
<i>Acridotheres ginginianus</i>	Bank Myna
<i>Acridotheres tristis</i>	Common Myna
<i>Aegithina tiphia</i>	Common Iora
<i>Alcedo atthis</i>	Common Kingfisher
<i>Amandava amandava</i>	Red Avadavat
<i>Amaurornis phoenicurus</i>	White-Breasted Waterhen
<i>Anas acuta</i>	Northern Pintail
<i>Anas clypeata</i>	Northern Shoveler
<i>Anas crecca</i>	Common Teal
<i>Anas platyrhynchos</i>	Mallard
<i>Anas poecilorhyncha</i>	Spot-Billed Duck
<i>Anas strepera</i>	Gadwall
<i>Anastomus oscitans</i>	Asian Openbill
<i>Anhinga melanogaster</i>	Oriental Darter
<i>Anthus rufulus</i>	Paddyfield Pipit
<i>Anthus trivialis</i>	Tree Pipit
<i>Apus affinis</i>	Little Swift
<i>Aquila clanga</i>	Greater Spotted Eagle
<i>Aquila heliaca</i>	Imperial Eagle
<i>Ardea cinerea</i>	Grey Heron
<i>Ardea purpurea</i>	Purple Heron



<i>Ardeola grayii</i>	Indian Pond-Heron
<i>Asio flammeus</i>	Short-Eared Owl
<i>Athene brama</i>	Spotted Owlet
<i>Aythya ferina</i>	Common Pochard
<i>Aythya fuligula</i>	Tufted Duck
<i>Bubulcus ibis</i>	Cattle Egret
<i>Burhinus oedipnemus</i>	Eurasian Thick-Knee
<i>Butastur teesa</i>	White-Eyed Buzzard
<i>Calidris minuta</i>	Little Stint
<i>Calidris temminckii</i>	Temminck's Stint
<i>Caprimulgus indicus</i>	Grey Nightjar
<i>Carpodacus erythrinus</i>	Common Rosefinch
<i>Casmerodius albus</i>	Great Egret
<i>Centropus sinensis</i>	Greater Coucal
<i>Cercomela fusca</i>	Indian Chat
<i>Ceryle rudis</i>	Pied Kingfisher
<i>Charadrius alexandrinus</i>	Kentish Plover
<i>Charadrius dubius</i>	Little Ringed Plover
<i>Chlidonias hybridus</i>	Whiskered Tern
<i>Chrysomma sinense</i>	Yellow-Eyed Babbler
<i>Ciconia episcopus</i>	Wooly-Necked Stork
<i>Ciconia nigra</i>	Black Stork
<i>Circus aeruginosus</i>	Western Marsh-Harrier
<i>Columba livia</i>	Rock Pigeon
<i>Copsychus saularis</i>	Oriental Magpie-Robin
<i>Coracias benghalensis</i>	Indian Roller
<i>Coracina macei</i>	Large Cuckoo-Shrike

<i>Coracina melanoptera</i>	Black-Headed Cuckoo-Shrike
<i>Corvus macrorhynchos</i>	Large-Billed Crow
<i>Corvus splendens</i>	House Crow
<i>Coturnix chinensis</i>	Blue-Breasted Quail
<i>Coturnix coromandelica</i>	Rain Quail
<i>Cuculus micropterus</i>	Indian Cuckoo
<i>Cuculus varius</i>	Common Hawk-Cuckoo
<i>Culicicapa ceylonensis</i>	Grey-Headed Canary-Flycatcher
<i>Cyornis tickelliae</i>	Tickell's Blue-Flycatcher
<i>Dendrocitta vagabunda</i>	Rufous Treepie
<i>Dendrocopos mahrattensis</i>	Yellow-Crowned Woodpecker
<i>Dendrocopos nanus</i>	Brown-Capped Woodpecker
<i>Dicrurus caerulescens</i>	White-Bellied Drongo
<i>Dicrurus macrocercus</i>	Black Drongo
<i>Dinopium benghalense</i>	Black-Rumped Flameback
<i>Dumetia hyperythra</i>	Tawny-Bellied Babbler
<i>Egretta garzetta</i>	Little Egret
<i>Elanus caeruleus</i>	Black-Winged Kite
<i>Emberiza buchanani</i>	Grey-Necked Bunting
<i>Emberiza stewarti</i>	Chestnut-Breasted Bunting
<i>Eudynamys scolopacea</i>	Asian Koel
<i>Falco severus</i>	Oriental Hobby
<i>Falco tinnunculus</i>	Common Kestrel
<i>Ficedula parva</i>	Red-Breasted Flycatcher
<i>Francolinus francolinus</i>	Black Francolin
<i>Francolinus pondicerianus</i>	Grey Francolin

<i>Fulica atra</i>	Common Coot
<i>Gallinula chloropus</i>	Common Moorhen
<i>Galloperdix lunulata</i>	Painted Spurfowl
<i>Galloperdix spadicea</i>	Red Spurfowl
<i>Grus antigone</i>	Sarus Crane
<i>Gyps bengalensis</i>	White-Rumped Vulture
<i>Gyps fulvus</i>	Eurasian Griffon
<i>Gyps indicus</i>	Long-Billed Vulture
<i>Halcyon smyrnensis</i>	White-Throated Kingfisher
<i>Himantopus himantopus</i>	Black-Winged Stilt
<i>Hirundo concolor</i>	Dusky Crag-Martin
<i>Hirundo daurica</i>	Red-Rumped Swallow
<i>Hirundo rustica</i>	Barn Swallow
<i>Hirundo smithii</i>	Wire-Tailed Swallow
<i>Ketupa zeylonensis</i>	Brown Fish-Owl
<i>Lanius excubitor</i>	Northern Shrike
<i>Lanius schach</i>	Long-Tailed Shrike
<i>Lanius vittatus</i>	Bay-Backed Shrike
<i>Larus brunnicephalus</i>	Brown-Head Gull
<i>Limosa limosa</i>	Black-Tailed Godwit
<i>Lonchura malabarica</i>	White-Throated Silverbill
<i>Luscinia svecica</i>	Bluethroat
<i>Megalaima haemacephala</i>	Coppersmith Barbet
<i>Melophus lathami</i>	Crested Bunting
<i>Merops orientalis</i>	Little Green Bee-Eater
<i>Merops philippinus</i>	Blue-Tailed Bee-Eater
<i>Mesophoyx intermedia</i>	Intermediate Egret

<i>Milvus migrans</i>	Black Kite
<i>Mirafra cantillans</i>	Singing Lark
<i>Mirafra erythroptera</i>	Indian Lark
<i>Motacilla alba</i>	White Wagtail
<i>Motacilla cinerea</i>	Grey Wagtail
<i>Motacilla flava</i>	Yellow Wagtail
<i>Motacilla maderaspatensis</i>	White-Browed Wagtail
<i>Mycteria leucocephala</i>	Painted Stork
<i>Nectarinia asiatica</i>	Purple Sunbird
<i>Neophron percnopterus</i>	Egyptian Vulture
<i>Netta rufina</i>	Red-Crested Pochard
<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose
<i>Ocyrceros birostris</i>	Indian Grey-Hornbill
<i>Oenanthe deserti</i>	Desert Wheatear
<i>Oriolus oriolus</i>	Eurasian Golden-Oriole
<i>Orthotomus sutorius</i>	Common Tailorbird
<i>Otus bakkamoena</i>	Indian Scops-Owl
<i>Oxylophus jacobinus</i>	Pied Cuckoo
<i>Parus major</i>	Great Tit
<i>Passer domesticus</i>	House Sparrow
<i>Passer hispaniolensis</i>	Spanish Sparrow
<i>Passer montanus</i>	Eurasian Tree Sparrow
<i>Pavo cristatus</i>	Indian Peafowl
<i>Pelecanus crispus</i>	Dalmatian Pelican
<i>Pelecanus onocrotalus</i>	Great White Pelican
<i>Perdicula asiatica</i>	Jungle Bush-Quail

<i>Pericrocotus cinnanomeus</i>	Small Minivet
<i>Pericrocotus flammeus</i>	Scarlet Minivet
<i>Pernis ptilorhyncus</i>	Oriental Honey-Buzzard
<i>Petronia xanthocollis</i>	Chestnut-Shouldered Petronia
<i>Phaenicophaeus leschenaultii</i>	Sirkeer Malkoha
<i>Phalacrocorax carbo</i>	Great Cormorant
<i>Phalacrocorax fuscicollis</i>	Indian Cormorant
<i>Phalacrocorax niger</i>	Little Cormorant
<i>Phoenicopterus ruber</i>	Greater Flamingo
<i>Phoenicurus ochruros</i>	Black Redstart
<i>Phylloscopus collybita</i>	Eurasian Chiffchaff
<i>Phylloscopus inornatus</i>	Inornate Warbler
<i>Phylloscopus trochiloides</i>	Greenish Warbler
<i>Pitta brachyura</i>	Indian Pitta
<i>Platalea leucorodia</i>	Eurasian Spoonbill
<i>Ploceus philippinus</i>	Baya Weaver
<i>Podiceps cristatus</i>	Great Crested Grebe
<i>Porphyrio porphyrio</i>	Purple Swamphen
<i>Prinia hodgsonii</i>	Grey-Breasted Prinia
<i>Prinia inornata</i>	Plain Prinia
<i>Prinia socialis</i>	Ashy Prinia
<i>Prinia sylvatica</i>	Jungle Prinia
<i>Pseudibis papillosa</i>	Red-Naped Ibis
<i>Psittacula cynocephala</i>	Plum-Headed Parakeet
<i>Psittacula eupatria</i>	Alexandrine Parakeet
<i>Psittacula krameri</i>	Rose - Ringed Parakeet
<i>Pterocles exustus</i>	Chestnut-Bellied Sandgrouse

<i>Pterocles indicus</i>	Painted Sandgrouse
<i>Pterocles orientalis</i>	Black-Bellied Sandgrouse
<i>Pycnonotus cafer</i>	Red - Vented Bulbul
<i>Pycnonotus leucotis</i>	White-Eared Bulbul
<i>Recurvirostra avosetta</i>	Pied Avocet
<i>Rhipidura aureola</i>	White-Browed Fantail
<i>Riparia paludicola</i>	Plain Martin
<i>Salpornis spilonotus</i>	Spotted Creeper
<i>Sarcogyps calvus</i>	Red-Headed Vulture
<i>Sarkidiornis melanotos</i>	Comb Duck
<i>Saxicola caprata</i>	Pied Bushchat
<i>Saxicola ferrea</i>	Grey Bushchat
<i>Saxicola maura</i>	Siberian Stonechat
<i>Saxicoloides fulicata</i>	Indian Robin
<i>Spilornis cheela</i>	Crested Serpent-Eagle
<i>Sterna acuticauda</i>	Black-Bellied Tern
<i>Sterna aurantia</i>	River Tern
<i>Streptopelia chinensis</i>	Spotted Dove
<i>Streptopelia decaocto</i>	Eurasian Collared-Dove
<i>Streptopelia orientalis</i>	Oriental Turtle-Dove
<i>Streptopelia senegalensis</i>	Laughing Dove
<i>Streptopelia tranquebarica</i>	Red Collared-Dove
<i>Strix ocellata</i>	Mottled Wood-Owl
<i>Sturnus contra</i>	Asian Pied Starling
<i>Sturnus malabaricus</i>	Chestnut-Tailed Starling
<i>Sturnus pagodarum</i>	Brahminy Starling

<i>Sturnus roseus</i>	Rosy Starling
<i>Sturnus vulgaris</i>	Common Starling
<i>Sylvia curruca</i>	Lesser Whitethroat
<i>Tachybaptus ruficollis</i>	Little Grebe
<i>Tephrrodornis pondicerianus</i>	Common Woodshrike
<i>Terpsiphone paradisi</i>	Asian Paradise-Flycatcher
<i>Threskiornis melanocephalus</i>	Black-Headed Ibis
<i>Treron phoenicoptera</i>	Yellow-Footed Green-Pigeon
<i>Tringa glareola</i>	Wood Sandpiper
<i>Tringa hypoleucos</i>	Common Sandpiper
<i>Tringa nebularia</i>	Common Greenshank
<i>Tringa ochropus</i>	Green Sandpiper
<i>Tringa totanus</i>	Common Redshank
<i>Turdoides caudatus</i>	Common Babbler
<i>Turdoides malcolmi</i>	Large Grey Babbler
<i>Turdoides striatus</i>	Jungle Babbler
<i>Turnix sylvatica</i>	Small ButtonQuail
<i>Tyto alba</i>	Barn Owl
<i>Upupa epops</i>	Eurasian Hoopoe
<i>Vanellus duvaucelii</i>	River Lapwing
<i>Vanellus indicus</i>	Red-Wattled Lapwing
<i>Vanellus malabaricus</i>	Yellow-Wattled Lapwing
<i>Vanellus vanellus</i>	Northern Lapwing
<i>Zosterops palpebrosus</i>	Oriental White-Eye

Reference:

Sankar, K., Mohan, D. and Pandey, S. 1993. Birds of Sariska Tiger Reserve, Rajasthan, India *Forktail* 8:133-141

## ANNEXURE XIII

### LIST OF MAMMALS FOUND IN SARISKA TIGER RESERVE

LATIN NAME	LOCAL NAME	ENGLISH COMMON NAME
<i>Axis axis</i>	Chital	Chital
<i>Boselaphus tragocamelus</i>	Nilgai	Nilgai or Blue Bull
<i>Canis aureus</i>	Jackal (Siyar)	Jackal
<i>Cervus unicolor</i>	Sambher	Sambar
<i>Felis bengalensis</i>	Chita Billi	Leopard cat
<i>Felis caracal</i>	Siyagosh	Caracal
<i>Felis chaus</i>	Cat Jungli (Jungli Billi)	Jungle Cat
<i>Gazella gazella</i>	Chinkara	Indian Gazelle, Chinkara
<i>Hemiechinus auritus</i>	Jhau Chuha	Hedgehog long eared
<i>Herpestes edwardsi</i>	Nevla	Mongoose
<i>Hyaena hyaena</i>	Jarakh	Hyaena striped
<i>Hystrix indica</i>	Seyali	Porcupine
<i>Lepus nigricollis</i>	Khargosh, Musa	Hare Indian
<i>Macaca mulatta</i>	Bandar	Monkey Rhesus
<i>Mellivora capensis</i>	Bijju, Buch	Ratel
<i>Panthera pardus</i>	Baghera, Tendua	Panther, Leopard
<i>Panthera tigris</i>	Sher, Bagh	Tiger
<i>Paradoxurus hermaphroditus</i>	Lakti	Palm Civet
<i>Presbytis entellus</i>	Langur	Langur common
<i>Suneus murimus</i>	Chhachhundar	Mushrat
<i>Sus scrofa cristatus</i>	Wild boar (Jungli Suar)	Wild Boar, Pig
<i>Tetracerus quadricornis</i>	Chousingha, Ghantali	Fourhorned antelope
<i>Vulpes bengalensis</i>	Indian Fox (Lomdi)	Indian Fox

Source : Management Plan of Sariska Tiger Reserve





## ANNEXURE XIV

## LIST OF GRASSES FOUND IN THE SARISKA TIGER RESERVE

LATIN NAME	LOCAL NAME
<i>Andropogon pumilus</i>	Masuri
<i>Apluda mutica</i>	Bhanjura, Polarda
<i>Aristida adscensionis*</i>	Lapla Dhola
<i>Aristida hystrix</i>	Lapla Safed
<i>Bothriochloa pertusa</i>	Karad Chhoti
<i>Brachiaria ramosa</i>	Kuri
<i>Cenchrus barbatus</i>	Bharut
<i>Cenchrus ciliaris</i>	Dhaman, Anjan
<i>Cenchrus setigerus</i>	Bharut, Kala Dhaman
<i>Chloris inflata</i>	Kali Charkali
<i>Chrysopogon fulvus</i>	Goria, Sedua, Seran
<i>Cymbopogon jawarancusa</i>	Goonder
<i>Cymbopogon martinii</i>	Raichha, Rosha
<i>Cynodon dactylon</i>	Dub, Hariyali
<i>Dactyloctenium aegypticum</i>	Makda
<i>Dactyloctenium scindicum</i>	Ganthia
<i>Dichanthium foveolatum*</i>	Buhari
<i>Dichanthium annulatum</i>	Karad, jarga
<i>Dichanthium caricosum</i>	Badi Jarga, Badi Karad
<i>Digitaria ciliaris*</i>	Chinkarda
<i>Digitaria cruciata</i>	
<i>Echinochloa colonum</i>	Sawan
<i>Enteropogon dolichostachyus*</i>	Bamna, Sendar
<i>Heteropogon contortus</i>	Surwala, Kali lamp

<i>Imperata cylindrica</i>	Siru
<i>Microchloa indica</i>	Katar lamp
<i>Panicum antidotale</i>	Gunera, Bule panic
<i>Panicum coloratum</i>	
<i>Saccharum spontaneum</i>	Kans
<i>Sehima nervosum</i>	Siran, Sheen
<i>Setaria glauca</i>	Bhindar
<i>Setaria pumila</i>	
<i>Sorghum halepense</i>	Baru, Barwadi
<i>Themeda quadrivalvis</i>	Ratedi
<i>Tragus roxburghii*</i>	Sitaghas

**Source:** Management Plan of Sariska Tiger Reserve

\*indicates change in nomenclature

old names are as follows (in the same order as in the list)

*Aristida depressa*  
*Chloris dolichostachya*  
*Digitaria adscendens*  
*Eremopogon foveolatus*  
*Setaria pallidifusca*  
*Tragus biflorus*

**Reference:**

Bennet, S S R 1987. *Name changes in flowering plants of India and adjacent regions* Triseas Publishers, Dehradun.

**ANNEXURE XV**

**MONTHLY RAINFALL STATISTICS FOR THANAKHAZI**

MONTH	MEAN RAINFALL (mm)	STANDARD DEVIATION (mm)	CV %	HIGHEST RAINFALL (mm)	LOWEST RAINFALL (mm)	RANGE
JANUARY	4.7	5.8	122	20.0	0.0	20.0
FEBRUARY	11.8	20.2	171	82.0	0.0	82.0
MARCH	3.7	7.6	207	24.0	0.0	24.0
APRIL	7.5	13.2	175	40.0	0.0	40.0
MAY	18.5	23.3	126	74.0	0.0	74.0
JUNE	63.9	40.4	63	154.3	0.0	154.0
JULY	260.0	152.2	59	653.0	0.0	653.0
AUGUST	185.0	98.6	53	415.0	0.0	415.0
SEPTEMBER	74.0	86.7	117	308.0	0.0	308.0
OCTOBER	10.5	19.3	183	61.0	0.0	61.0
NOVEMBER	3.2	7.9	246	30.0	0.0	30.0
DECEMBER	3.2	6.9	214	25.0	0.0	25.0
ANNUAL	646.2	237.7	37	1117.1	206.0	911.1

**MONTHLY RAINFALL STATISTICS FOR MALAKERAH**

MONTH	MEAN RAINFALL (mm)	STANDARD DEVIATION (mm)	CV %	HIGHEST RAINFALL (mm)	LOWEST RAINFALL (mm)	RANGE
JANUARY	9.5	15.4	163	59.0	0.0	59.0
FEBRUARY	10.7	23.4	219	103.0	0.0	103.0
MARCH	3.8	6.6	172	20.0	0.0	20.0
APRIL	5.4	9.6	177	36.0	0.0	36.0
MAY	18.5	32.9	178	104.0	0.0	104.0
JUNE	46.2	67.0	145	295.0	0.0	295.0
JULY	186.4	96.3	52	448.0	0.0	448.0
AUGUST	162.0	90.5	56	348.5	0.0	348.5
SEPTEMBER	61.2	80.1	130	219.0	0.0	219.0
OCTOBER	20.6	35.5	172	117.0	0.0	117.0
NOVEMBER	4.9	10.0	203	33.0	0.0	33.0
DECEMBER	2.7	6.2	231	18.0	0.0	18.0
ANNUAL	532.7	233.3	44	1046.0	127.0	919.0

### MONTHLY RAINFALL STATISTICS FOR RAJGARH

MONTH	MEAN RAINFALL (mm)	STANDARD DEVIATION (mm)	CV %	HIGHEST RAINFALL (mm)	LOWEST RAINFALL (mm)	RANGE
JANUARY	6.6	8.9	134	29.0	0.0	29.0
FEBRUARY	10.9	17.5	162	70.0	0.0	70.0
MARCH	3.1	5.1	163	16.0	0.0	16.0
APRIL	6.4	11.6	180	44.0	0.0	44.0
MAY	12.5	20.3	162	69.0	0.0	69.0
JUNE	41.1	30.0	73	103.0	0.0	103.0
JULY	186.1	119.9	64	517.0	0.0	517.0
AUGUST	169.3	122.3	72	504.0	0.0	504.0
SEPTEMBER	60.5	64.1	106	260.0	0.0	260.0
OCTOBER	17.1	29.0	170	94.0	0.0	94.0
NOVEMBER	2.7	8.1	299	35.0	0.0	35.0
DECEMBER	2.7	7.5	283	25.0	0.0	25.0
ANNUAL	519.0	204.2	39	930.5	129.0	801.5

### MONTHLY RAINFALL STATISTICS FOR ALWAR

MONTH	MEAN RAINFALL (mm)	STANDARD DEVIATION (mm)	CV %	HIGHEST RAINFALL (mm)	LOWEST RAINFALL	RANGE (mm)
JANUARY	9.4	10.5	111	38.6	0.0	38.6
FEBRUARY	15.1	23.4	156	96.5	0.0	96.5
MARCH	9.7	13.1	135	52.3	0.0	52.3
APRIL	8.1	13.5	166	50.8	0.0	50.8
MAY	15.4	15.9	103	59.0	0.0	59.0
JUNE	42.7	28.5	67	98.7	0.0	98.7
JULY	204.1	100.5	49	416.8	0.0	416.8
AUGUST	177.4	86.5	49	355.0	0.0	355.0
SEPTEMBER	83.7	91.4	109	348.0	0.0	348.0
OCTOBER	11.3	29.9	264	133.2	0.0	133.2
NOVEMBER	2.7	5.1	188	16.0	0.0	16.0
DECEMBER	3.2	6.7	208	26.8	0.0	26.8
ANNUAL	582.9	200.5	34	884.8	155.6	729.2

### MONTHLY RAINFALL STATISTICS FOR AZABGARH

MONTH	MEAN RAINFALL (mm)	STANDARD DEVIATION (mm)	CV %	HIGHEST RAINFALL (mm)	LOWEST RAINFALL (mm)	RANGE
JANUARY	0	0	0	0.0	0.0	0.0
FEBRUARY	0	0	0	0.0	0.0	0.0
MARCH	0	0	0	0.0	0.0	0.0
APRIL	0	0	0	0.0	0.0	0.0
MAY	0	0	0	0.0	0.0	0.0
JUNE	22.2	36.8	166	114.0	0.0	114.0
JULY	242.5	143.1	59	574.2	131.0	443.2
AUGUST	128.2	85.7	67	300.0	0.0	300.0
SEPTEMBER	21	25.7	122	67.0	0.0	67.0
OCTOBER	0	0.0	0	0.0	0.0	0.0
NOVEMBER	0	0.0	0	0.0	0.0	0.0
DECEMBER	0	0	0	0.0	0.0	0.0
ANNUAL	413.9	157.6	38	778.8	251.5	527.3



## ANNEXURE XVI

## SOIL WATER BALANCE FOR ALWAR

AWHC (mm) = 100. AVERAGE OVER 19 YEARS

WEEK	RAIN (mm)	PE (mm)	AE/PE	AE (mm)	DEFICIT (mm)	RUNOFF (mm)	SMOCS (mm)
1	0.8	12.2	0.07	0.82	0.49	0.00	3.58
2	1.5	12.6	0.08	1.00	0.52	0.00	4.11
3	2.9	13.2	0.14	1.89	0.78	0.00	5.13
4	1.5	14.4	0.14	1.96	1.01	0.00	4.67
5	4.0	15.7	0.15	2.42	0.69	0.00	6.24
6	1.4	17.0	0.12	2.02	1.32	0.00	5.69
7	6.2	18.3	0.25	4.54	1.05	0.00	7.32
8	2.5	20.0	0.15	3.04	1.58	0.00	6.83
9	5.7	21.9	0.22	4.78	1.63	0.00	7.75
10	2.6	23.7	0.19	4.51	2.43	0.00	5.88
11	0.8	25.6	0.10	2.54	1.71	0.00	4.18
12	0.5	27.5	0.07	1.90	1.56	0.00	2.82
13	2.1	29.3	0.07	2.16	1.09	0.00	2.74
14	1.5	31.1	0.06	1.98	1.09	0.00	2.34
15	0.9	33.0	0.05	1.65	1.02	0.00	1.66
16	3.0	35.0	0.09	3.22	0.56	0.00	1.61
17	1.7	37.2	0.06	2.05	0.84	0.00	1.50
18	1.3	29.5	0.05	1.94	0.82	0.00	1.15
19	5.0	41.7	0.10	4.25	0.56	0.00	2.15
20	3.8	43.4	0.10	4.35	0.86	0.00	1.98
21	2.7	43.3	0.08	3.33	1.02	0.00	1.63
22	3.6	43.0	0.08	3.60	0.64	0.00	1.88
23	4.0	42.8	0.09	4.00	0.72	0.00	2.10
24	4.9	42.5	0.11	4.61	1.01	0.00	2.46
25	13.6	40.0	0.25	10.02	0.70	0.00	6.09
26	17.5	36.5	0.35	12.73	1.83	0.00	10.87
27	35.6	32.9	0.59	19.58	1.58	0.00	26.88
28	29.5	29.4	0.80	23.65	3.11	0.89	41.81
29	53.9	20.1	0.83	24.12	2.21	13.4	58.22
30	62.0	33.0	0.86	28.29	4.60	22.8	69.12
31	52.6	36.9	0.83	30.70	5.62	22.39	68.69
32	45.9	40.9	0.88	35.89	10.99	14.41	64.28
33	44.7	43.7	0.90	39.23	11.22	11.35	58.38
34	35.4	40.4	0.88	35.66	11.95	5.64	52.46
35	38.5	36.0	0.81	29.08	9.59	8.19	53.69
36	33.8	31.6	0.74	23.27	12.19	15.3	48.91
37	12.2	27.2	0.65	17.60	10.74	4.4	29.12
38	17.7	25.0	0.65	16.28	7.57	1.75	38.78
39	4.9	24.6	0.59	14.47	11.84	0.00	29.21
40	5.1	24.1	0.52	12.53	9.2	0.00	22.76
41	5.4	32.5	0.41	9.68	6.73	0.00	18.51
42	0.7	22.6	0.27	6.11	5.49	0.00	13.05
43	0.0	20.8	0.19	3.97	3.97	0.00	9.08
44	0.0	18.9	0.14	2.56	2.56	0.00	6.52
45	0.3	17.0	0.10	1.68	1.51	0.00	5.11
46	0.0	15.1	0.07	1.11	1.11	0.00	3.99
47	0.8	14.1	0.11	1.48	0.74	0.00	3.35
48	0.7	13.4	0.10	1.33	0.62	0.00	2.76
49	0.7	12.5	0.09	1.14	0.48	0.00	2.30
50	0.4	11.7	0.04	0.46	0.39	0.00	2.24
51	0.3	11.6	0.04	0.42	0.36	0.00	2.12
52	0.8	11.9	0.04	0.50	0.32	0.00	2.40



## SOIL WATER BALANCE FOR AZABGARH

AWHC (mm) = 100. AVERAGE OVER 9 YEARS

WEEK	RAIN (mm)	PE (mm)	AE/PE	AE (mm)	DEFICIT (mm)	RUNOFF (mm)	SMOCS (mm)
1	0.0	12.2	0.06	0.71	0.56	0.00	2.25
2	0.0	12.6	0.05	0.62	0.47	0.00	1.79
3	0.0	13.2	0.04	0.56	0.37	0.00	1.42
4	0.0	14.4	0.04	0.51	0.30	0.00	1.12
5	0.0	15.7	0.03	0.50	0.28	0.00	0.84
6	0.0	16.9	0.03	0.45	0.21	0.00	0.63
7	0.0	18.3	0.02	0.42	0.16	0.00	0.44
8	0.0	20.0	0.02	0.42	0.14	0.00	0.33
9	0.0	21.9	0.02	0.39	0.08	0.00	0.25
10	0.0	23.7	0.02	0.42	0.08	0.00	0.17
11	0.0	25.6	0.02	0.41	0.05	0.00	0.12
12	0.0	27.4	0.02	0.44	0.05	0.00	0.07
13	0.0	29.3	0.02	0.47	0.05	0.00	0.02
14	0.0	31.1	0.02	0.49	0.05	0.00	0
15	0.0	33.0	0.02	0.52	0.00	0.00	0
16	0.0	35.0	0.02	0.56	0.00	0.00	0
17	0.0	37.2	0.02	0.59	0.00	0.00	0.00
18	0.0	39.4	0.02	0.63	0.00	0.00	0
19	0.0	41.7	0.02	0.66	0.00	0.00	0
20	0.0	43.4	0.02	0.69	0.00	0.00	0
21	0.0	43.4	0.02	0.69	0.00	0.00	0
22	0.0	43.1	0.02	0.68	0.00	0.00	0
23	5.0	42.8	0.09	3.92	0.00	0.00	1.61
24	6.3	42.4	0.15	6.21	0.67	0.00	2.18
25	12.2	40.0	0.24	9.45	0.00	0.00	5.26
26	3.7	36.4	0.15	5.34	2.26	0.00	3.84
27	27.3	32.9	0.49	15.97	0.99	0.00	15.26
28	69.1	29.4	0.84	24.68	0.00	6.6	53.10
29	97.9	29.1	1.00	29.10	9.70	45.81	76.08
30	29.6	33.0	0.91	20.92	16.03	15.67	60.05
31	43.9	36.9	0.9	33.13	10.73	5.12	64.70
32	46.9	40.9	1.00	40.88	12.60	5.15	65.56
33	34.9	43.7	0.90	29.41	18.28	13.44	47.65
34	18.2	40.4	0.69	27.88	12.67	0.00	37.93
35	25.7	36.0	0.66	23.68	6.33	0.11	39.80
36	4.7	31.6	0.61	19.16	15.65	0.00	25.31
37	4.3	27.2	0.46	12.44	9.02	0.00	17.21
38	0.0	25.1	0.27	6.72	6.72	0.00	10.49
39	0.0	24.6	0.16	3.95	3.95	0.00	6.58
40	0.0	24.1	0.10	2.46	2.42	0.00	4.16
41	0.0	23.6	0.06	1.50	1.45	0.00	2.71
42	0.0	22.7	0.04	0.96	0.92	0.00	1.83
43	0.0	20.8	0.03	0.62	0.51	0.00	1.32
44	0.0	18.9	0.02	0.40	0.30	0.00	1.02
45	0.0	17.0	0.02	0.30	0.21	0.00	0.81
46	0.0	15.2	0.02	0.24	0.16	0.00	0.65
47	0.0	14.1	0.02	0.22	0.15	0.00	0.50
48	0.0	13.3	0.02	0.21	0.14	0.00	0.36
49	0.0	12.5	0.02	0.20	0.13	0.00	0.24
50	0.0	11.7	0.02	0.19	0.08	0.00	0.17
51	0.0	11.5	0.02	0.18	0.06	0.00	0.11
52	0.0	11.8	0.02	0.19	0.04	0.00	0.07

## SOIL WATER BALANCE FOR RAJGARH

AWHC (mm) = 100. AVERAGE OVER 19 YEARS

WEEK	RAIN (mm)	PE (mm)	AE/PE	AE (mm)	DEFICIT (mm)	RUNOFF (mm)	SMOCS (mm)
1	0.2	12.2	0.07	0.81	0.66	0.00	3.47
2	2.4	12.6	0.12	1.47	0.57	0.00	4.41
3	2.8	13.2	0.18	2.43	0.83	0.00	4.83
4	0.7	14.4	0.09	1.25	0.89	0.00	4.35
5	0.2	15.7	0.07	1.13	0.94	0.00	3.48
6	1.8	17.0	0.08	1.40	0.61	0.00	3.99
7	5.8	18.3	0.20	3.59	0.58	0.00	6.20
8	1.4	20.0	0.12	2.36	1.47	0.00	5.26
9	2.4	21.9	0.12	2.58	1.24	0.00	5.12
10	1.3	23.7	0.10	2.36	1.59	0.00	4.10
11	0.3	25.6	0.07	1.77	1.38	0.00	2.74
12	0.1	27.5	0.04	1.22	1.05	0.00	1.75
13	0.8	29.3	0.04	1.18	0.69	0.00	1.52
14	0.6	31.1	0.03	1.01	0.60	0.00	1.21
15	1.7	33.0	0.05	1.52	0.58	0.00	1.45
16	2.6	35.0	0.07	2.31	0.50	0.00	1.84
17	1.5	37.2	0.06	2.14	0.99	0.00	1.48
18	2.1	39.5	0.06	2.41	0.65	0.00	1.47
19	2.8	41.7	0.08	3.14	0.73	0.00	1.48
20	2.6	43.4	0.07	3.19	0.58	0.00	1.31
21	1.5	43.3	0.07	3.18	0.72	0.00	1.40
22	2.1	43.0	0.06	2.63	0.82	0.00	1.21
23	2.8	42.8	0.07	2.96	0.63	0.00	1.47
24	2.1	42.5	0.12	5.25	0.29	0.00	2.69
25	3.0	40.0	0.17	6.91	1.00	0.00	4.20
26	6.3	36.5	0.35	12.82	1.02	0.00	12.62
27	8.3	32.9	0.44	14.36	1.59	0.00	18.42
28	21.2	29.4	0.80	23.58	0.71	3.57	44.06
29	20.2	29.1	0.80	23.17	3.17	13.25	55.72
30	52.8	33.0	0.89	29.44	7.51	18.22	61.56
31	48.1	36.9	0.84	31.17	9.53	20.75	58.74
32	55.6	40.9	0.92	37.49	11.63	19.54	57.27
33	35.8	43.7	0.81	35.32	10.98	6.01	51.75
34	28.7	40.4	0.80	32.18	11.54	4.71	43.54
35	27.2	36.0	0.70	25.35	7.53	4.53	40.87
36	21.0	31.6	0.62	19.55	9.76	2.64	39.65
37	14.4	27.2	0.55	15.06	5.30	0.94	38.06
38	9.5	25.0	0.56	14.00	9.23	1.78	31.81
39	4.1	24.6	0.50	12.25	9.93	0.00	23.66
40	6.3	24.1	0.47	11.4	6.91	0.00	18.61
41	9.8	23.5	0.38	9.01	5.12	0.00	19.48
42	0.0	22.6	0.27	6.21	6.17	0.00	13.31
43	0.0	20.8	0.20	4.22	4.17	0.00	9.15
44	0.3	18.9	0.15	2.78	2.64	0.00	6.73
45	0.5	17.0	0.11	1.89	1.58	0.00	5.36
46	0.7	15.1	0.09	1.42	1.18	0.00	4.66
47	1.8	14.1	0.13	1.81	0.80	0.00	4.67
48	0.0	13.4	0.07	0.97	0.94	0.00	3.74
49	1.2	12.5	0.11	1.38	0.69	0.00	3.60
50	1.2	11.7	0.10	1.18	0.53	0.00	3.61
51	0.6	11.6	0.07	0.76	0.49	0.00	3.52
52	0.0	11.9	0.06	0.65	0.62	0.00	2.90

## SOIL WATER BALANCE FOR SILISERH

AWHC (mm) = 100. AVERAGE 10 YEARS

WEEK	RAIN (mm)	PE (mm)	AE/PE	AE (mm)	DEFICIT (mm)	RUNOFF (mm)	SMOCS (mm)
1	0.0	12.2	0.05	0.66	0.54	0.00	2.30
2	0.0	12.6	0.05	0.58	0.46	0.00	1.84
3	0.0	13.2	0.04	0.52	0.40	0.00	1.45
4	0.0	14.4	0.03	0.48	0.32	0.00	1.13
5	0.0	15.7	0.03	0.47	0.30	0.00	0.83
6	0.0	16.9	0.03	0.43	0.24	0.00	0.59
7	0.0	18.3	0.02	0.41	0.20	0.00	0.42
8	0.0	20.0	0.02	0.41	0.13	0.00	0.30
9	0.0	21.9	0.02	0.38	0.07	0.00	0.23
10	0.0	23.7	0.02	0.41	0.08	0.00	0.15
11	0.0	25.6	0.02	0.41	0.04	0.00	0.11
12	0.0	27.5	0.02	0.44	0.04	0.00	0.07
13	0.0	29.3	0.02	0.47	0.04	0.00	0.02
14	0.0	31.1	0.02	0.49	0.05	0.00	0.00
15	0.0	33.0	0.02	0.52	0.05	0.00	0.00
16	0.0	35.0	0.02	0.56	0.00	0.00	0.00
17	0.0	37.2	0.02	0.59	0.00	0.00	0.00
18	0.0	39.5	0.02	0.63	0.00	0.00	0.00
19	0.0	41.7	0.02	0.66	0.00	0.00	0.00
20	0.0	43.4	0.02	0.69	0.00	0.00	0.00
21	0.0	43.3	0.02	0.69	0.00	0.00	0.00
22	0.0	43.0	0.02	0.68	0.00	0.00	0.00
23	0.0	42.8	0.02	0.68	0.00	0.00	0.00
24	3.8	42.5	0.07	3.17	0.00	0.00	1.24
25	14.5	40.0	0.22	8.63	0.00	0.00	7.51
26	3.6	36.5	0.18	6.71	3.67	0.00	4.77
27	24.6	32.9	0.49	16.10	0.81	0.00	13.42
28	50.7	29.4	0.79	23.33	1.39	0.00	40.82
29	47.7	29.1	0.80	23.42	3.00	5.63	59.52
30	36.9	33.0	0.76	25.09	12.50	15.64	55.72
31	41.3	36.9	0.81	29.87	6.21	7.31	59.83
32	77.2	40.9	1.00	40.88	16.02	36.88	59.27
33	31.4	43.7	0.74	32.55	13.73	10.26	47.82
34	15.7	40.4	0.61	24.77	13.08	3.58	35.20
35	14.6	36.0	0.47	16.80	7.17	0.50	32.51
36	8.6	31.6	0.37	11.83	5.23	0.00	29.34
37	8.9	27.2	0.34	9.33	3.44	2.11	26.85
38	0.0	25.1	0.31	7.71	7.67	0.00	19.17
39	0.0	24.6	0.27	6.56	6.52	0.00	12.69
40	0.0	24.1	0.20	4.89	4.81	0.00	7.88
41	0.0	23.6	0.13	3.03	2.92	0.00	5.00
42	0.0	22.6	0.08	1.87	1.73	0.00	3.28
43	0.0	20.8	0.06	1.89	1.02	0.00	2.27
44	0.0	18.9	0.04	0.78	0.60	0.00	1.67
45	0.0	17.0	0.03	0.57	0.41	0.00	1.26
46	0.0	15.1	0.03	0.41	0.26	0.00	1.00
47	0.0	14.1	0.02	0.31	0.18	0.00	0.82
48	0.0	13.4	0.02	0.30	0.17	0.00	0.65
49	0.0	12.5	0.02	0.24	0.12	0.00	0.55
50	0.0	11.7	0.02	0.22	0.09	0.00	0.45
51	0.0	11.6	0.02	0.18	0.05	0.00	0.40
52	0.0	11.8	0.02	0.19	0.06	0.00	0.34

SOIL WATER BALANCE FOR THANAKHAZI

AWHC (mm) = 100. AVERAGE 19 YEARS

WEEK	RAIN (mm)	PE (mm)	AE/PE	AE (mm)	DEFICIT (mm)	RUNOFF (mm)	SMOCS (mm)
1	0.9	12.2	0.07	0.81	0.6	0.00	3.41
2	1.0	12.6	0.07	0.85	0.58	0.00	3.59
3	2.9	13.2	0.22	2.9	0.69	0.00	3.63
4	0.0	14.4	0.05	0.78	0.76	0.00	4.88
5	1.1	15.7	0.06	0.93	0.56	0.00	3.04
6	1.7	17.0	0.11	1.78	0.51	0.00	3.01
7	2.7	18.3	0.11	2.05	0.70	0.00	3.75
8	1.8	20.0	0.09	1.72	0.74	0.00	3.86
9	3.6	21.9	0.12	2.62	0.68	0.00	4.84
10	1.0	23.7	0.09	2.12	1.56	0.00	3.73
11	0.0	25.6	0.06	1.52	1.47	0.00	2.30
12	1.3	27.5	0.06	1.54	0.87	0.00	2.14
13	0.6	29.3	0.04	1.27	0.83	0.00	1.58
14	0.5	31.1	0.04	1.09	0.70	0.00	1.11
15	1.2	33.0	0.04	1.38	0.55	0.00	1.13
16	2.7	35.0	0.07	2.37	0.36	0.00	1.79
17	3.0	37.2	0.08	3.08	0.68	0.00	2.03
18	3.0	39.5	0.09	3.36	1.06	0.00	1.98
19	1.9	41.7	0.07	2.86	0.89	0.00	1.46
20	5.2	43.4	0.11	4.72	0.29	0.00	2.25
21	4.4	43.3	0.12	4.99	1.05	0.00	1.98
22	3.8	43.0	0.1	4.14	1.19	0.00	1.97
23	12.2	42.8	0.23	9.89	0.84	0.00	4.46
24	10.2	42.5	0.24	10.14	1.68	0.00	4.65
25	17.6	40.0	0.32	12.86	1.73	0.00	9.44
26	26.1	36.5	0.47	17.17	1.27	0.00	18.37
27	37.8	32.9	0.63	20.82	2.93	5.41	29.94
28	61.9	29.4	0.84	24.64	1.3	8.39	58.84
29	84.6	29.1	0.90	26.16	2.71	41.66	75.69
30	67.7	33.0	0.95	31.29	6.53	29.94	82.17
31	70.5	36.9	0.91	33.72	8.59	39.55	79.38
32	46.7	40.9	0.94	38.48	14.23	17.00	70.61
33	43.9	43.7	0.92	40.11	14.38	16.53	57.83
34	30.8	40.4	0.81	32.93	13.9	9.14	46.59
35	32.5	36.0	0.74	26.56	10.85	7.71	44.84
36	28.9	31.6	0.62	19.7	10.22	13.41	40.64
37	20.1	27.2	0.57	15.58	9.28	6.20	38.94
38	11.4	25.0	0.53	13.29	7.72	3.00	34.07
39	6.7	24.6	0.57	14.1	9.8	0.00	26.73
40	5.2	24.1	0.50	12.07	7.67	0.00	19.89
41	5.8	23.5	0.41	9.62	6.32	0.00	16.09
42	0.0	22.6	0.25	5.68	5.64	0.00	10.46
43	0.3	20.8	0.16	3.38	3.09	0.00	7.37
44	0.9	18.9	0.13	2.42	2.10	0.00	5.88
45	0.3	17.0	0.09	1.59	1.48	0.00	4.63
46	0.0	15.1	0.07	1.06	1.04	0.00	3.61
47	2.1	14.1	0.11	1.58	0.65	0.00	4.20
48	0.0	13.4	0.06	0.84	-0.8	0.00	3.40
49	0.5	12.5	0.06	0.72	0.57	0.00	3.18
50	1.2	11.7	0.10	1.16	0.52	0.00	3.26
51	0.0	11.6	0.05	0.57	0.54	0.00	2.72
52	0.5	11.9	0.05	0.57	0.29	0.00	2.67

## SOIL WATER BALANCE FOR MALAKERAH

AWHC (mm) = 100. AVERAGE 19 YEARS

WEEK	RAIN (mm)	PE (mm)	AE/PE	AE (mm)	DEFICIT (mm)	RUNOFF (mm)	SMOCS (mm)
1	0.1	12.2	0.006	0.79	0.74	0.00	3.42
2	0.9	12.6	0.07	0.85	0.62	0.00	3.53
3	2.1	13.2	0.16	2.13	0.60	0.00	3.51
4	4.7	14.4	0.16	2.27	0.71	0.00	6.00
5	1.3	15.7	0.11	1.77	0.99	0.00	5.55
6	1.9	17.0	0.15	2.61	1.04	0.00	4.89
7	5.3	18.3	0.19	3.44	1.02	0.00	6.76
8	1.6	20.0	0.13	2.59	1.25	0.00	5.85
9	2.4	21.9	0.14	2.98	1.28	0.00	5.31
10	0.3	23.7	0.09	2.06	1.88	0.00	3.63
11	0.2	25.6	0.06	1.45	1.28	0.00	2.45
12	0.0	27.5	0.04	1.05	0.96	0.00	1.50
13	1.3	29.3	0.05	1.32	0.56	0.00	1.57
14	0.7	31.1	0.04	1.17	0.62	0.00	1.26
15	0.5	33.0	0.03	1.13	0.55	0.00	0.90
16	3.8	35.0	0.1	3.6	0.44	0.00	1.38
17	0.8	37.2	0.04	1.46	0.71	0.00	1.01
18	1.4	39.5	0.05	1.81	0.36	0.00	0.97
19	3.5	41.7	0.08	3.52	0.45	0.00	1.35
20	5.5	43.4	0.12	5.22	0.47	0.00	2.07
21	3.2	43.3	0.09	3.94	1.23	0.00	1.74
22	0.2	43.0	0.04	1.73	1.11	0.00	0.69
23	1.8	42.8	0.05	2.07	0.43	0.00	0.90
24	12.5	42.5	0.2	8.4	0.18	0.00	5.25
25	6.4	40.0	0.18	7.38	2.87	0.00	4.40
26	18.7	36.5	0.31	11.21	1.41	0.00	12.00
27	24.9	32.9	0.51	16.70	1.3	3.50	16.75
28	56.6	29.4	0.76	22.38	0.78	5.50	45.43
29	47.5	29.1	0.83	24.26	5.08	10.89	57.75
30	50.0	33.0	0.87	28.56	8.40	19.00	60.21
31	48.0	36.9	0.83	30.49	8.03	18.19	59.56
32	41.2	40.9	0.87	35.38	15.63	11.27	54.09
33	33.6	43.7	0.79	34.45	10.3	4.53	48.69
34	29.4	40.4	0.79	32.08	12.98	6.34	39.71
35	23.5	36.0	0.72	25.74	9.94	1.74	35.75
36	33.1	31.6	0.6	19.07	6.36	8.47	41.32
37	12.7	27.2	0.55	15.10	7.47	1.58	37.35
38	5.7	25.0	0.49	12.24	8.64	0.72	30.12
39	2.0	24.6	0.46	11.2	9.72	0.00	20.93
40	10.4	24.1	0.46	11.06	5.97	0.49	19.83
41	9.8	23.5	0.37	8.68	4.41	0.00	21.03
42	0.0	22.6	0.29	6.57	6.53	0.00	14.50
43	0.4	20.8	0.22	4.58	4.44	0.00	10.32
44	0.0	18.9	0.16	3.02	2.98	0.00	7.33
45	0.0	17.0	0.11	1.92	1.89	0.00	5.44
46	0.3	15.1	0.09	1.32	1.2	0.00	4.47
47	3.3	14.1	0.21	3.02	0.78	0.00	4.80
48	2.3	13.4	0.18	2.36	0.94	0.00	4.72
49	0.0	12.5	0.07	0.88	0.86	0.00	3.86
50	1.7	11.7	0.16	1.85	0.6	0.00	3.77
51	0.0	11.6	0.06	0.65	0.63	0.00	3.14
52	1.0	11.9	0.1	1.18	0.54	0.00	2.37

ANNEXURE XVII

VILLAGE LEVEL DATA (SARISKA)

Key to abbreviation in the data sheet Description of the Item

Population

(A)

1. Males
2. Female
3. Total Population
4. Number of Households
5. Number of cultivators
6. Number of Agricultural labourers
7. Number of Marginal workers
8. Number of non-workers
9. Number of literates males
10. Number of literates females
11. Number of Scheduled Caste
12. Number of Scheduled Tribe

(B)

Land Utilization

1. Geographical Area
2. Net sown Area
3. Gross Cropped Area
4. Forest Area
5. Barren and uncultivable land
6. Pastures and Groves
7. Kharif Cropped Area
8. Rabi Cropped Area

(C)

Irrigation

1. Net area irrigated by all sources
2. Area irrigated by wells
3. Area irrigated by tubewells
4. Area irrigated by tanks
5. Area irrigated by other sources

(D)

Cropping patterns

1. Area under jawar - *Hordeum vulgare*
2. Area under bajra - *Pennisetum americanum*
3. Area under udith - *Vigna mungo*
4. Area under thoovar - *Cajanus cajan*
5. Area under ehanna - *Cicer arietinum*
6. Area under wheat - *Triticum aestivum*
7. Area under oil seeds
8. Area under condiments like (adrak, lason, ajwain) *Zingiber officinale*,  
*Allium pativum* *Trachypemum ammi*
9. Area under vegetables and other food crops
10. Area under other cash crops

(E)

Livestock

1. Number of bullocks
2. Number of cows
3. Number of he buffaloes
4. Number of she buffaloes
5. Number of calves both male and female
6. Number of sheep
7. Number of goats
8. Number of donkey/horses
9. Number of camels.

(F)

Agricultural Implements and machinery

1. Number of plough
2. Number of weeders
3. Number of bullock carts
4. Number of oil engines
5. Number of electric motors
6. Number of wells
7. Number of tube wells
8. Number of tractors

(G)

Land Holdings

1. Marginal farmers (1-2 ha)
2. Small farmers (2-4 ha) 3. Medium farmers (4-10 ha)
4. Large farmers (> 10 ha)
5. Landless labourers

(H)

Amenities

1. Electricity
2. Agricultural co-operative society
3. Market
4. Primary school
5. Middle school
6. High school
7. Technical school
8. Type of medical facility (PHC, D, H etc)
9. Veterinary dispensary
10. Type of road kochcha or pucca
11. Post office/Telephone

## ALMARI

VILLAGE/ TEHSIL CODE	POPULATION (1981)											LAND UTILIZATION										IRRIGATION					CROPPING PATTERN									
	A/1	A/2	A/3	A/4	A/5	A/6	A/7	A/8	A/9	A/10	A/11	A/12	B/1	B/2	B/3	B/4	B/5	B/6	B/7	B/8	C/1	C/2	C/3	C/4	C/5	D/1	D/2	D/3	D/4	D/5	D/6	D/7	D/8	D/9	D/10	
A/70 SIRAWAS	191	147	338	56	63	4	-	265	11	-	19	-	658	536	655	-	616	-	153	502	39	39	-	-	-	5	112	8	4	12	161	120	-	2	-	
A/71 RINDH SADARWAS	130	110	240	41	52	-	-	188	19	1	240	-	3684	512	312	110	410	154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
A/72 ROGHA	134	139	273	36	39	2	-	236	24	-	-	-	481	136	159	247	153	14	24	135	6	6	-	-	-	-	114	2	7	5	12	18	-	1	-	
A/73 RAMWAGAN	67	56	123	24	26	1	-	96	3	-	26	-	289	106	132	124	123	2	31	101	9	9	-	-	-	2	78	-	-	65	110	55	-	2	-	
A/74 DHELAWAS	621	526	1147	174	201	6	10	869	118	11	133	-	2520	1216	1432	901	1319	63	113	1319	113	113	-	-	-	7	210	5	-	78	217	105	2	10	-	
A/75 BHAKEPURA	224	192	416	53	101	4	-	301	79	3	110	28	346	134	190	155	66	4	124	66	124	124	-	-	-	-	72	-	2	65	82	52	-	2	-	
A/76 RUNDH DADIKAR	30	24	54	9	12	2	-	40	5	1	48	-	287	118	160	130	65	25	117	70	118	118	-	-	-	2	41	5	-	52	78	35	1	2	-	
A/77 KISHNUPUR	394	339	733	112	206	6	166	335	28	-	19	-	774	123	388	415	114	33	274	114	274	274	-	-	-	1	32	2	-	42	66	43	-	1	-	
A/101 UMREN	1103	983	2086	316	339	22	257	1260	515	117	164	7	1434	680	1022	55	300	-	722	300	722	712	-	-	-	110	2	71	1	4	62	146	41	-	5	-
A/102 SHYODAN PURA	90	87	177	23	38	2	28	107	8	-	-	-	164	99	174	50	71	2	103	71	103	103	-	-	-	-	31	-	-	41	62	36	-	1	-	
A/103 PAITPUR	203	170	373	56	93	12	61	186	25	2	159	-	2195	550	1145	1027	420	44	725	420	725	725	-	-	-	6	47	-	4	82	240	54	-	2	-	
A/106 RUNDH KALIKOL	93	86	179	27	45	-	-	129	-	-	-	-	32	31	83	-	32	-	51	32	51	51	-	-	-	4	32	-	-	-	-	-	-	-	-	
A/107 KHALIKOL	272	244	516	66	144	-	-	368	13	-	234	-	265	89	111	77	107	10	4	106	4	4	-	-	-	-	-	-	-	-	-	-	-	-	5	-
A/108 AKBARPUR	1327	1179	2506	357	280	79	6	1898	667	253	679	48	2641	826	1288	1400	821	28	467	821	467	467	-	-	-	7	105	31	2	42	246	174	5	8	-	



A/109 DHANWALA	149	150	299	35	66	-	-	209	45	20	7	-	351	84	165	225	88	-	77	88	77	77	27	1	-	34	108	33	-	1	-				
A/110 SAHORI	721	654	1375	210	284	7	278	719	182	22	573	10	620	371	645	118	197	-	216	409	446	446	35	2	-	27	168	46	1	10	-				
A/139 NIRBHA KA BAS	112	107	219	32	43	-	4	167	65	41	98	-	72	46	63	17	-	1	17	42	63	63	2	7	-	-	5	10	12	-	-				
A/140 DHARAM PURA	234	195	429	65	87	-	-	337	44	1	49	69	726	186	265	444	161	2	186	217	84	84	-	-	-	1	76	5	-	46	185	76	2	1	-
A/141 GOPALPURA	55	47	102	19	25	-	-	77	2	-	-	-	205	47	83	101	46	-	36	46	37	37	-	-	-	5	22	2	-	27	24	16	-	2	-
A/142 MADHOGARH	580	485	1065	167	208	26	151	618	72	4	192	45	3023	331	534	2155	319	143	338	294	215	215	65	3	1	54	112	165	-	-	-	-			
A/143 KALA CHHARA	39	35	74	14	18	-	17	32	2	-	-	-	328	145	102	233	579	25	437	578	10	10	-	-	-	-	137	8	4	35	214	146	-	8	-
A/144 INDOK	626	587	1213	194	192	34	8	874	131	1	310	474	2400	146	271	1846	144	32	122	145	127	127	76	-	2	16	78	35	-	-	-	-	-		
A/146 RUNDH KRASAKA	9	-	9	9	-	-	-	6	7	-	1	1	1385	-	-	1385	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
A/147 KRASKA	180	167	347	61	58	-	60	142	6	-	7	49	2242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
A/149 RUNDH BALETA	90	78	168	23	17	-	-	122	2	-	-	-	281	80	75	N.A	N.A	82	110	74	110	110	76	-	-	34	42	36	-	-	-	-	-	-	
A/150 KUSHAL GARH	190	154	344	52	57	2	22	188	60	7	7	14	1182	146	163	87	92	-	57	104	86	86	-	-	-	2	32	-	-	12	39	32	-	2	-
A/151 DABLI	97	89	186	21	42	-	-	144	1	-	-	-	404	23	534	362	47	3	-	47	4	4	-	-	-	-	5	-	-	-	17	14	-	-	-
A/152 PRITHVI PURA	1554	1369	2923	421	500	20	338	1845	598	152	558	136	3344	2303	2993	714	1668	12	1325	1668	1325	-	1352	-	-	5	165	2	1	52	276	318	11	7	-
A/154 SIYA-KA BAS	113	103	216	30	55	-	7	154	12	-	-	-	308	113	168	72	81	17	44	119	87	87	-	-	-	-	7	3	2	17	46	37	1	-	-

A/155 CHAND PHARI	123	121	244	33	64	-	-	180	17	-	47	33	182	109	145	29	33	4	32	108	112	112	10	-	-	8	76	18	-	1	-				
A/181 BALETA	1812	1532	3344	466	592	83	39	2363	632	112	827	596	2691	2175	2012	124	1789	15	823	1789	829	829	-	-	-	8	46	7	2	27	252	310	2	5	-
A/188 BADOLI	327	273	600	75	146	2	200	247	42	2	57	-	615	275	310	40	165	8	110	165	111	111	43	-	-	8	12	63	-	-	-	-	-		

ALWAR

VILLAGE/ LIVESTOCK TEHSIL CODE	AGRICULTURAL IMPLEMENTS											LAND HOLDING					AMENITIES																					
	E/1	E/2	E/3	E/4	E/5	E/6	E/7	E/8	E/9	F/1	F/2	F/3	F/4	F/5	F/6	F/7	F/8	G/1	G/2	G/3	G/4	G/5	H/1	H/2	H/3	H/4	H/5	H/6	H/7	H/8	H/9	H/10	H/11					
A/70 SIRAWAS	162	224	25	290	81	-	1904	-	5	89	-	16	22	-	20	-	2	15	14	10	5	85	-	-	-	2	-	-	-	-	-	-	-	-	-	K	-	
A/71 RINDH SADARWAS	25	165	27	201	40	-	310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	-	
A/72 ROGRA	39	49	33	276	11	-	520	-	-	18	-	4	16	-	11	5	16	8	4	4	81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-	
A/73 RAMNAGAR	26	6	11	115	-	-	171	-	-	19	-	8	10	-	6	-	-	8	10	2	2	67	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-	
A/74 DHELAWAS	210	228	45	397	95	-	1570	14	8	95	-	30	96	-	96	-	-	40	56	21	13	91	-	-	-	-	-	-	-	-	-	-	-	-	D(1)	K	-	
A/75 BHAKEPURA	83	162	21	170	85	-	881	-	-	26	-	4	25	-	28	-	1	35	18	7	5	135	-	-	-	1	-	-	-	-	-	-	-	-	-	PHS(1)	K	-
A/76 RUNDH DADIKAR	42	94	28	310	95	-	318	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-	
A/77 KISHANPUR	173	260	30	460	139	-	1037	26	2	60	-	13	21	-	19	-	3	46	54	21	27	140	-	-	-	1	-	-	-	-	-	-	-	-	-	CHW(1)	P	-
A/101 LHREN	107	200	76	585	212	-	1010	9	-	19	-	16	8	4	37	31	13	35	22	21	7	70	-	-	-	1	1	-	-	-	-	-	-	-	-	PHS(1) RP(1) CHW(1)	P	P.O PHONE
A/102 SHYODAN PURA	41	101	10	149	64	-	267	-	-	12	-	2	2	3	11	1	-	31	21	12	9	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P K	-
A/103 PALTPUR	36	53	16	49	33	-	173	-	-	16	-	5	6	4	77	-	-	18	27	16	13	76	-	-	-	1	-	-	-	-	-	-	-	-	-	-	P K	P.O
A/106 RUNDH KALIKOL	29	149	64	325	72	-	1590	-	-	7	-	4	-	-	-	-	-	11	21	19	15	91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-
A/107 KHALIKOL	49	233	64	348	95	-	1293	-	-	17	-	12	-	-	6	-	-	14	11	13	8	127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-
A/108 AKBARPUR	105	156	43	444	91	45	1466	112	15	37	-	42	38	10	89	-	6	17	15	11	5	135	-	-	-	1	1	1	-	-	-	-	-	-	-	D(2) PHS(1) CHW(1)	P K	P.O

A/109 DHANWALA	41	91	11	91	46	-	436	-	20	18	-	4	5	-	12	-	1	27	21	18	8	111			P	-						
A/110 SAHORI	138	113	48	336	60	83	1131	-	-	57	-	16	8	4	55	-	13	23	18	14	9	76	1		K	-						
A/139 NIRBHA KA BAS	29	42	3	33	28	-	85	-	-	15	-	2	3	2	7	-	1	8	11	7	8	35			K	-						
A/140 DHARAN PURA	75	110	37	199	55	-	720	-	3	43	-	16	8	7	19	-	-	25	19	15	13	40			P	-						
A/141 GOPALPURA	12	2	14	117	2	13	308	-	2	12	-	6	6	-	8	-	-	7	6	6	5	54	-		D(1)	K	-					
A/142 MADHOGARH	79	343	61	635	156	-	497	-	6	20	-	1	18	-	146	-	1	56	41	24	7	56	-	-	-	1	K	-				
A/143 KALA CHHARA	10	59	7	79	16	-	99	-	-	5					8	-	-	8	4	3	1	71			K	-						
A/144 INDOK	189	437	35	449	191	-	960	-	-	27	-	2	4	-	64	-	1	74	65	43	13	74	1		CHM	K	-					
A/146 RUNDH KRASKA	437	182	36	167	71	-	518	-										4	2	2	1	86			K	-						
A/147 KRASKA	37	274	22	329	108	-	322	5	-	8	-				1	-	-	46	9	8	7	41			K	-						
A/149 RUNDH BALETA	25	118	38	117	58	-	412																			K	-					
A/150 KUSHAL GARH	39	69	16	204	24	1	439	4	2	20					20		1	23	21	8	2	85	1		K	-						
A/151 DABLI	49	254	88	289	100	87	571	-	-	8	-	-	-	-	2	-	-	8	7	4	2	51	-		K							
A/152 PRITHVI PURA	183	497	102	795	203	152	1460	55	219	68	-	67	36	147	-	-	24	117	85	76	11	56	-	-	-	1	1	1	-	D(1)	K	P.O.
A/154 SIYA-KA BAS	60	78	11	143	66	113	150	-	-	15	-	18	9	4	15	-	2	11	7	9	8	41			K	-						

A/159	41	57	8	51	48	-	74	-	-	21	-	11	5	6	19	-	-	12	8	7	7	38		K	-								
CHAND																																	
PHARI																																	
A/181	249	474	73	702	256	459	1336	24	86	77	-	44	32	7	-	-	-	251	131	76	18	76	-	-	-	1	1	-	-	FP(1	-	P	P.O.
BALETA																															K		
A/188	176	323	80	441	127	-	316	7	-	69	-	59	17	18	-	-	10	54	58	21	9	47	-	-	-	1	-	-	-	PAS(	-	K	-
BADOLI																																	

THANA GAZI 1990-91

VILLAGES/ TEHSIL/ LOCATION CODE	POPULATION										LAND UTILIZATION										IRRIGATION					CROPPING PATTERN									
	A/1	A/2	A/3	A/4	A/5	A/6	A/7	A/8	A/9	A/10	A/11	A/12	B/1	B/2	B/3	B/4	B/5	B/6	B/7	B/8	C/1	C/2	C/3	C/4	C/5	D/1	D/2	D/3	D/4	D/5	D/6	D/7	D/8	D/9	D/10
T/9 LADOKWAS	270	257	527	71	118	-	181	220	35	-	33	-	346	-	387	-	421	15	285	287	-	154	-	-	-	-	67	-	4	57	37	64	1	1	-
T/10 KHARKARI KALAN	924	796	1720	263	372	4	25	1244	186	38	346	-	3106	-	1029	783	1061	62	369	1061	-	369	-	-	-	2	598	2	61	178	209	297	6	1	19
T/11 KHAMPIRA	599	560	1159	163	264	8	3	867	106	8	12	16	949	-	365	59	392	47	283	231	-	125	-	-	-	-	250	-	25	47	77	87	3	1	-
T/12 MANAWAS	314	259	573	93	146	-	-	422	43	8	147	40	472	-	206	114	250	30	172	173	-	96	-	-	-	133	-	10	21	32	128	2	-	13	
T/13 MUNDHARA	1663	1420	3083	482	645	98	-	2186	352	58	384	39	2283	-	721	291	1088	281	664	806	-	400	-	-	-	4	709	-	33	143	264	557	13	-	42
T/18 BHAKANWAS KARKAR	734	709	1443	219	305	35	151	897	201	22	147	274	5138	-	1065	2681	1259	340	349	1259	-	349	-	-	-	4	751	1	77	142	184	240	3	2	53
T/19 RAH-KA NALA	46	46	92	14	-	-	38	54	-	-	-	-	689	-	18	559	33	90	22	11	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-
T/20 BAIRAWAS	214	203	417	71	74	9	121	213	17	-	-	-	1674	-	135	126	127	88	119	82	-	42	-	-	-	104	-	11	1	17	56	-	-	-	
T/21 NANGAL HERI	164	139	303	49	56	6	-	230	27	-	40	-	1057	-	57	651	59	35	43	34	-	18	-	-	-	29	1	12	-	9	24	-	-	-	
T/22 DUNARMALA	191	175	366	57	47	-	67	208	13	-	144	-	2218	-	253	1680	380	24	234	115	-	44	-	-	-	144	-	78	16	32	62	-	-	-	
T/23 TOLAWAS	469	413	882	126	180	4	146	496	164	34	16	33	856	-	388	211	416	46	316	168	-	220	-	-	-	257	1	12	23	51	102	-	-	-	
T/52 AMARKA BAS	38	24	62	18	14	-	8	35	7	-	1	1	296	-	67	100	58	5	36	26	-	4	-	-	-	33	-	2	-	2	23	-	-	-	
T/53 LAHAKA BAS	122	109	231	34	66	2	12	144	14	-	44	-	255	-	112	45	144	18	70	90	-	17	-	-	-	3	49	-	15	4	12	57	-	-	-

T/65 JHODAMAS	363	203	465	71	116	-	-	347	57	5	112	-	572	-	81	324	121	66	79	89	-	42	-	-	-	23	13	-	34	2	15	57	-	1	5	
T/66 TODIN LUHARAN	141	129	270	43	60	1	-	209	25	3	13	182	458	-	108	272	114	2	63	80	-	29	-	-	-	22	17	-	15	9	11	63	1	-	-	
T/69 RAIPUR	140	105	245	41	61	-	63	104	11	-	71	-	318	-	46	204	42	18	43	72	-	13	-	-	-	22	-	26	13	6	23	-	-	-		
T/90 HADAYLI	29	21	50	9	6	-	6	26	17	1	17	9	155	-	78	7	98	1	43	72	-	98	-	-	-	101	-	11	8	5	42	1	-	-		
T/91 KISHORI	1277	1070	2347	368	446	48	318	1324	446	17	121	756	1886	-	222	-	531	112	408	352	-	236	-	-	-	-	-	-	-	-	122	107	256	7	-	-
T/92 GOPALPURA	153	126	279	47	40	-	67	128	83	1	59	207	360	-	47	182	31	25	20	36	-	23	-	-	-	5	-	15	4	12	24	-	-	7		
T/119 GOVIND PURA	93	80	173	27	16	-	50	66	50	1	25	147	257	-	83	81	61	30	38	85	-	62	-	-	-	11	-	29	12	16	38	1	-	6		
T/120 JAITPUR BRAHMAN	224	229	453	79	91	15	95	256	59	16	100	57	401	-	138	-	130	53	52	153	-	32	-	-	-	9	8	1	30	46	49	21	1	-	-	
T/121 KUNDLA	153	142	295	46	12	-	63	138	79	7	34	177	388	-	65	215	80	-	50	53	-	23	-	-	-	15	-	24	23	26	41	1	-	13		
T/123 GUMARA KALYAN	96	76	172	25	24	3	10	101	48	11	7	100	221	-	72	103	28	11	27	71	-	46	-	-	-	-	-	5	5	37	21	-	-	-		
T/124 GU- KUNDAL	51	35	86	14	5	-	3	56	26	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	8	8	8	6	-	-	2			
T/125 SEELI BAMARI	481	453	964	162	73	-	186	502	154	54	340	459	1012	-	222	259	124	104	194	180	-	231	-	-	-	8	33	3	45	57	42	46	1	3	1	
T/127 GU- KUNDAL	28	34	62	6	7	-	7	40	15	-	-	52	248	-	26	141	13	8	94	18	-	18	-	-	-	1400	-	404	50	7	13	1	1	-		
T/128 GU-BHORI YAWALI	126	124	250	37	14	-	19	155	70	5	6	226	256	-	44	156	16	21	36	34	-	54	-	-	-	700	-	1500	2	15	26	1	1	-		
T/129 GU- DABAR	37	37	74	9	3	-	18	36	20	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	4	3	-	-	3			
T/130 GU-SEERA	55	44	99	21	9	-	24	44	31	-	-	99	118	-	-	-	-	-	-	-	-	-	-	-	-	-	12	2	8	8	-	-	3			

T/131 GU-BHARI	81	76	157	22	15	-	43	71	43	-	-	96	135	-	-	-	-	-	-	-	-	-	3	-	3	1	-	-	3									
T/132 GU-LALA BHAIYA	19	14	33	4	2	-	8	13	12	-	-	-	13	-	10	-	8	-	7	8	-	7	-	-	-	-	-	-	-	3	-	4	1	6	1	-	-	3
T/133 GU- HANUMAN	45	31	76	10	8	-	18	28	30	-	-	8	38	-	-	-	-	-	-	-	-	-	6	1	6	5	-	-	2									
T/134 GU-SAHIBA	17	16	33	3	3	-	10	9	14	-	-	3	20	-	-	-	-	-	-	-	-	4	1	6	2	-	-	3										
T/135 GU-KALOT	37	45	82	15	9	-	36	21	25	-	-	82	54	-	-	-	-	-	-	-	-	4	-	4	2	2	-	2										
T/136 GU- DEGHAN	15	20	35	5	3	-	9	16	10	-	-	35	55	-	-	-	-	-	-	-	-	3	-	2	2	-	-	2										
T/137 GU- JANAHAT	92	78	170	24	30	1	31	96	40	-	-	31	15	-	-	-	-	-	-	-	6	-	6	4	-	-	3											
T/138 GU-HAR	79	76	155	36	24	-	54	50	51	-	-	155	114	0	57	8	31	13	44	31	-	7	-	-	-	-	-	10	7	16	15	-	-	6				
T/139 GU- JAMADAR	15	19	34	5	6	-	9	14	11	-	-	28	8	-	-	-	-	-	-	-	-	3	-	3	3	-	-	1										
T/140 GU-VYAS	11	8	19	2	6	-	5	8	6	-	-	-	15	-	-	-	-	-	-	-	-	4	-	5	2	-	-	2										
T/141 GU-SOTI	102	92	194	38	1	1	52	92	50	-	-	148	42	-	-	-	-	-	-	-	-	16	3	8	12	-	-	6										
T/145 GU- DULAWAN	15	13	28	5	-	-	1	19	8	-	-	-	56	-	17	-	16	-	4	16	-	6	-	-	-	-	-	9	-	10	4	3	3	1	-	-		
T/142 GU- BIRKARI	116	123	239	35	20	-	69	107	62	-	8	231	225	-	64	56	6	10	35	50	-	99	-	-	-	-	-	5	-	19	9	51	25	-	-	-		
T/146 RUNDH BANDHIPUL	25	19	44	7	-	-	11	19	14	-	-	-	64	-	15	-	2	-	-	-	-	3	-	6	-	5	13	1	-	-								
T/148 GU-GUGLI	178	188	366	60	22	4	117	136	111	-	-	172	267	-	63	83	58	96	8	13	-	33	-	-	-	-	-	4	-	17	-	24	16	-	1	-		
T/148 GU-RODI	77	69	146	20	5	-	47	51	48	-	-	146	118	-	22	-	13	23	21	16	-	5	-	-	-	-	-	5	-	12	-	8	4	-	-	-		



T/149	30	39	55	10	14	6	10	33	13	-	-	-	4	-	3	-	-	-	2	3	-	6	-	-	-	3	-	3	1	1	1	-	-	-
GU-LESMA																																		
T/150	10	14	24	4	1	-	10	8	6	-	-	-	54	-	14	18	31	-	6	12	-	6	-	-	-	1	-	4	-	-	8	-	-	-
GU-NIRMA																																		
T/151	196	188	384	72	65	1	125	165	91	-	-	384	168	-	39	65	5	38	34	30	-	59	-	-	-	4	-	18	-	13	13	-	-	-
GU-RAMII																																		

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VILLAGES/ TEHSIL/ LOCATION CODE	LIVESTOCK									AGRICULTURAL IMPLEMENTS								LAND HOLDING					AMENITIES														
	E/1	E/2	E/3	E/4	E/5	E/6	E/7	E/8	E/9	F/1	F/2	F/3	F/4	F/5	F/6	F/7	F/8	G/1	G/2	G/3	G/4	G/5	H/1	H/2	H/3	H/4	H/5	H/6	H/7	H/8	H/9	H/10	H/11				
T/9 LADOMAS	29	35	10	86	310	-	110	40	-	30	40	8	4	16	25	-	2	27	23	24	8	56					1	-	-	-	-	-	-	KR	PO(1)		
T/10 KHAKKARI KALAN	40	52	7	45	114	17	65	12	2	27	25	5	128	66	203	-	1	165	56	54	27	152	-	-	-	1	-	-	-	-	-	-	D(1)	-	KR	PO(1)	
T/11 KHANPURA	12	40	12	42	135	8	76	8	2	12	20	8	5	18	90	-	2	74	85	26	11	54	-	-	-	1	-	-	-	-	-	-	-	-	KR	-	
T/12 MANAWAS	65	76	16	80	146	18	201	7	1	25	40	7	12	16	52	-	-	65	51	21	7	56				1	-	-	-	-	-	-	-	-	KR	-	
T/13 MUNDWARA	12	32	8	65	108	17	165	12	-	8	7	2	5	7	85	-	2	165	176	85	51	70	-	-	-	1	1	-	-	-	-	-	PHS(-)	-	KR	PO(1)	
T/18 DHANAWAS KARKAR	24	80	18	76	154	-	118	20		22	32	12	39	47	110	-	1	118	54	63	21	85	-	-	-	1	-	-	-	-	-	-	PHS(-) D(1)	-	PR	PO(1)	
T/19 RAH-KA MALA	2	60	7	64	95	18	65	5	1	2	14	1					3	4	6	2	2	45													KR		
T/20 BATRAMAS	16	114	12	84	135	12	74	18	1	4	11	1	5	-	7	-	-	20	21	17	8	56				1	-	-	-	-	-	-	-	-	-	PR	-
T/21 NANGAL HERI	7	18	4	32	65	5	65	12	2	7	4	2	8	-	11	-	-	20	11	13	7	82												-	-	PR	-
T/22 DUHARMALA	4	35	2	12	90	4	112	4	2	3	2	1	8	10	21	-	-	25	17	15	11	51												-	-	KR	-
T/23 TOLAWAS	76	185	13	85	176	40	135	12	-	27	37	8	15	9	37	-	-	20	21	17	15	49				1	-	-	-	-	-	-	-	-	-	KR	-
T/52 ANAKA BAS	4	40	7	52	170	22	85	-	2	14	12	4	2	2	7	-	-	8	7	2	2	35												-	-	KR	-
T/53 LAHAKA BAS	12	32	8	135	140	42	400	22	1	32	38	10	3	4	12	-	-	17	13	4	2	56												-	-	KR	-
T/65 JHODAWAS	42	82	17	94	135	32	112	18	-	16	14	-	18	-	25	-	2	35	17	16	4	41				1	-	-	-	-	-	-	-	-	-	KR	PO(1)

T/AA TODIN LUMARAN	7	72	15	52	165	12	AA	12	1	14	11	A	4	-	12	-	1	26	11	13	8	51	-	KR	-											
T/69 RAIPUR	50	162	12	112	210	43	135	8	2	12	18	8	2	-	11	-	1	24	18	11	7	46	-	-	-	KR	-									
T/90 HADAYLI	12	60	18	40	205	117	70	20	5	12	35	17	-	-	25	-	-	4	2	2	1	41	-	-	-	K	-									
T/91 KISHORI	41	152	7	74	310	85	165	64	7	36	64	7	7	-	17	-	-	141	76	51	8	35	-	-	1	1	1	-	D(2)	-	K	PO				
T/92 GOPALPURA	18	84	5	67	186	65	70	17	-	24	44	21	17	-	8	-	1	21	16	13	7	56	-	-	-	-	-	-	-	-	K	-				
T/119 GOVIND PURA	22	116	11	118	133	-	85	21	8	27	45	5	11	-	21	-	-	8	7	6	3	51	-	-	-	-	-	-	-	-	-	K	-			
T/120 JAITPUR BRAHMAN	28	75	17	78	146	74	172	-	-	16	54	7	5	-	23	-	3	43	21	18	11	56	-	-	-	-	-	-	-	-	-	K	-			
T/121 KUNDLA	17	60	21	65	125	-	611	-	-	18	63	31	4	-	18	-	-	21	27	8	4	35	-	-	-	-	-	-	-	-	-	-	K	-		
T/123 GUMARA KALYAN	14	48	9	78	165	15	415	-	-	21	67	5	9	-	17	-	-	9	8	7	5	54	-	-	-	-	-	-	-	-	-	-	-	K	-	
T/124 GU- KUNDAL	13	131	8	58	124	25	1010	16	4	19	32	8	3	-	11	-	-	6	5	3	-	51	-	-	-	-	-	-	-	-	-	-	-	K	-	
T/125 SEELI BAWARI	27	180	7	65	179	22	264	-	-	43	34	39	27	-	27	-	4	56	41	31	8	86	-	-	-	1	-	-	-	-	-	-	-	K	-	
T/127 GU- KUNDAL	8	61	-	-	85	-	174	31	2	17	28	11	5	-	21	-	-	21	17	15	8	54	-	-	-	-	-	-	-	-	-	-	-	-	K	-
T/128 GU-BHORI YAWALI	27	174	13	108	97	63	908	8	-	21	35	27	2	-	18	-	2	135	51	63	8	56	-	-	-	-	-	-	-	-	-	-	-	-	K	P
T/129 GU- DABAR	7	67	11	94	190	-	607	21	7	26	18	12	-	-	7	-	-	43	27	11	8	57	-	-	-	-	-	-	-	-	-	-	-	-	K	-
T/130 GU-SEERA	12	68	5	83	141	6	512	32	-	19	27	4	3	-	5	-	1	48	35	16	2	35	-	-	-	-	-	-	-	-	-	-	-	-	K	-

T/131 GU-GHARI	11	125	8	72	64	24	416	-	2	14	26	16	7	-	7	-	-	76	54	37	11	40	-	-	K	-			
T/132 GU-LALA BHAIYA	21	178	3	61	73	37	860	12	1	18	21	31	-	-	4	-	2	23	18	11	2	37	-	-	K	-			
T/133 GU- HANUMAN	9	92	7	112	92	-	431	-	3	16	38	28	8	-	13	-	-	47	17	2	-	54	-	-	K	-			
T/134 GU-SAHIBA	5	82	4	38	61	8	812	3	2	8	46	7	7	-	11	-	1	13	14	11	7	34	-	-	K	-			
T/135 GU-KALOT	15	134	8	49	83	-	735	41	3	13	37	11	14	-	13	-	-	46	21	13	5	64	-	-	K	-			
T/136 GU- DHAGWAN	8	40	7	65	134	-	201	20	2	16	21	2	8	-	11	-	-	2	2	1	-	27	-	-	K	-			
T/137 GU- JANWAT	7	35	5	36	138	35	307	-	-	41	24	3	7	-	17	-	-	11	8	7	-	38	-	-	1	-	-	K	-
T/138 GU-HAR	13	51	18	46	171	41	171	11	1	13	18	8	2	-	8	-	-	18	11	8	2	35	-	-	-	K	-		
T/139 GU- JAMADAR	21	65	21	32	98	37	235	17	-	17	35	4	5	-	7	-	-	2	1	1	-	13	-	-	K	-			
T/140 GU-VYAS	16	67	37	48	145	38	198	8	-	4	14	2	7	-	9	-	-	1	1	1	-	14	-	-	K	-			
T/141 GU-SOTI	14	71	16	51	136	27	265	13	3	21	15	7	8	-	14	-	-	11	4	-	-	16	-	-	K	-			
T/145 GU- DULAWAN	11	64	24	44	171	18	185	9	2	8	27	3	2	-	7	-	-	11	8	2	-	-	-	-	K	-			
T/142 GU- BIRKARI	16	46	17	34	208	34	265	-	-	21	34	-	7	-	15	-	-	21	34	13	2	38	-	-	K	-			
T/146 RUNDH BANDHIPUL	7	37	15	38	198	37	317	-	4	7	41	4	4	-	12	-	-	14	13	2	1	46	-	-	K	P			
T/148 GU-GUGLI	5	64	26	52	172	28	217	-	-	12	13	2	2	-	8	-	-	34	17	11	5	54	-	-	P	-			
T/148 GU-RODI	21	138	31	67	183	35	148	-	3	21	17	1	9	-	17	-	-	8	7	2	1	58	-	-	K	-			

T/149	18	27	46	56	121	27	225	-	-	7	34	1	6	-	4	-	-	5	2	2	-	56	-	-
GU-LESMA																								
T/150	4	21	2	10	26	-	40	-	-	14	26	2	2	-	6	-	-	2	1	1	-	-	-	-
GU-NIRNA																								
T/151	31	86	8	46	98	-	146	12	-	8	27	3	1	-	9	-	-	34	11	8	2	26	-	-
GU-RANJIL																								

K -  
K -  
K -



36	ANWARA	501	460	761	140	264	2	124	553	137	16	168	510	383	30	206	-	280	1	246	252	226	226	-	-	7	18	2	6	72	129	38	1	-	-	
90	DHAMRED	1363	1139	2502	370	668	27	60	1799	401	92	509	522	1170	771	488	193	809	-	-	-	450	450	-	-	4	2	1	23	206	251	76	1	-	-	
96	DANGAR- WARA	434	397	831	126	132	1	150	519	182	36	82	18	598	184	116	149	165	50	174	1	43	45	-	-	-	40	2	8	14	77	22	1	-	-	
100	KODNELLA	451	359	810	140	206	4	99	474	152	8	31	760	2522	498	191	1417	387	223	300	200	262	262	-	-	3	32	7	49	13	161	56	7	2	-	
101	RAMSINGH PURA	257	239	496	80	121	8	78	289	88	6	109	136	352	61	51	180	71	43	69	49	41	41	-	-	4	16	-	8	4	30	13	-	1	-	
104	TODA-JAI SINKHIPURA	367	352	719	117	186	1	157	366	57	-	31	453	657												2	13	1	8	93	111	43	1	2	-	
105	THANA	306	268	574	103	154	1	165	233	73	10	95	52	863	408	222	351	300	-	-	-	330	330	-	-	-	2	-	6	15	69	76	1	-	-	
106	DOONDIPURI	284	259	543	93	134	11	93	286	23	5	-	171	222	110	44	7	87	42	74	80	17	17	-	-	50	3	40	5	3	7	20	47	2	3	-
107	KIKOH	1497	1350	5847	524	347	47	397	1606	583	148	552	681	618	214	165	72	80	61	80	135	74	74	-	-	4	17	2	15	24	308	140	1	7	-	
17	GARIH	135	121	41	47	1	70	119	35		21	59	155	136	60	-	116	-	61	135	80	80	-	-	-	-	-	-	-	-	-	-	-	-	-	
108	RUNDH NARAYAN	9	4	13	8	1	-	-	6	6	-	2	1	1333	112	43	80	16	40	16	13										18	52	-	2	-	
109	DHEERADA	576	541	1117	187	185	4	207	601	151	12	482	67	896	150	40	467	143	48	144	51	52	52	-	-	-	22	-	15	8	15	25	1	-	-	
110	TODI-KA- DAS	33	24	57	15	22	-	5	23	8	2	-	48	82												3	24	3	6	10	13	18	-	-	-	
111	KIRAI-KA BAS	66	55	121	20	43	1	23	54	16	-	-	121	251	-											4	32	-	6	12	20	12	-	-	-	
114	BHANGARH	395	375	770	127	157	9	163	417	76	2	245	66	1291												2	20	-	-	14	22	54	1	-	-	
115	GOLA-KA BAS	931	866	1797	325	203	34	241	1046	453	95	447	71	170	88	8	22	27	34	27	68	69	49	-	-	20	7	16	4	2	37	138	320	4	2	-
129	LAKHAWAS	110	99	209	41	65	-	-	-	7	-	2	2071	26	-	-										3	18	-	4	32	56	54	2	-	2	
133	BARWA DOONGRI	67	74	141	22	30	-	28	82	10	-	-	141	294	57	16	219	35	19	35	19	18	18	-	-	-	8	17	2	5	12	9	11	2	-	-
134	NANGAL KARNA	81	83	164	28	38	-	32	92	2	-	13	124	206	72	8	92	67	11	54	26	13	13	-	-	-	24	1	3	8	15	25	1	-	1	
137	GHATRA	604	507	1111	180	325	3	207	529	85	5	158	131	644	214	139	258	194	7	166	187	159	159	-	-	-	7	32	1	6	30	204	51	3	1	-
139	BEEGOTA	965	371	1836	341	554	25	289	896	226	30	358	802	2034	528	323	1881	565	143	-	-	286	286	-	-	-	2	52	1	39	26	195	44	1	2	-
140	VITHIPLUR	252	229	481	83	112	2	142	195	74	2	290	76	456	153	47	215	135	32	132	65	65	65	-	-	-	3	4	-	3	3	35	24	1	4	-
141	KHERLI	167	153	320	56	102	16	96	106	49	-	86	111	241	34	14	88	32	36	32	16	16	16	-	-	-	2	17	3	5	6	24	14	-	1	-

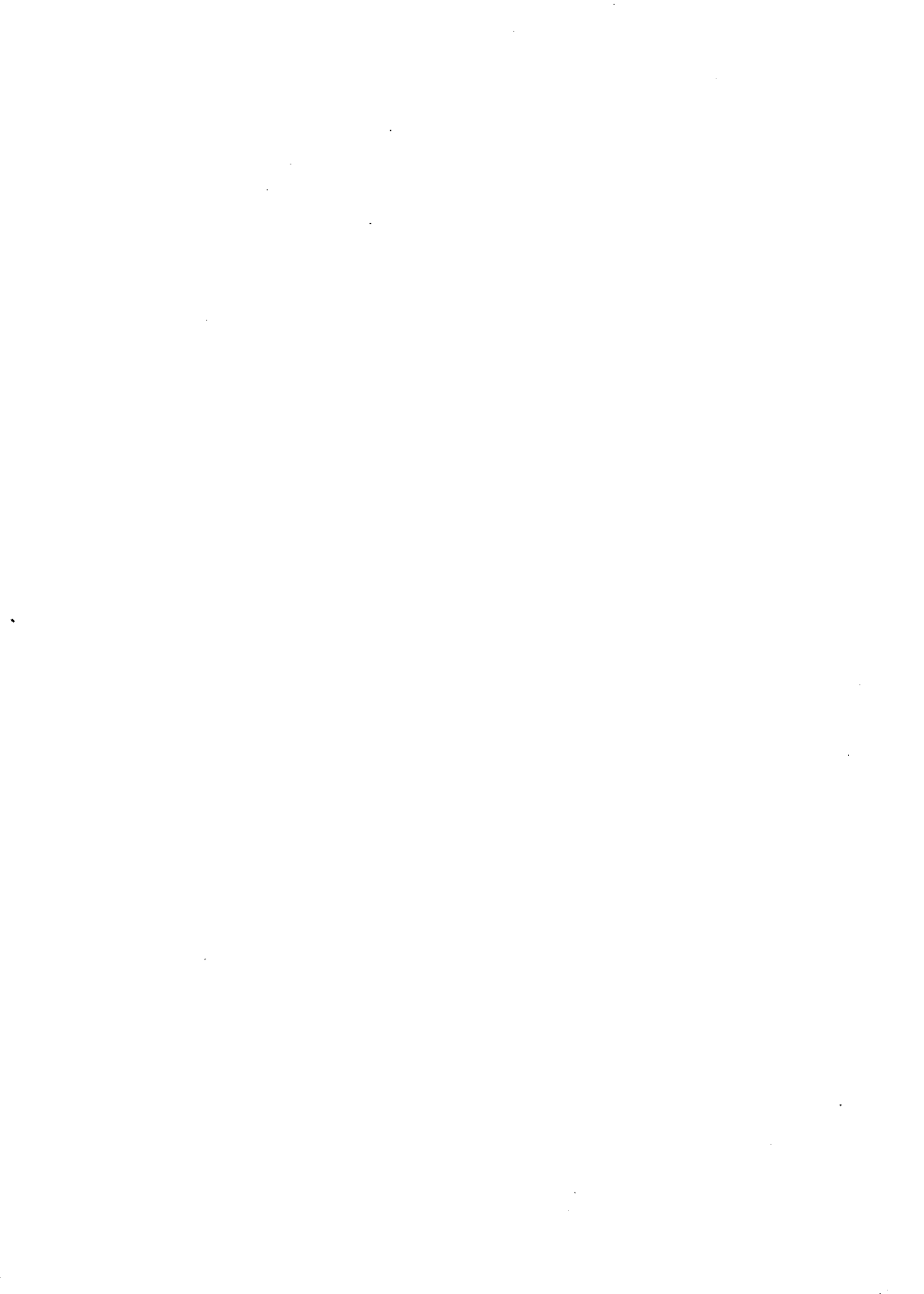
RAJGARH

LOCATION CODE	NAME OF VILLAGE	LIVESTOCK									AGRICULTURAL IMPLEMENTS								LAND HOLDING					AMENITIES																
		E/1	E/2	E/3	E/4	E/5	E/6	E/7	E/8	E/9	F/1	F/2	F/3	F/4	F/5	F/6	F/7	F/8	F/8	G/1	G/2	G/3	G/4	G/5	H/1	H/2	H/3	H/4	H/5	H/6	H/7	H/8	H/9	H/10	H/11					
2	KAKHARI	4	150	5	40	135	25	61	2	-	-	-	-	-	2	-	-	-	21	17	4	2	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	KR	-	
3	KANTYAWAS	10	135	8	72	170	35	65	5	-	-	-	-	-	17	-	-	-	8	4	2	1	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	KR	-	
4	MITRAMAT	12	124	7	69	92	65	135	9	2	32	34	10	5	-	13	-	-	11	13	2	-	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	KR	-	
6	RAJDA	2	28	5	67	135	34	142	4	2	14	30	5	15	7	38	-	-	41	36	21	8	37	-	-	-	P(1)	-	-	-	-	-	-	-	-	-	-	KR	-	
9	NADOD	40	210	22	131	165	62	171	12	1	7	19	8	11	-	19	-	-	35	21	27	9	34	-	-	-	P(1)	-	-	-	-	-	-	-	-	-	-	KR	-	
10	MURLIPURA	2	35	42	122	171	65	92	4	1	4	20	-	7	-	15	-	-	8	7	4	2	54	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-		
11	GHEWAR	5	80	4	72	137	64	131	7	-	10	18	4	15	4	28	-	-	47	21	13	4	35	-	-	-	P(1)	M(1)	-	-	-	-	-	-	-	-	K	PD		
12	TAHLA	18	52	8	73	140	65	72	24	5	40	112	12	40	38	186	-	4	121	76	54	8	-	-	-	-	P(1)	M(1)	H(1)	-	-	-	-	-	-	-	PHC(-) MH(1)	P1 K	PO	
13	NAIDOLI	12	72	14	137	315	32	135	12	2	32	52	8	4	3	11	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-		
15	DABKAN	-	32	16	80	135	38	95	4	-	41	35	-	6	-	15	-	-	11	7	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	K	-	
18	KALWAR	7	40	17	80	170	55	85	4	1	30	47	7	6	4	12	-	-	23	7	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P K	-	
19	TILWARI	2	35	14	112	140	35	71	8	1	4	15	2	4	-	11	-	-	8	7	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-	
24	PALPUR	4	28	13	102	145	67	182	8	2	11	54	4	20	12	42	-	2	35	21	7	1	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-
25	GORDHAN PURA	4	82	12	114	165	63	97	8	2	11	54	3	24	18	46	-	2	21	17	11	12	58	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	K	PO
28	RAJDOLI	12	32	11	74	132	62	192	6	-	32	42	2	15	11	27	-	1	11	7	4	-	35	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	K	-
29	ROOPBAS	16	134	19	82	141	61	98	4	1	14	18	1	14	8	35	-	-	4	6	4	-	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-
30	CHAWA-KA BAS	7	28	8	64	124	81	135	-	-	12	28	-	7	-	12	-	-	27	21	5	2	53	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	K	-
31	LASAL	4	38	6	97	112	42	114	4	1	25	35	-	25	15	43	-	-	21	23	11	7	42	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	K	-
32	UMRI DEORI	10	68	4	72	94	34	55	-	-	21	38	-	6	7	19	-	-	15	14	13	2	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-
33	RUNCH UMRI DEORI	16	82	12	65	67	72	135	-	-	-	-	-	-	-	2	-	-	11	2	2	-	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	K	-



34	PRATAP PURA	14	52	16	72	160	54	136	2	-	43	54	2	24	8	38	-	1	54	13	8	5	17	-	-	-	1										K	-							
35	THONSRA	11	72	11	63	140	52	77	2	1	27	35	1	4	-	12	-	-	27	8	7	-	56															K	-						
36	ANAWARA	17	74	8	80	152	32	80	25	4	12	31	3	2	3	6	-	2	51	47	35	12	86	-	-	-	1											K	-						
90	DHAMRED	18	29	9	65	125	82	134	4	1	41	35	4	74	65	167	-	8	135	71	54	17	82	-	-	-	1	1	-	-	-	-	-	-	-	-	K	P.O.							
96	DANGAR- WARA	6	82	5	73	138	65	132	8	1	37	51	1	22	7	48	-	-	56	21	7	2	-	-	-	-	1											K	-						
100	KOONELLA	3	29	4	82	134	35	141	12	2	34	42	-	12	2	21	-	-	51	35	13	2	-	-	-	-	1											P	P.O.						
101	RAMSINGH PURA	4	85	11	118	165	61	102	7	4	15	27	3	14	4	20	-	-	41	13	2	1	-	-	-	-	1												K						
104	TODA-JAI SINGHPURA	7	72	15	138	140	38	72	4	7	18	39	2	21	6	36	-	-	21	24	11	8	54	-	-	-	1												K	-					
105	THANA	4	82	9	83	141	60	94	2	-	14	19	4	140	8	194	-	2	27	14	8	1	27	-	-	-	1													K	P.O.				
106	DOONDURI	8	63	8	75	132	42	180	12	2	68	113	3	15	5	23	-	-	21	17	11	5	36																	K	-				
107	KIOH	25	135	11	118	235	32	230	18	4	54	107	5	17	15	90	4	24	11	7	2	41	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	H(1) - D(1) FPC(1)	P K	PO				
17	SARH	6	42	25	80	135	41	135	12	2	25	80	2	4	3	8	-	-	51	11	-	-	56	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-			K	-			
108	RUNDH NARAYAN	8	35	7	130	176	80	165	4	1	32	134	5	2	1	5	-	2	4	2	2	-	34	-	-	-															K	-			
109	DHEERADA	7	41	8	85	140	37	140	7	-	28	88	7	3	4	9	-	-	21	13	7	2	50	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-			PHS(	K	-	
110	TODI-KA- BAS	7	40	12	88	170	35	134	8	2	41	52	1	4	1	7	-	2	7	2	8	-	21																			PR KR	-		
111	KIRAT-KA BAS	2	35	14	112	140	82	137	25	2	16	46	3	4	-	8	-	-	14	11	11	8	36																		P K	-			
114	BHANGWAIH	8	57	16	88	165	87	140	8	2	20	35	4	21	13	58	-	1	17	13	7	4	41																			K	-		
115	GOLA-KA BAS	7	80	4	72	137	64	135	90	3	2	71	7	65	40	151	-	4	14	17	11	-	76	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-			D(2) - PHS(1) RP(1)	P K	PO	
129	LAKHWAS	21	85	7	87	102	42	76	4	1	37	81	7	7	5	15	-	-	11	7	5	-	34																				K	-	
133	BARWA DOONGRI	8	72	4	65	127	31	86	17	2	41	64	5	12	-	13	-	-	17	5	8	2	18	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-					K	-	
134	NANGAL KARNA													4	-	21	-	-	18	13	7	4	34	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-					K	-

137	GHATRA	17	54	28	80	164	52	140	8	2	28	35	1	65	41	171	-	1	13	11	4	3	21	-	-	-	1			X	-
139	DEEGOTA	8	87	22	135	185	65	206	4	1	29	17	3	8	7	17	-	-	15	11	5	2	16	-	-	-	1	-	H(1) - D(2)	K	-
140	VIRPURI	12	76	32	122	164	63	72	8	1	21	41	5	4	5	19	-	1	18	14	9	2	-	-	-				X	-	
141	KHERLI	9	82	12	95	210	67	135	14	-	34	72	2	9	1	11	-	1	12	7	3	-	-			1			K	-	



## ANNEXURE XVIII

## MEN SCHEDULE

ISSUES	N.W.	N.E.	S.W.	S.E.
Are crops damaged	100% yes	85% yes, 15% no.	90% yes, 10% no.	92% yes, 8% no.
Species responsible	75% Nilgai, 12% Wild Boar	50% Nilgai, 20% Wild Boar	31% Nilgai rest by all animals	41% Nilgai, 8% Wild Boar, 10% Sambar
Extent of crop damage	32% hh loose >50% crop (hh-households)	67% hh loose >50% crop	40% hh loose >50% crop	42% hh loose more 50% than crop
Steps taken to protect crop damage	68% make noise, 18% guns.	95% make noise, 5% use guns	45% blank fire, 36% noise	42% use guns, 22% noise
Is compensation asked for?	98% say increase	80% say increase, 8% say decrease	92% say increased	95% say increased
Steps respondent would like to take to protect crops	37% want to kill animals, 10% crackers, 8% blank firing	35% want to kill, 11% want to use crackers	No suggestions	22% want to kill
Is cattle lifted	22% yes	38% yes	42% yes	39% yes
Season of cattle are lifted	75% in monsoon	60% say in monsoon	100% say in monsoon	44% say in monsoon
Area where cattle are lifted	60% say in villages	50% say in buffer zone, 25% say in village	60% say in buffer, 40% say in village	82% say in buffer, 18% say in village
Steps taken to protect cattle	64% make noise, 18% accompany, 10% enclosure	72% make noise, 8% accompany	56% make noise, 31% put them in enclosure	50% make noise, 50% put them in enclosure
Is compensation asked	85% do not ask	68% do not ask	68% do not asked	100% do not asked
Why compensation not given	45% no idea, 32% not asked, do not know whom to ask	40% not asked because don't know whom to ask, 40% no idea	100% not asked, Don't know whom to ask	100% not asked, Don't know whom to ask
Other resources collected	49% collect timber, 49% collect wood for house building, 2% collect NTFP	67% timber, 31% wood for house building	95% timber, 5% wood for house	89% timber, 11% wood for house
Quantity of resource collected	45% collect 100-150kg, 35% collect >150kg	55% collect 100-150kg, 17% collect >150kg	78% collect 100-150kg, 22% collect >150kg	34% collect 100-150kg, 40% collect >150kg
Distance travelled to collect other resources	100% travel <5 km	57% travel <5 km, 42% travel 5-10 km	100% travel <5 km	71% travel <5 km, 5km, 14% travel 5-10 km, 14% travel >10 km
Frequency of requirement	63% require in <5 yrs, 23% in 5-10 yrs	54% require in less than 5 yrs, 33% in 5-10 yrs	65% require in less than 5 yrs, 28% in 5-10 yrs	30% require in <5 yrs, 60% require in 5-10 yrs



ANNEXURE XIX  
WOMEN'S SCHEDULE

FUELWOOD	N.W.	N.E.	S.W.	S.E.
Amount of fuelwood collected/week	42% collect >30 kg, 25% collect 20-25 kg	40% collect >30 kg, 27% collect 15-20 kg	21% collect >30 kg, 40% collect 20-25 kg	50% collect >30 kg, 50% collect <15 kg
Fuelwood bought	73% buy	36% buy	70% buy	Don't buy
Any other fuel used	15% use kerosene, 82% use other fuelwood	30% use kerosene, 70% use no other fuelwood	Don't use	60% use kerosene, 40% corm residue
Do you burn dung	65% yes	82% burn dung	75% burn dung	92% burn dung
Daily requirement of fuelwood	20% 1-5 kg, 52% more than 10 kg	41% >10kg, 48% 5-10 kg	40% >1-10kg, 52% <1kg	29% 10kg, 24% 5-10 kg, 29% <1kg
Agricultural waste used	57% more than 1000kg, 18% <500kg	80% >1000kg	28% 1000kg, 43% 500-1000kg	No data
Percentage of hh who use agricultural residue	92% use	72% use	90% use	No data
Fodder quantity sufficient remarks	28% only find the quantity enough	21% only find the quantity enough	73% find the quantity enough	Only 25% find the quantity enough
Area of collection	8% use park, another 10% use park and buffer area, 82% use village and other areas	Just 2% use Park and 28% use buffer, 70% use village and other areas	11% use park, 36% use buffer, 54% use village and other areas	96% use village and other areas, only 4% use buffer
Quantity collected	69% collect <30kg/week, 23% - 30-50kg/week, about 8% collect 50-70kg/week	78% collect <30kg/week, 22% about 30-50kg/week	58% collect <30kg a week, only 13% collect 50-70kg/week	39% collect <30kg/week, 50% collect 30-50kg/week
Distance	77% travel <2km, only 5% travel 5-10 km	89% travel <2km, 10% travel from 2-10 km	68% travel 0-2km, 32% travel 2-5 km	93% travel 1.5 km
Fodder bought from market per annum	68% buy more than 1000kg, 29% buy between 500-1000kg	80% buy more than 1000kg	60% buy more than 1000kg	12% buy more than 1000kg, 62% buy <500kg
Additive	66% use 5-10 kg/week	40% use more than 10kg/week, 20% use 5-10 kg/week	100% use <5kg	100% use <5kg
Grazing areas	50% graze in Park and buffer (4.5%) in Park	48% graze in buffer and 12% in Park	48% graze in buffer, 5% in Park	13% graze in buffer and 33% in buffer
Grazing distance	60% graze in 2-5 km	16% graze at more than 10 km, 42% between 2-5 km	50% graze at 2-5 km, 7% at 5-10 km	4% graze between 5-10 km, 28% graze between 2-5 km
Grazing season	69% only in monsoon, 18% all year	43% graze only in monsoon, 43% graze all year round	50% graze only in monsoon, 23% graze all year round	13% in monsoon, 26% in winter, 46% all year



ANNEXURE XX

N.B. See below for villages in the Reserve, details for which have been obtained from independent sources.

Table - 1

List of Revenue / Forest Villages  
in Sariska Tiger Reserve<sup>4</sup>

Revenue Villages

1. Madhogarh
2. Kushalgarh
3. Indok
4. Kala Chara
5. Nangalhedi
6. Bairawas
7. Duharmala
8. Rekhamala
9. Kundalka
10. Karna Ka Bas
11. Kaniyawas
12. Mithrowat
13. Rajor
14. Garh
15. Deori
16. Kiraska
17. Dabli (Rathyawala)

Forest Villages

1. Kankwadi, Pilapani, Kadat
2. Umri
3. Haripura
4. Bhagani
5. Lilunda
6. Sukola
7. Sheronds
8. Rotkala
9. Silibery

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<sup>4</sup> This list has been provided by the Sariska Tiger Reserve authorities, and as such has been adhered to in the report unless otherwise stated.



The following villages were shown on the Toposheets and the map of Project Tiger Reserve, Sariska, but were missing in the District Census Handbook:

Village	Zone	Status
Bharthari Mandir	Buffer	Revenue
Nahar Sati Temple	Buffer	Forest
Ramsara	Buffer	Revenue
Nilkanth	Buffer	Revenue
Mandalwas	Buffer	Revenue
Manyawala	Buffer	Revenue
Khairit Ka Bas	Buffer	Revenue
Narainji Temple	Buffer	Forest
Nathusar	Buffer	----
Logh	Buffer	----
Logh	Buffer	----
Bera	Buffer	Forest
Rekha	Buffer	Revenue
Nawal Ki Dhani	Buffer	Revenue
Khawas Bawri	Buffer	Revenue
Khairati Ki Dhani	Buffer	Revenue
Lalpura	Buffer	Revenue
Sawar	Buffer	Forest
Talbriksh	Buffer	----
Indok Chota	Buffer	Revenue
Guarah Charatu	Buffer	Revenue
Shinda	Core - I	Forest
Haripura	Core - I	Forest
Lilonda	Core - I	Forest
Rotkala	Core - I	Forest
Kund	Core - I	Forest
Esala	Core - I	Forest
Pandupol	Core - I	Forest
Silopka	Core - I	Forest
Kalighati	Core - I	Forest
Algwal	Core - I	Forest
Pilapani	Core - I	Forest
Bakala	Core - I	Revenue
Gawara	Core - I	Revenue
Panidal	Core - II	Forest
Dulab	Core - III	Forest

The names of the following villages have been spelt differently in the sources used.

<u>District Census Development Handbook</u>	<u>Map provided by the Reserve authorities</u>	<u>Toposheet Integrated Plan</u>
Dhanwala	Dhawala	-----
Kiraska	Kiraska	Kirashka
Mitrawat	Muthrawat	-----
Karna Ka Bas	Karnawas	-----
Siraska	Seriska	-----
Bairawas	Baiyarawas	-----
Rah-Ka-Mala	Rekhamala	-----
Sukalo	Sukola	-----
Akbarpura	Akbarpura	Akberpura
Kakwari	Kankwarhi	-----
Nangalheri	Nangalheri	-----
Dabkan	-----	-----
Kaniyawas	-----	-----
Umri	-----	-----



ANNEXURE XXI

IN THE SUPREME COURT OF INDIA  
CIVIL ORIGINAL JURISDICTION  
WRIT PETITION (C) NO. 509 OF 1991

TARUN BHARAT SANGH, ALWAR,

.....PETITIONER

VERSUS

UNION OF INDIA AND ORS.

.....RESPONDENTS

J U D G E M E N T

B.P. JEEVAN REDDY, J.

Tarun Bharat Sangh, a voluntary organisation interested inter alia in protection of environment, approached this - Court complaining that widespread illegal mining activity was going on in the area declared as Tiger Reserve in Alwar district of Rajasthan. In the interest of ecology, environment and rule of law, it said, the activity should stop.

The petitioner's case is that the area wherein the illegal mining is going on has been declared as a tiger reserve under Rajasthan wild Animals and Birds Protection Act, 1951, as a sanctuary and a National Park under Wildlife (Protection) Act, 1972, and as protected forest under the Rajasthan Forest Act, 1953. These various notifications, said the petitioner, prohibit all or any mining activity - and yet the Government of Rajasthan had granted hundred of licences for mining marble, dolomite and other minerals in late 1980s, contrary to law.

After issuing notices to the Government of Rajasthan and the mine owners (which expression is used in this order to denote lessee and licencees under the leases and licences granted by the state of Rajasthan), this court gave certain directions on October 11, 1991. An interlocutory direction was issued to the effect that "no mining operation of whatsoever nature shall be carried on in the protected area". A committee under the chairmanship of Sri M.L. Jain, J., former judge of the Rajasthan High Court was appointed to ensure due observance of the various Acts and Notifications issued thereunder with respect to the said protected area. In particular, the committee was asked to demarcate the area declared as protected forest under the notification dated January 1, 1975 issued by the Rajasthan Government under Section 29 of the Rajasthan Forest Act. This demarcation was felt necessary in view of the ambiguity prevailing with respect to the precise boundaries of the protected forest declared as such under the notification aforesaid. Petitioner's case was that no mining lease/licence can be granted within the protected forest except with the prior permission of the Government of India - Section 2 of the Forest (Conservation) Act, 1980 and Rule 4(6) of Rajasthan Minor Mineral Concession Rules - and that no such permission was obtained in fact.

By its order dated November 26, 1991, the court clarified that the order dated October 11, 1991 was not intended to permit the mine-owners to carry on their mining activity where such activity was prohibited by any Act, Rule or Notification having the force of law. In effect, the order said, it meant to prohibit - and not to permit - the mining activity.

In its order dated May 14, 1992, the court clarified the meaning of the expression "protected area" used in the order dated October 11, 1991. The expression, it was clarified, was intended to and does refer to all the areas which have had legal protection against non-forest activities that devastated the environment including poaching, mining, felling of trees etc.

It was further clarified that once an area is declared as protected forest, it becomes a protected forest notwithstanding the fact that a part of that area is waste. The idea behind declaring an area as protected forest, it was pointed out, is not merely the protection of the existing forest but also afforestation.

The Committee submitted its report dated September 28, 1992. The Report states that the Committee verified and cross-checked the tracing maps furnished by the Forest Department with the maps furnished by the Revenue Department and found that both of them matched. After looking into the khasra numbers mentioned in the notification dated January 1, 1975 and all other material placed before it by the parties including the mine-owners, the report states, the committee identified the areas declared as protected forest. The report indicates that the area declared as protected forest under the said notification was not in one contiguous block but was comprised in several blocks or areas, as it may be called.

As per the said Report, 215 mines mentioned in appendix-A to the Report fall completely within the areas declared as protected forest while 47 mines mentioned in appendix-B to the report fall partly inside and partly outside the areas declared as protected forest. (These 262 mines are referred to hereinafter as "listed mines"). To this extent, there is no difference of opinion among the members of the committee. Differing opinions have, however, been expressed when it came to making of recommendations for the consideration of this court. The Chairman, Shri Justice M.L. Jain recommended that the mining operations in all the 215 mines listed in appendix-A should be stopped forthwith and that the mining operations in the 47 mines listed in appendix-B should be stopped forthwith to the extent they fell within the area declared as protected forest. Three other members of the Committee (Collector, Alwar, the Chief Conservator of Forest and Chief Wildlife Warden, Rajasthan and the Additional Director of Mines) differed from the Chairman. They suggested that this Court be pleased to accept the representation of the State Government (appended as appendix-C to the report) where in it was prayed that the area covered by the mines should be allowed to be excluded from the protected forest, in lieu of which the Government of Rajasthan will provide an equal extent of area for being included in the protected forest. An application has also been filed by the State of Rajasthan to the same effect. It is stated therein that the protected forest area measures about 800 sq. kilometers, whereas the 262 mines mentioned in appendix (A) and (B) cover only an area of 2.08 sq. kilometers. In the interest of economy of the State, industry and the workers engaged there in, it is submitted, an extent of 5.02 sq. kilometers including the area covered by the said mines be allowed to be deleted from the protected forest. In lieu thereof, the Government of Rajasthan offered to place an equal extent for the purpose of being declared as protected forest. It is submitted further that when the mining leases with respect to the said 262 mines were granted, the Government of Rajasthan was under the impression that the said mines did not fall within the protected forest area. Indeed, it was so certified by the Forest Department. This happened because of want of clarity about the precise boundaries of the areas declared as protected forest.

The mine-owners too have filed objections to the report of the committee, to the recommendation made by the Chairman of the Committee and submitted alternately that the proposal of the allowed to continue their mining operations.

At this stage, we directed the Government of India to file an affidavit making their stand clear in the matter. Accordingly, an affidavit sworn to by Shri S.P. Singh, Deputy Director in the Ministry of Environment and Forest, Project Tiger, New Delhi has been filed. It is stated in the affidavit that the area declared as project tiger/tiger reserve is covered

by notifications issued under the Rajasthan Forest Act, Environment (Protection) Act, 1986 and the Mines and Minerals (Regulation and Development) Act, 1957. It is submitted that the Forest (Conservation) Act applies not only to reserve and protected forest but to all areas recorded as forest in Government records. Mining is non-forestry activity and, therefore, cannot be carried on in the areas to which Forest (Conservation) Act applies without the prior approval of the Government of India. It is stated further that on May 7, 1992, the Government of India has issued the final notification under Section 3 of the Environment (Protection) Act, 1986 prohibiting all mining activity, except with the approval of the Government of India, in the protected forest, Sariska National Park and certain areas of Alwar District mentioned in the notification. Since no permission is obtained under any of the said enactments with respect to the said 262 mines, it is submitted, no mining operations can be carried on in the area untill and unless they obtain the permission of the Central Government. Indeed, the prohibition extends not merely to protected forest areas but to the entire area declared as tiger reserve and as Sariska National Park. A copy of the notification dated May 7, 1992 issued under section 3 of the Environment (Protection) Act is appended to the affidavit. It is necessary to notice the relevant portions of the said notification. They read:

"Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of Section 3 of the Environment (Protection) Act, 1986 (29 of 1986) read with rule 5 of the Environment (Protection) Rules, 1986, the Central Government hereby prohibits the carrying on of the following processes and operations, except with the prior permission, in the areas specified in the Table appended to this Notification:

- (i) Location of any new industry including expansion/modernisation;
- (ii) (a) All new mining operations including renewals of mining lease.
- (b) Existing mining leases in sanctuaries National Park and areas covered under Project Tiger and; or
- (c) Mining is being done without permission of the competent authority;
- iii) Cutting of trees;
- (iv) Construction of any clusters o dwelling units, farms houses, sheds, community centres, information centres and any other activity connected with such construction (including roads a part of any infrastructure relating there to):
- (v) Electrification (laying of new transmission lines).

#### T A B L E

Areas where carrying on of processes and operations without permission is prohibited.

- (i) all reserved forests, protected forests or any other area shown as "forest" in the land records maintained by the State Government as on the date of this notification in relation to Gurgaon District of the State of Haryana and the Alwar District of the State of Rajasthan.
- (ii) all areas shown as
  - (a) Gair Mumkin Pahar, or
  - (b) Gain Mimkin Rada, or
  - (c) Gain Mumkin Behed, or
  - (d) Banjad Beed, or
  - (e) Rundh

in the land records maintained by the State Government as on the date of this Notification in relation to Gurgaon District of the State of Haryana and the Alwar district of the state of Rajasthan.

(iii) all areas covered by notifications issued under section 4 and 5 of the Punjab Land preservation Act, 1900 as applicable to the state of Haryana in the district of Gurgaon upto the date of this Notification.

(iv) all areas of Sariska National Park and Sariska Sanctuary notified under the Wildlife (Protection) Act, 1972 (53 of 1977).

(emphasis added)

We have heard Dr. Rajiv Dhavan, counsel for the writ petitioner, Shri Aruneshwar Gupta, counsel for the state of Rajasthan and S/Sri N.C. Bhandare and P. Chidambaram, counsel appearing for the mine-owners. Certain other mine-owners have intervened. We permitted them to file their written submissions.

Dr. Rajiv Dhavan submitted that in view of the earlier orders of this court and the report of the committee, all the mining activity in all the areas declared as protected forest and in the areas notified under the notification dated May 7, 1992 should stop forthwith. Indeed, he says, it should have stopped long ago. Continuance of mining activity is in gross contempt of this court and constitutes a clear violation of its orders. The Government of Rajasthan is equally guilty of contempt inasmuch as it has come forward with an application for directions instead of taking stringent action forthwith to stop the mining activity in all the listed mines. As a matter of fact, he says, the Government of Rajasthan appears to be colluding with the mine-owners which is evident from the dissent expressed by the officers of the Rajasthan Government (who were members of the committee appointed by this Court)\_\_\_\_\_ to the straight-forward and logical recommendation of the Chairman of the Committee. The Government of India's affidavit places the matter beyond doubt. Not only the mining operations in the listed mines should be enjoined forthwith but the mine owners and the Government of Rajasthan should be proceeded against for contempt, says the counsel. He pointed out further that the mining leases granted by the Government of Rajasthan are ex-facie illegal inasmuch as prior permission of the central government was admittedly not obtained for the said leases as required by the Forest (Conservation) Act and Rule 4(6) of the Rajasthan Minor Mineral Concession Rules. Prohibition of mining flows from the provisions of the Forest (Conservation) Act as well as the notification issued under the Environment (Protection) Act in May, 1992.

Shri Aruneshwar Gupta, learned counsel for the state of Rajasthan submitted that the Rajasthan government and its officers were not aware, when they granted leases/licences in respect of listed mines that they fell within the area declared as protected forest. Indeed, a certificate was issued by the Forest Department to the effect that they did not fall within the protected forest area. It was thus a bonafide grant. The boundaries of the areas declared as protected areas were not clearly known nor were they demarcated on the spot. Of course, it now turns out that the said listed mines fall wholly or partly within the protected forest but for the reasons mentioned in the application filed by the Government of Rajasthan, the area of five sq. Kilometers should be allowed to be deleted from out of the protected forest subject to the conditions offered in the said application. Counsel says that the Government of Rajasthan is neither colluding with the mine-owners nor has it any intention to flout the orders of the court. It is prepared to abide fully by the orders of this court. It has already shut down 54 mines. It is also prepared to shut down all the other listed mines if this court so directs. It is, however, making an earnest request that it may be allowed to exclude the areas covered by these mines from the protected forest in public interest. Learned Counsel has placed before us

map, said to have been prepared by the officers of the Rajasthan State, showing the areas covered by tiger reserve, sanctuary, protected forest and the location of the listed mines.

Shri M.C. Bhandare, learned counsel appearing for the mine-owners in Mallana village submitted that demarcation of protected forest by the committee is defective, erroneous and unacceptable for the various reasons set out in the objections filed by his clients. It is technically imperfect. The very description of the boundaries in the notification dated January 1, 1975 is vague and misleading. It mentions old khasra numbers which were not in vogue in the year 1975. The map produced by the Government of Rajasthan, for the perusal of this Court, delineating the tiger reserve is equally incorrect besides being unauthenticated. It is not known who prepared the map and on what basis. The mine-owners do not admit that their mines fall within the tiger reserve or within the protected forest areas. Closing down hundreds of mines employing thousands of workers, wherein a large amount of capital is invested would disturb the economy of the State besides affecting the supplies of marble and other minerals. No public purpose would be served by such closure. The mine-owners are not guilty of contempt of this court inasmuch as their mines do not fall within the protected forest or protected area. Even otherwise, it appears that the areas declared as protected forest are in disparate patches away from each other. Mines are located not only within the areas declared as protected forest but also in the adjacent areas which are not declared as protected forest. In such a case, no purpose is served by closing the mines within the protected forest inasmuch as the mining activity in the mines located outside the protected forest will continue uninterrupted. The purpose of ecology and environment would not be served by such a situation. Moreover, the notification issued by the Government of Rajasthan on January 1, 1975 declaring certain areas as protected areas is only a provisional or an interim notification. It is not a final notification. The final notification is yet to be issued. Since there is no forest in the areas covered by the mines nor is any afforestation possible in such areas, they should be allowed to be deleted from the protected forest in the final notification to be issued.

Shri P.Chidambaram, learned counsel appearing for some of the mine-owners submitted that it is unsafe for this court to act upon and/or to pass any orders based upon the map produced by State of Rajasthan showing the tiger reserve and identifying the areas declared as protected forest. It is not known who prepared the said map and on what basis and for what purpose. The declaration as tiger reserve by the Government of India is not under any statutory authority. The area declared as tiger reserve and the area notified as sanctuary under section 18 of the Wildlife (Protection) Act, as also the area declared as National Park under Section 35 of the Wildlife (Protection) Act are not co-extensive with each other. More particularly, the areas declared as protected forest are not co-extensive with the area declared as tiger reserve, sanctuary or National Park. It is not known how many areas declared as protected forest fall within tiger reserve and how many in the sanctuary and/or National Park. The Government of India has not prepared or submitted any map showing these various areas. None of the mines fall within the sanctuary or the National Park, not even within project tiger. In such a situation, any orders stopping the mining operations merely on the basis of the report of the commission or the unauthenticated map produced by the Government of Rajasthan would be wholly unsafe. The proper course would be to appoint a committee, or to call upon the Government of India, to identify the areas declared as tiger reserve, sanctuary, National Park and the areas declared as protected forest indicating at the same time the location of mines, if any, in the said areas. Only then will the correct position be known. Counsel also submitted that the proposal of the Government of Rajasthan merits acceptance by this court. Both the counsel appearing for the mine-owners affirmed that the mine-owners are not acting in a spirit of adversarial litigation but in a



spirit of cooperation. They are as much interested in protecting the environment and ecology as the petitioner but, they say, it should not be a one-side affair.

At the outset, we may be permitted to clarify an aspect. This is not a case where we are called upon to shut down an activity being carried on lawfully, in the name of higher considerations of ecology and environment. This is a simple case where we are called upon to ensure observance of enacted laws made by the state to protect the environment and ecology of the area. In such a case, we need not be oppressed by considerations of balancing the interests of economy and ecology. That has already been done by the Legislature and Parliament. The grievance of the petitioner is against the executive. Charged with the delegation of implementing the laws of the land, the executive is yet failing to do its duty by law and by people, when faced with the might of money; respect for law is dissolving into respect for mammon, says the petitioner. Let us therefore first find out which laws are violated, if any, and then decide, what are the proper directions to make.

(A) Section 2 of the Forest (Conservation) Act read with Section 29 of the Rajasthan Forest Act and Rule 4(6) of the Rajasthan Minor Mineral Concessions Rule:-

Section 29 of the Rajasthan Act empowers the government to declare any forest land or waste land to be a protected forest. Sub-section (1) says that "the State Government may by notification in the official gazette declare the provisions of this chapter applicable to any forest land or waste land which is not included in a reserve forest but which is the property of the State Government or over which the State Government has proprietary rights." It is not disputed in this case that the land over which the listed mines (mines listed in Appendix A and B to the report of the justice M.L. Jain Committee) are situated is the property of the State Government. The State Government is empowered not only to declare any forest land as a protected forest but also any waste land as such. The idea evidently is not only to protect the existing forest but also to bring waste lands under schemes of afforestation. Once declared as protected forest, the distinction between forest land and waste land disappears. The entire area becomes a protected forest. Before, however, declaring any forest land or waste land as a protected forest, the State Government is obliged to make an enquiry into the nature and extent of the rights of the State Government and of private persons in or over the forest land or waste land proposed to be declared as protected forest and record the same at a survey or settlement or in such other manner as the State Government thinks sufficient. This is the requirement of sub-section (3). However, the proviso to sub-section (3) empowers the State Government, in case it thinks that such an enquiry and record will occupy such length of time as in the meantime to endanger the rights of the State Government, it may, pending such enquiry and record, declare a particular area to be a protected forest without, of course, abridging or affecting any rights of individuals or communities. Sub-section (4) empowers the State Government to delete any area from out of the area declared as protected forest. Reading Section 29 as a whole, it appears, the normal rule is to make an enquiry into the rights of the state Government and of the private parties over the land proposed to be declared as protected forest in the first instance, prepare a record there of and then declare it as a protected forest. But in case of urgency, it is open to the state Government to issue such notification forthwith subject, of course, to the existing rights of individuals and communities in the area concerned. In this case, the notification dated January 1, 1975 issued under the proviso to sub-section (3). Shri Bhandare submits that a notification issued under the proviso to sub-section (3) is only an interim or provisional notification and that after conducting the enquiry contemplated by the main limb of sub-section (1) has still to be issued. Until then, he submits, the

declaration as protected forest does not take effect. We are not prepared to agree. Section 29 contemplates only one notification declaring an area as a protected forest. Whether issued after a normal enquiry and record or without enquiry or record, Section 29 contemplates only one notification and not two in any event. Therefore, the notification issued is the valid and effective one. It is not a provisional or preliminary notification. It is not also the case of the mine-owners that leases or licences in their favour were granted prior to January 1, 1975. All of them were granted in the middle of or in the late eighties. The savings clause contained in the proviso to sub-section (3) does not avail them.

In view of the ambiguity prevailing with respect to the precise boundaries of the area or areas declared as protected forest under the notification dated January 1, 1975, the Justice M.L. Jain committee was appointed by this court to demarcate and identify the areas declared as protected forest under the said notification, with the help of the Revenue and Forest departments of the State of Rajasthan. It has done so. Besides being headed by a former Judge of the Rajasthan High Court, it was composed of high officials of the Government of Rajasthan. They have undertaken an elaborate and intensive exercise and have demarcated the areas declared as protected forest with the help of the official maps and records. We see no reason not to accept the said report. The several objections submitted by the mine-owners cannot prevail over the official maps and records. They were represented before the Commission at the time of the said exercise. It is significant to notice that the dissent note appended by the officers of the Government of Rajasthan was not with respect to the demarcation or identification of areas declared as protected forest, but only with respect to the closure of the mines operating within those areas. The report of the committee is accordingly accepted herewith.

Once an area is declared as a protected forest, it comes within the purview of the Forest (Conservation) Act, 1980. It becomes a forest land within the meaning of section 2. The effect of this position is that no non-forest activity can be carried on in the said area except with the prior approval of the Central Government. Even the State Government cannot carry on any such non-forest activity in the said area without such prior approval. That the mining activity amounts to non-forest purpose is beyond dispute. Thus, the grant of mining leases/licences and their renewal by the State Government, without obtaining the prior approval of the central government, in respect of the mines situated within the protected forest, after January 1, 1975 is contrary to law. All the mines listed in Appendix A to the committee's report do fall within the areas declared as protected forest while the mines listed in Appendix B fall partly within and partly outside such areas. According to rule 4(6) of the Rajasthan Minor Mineral Concession Rules, 1986 too, no mining lease could have been granted or renewed within the forest "without clearance from the Central Government in accordance with the Forest (Conservation) Act, 1980 and the rules made there under". Admittedly, no such prior approval or clearance of central government was obtained. The Chairman of the Committee, Shri Justice M.L. Jain has recommended that 215 mines mentioned in appendix-A to his report, which are situated wholly within the protected forest should be closed forthwith. There can hardly be any valid objection in law to the said recommendation. Similarly, with respect to 47 mines mentioned in appendix-B to the report, the learned Chairman has recommended that they should be closed forthwith in so far as they fall within the protected forest. To this recommendation also, there can be no valid objection in law.

At this stage, it would be appropriate to consider the application filed by State of Rajasthan for permission to delete an extent of 5.02 sq. km. from out of the protected forest. The application is confined only to 208 mines out of 262 listed mines. 54 mines mentioned in para (9) of the application are proposed to be closed; indeed, according to the counsel for the State, they have already been closed. Reliance is placed upon the order

dated May 14, 1992 in this behalf. It is pointed out that the said order does contemplate such modification, of course, with the permission of this Court and for valid reasons. It is pointed out that for such deletion or modification, the prior approval of the central government is not required. No such requirement is prescribed either in the Forest (Conservation) Act or Rajasthan Forest Act, it is submitted. In this context, the submission of Shri M.C. Bhandare may also be considered. He says that there are a number of mines around and outside the area declared as protected forests and that no purpose would be served by merely closing the mines within the protected forest and leaving those outside unhindered. He says that all these mines within and outside, are within the tiger reserve, as per the Rajasthan government map though outside the sanctuary. May be so. But it cannot be forgotten that purpose of Forest Acts and purpose of Environmental Protection Acts may not always be the same. Such closure may not serve the environmental purpose - assuming that factual situation asserted by the learned counsel is true, upon which aspect we need not and do not make any pronouncement - but it may serve the forest purpose. Be that as it may, both the purposes appear to be inter-twined in this case. In this situation, we think it appropriate that the merits of the said proposal be examined by the Ministry of Environment and Forests, Government of India and a report submitted to this court, within three months from today. Orders will be passed on the application for directions filed by the state of Rajasthan after considering the said report.

(B) Notification issued by the Central Government under section 3 of the Environment (Protection) Act, 1986 on May 7, 1992:

This notification expressly prohibits the carrying on of the mining operations, except with the Central Government's prior permission, in the "areas covered under project tiger". The prohibition extends to existing mining leases in Sanctuaries/National Park. All mining operations are prohibited therein. The table appended to the notification particularises the areas where carrying on of the processes and operations a fore said is prohibited without the permission of the Central Government. They include all reserve forest, protected forest or any other area shown as forest in the land records maintained by the State Government as the date of the issuance of the said notification in relation to inter alia Alwar district of the state of Rajasthan. The table also includes "all areas of Sariska National Park and Sariska Sanctuary notified under the Wildlife (Protection) Act, 1972 (53 of 72)". We cannot agree with the learned counsel for mine-owners that the area declared as project tiger in the Alwar district has not been properly identified or that it is not properly identifiable. Both the State Government and Central Government have demarcated them in exactly identical manner. The map produced before us by the State Government is a detailed plan, prepared with great care. There is no reason to presume that it is not prepared by competent persons on the basis of the relevant material. The map delineates the area declared as sanctuary within the area declared as tiger reserve. The location of listed mines is clearly marked. They fall within the tiger reserve - though outside the sanctuary. A publication by the Forest Survey of India, Dehradun, Ministry of Environment and Forest, Government of India, entitled 'Status of Forest covering in Project Tiger Reserve' has been placed before us. At pages 92-94, we find the map of Sariska Tiger reserve, Rajasthan. The boundaries, shape and dimensions of the said map tally fully and perfectly with the map prepared by the State of Rajasthan. Thus, there can be no legitimate dispute with respect to the correctness of the map produced by Government of Rajasthan or with respect to the area declared as tiger reserve. Both the state government and central government have delineated it. May be that the declaration as tiger reserve was without any statutory authority and is relatable to the executive power of the Union of India - but notification issued under Section 3 of the environment (Protection) Act puts the stamp of statutory authority over it. The central Government has specifically stated

in its affidavit that no "prior permission" was obtained with respect to the mines located within the tiger reserve. On this ground, the mining operations being carried on in the tiger reserve, including the listed mines also appears to be contrary to law. Of course, this notification has come only in May, 1992.

Now coming to the appropriate directions to be made in this behalf, it should be borne in mind that there is a distinction between the listed mines and those mines which are situated outside the protected forest but within the tiger reserve. So far as the listed mines are concerned, the very grant and renewal of those mining leases/licences is itself illegal. These areas were declared as protected forest as far back as January 1, 1975. If so, no mining lease or licence could have been granted in respect of the mines situated within the protected forest without clearance from the central government as required by Rule 4(6) of the Rajasthan Minor Mineral Concession Rules and without prior approval of the central government under section 2 of the forest (Conservation) Act, 1980. It is an admitted fact that all these leases and licences were granted after 1980. There is also the order of this Court dated October 11, 1991 directing that "no mining operation of whatever nature shall be carried on in the protected area" - (protected area does, without a doubt, include the areas declared as protected forest). The recommendation of the Chairman of the Committee, Shri Justice M.L. Jain is also to the effect that the mining activity in the listed mines should be stopped forthwith. Even with respect to the mines in appendix-B (which partly fall within and partly outside the protected forest areas) the recommendation of the Chairman is that they should be closed to the extent they fall within the protected forest. The central government has also taken the stand that the mining activity in these areas is illegal and cannot go on. As against this is the plea of the Rajasthan Government and of the mine-owners that the area covered by these mines should be allowed to be deleted/excluded from the protected forest in lieu of their offer to include an equal extent of area within the protected forest. We do not propose to express any opinion on this plea of the Rajasthan Government and the mine-owners for the reasons recorded herein before. We would like to have the opinion of the central government on the said plea or proposal, as it may be called. Only there after shall we consider the request of the state government. But as on today, the situation is that the mining activity in the listed mines (according to the Rajasthan government, it has already stopped all mining activities in 54 mines specified in its application) is illegal and has to stop. May be that this will have the effect of bringing to half the activity involving a good amount of capital and a large number of workers. But in view of the inherent illegality attaching to them, indicated hereinbefore, we have no option but to close them. We cannot permit them to operate. If and when the central government recommends the plea of the state government and any of the areas already declared as protected forest are deleted with leave of this court, can the mining activity go on in these areas. It is accordingly directed that all mining activity in the mines mentioned in appendix-A to the report of Shri justice M.L. Jain Committee shall stop forthwith. Similarly, the mining activity in the mines mentioned in appendix-B to the said report shall also stop forthwith in so far as they fall within the protected forest areas. The plea of the Rajasthan government and of the mine-owners shall be considered by Department of Forest and Environment, Government of India and a report submitted to this court within three months. Within this period it shall be open to the concerned mine-owners to approach the Department of Forest and Environment, Government of India for permission to continue the mining operations in these mines only if the central government permits them and subject to the orders of the central government in that behalf. If no permission is obtained from the central government within the said period of four months, the mining activity in the entire area declared as tiger reserve shall stop and cease on the expiry of four months.

List this matter for further orders on July 12, 1993.

## References :

### A REPORT ON SARISKA NATIONAL PARK

Notes: "Reserve" or "P.T. Reserve" should be taken to mean the Project Tiger Reserve, "Sanctuary" to mean the Sanctuary created in 1959 and "Park" to mean the National Park.

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Rathore Fateh Singh, Field Director, STR  
Lakshman Singh, Asst. FD - STR  
Sanjay Gupta, Cattle guard at STR.

