CHAPTER III

SOCIO - CULTURAL AND ECOLOGICAL ASPECTS

"A greening of the human mind must precede the greening of our Earth. A green mind is one that cares, saves and shares. These are qualities essential for conserving biological diversity now and forever ".

M. S. Swaminathan, Former President, IUCN.

INTRODUCTION

Marcos Flores Rodas, Assistant Director General of FAO, in his Welcome Address at the World Congress on National Parks held at Bali, in 1982, drew the attention of the delegates to the importance of people in protected area considerations -

" Until and unless the rural people are ensured adequate food and shelter and a dignified standard of life, all efforts to establish and manage national parks and protected areas will be nothing but grandiose projects in futility. I submit to you that this Congress should focus attention on the interests of the rural people in developing countries who live in the vicinity of national parks and protected areas "(McNeely, 1984).

`Natural areas', untouched by Man have always been rare. Recently, people have started drawing lines on maps and are preventing local people from using resources they have traditionally exploited. Without the support of local people, the future of any protected area is insecure (Dasmann, 1984). Parks have their place in the life of Mankind. They stand for aesthetic value - enriching people with their beauty; economic pillars - income from tourism and scientific aspects - in the form of Nature's laboratories for research leading towards human well-being (Oza, 1992).

The factors affecting local people's attitude in relation to resources must be considered under four independent systems: economic, energy, culture and ecology - the economic, energy and cultural systems act together to define the value of resources and influence people's behaviour in relation to those resources; thereby, indirectly affecting the ecological system which consists of availability of resources, their level of use and resilience (Durbin & Ralambo, 1994).

India was much ahead of the current concepts of linking tribal people with protected areas. This was very vividly presented by the late Prime Minister of India, Smt. Indira Gandhi, when she addressed the plenary session of the UN Conference on the Human Environment held in Stockholm in the year 1982, and asked, " Are not poverty

and need the greatest polluters? For instance, unless we are in a position to provide employment and purchasing power for the daily necessities of the tribal people and those who live in and around our jungles, we cannot prevent them from combing the forest for food and livelihood, or from poaching and despoiling the vegetation. When they themselves feel deprived, how can we urge preservation of animals?" (Repetto, 1994).

It is now understood that protected areas play a role in rural development as a part of multiple-use strategies which encourage environment stability and the sustainable use of resources (Mackinnon et al., 1986).

Agriculture provides subsistence to more than two-thirds of India's 850 million people. Every year people gather about 150 million tonnes of fuelwood for domestic consumption and free-range grazing by their livestock is estimated to meet the fodder demands of over 500 million tonnes. Indian population relies on a diversity of living resources to fulfil daily requirements. Such needs are based on the plant and animal products available in the proximity of the areas where they live and collect. About 35-40% of the Indian people earn just enough to feed themselves and have no purchasing power to meet their other demands (Barbier *et al.*, 1994 based on Gadgil, 1993).

However, most people living in cities are cut off from nature and have little idea where their food, medicines, clothing and building materials come from. The studies were initiated to convince the masses and decision-makers that the entire sustenance of mankind originates in forests, wetlands and grasslands. These are the habitats which urban dwellers hardly ever get to see or know except superficially as casual tourists. There are significant threats to our biological diversity. With a view to retaining our rich heritage of diversity of life, we shall have to endeavour to halt the alarming loss of biodiversity to further the growth of economic stability of the tribal people.

METHOD

Data were obtained through personal dialogues with the local people, questionnaire survey and substantiated by statistics from the District Census Handbooks. With a view to collecting information on socio-cultural life styles of the local communities of the sanctuary, to document their dependency on the forests and to attempt to understand the forest-people relationship, the following parameters were considered:

TRIBAL LIFE STYLES

1. **Demography**: Population figures were obtained for the years 1961 - 1981. 1991 figures were available for villages of Jambughoda taluka only.

2. **Scheduled tribe populations**: To ascertain the indigenous nature of the Scheduled tribe (ST) population, their percentage to the total population was estimated for the years 1961, 1971, 1981 and 1991 (Jambughoda taluka only).

3. **Literacy**: Total literates and especially total female literates were noted in order to ascertain the literacy % for the various villages of the sanctuary. This information was considered relevant for future participatory integration management programmes.

4. **Agricultural Practices**: Questionnaire survey and personal dialogues were the basis to collect information on - (i) Land holdings; (ii) Major, minor and cash crops; (iii) Use of artificial or natural manures; (iv) Availability of irrigation; (v) Crop yield; (vi) Soil and water qualities for agriculture and domestic requirements, respectively.

5. **Natural Resources Collection (NTFP)**: The natural resources collected from the forest areas for food, medicine or as income were documented based on personal observations.

6. **Income**: An estimate of annual income per household was accounted based on probability of contributing items.

7. **Cultural and Social beliefs**: Older residents of the area and the members of the Royal family of Jambughoda provided information on tribal deities and their various social and cultural practices.

8. **Migration**: To try and understand the reasons for migration of tribal populations to

cities like Ahemdabad, Baroda and Surat, local residents and migrants were questioned personally.

IMPACT OF TRIBAL PEOPLE ON THE SANCTUARY ECOSYSTEM

Long-term studies are extremely essential to obtain reliable understanding of the processes operating in an ecosystem. However, the meagre funding resources and time constraints permitted us to concentrate less vigorously on such impact studies.

A subjective assessment of the state of forest degradation was carried out using an arbitrary scale method. A chi-square 3x3 contingency table (Zar, 1984), was conducted to compare the state of forest degradation for the three talukas(JT, HT, Sankheda taluka) of the sanctuary. The parameters considered for each scale are presented below:

Scale 1 : Highly degraded - Predominance of lopped and stunted trees, presence of introduced species and weeds, less diversity in tree species.

Scale 2 : Sustainable - Tree species in a better condition than in scale 1, absence of introduced species and weeds, more diversity in tree species.

Scale 3 : Potentially good - Trees of good height and girth, lopped trees almost non-existent, forests rich in plant and animal diversity.

Other impacts which could lead to people-sanctuary conflicts revolve around the following major issues: (i) Energy - in terms of fuelwood and fodder needs; (ii) Impact of livestock grazing on the forest ecosystem; (iii) Encroachment into forest land; (iv) Forest fires and mining operations; (v) High rate of alcoholism; (vi) Leopard menace and crop raiding by Nilgai.

Energy - fuelwood and fodder needs : Estimation of fuelwood consumption was by headloads only; quantification was difficult as requirements varied with number of household members; and requirements during different seasons of the year. A special note was made of preferences of tree species for fuelwood and fodder.

Data for the other issues were obtained from secondary information and from personal communication and interaction with the local tribal people.

RESULTS AND DISCUSSION

Sanctuary notification lists forested tracts of 45 villages, comprising 130.38 sq. kms. area. We have considered 43 villages for our study; 23 villages of Jambughoda taluka (JT), 10 villages of Halol taluka (HT), and 10 villages of Sankheda taluka. All other data which are not quantified are represented as estimates based on personal interactions.

TRIBAL LIFE STYLES - Tribals are inextricably linked with their environment (Figure III. 1).

People and Habitat: Majority of the people living in and around the sanctuary environs belong to the Scheduled Tribes (ST). The ST communities are mainly Rathwa, Naikda and Baria. Other communities like Rajput, Brahmin, Vania, Muslim and Harijan are in minority.

The Rathwa community predominates in Jambughoda taluka of the Sanctuary. Barias are a majority in Halol and Sankheda talukas. Most Rathwas and Naikdas are meat eaters; some have adopted vegetarianism by becoming followers of Saint Kabir (Kabirpanthi).

A typical tribal village in JWLS shows the following charateristics (Plate III. 1. 1): On an average, 10-25 households congregate to constitute a village. The villages on the periphery of the sanctuary are larger, having 30-50 households. Huts are scattered on hilly slopes or are at the base of a hill. Agricultural fields are typically on slopes and flats in between hills. Terracing is not practised. Field boundaries show certain forest tree species. Water is available from wells, and hand pumps are present in some villages. The village periphery usually merges with the surrounding forests. Such typical tribal habitat traits are portrayed in the following villages: Bhuriveri, Kohivav, Bhuriakuva, Borkach, Keshavpura, Gandhra, Poyali, Malbar, Katkuva, Jhand, Lambhiya, and Kathiari.

Dwelling: A tribal hut is made from wood, mud and cow dung. The roof is thatched with toddy palm leaves or with mud tiles. The houses are quite spacious, having a large outer

FIGURE III.1

Inter-Relationship of Tribals, Livestock and their Environment

TABLE III

Year		1961			1971			1981			1991	
Taluka	J	H	S	J	H	S	J	H	S	J	H	S
Total Population	4988	6248	2448	6812	7593	3215	7731	8613	3541	11010	-	-
% ST Population	18.38	7.79	4.94	51.35	39.12	22.39	47.79	38.04	20.36	53.53	-	-
Literacy %	11.20	13.94	15.03	12.19	15.26	19.75	23.10	23.77	23.49	28.43	-	-
Female Literacy %	12.88	9.41	14.40	16.36	6.82	16.85	15.62	14.40	20.43	22.64	-	-

J - Jambughoda Taluka
H - Halol Taluka
S - Sankheda Taluka

space, followed by an inner one or two rooms. The living space is shared with kitchen and store. The cereals are stored in large earthen pots or in woven baskets plastered with mud and cow dung. A loft area provides space for storage of fuelwood for the monsoon months. A raised platform with its own shade holds the drinking water pots, outside the living quarters. Health and sanitation are not accorded basic priorities. A provision for bathing is made in a very limited space.

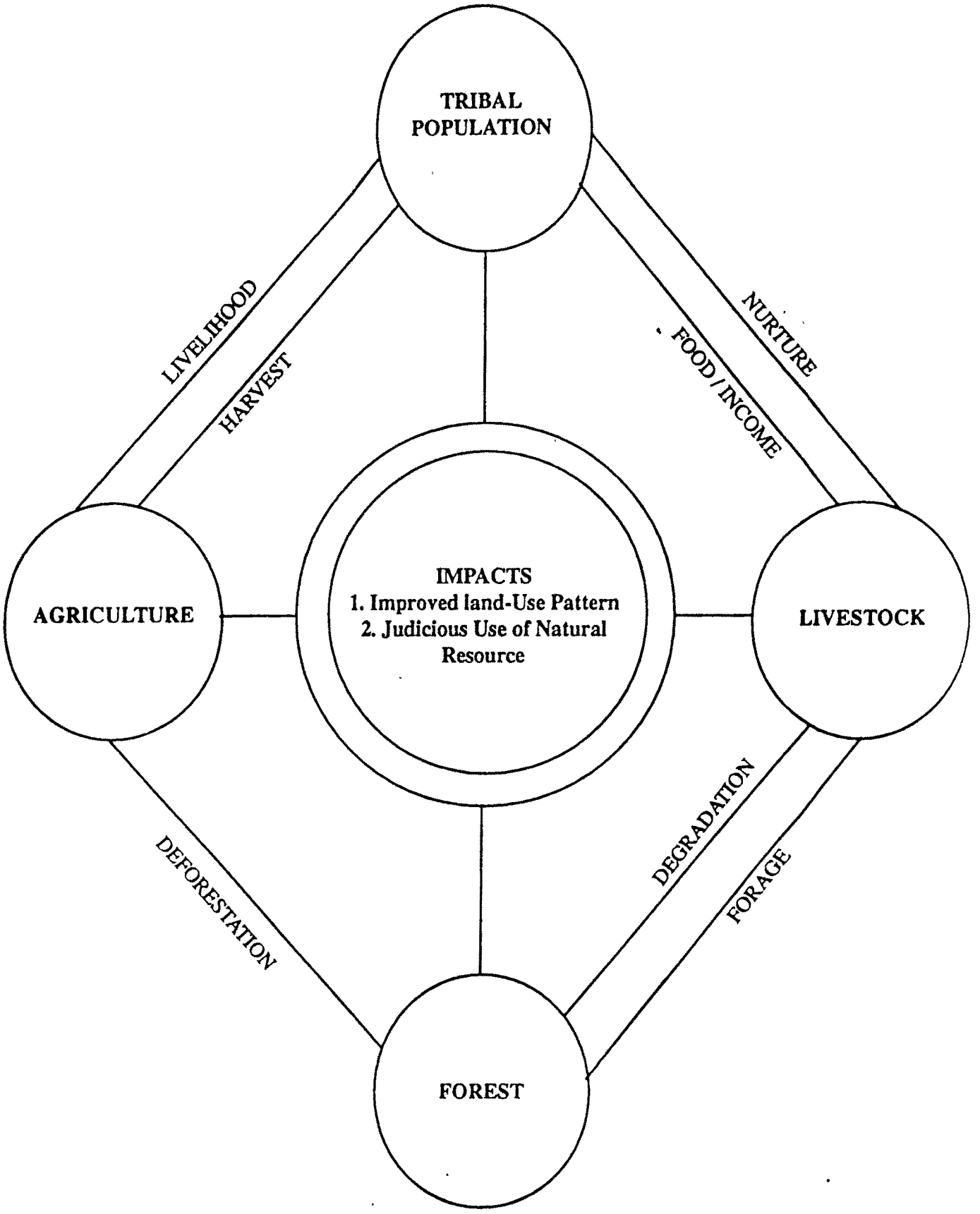
A separate enclosure provides shelter to their livestock, wherein the bullocks, cows and buffaloes and their goats are segregated with partitions made from forest products.

A hut is generally rebuilt after 15-20 years. The time selected for rebuilding is during the months of March to May. In the year 1994, we came across atleast 7-8 houses being rebuilt, with the modern concept of windows, doors with locks, bricks and mortar. This is the influence of migrating tribals who work as construction labourers in large cities (Plate III. 1. 2). A large amount of wood is used in making the beams and pillars.

Under the tribal upliftment and housing scheme, government provides houses to the landless labourers. All such shelters are made of stone and cement with sheet roofs. Most of these houses are in need of repair or lie unoccupied, possibly because, were these not designed according to their needs ?

Accessibility: Certain villages cannot be reached by any mode of transport, except on foot. Bhuriveri, Kohivav, Katkuva and Kathiari are such villages. Some others are not connected by proper roads. The market facilities and medical aid are difficult to reach during the monsoons, when the villagers are almost stranded for a short period.

Demography and Scheduled tribe percentage: Data for the three talukas of the sanctuary are presented in Table III. The total population for villages of Jambughoda taluka is 11,010 in 1991 with 53.3% ST population. The population of villages of Halol and Sankheda talukas was 8,613 and 3,451, respectively in 1981. The ST population in each taluka was



INTER - RELATIONSHIP OF TRIBALS, LIVESTOCK AND THEIR ENVIRONMENT

38.04% and 20.36%, respectively. 100% ST population is found in Ranjitnagar and Bhuriakuva of JT; Kathiari in Sankheda taluka and none in HT. ST populations are totally absent in Wadek (JT), Bamankuva and Rinchhbar (HT) and no village in Sankheda taluka is without ST population(District Census Handbook, Panchmahal & Vadodara, 1984).

Education : All villages have primary schools upto Class 4, with the exception of the following villages - Ranjitnagar, Bhuriakuva, Mahudibor (JT); Kathiari (Sankheda taluka); Sodhra (HT). Female literates were totally absent in Ranjitnagar, Bhuriakuva (JT) and in Kathiari and Lambhiya (Sankheda taluka). Literacy had incresed in all the three talukas since 1961 (Table III).

In the primary schools, afternoon meals are provided *gratis* by the government which has encouraged parents to send their children for education. In reality, the very purpose of imparting education is defeated as children of all age groups are made to sit in one small classroom. Individual attention cannot be accorded to children of various classes. Moreover, the arrival of teachers is just erratic and no schedules of timings are ever practised sincerely. In the long run, the interest of children wavers and they cease to go to school. This trend is prevalent in majority of the villages and only few villages have ideal learning facilities.

Water Availability: Water is available for drinking in all villages from wells. In most village wells, water is at about 30ft depth. Wells may be lined by bricks or cement or may be simple `tea cup wells'. Water for agriculture is not available from wells. Canals from minor irrigation schemes, at Kada, Laphni and Targol, provide water for agriculture to the following villages - Dhanpuri, Laphni, Targol, Gajipura, Paniyara, Sadada, Narukot and Hirapura. Perennial springs called as - `Zari' - are found at Jhand, Ranjitnagar and Jabban. These provide water for drinking and other domestic purposes. Natural streams passing through villages are called `kotars'. During earlier decades, water remained in the kotars upto about end of March. Now, the kotars are dry by the end of December. Water for the livestock is also provided from the wells and canals. Hand pumps are either not in

operation or water is used only for domestic work and not for drinking.

Electricity: Almost all the villages are electrified except Katkuva, Kathiari, Bhuriveri and Koba. Certain houses in Jhand, Lambhiya, Gandhra, Kohivav and Poyali are also without electrification. People generally use oil lamps and/or have a fire burning to provide light.

Agricultural Practices: The major crops of the region are Maize and Rice. In addition, pulses like Tuver and Udad are grown in large quantities. The major, minor and cash crops with their months of sowing and harvesting are presented in Table IV.

TABLE IV

Name of crop	Months of sowing	Months of harvesting
Maize (Kharif)	June	Septmber
Maize (Rabi)	November	February
Rice	June - July	September - October
Tuver dal	June	March
Wheat	November	February
Bajri	September	December
Jowar	June	October
Groundnut	June - July	October - November
Cotton	June	December - March

Other pulses are grown mixed with Maize or Wheat during winter.

Agricultural fields are either in valleys in between hills or on hill slopes (Plate III. 2. 1). Terracing is not practised and fields on slopes show stony soil and signs of severe erosion. Trees along field boundaries are less in number and mostly of Toddy, Bor, Rinjhdo, Palas, Timru or Saag.

Land holdings are small and get further divided when a son builds a separate house. Thus, subsistence on smaller holdings becomes more and more difficult.

Agricultural implements are few and simple, made from wood - plough, hoe and spade. Cows and bullocks help plough the field. The present Maharana of Jambughoda's father had introduced the use of artificial fertilizers like urea and DAP (H.H Digvijaysinhji, *pers. comm.*). Natural manure such as cow dung and goat pellets are also used. Pesticides and insecticides are not much used.

The crops harvested are mainly for local consumption only. Very rarely cereals are sold in the market place. In villages with irrigation facilities, a second winter crop is sown. Generally, quality of crop and yield are dependent on the rains. Estimates of crop yield were difficult as the grains are never sold in the markets. Loss of crops due to mammals, birds or insect pests is also not accounted for. During the monsoon, numerous wild vegetables are collected from the forests and additionally, fruit vegetables are planted around the house.

Natural Resources Collection (NTFP): Agenda 21 (United Nations Conference on Environment and Development, 1992), termed the "minor forest produce" as `Non wood forest produce' or `Non timber forest products' - NTFP.

Tribal populations depend heavily on NTFPs for income and subsistence.

The main NTFPs collected from JWLS forests are *Madhuca* flowers and later fruits -`Doli'; Charoli fruits; Timru leaves; Palas leaves; Kachnar leaves; Kadai gum; Dhoop; Karanj seeds and Honey.

***Madhuca* flowers and fruits** - Collection of flowers is an activity wherein all the members of the household are involved. The area beneath the tree is cleared and early morning the flowers are picked from the ground. Sun-dried flowers are stored in woven baskets and sold to the State Forest Corporation depots. Some amount of flowers are eaten fresh or cooked

as vegetable. In 1994, the Forest depots paid Rs. 60/- for 20 kgs of dried *Madhuca* flowers.

The fruits of *Madhuca*, called as `Doli' are also collected as NTFP for its seeds which yield a type of oil/cocoa butter. This oil is used for cooking or to light lamps. Extensive collection of `Doli' has resulted in less regeneration of Mahuda trees. Collection of seeds only for regeneration from healthy trees should be a practice adopted by forest nurseries. Such an important forest tree should be saved as it is very slow growing and a first victim to sucumb to natural calamities.

Timru and Kachnar leaves: These leaves are used in making local cigarettes called as `bidis'. Dried leaves are cut and filled with tobacco and rolled. Smoking timru bidis is the most common pastime for the males of the region. Kachnar has become rare in the region and bidis made from their leaves are generally sold at the weekly markets at the rate of Rs. 60/- for 1000 bidis. An individual can roll around 1000 bidis in a day; which he sells at Rs. 48/- to the market seller.

One point of concern is that the collection of timru leaves is most recklessly done by locals/contractors - instead of collecting leaves only, the entire branches are chopped off which in the long run does not permit the flowers to blossom, as the flowering coincides with the emergence of young leaves in March - April.

Income: The items contributing towards annual household income are NTFP sale, fodder collection, casual labour, sale of poultry or goats which is need-based. Harvests of crops is for their sustenance and normally not sold in the market.

Cultural and Social beliefs: Division of labour exists in every family. Children normally take the animals for grazing and collect fodder leaves, grass and occasionally fuelwood in the environs of their dwelling (Plate III. 2. 2). Women take care of the home, collect water for drinking, nurse the livestock, prepare the meals, and fetch headloads of fuelwood. Comparatively the menfolk remain idle. Only during the monsoons, they are active in farming. Rest of the time they smoke tobacco and consume country liquor.

Many have restored faith in Saint Kabir, and are called as `Kabirpanthi'. They believe in `Bhathiji Maharaj' and worship the lord to ward off threats from snakes and scorpions. A typical `Devsthaan' (place of worship) is found in every village. The deities are made from clayey mud into various shapes - horses, jars and beehive-shaped vessels (Plate III. 4. 1).

**`Pithoro':** When desired wishes are fulfilled, for example, birth of a member in a family after a prolonged period; recovery from a dreaded illness; on achieving a good harvest, a `pithoro' is generally held in the month of January, when sufficient funds are available. On this occasion, relatives from various villages arrive and all the members of the village are invited for three days, wherein food and alcohol are served lavishly. About 25-30 goats are offered to their deities. These are slaughtered and meat is cooked and served to all. During the 3-day function, special pithoro painters are invited to paint the walls of the house with local dyes and colours (Plate III. 4. 2). This tradition is practised from generation to generation. Five feet long branches of *Mitragyna parvifolia* - Karmi, are installed as traditional deities and worshipped for three days. During the `pithoro' festival, every night they dance around the `karmi' branches.

`Holi' - the festival of colours is a vital event of the year during March. Celebrations continue for a week. Those who have migrated to urban areas return back to their homes. This is the time when the flowering of *Butea monosperma* - Khakhar or Palas - Flame of the forest, coincides with the Holi celebrations heralding joy. Dassera and Diwali are their other important festivals celebrated in the region.

Marraige ceremonies - Early marraiges are more prevalent. The ceremony lasts for a week, wherein the bride and bridegroom are smeared with turmeric paste daily for four days. Relatives from near and far arrive for joyous singing and dancing to bless them for prosperity.

Migration: After the harvest, the majority of the tribal families migrate to urban areas to serve as labourers at construction sites. Grandparents and young children are left to look

PLATE III.1

III. 1. 1 - A typical tribal habitat

III. 1. 2 - Urban Influence on a Trible Home

PLATE III . 2

III. 2. 1 - Agricultural Practices

III. 2. 2 - Young children engaged in grazing livestock in forests, consequently, they are deprived of education

PLATE III . 3

III. 3. 1 - Abode of Tribal deities

III. 3. 2 - Tribal customs - 'Pithoro'

after their homes, livestock and land.

Arriving in urbanised and industrialised areas, they play a significant role in the growth of cities and industries. In return, they lead a miserable life for they are deprived of a homely shelter - living on pavements of roadsides under the sky braving scorching heat and severe cold. They neither recieve education nor medical health care. They cook their food with a meagre supply of fuelwood, out in the open.

Having lived in a healthy forest environment, they migrate to cities and live in a miserable polluted environment.

IMPACT OF TRIBAL PEOPLE ON THE SANCTUARY ECOSYSTEM:

The degree of forest degradation between the three talukas (JT, HT, Sankheda taluka) of the sanctuary showed **significance** ($\alpha^2 = 7.779$, n=43, $P < 0.1$, Figure III. 2). Factors leading to degradation of habitat and impacts leading to people-sanctuary conflicts are depicted in Figure III. 3.

We enumerate here impacts of fuelwood and fodder collection, livestock grazing, encroachment in forests, forest fires, mining operations, high rate of alcoholism and animal menace.

Fuelwood and fodder collection - Due to protection accorded by the sanctuary status, fuelwood collection is not permitted; therefore, the local people in the peripheral villages bear a grudge, that they have now to purchase fuelwood from the marketplace - whereas people living within the forests get it free and gain an additional income by illicit collection and sale at the market.

Fuelwood is collected by headloads from the forest area, usually by women and children. On an average, the weight of a headload is between 15-20 kgs for an adult and 8-10 kgs for a child of 8-12 years. Collection of fuelwood is a daily chore and not on the basis of requirement. Collection is more intensively done during the summer, to stock for the monsoons. Depending upon the size of a household, a headload of fuelwood may last

FIGURE III.2

Extent of Habitat Degradation in JWLS

△ Scale 1 - Highly degraded

○ Scale 2 - Sustainable

▲ Scale 3 - Potentially good

EXTENT OF HABITAT DEGRADATION IN JAMBUGHODA WILDLIFE SANCTUARY

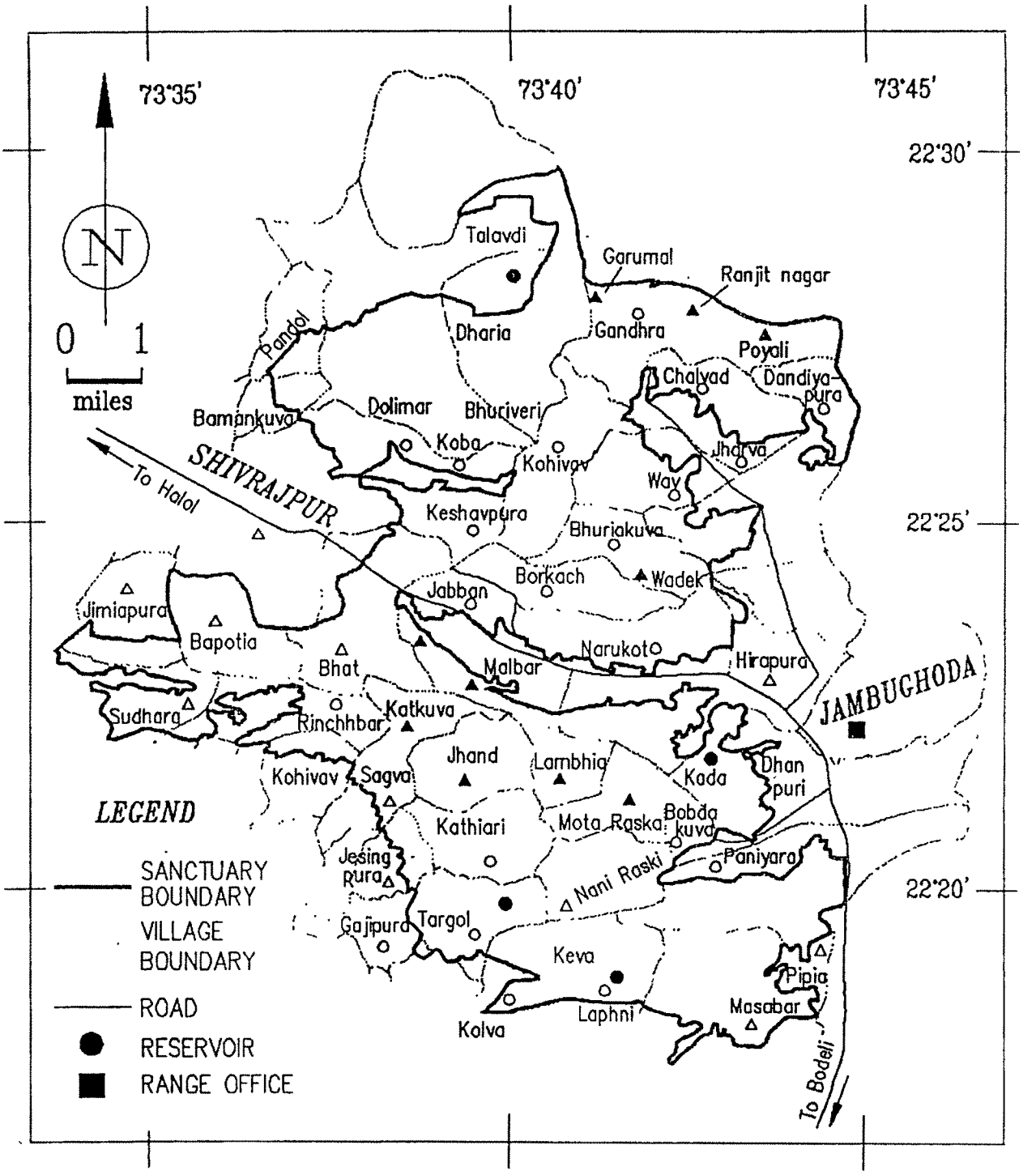
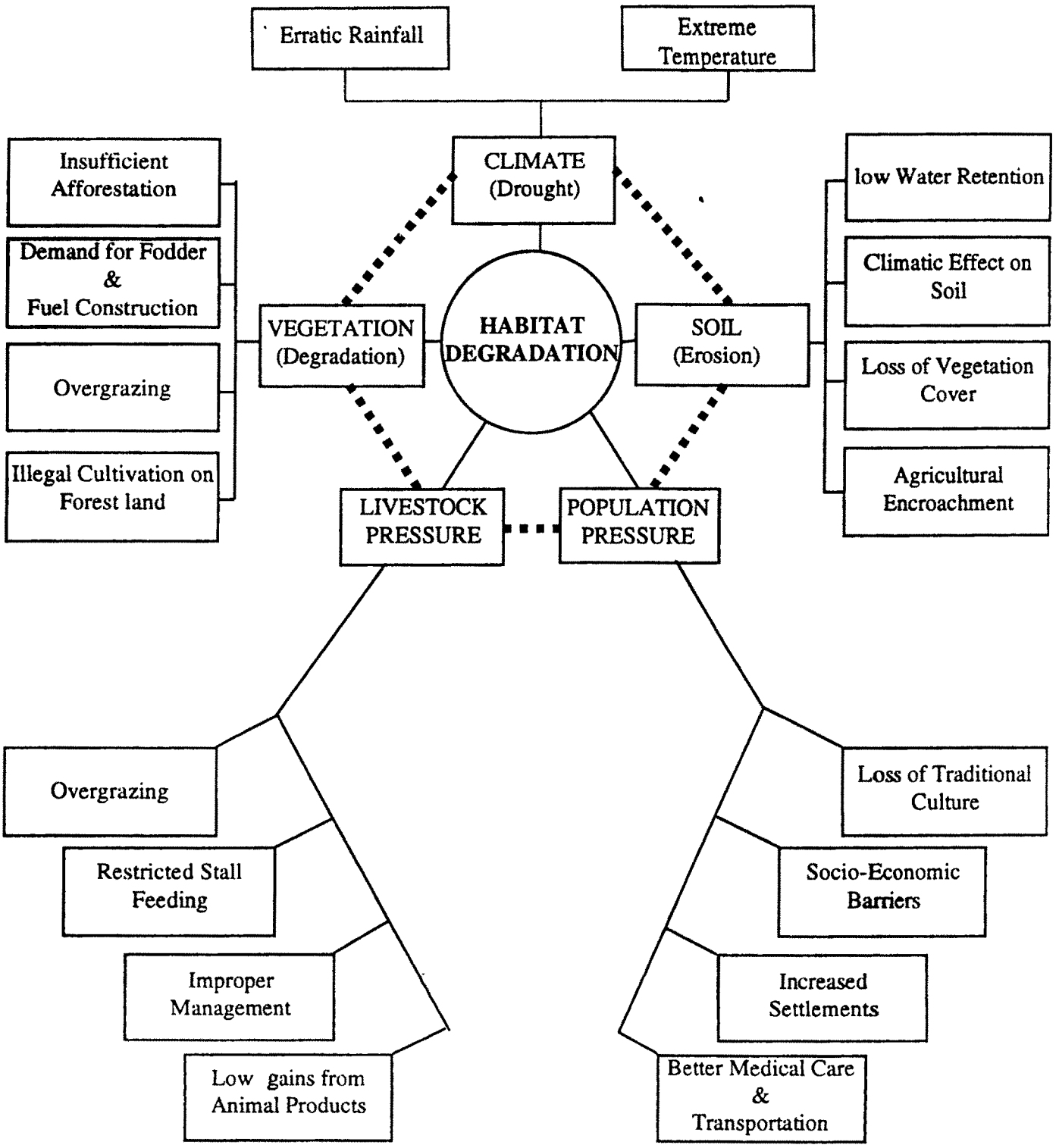


FIGURE III.3

Factors Leading to Degradation of Habitat

FACTORS LEADING TO DEGRADATION OF HABITAT



for 3-4 days and maximum upto one week. This is because, besides firewood, agricultural wastes are also burnt. Manure is not commonly used for burning. The fuelwood requirement varies to some extent during the different seasons. Consumption increases during the monsoon and winter as fire burns continuously to warm the house and heat water. Occasionally logs of wood are also used (Plate III. 3. 1 & 2).

The tree species preferred as fuelwood are Teak - an expensive timber; cutting of these trees on the person's own land is not permitted, as all Teak trees are "crown" property. In addition, the other species of preference for fuelwood are - Dhaodo, Aledi, Khakhar, Sadad, Kankadio, Timru, Karmi and Indrajav.

Fodder for livestock is mostly agricultural wastes, emerging after harvest of various cereal crops. During the rains and in winter, undergrowth in the forest is very luxurious. Local people prefer to graze the animals in the forests (Plate III. 2. 2).

Livestock grazing: According to a recent count, there are about 5446 bullocks, 5367 cows and buffaloes, 5162 goats and about 10,300 poultry in Jambughoda taluka, but the production of milk, meat, eggs and other animal products are economically not viable (Maharaj Harishchandrasinhji, *pers. comm.*).

Free-range grazing is not permitted in certain areas of the sanctuary, especially in the environs of a forest plantation. Free roaming cattle and goats have a detrimental effect on regeneration of forest trees. Stall feeding is not preferred by the tribals in JWLS. They believe that like humans, the livestock also require free movement in open spaces without any kind of bondage. Policing by the forest department has curbed grazing in the forest to a limited extent.

Encroachment: According to the pre-independence forest economy, each village was provided with its own gaucher land for grazing livestock. After 1948, with the sharp increase in human population and lax administration of forests, encroachments into forest land and

gauchers was on the increase. The recent policy of transfering forest land to private ownership, since it has already been encroached may in future negatively affect the forest biodiversity (Braatz *et al.*, 1992).

Forest Fires and Mining Operations: During the month of March, *Madhuca* flowers are extensively collected. To clear the forest floor beneath the tree, fire is set to the fallen leaves. Strong winds blow the fire to unmanageable distances, in the process clearing and burning the undergrowth, regenerated saplings and animals. Occasionally, a fire may be lit unknowingly by a tribal from his unextinguished `bidi'. We came across such a fire in the forests near Bhuriakuva and Wadek on 14-5-93 (Plate III. 5. 1).

The hills of JWLS are rich in minerals. They have been commercially exploited at Shivrajpur and surroundings for manganese since the earlier decades of this century. Most of the tribals living in the area are employed at the mines, from young children to adults. The hills are shorn off their rich forest tree mantle and bear an ugly look (Plate III. 5. 2). Can such practices be terminated in the sanctuary ? Can the labourers be employed for the restoration of these devasted ecosystems ?

High Rate of Alcoholism: Gujarat is a dry state. Tribals of JWLS profusely consume country liquor made from *Madhuca* flowers, toddy palm juice and even from jaggery and water.

Local alcohol distilleries, called as `bhatti', are innumerable in the region, situated along the banks of forest streams or `kotars'. Large quantities of wood is required to heat the pot contents. The process lasts for 2-3 days.

Consuming such large quantities of alcohol not only demoralises the person but also affects his family life and prevents from supporting home needs. Alcoholism in the region has led to the degradation of the forests to a large extent.

Animal Menace: Due to excessive hunting and poaching of wild ungulates, the natural prey of the leopard exists in small numbers in JWLS. Therefore, the leopard regularly

visits village environs and lifts goat kids, village dogs and occasionally cows. Children or women may be attacked by a leopard, while collecting grass or fodder in the forests. Policy for compensation to affected parties is not very efficient and strictly binding.

Nilgai in the region regularly invade fields of tuver dal, but is not a serious problem in JWLS.

PLATE III.4

III. 4. 1 - Lopping of forest trees for fuelwood, construction or agricultural implements ?

III. 4. 2 - Fuelwood collection - A headload of fuelwood weighs about 20 kgs. and lasts for 3-4 days for an average family of 5-6 members

PLATE III . 5

III. 5. 1 - Habitat degradation due to forest fires - natural or caused by man

III. 5. 2 - Loss of forests due to mining operations