CHAPTER 6

STUDY AREA
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The Study Area is for “Remote Sensing inputs for forest working plan revision a case study in Vijaynagar Range forest of Sabarkantha in state of Gujarat, India” Vijaynagar range forest area of Sabarkantha and Gandhinagar (GN) forest division of Gandhinagar circle in Gujarat State. The range covers villages of Vijaynagar Taluka and Bhiloda Taluka of Sabarkantha (Sk) District. Vijaynagar range forest is part of Vijaynagar Taluka of Sabarkantha district. It lies between 23°45' N to 24°10' N latitude and 73°10' E to 73°30'E longitude. Vijaynagar Range is bound by Rajasthan state in North and East, Dholavaini Range in West. It is bound to South by Bhiloda Taluka of Sabarkantha district. Vijaynagar taluka has two forest ranges, i.e. Vijaynagar range and Dholwani range.

Altitude in the Vijaynagar Range area varies from 240 m to 748-m. highest point in the range is 748 m.

Kundoli, Chorimala, Virpur, Zinzudi, and Raisangpur are villages of Bhiloda Taluka which have been included in Vijaynagar Range forest in addition to villages falling in East part of the Vijaynagar Taluka. Thus there area 46 villages in Vijaynagar range.

SABARKANTHA DISTRICT

Prior to Independence, the present territories of the district were occupied by 29 states and Estates like Idar, Ambaliara, Malpur, Bayad, etc. The Prantij taluka and Modasa mahal of former Ahmedabad district were added to it. The States and Estates were merged in the district in 1949 in accordance with the Merger Agreement signed by the Rulers in 1948 A.D.

Lastly, the Bombay State was bifurcated on 1st May 1960 A.D. and separate States of Gujarat and Maharashtra were formed. Since that date, the district became part of the Gujarat State. (Rajyagore S. B., 1974)

Fig. 6.1 shows study area in Gujarat State.
FIG. 5. STUDY AREA: VIJAYNAGAR FOREST RANGE, VIJAYNAGAR TALUKA, SABARKANTHA DISTRICT, GUJARAT STATE.
Territorial Changes

It has been observed previously that the present Sabarkantha district consists of 29 States and Estates. After the merger of various Princely States with the State of Bombay in 1949 A.D. the district became a part of former Bombay state. Between 1951 A.D. and 1961 A.D. though there were no major territorial changes, there was an increase in area of 288.00 sq. miles since 1951 A.D. due to survey of unsurveyed areas.

Fig. 6.2 shows Map of Sabarkantha District

Fig. 6.3 shows Map of Vijaynagar Taluka

It may be pointed out that in 1961 A.D. the total number of villages in the district was 1,543, while in 1970 A.D. the number was 1,422. It would thus appear that as compared to 1961 A.D. the number of villages in 1970 A.D., have decreased. The decrease is due to amalgamation of deserted villages into adjacent villages as per the orders of Government.

Physical Features

Configuration

The configuration of the district varies from gently undulating with low hill ranges to steep hilly countryside running all along the eastern border of the district touching Rajasthan State. In other words, the district can be divided into two zones, viz., the hilly religion and the plains. The range of the Aravalli hills covers the northern and eastern parts of the district and takes a southward turn on the border of the district. The hilly track known as Poshina Patti area comprises the north and north-east parts covering Khedbrahma, Vijaynagar, Meghraj, Malpur and parts of Idar talukas/mahals. The highest elevation reached is about 800 ft. (243.84 metres). The hills are a part and parcel of the chain of Aravalli hills which are found as long continuous strips of detached hills. In topographic details, the Aravalli outliers in the north of the district are bare granite rocks, Vijaynagar, Dholwani and part of Bhiloda ranges are more hilly. The hills of these ranges are interlinked by either ravines or indentations or forms a long continuous chain. A bird's eye view of these hills reveals
Map of Sabarkantha
a picturesque surrounding being a rugged region broken by numerous great rounded or pointed hill masses with occasional steep falls or by smaller hillocks. The topography of the rest of the tract is generally flat or undulating. It may be pointed out that the southern and western parts of the district are mostly sandy. This plain tract covers Prantij, Himatnagar, bayad and parts of Idar and Modasa talukas.

Hills

More rugged and formidable are the highlands occupying parts of the Sabarkantha district. The Sabarkantha highlands are formed by the outliers of the Aravalli hills and are drained by the river Sabarmati and its tributaries. The ranges of Aravalli hills which take a southern turn on the border of the district form a natural boundary. The hills are mainly situated on the northern and eastern portions.

Fig. 6.4 shows IRS LISS-III FCC Image (2,3,4 of Himmatnager area (SK))

Fig. 6.5 shows IRS LISS-III FCC Image (2,3,5)

Fig. 6.6 shows IRS Data of Vijaynagar showing Hilly region

Fig 6.7 shows Landsat TM of Vijaynagar area

Fig. 6.8 shows IRS LISS-II data, Sept 30, 1994

Drainage: River System

The district at present is traversed by 7 perennial rivers, viz., the Sabarmati, the Hathmati, the Meshvo, the Mazum, the Vatrok, the Harnav and the Khari. Broadly speaking, the Sabarmati river flows from north to south along the western borders of the district, and other rivers flow practically from north-east to south-west.

In addition to the perennial rivers there are number of small other rivers in the district such as the Indrasi, the Sai, the Guhai, the Vakal, the Vekri, the Debhol, the Bheka1, the Sakri, the Budheli, the Kosambi, and the Varanasi.

The Hathmati
The river Hathmati rises in the Mewad hills or Rajasthan. It passes south-west for about 56 kms. Through the district, falling into the Sabarmati throughout the year, it passes between high rough banks, first over a rocky and then through a sandy bed. The river passes through Vijaynagar mahal. During its course in Vijaynagar mahal, it passes by the following villages, viz., Chitariya, Pal, Movatpur, Amodara, Biladia, Samaiya, Jasawada, Dantod, Masota, Chithoda, Parvath, Itavadi and Kanadari.
Fig. 6.4 LISS-III FCC image (234)
Fig. 6.6 IRS data of Vijaynagar showing Hilly region
VIJAYNAGAR FOREST NORTH GUJARAT

Fig. 6.8 IRS LISS II SEPT 30 1994
The Harnav

The river Harnav rises in the Malwa hills of Rajasthan. It enters the district near the village Khokhra in the Vijaynagar mahal. It passes through rocky and forest areas. After a course of 61 kms., it meets the river Sabarmati near the village Marvada (Idar taluka). A weir was built near Sharneshwar of the Vijaynagar mahal for the purpose of irrigation. At present the weir is built near Vanaj village.

The river passes through one mahal and 2 talukas of the district, namely, Vijaynagar, Khedbrahma and Idar. In the Vijaynagar mahal, it touches Khokhra, Sarsav, Vandhol, Abhapur, Atarumba, Ladliwada and Parosada.

Geology

The rock formations met within the district, arranged in order of their increasing antiquity, are as follows:

- Alluvium, Soil
- Laterites
- Mafic Intrusives
- Deccan Traps
- Himatnagar Series
- Unconformity
- Idar Granite
- Ultramafics
- Delhi System Ajabgarh Series
- Alwar Series
- Aravalli System

In Vijaynagar Rock formations are of ultramafics, Delhi System Ajabgarh Series, and Alwar Series.

The Aravalli System of formations occurring extensively in the district comprises the following principal rock types:

- Calc-gneisses, mica-and hornblende-schists, chlorite-and serioite-schists, biotite-gneisses, slates, phyllites, quartzites and crystalline limestones.
Many hills and knolls consist of calc-gneisses, which strike north to north-east and dip at steep angles in Vadali, Khedbrahma and Golwada areas. They are generally complicated in their foliation and banding but have a general north-north-east strike. The rock is roughly equidimensional and a granular aggregate of calcite along with varying amount of quartz felspar (generally orthoclase and microcline), diopside, hornblende and spheren. Besides these, at places, biotite, a little graphite, pyrite, scapolite, zoisite, wollastonite and minute garnet grains are also associated. At places, the gneisses are intruded by aplite veins.

Mica-and hornblende-schists, chlorite-and sericite-schists and biotite-gneisses are exposed east of Golwada and white calc-gneisses are found near Chandap, Navavas, Wasan, Metora and Semlia. It is also exposed north-east, east and south-east of Khedbrahma near Valaran, Dijio, Derol, Damanvas and Medh. Biotite-gneisses are well foliated, medium-grained and perfectly gneissic in structure.

Delhi System – The Delhi System of rocks occurring in the district are sub-divided into the Alwar and the Ajabgarh Series.

Alwar Series

The Alwar series consists mainly of massive quartzite, which forms the lowest member of the series. The other rocks of the series are phyllites, micaschists and quartz-schists. Alwar quartzites form chains of small hill ranges. They are mainly exposed near Harnav river, Chorivad, between Hathmati and Guhai rivers, near Munati, Vasai, Chhapras, Kapratta, Khet, Jamla, Chithoda, Bhiloda, Dhuleta, Sathrol and Sardo.

The quartzites are generally monotonous in their uniformity. The rocks are generally medium-to coarse-grained. In this sections it shows a completely altered and recrystallized quartz mosaic, in which none of the original sedimentary outlines are preserved. It might be sometimes called a quartz-schist owing to the secondary crushing along parallel planes. It is generally a hard rock of pale grey or pink or purple or white colour. It is occasionally ferrugious and penetrated by quartz veins. The bedding is generally obscure.
Ajabgarh Series

Ajabgarh series mainly consists of phyllites, mica-schists, limestones, calc-gneisses and calcareous mica-schists overlying the rocks of Always series. Prominent exposures are found in the upper valley of the Hathmati river near Dal, Kanadara, Thuravas, Tembana Math, Janali, Barnali, Navagam, Devnimori, Kundol, Meghraij and Modasa.

Ultramafic intrusives

Most of the dykes in the district are of Ultramafic rocks and are confined to the Aravalli series. Broadly speaking, the Ultramafic exposures can be brought under two groups.

(i) Western exposures confined to Ida area, where they are almost invariably occurring in fold cores. This group can further be divided into four areas (a) between Devnimori and Kundol, (b) between Kokapur and Vartha, (c) at Thuravas, near Mankdi, and (d) between Chavania and Bhanmer.

(ii) Northern exposures, occurring in the neighbourhood of Kherwada forming strike ridges on the crests of the hills, or as bands in Aravalli phyllites.

Soil and Alluvium

The soil in the hilly area is very shallow and poor, in extreme cases even the parent rocks are exposed. On hills there is not much of humus. The hilly area contains shallow soil except in pockets and villages.

Climate:

Climate in general is sub tropical with three main seasons. Monsoon or rainy season occurs from middle of June to middle of September. Winter or Cold season begins from November and extends up to February. Summer or Hot season extends from March to June.

Monsoon is irregular and erratic which is accompanied by gusty winds. The average rainfall in Vijaynagar Range is 690 mm.
The seasonal variation and temperature is very wide. The diurnal range of temperature does not exceed 31.7 deg. C. The maximum and minimum temperature recorded in the district for ten years are 44.4 deg. C and 5.5 deg. C.

Humidity is generally high during southwest monsoon.

Drought: Every alternate year is a scarcity year and the resultant effect is observed as heavy casualties in plantations.

Frost: Frost occurs in this range and the leading shoots are damaged. This also causes branching in the plants.

Minerals

Minerals found in Vijaynagar are Asbestos and Steatite

Asbestos and Steatite

Asbestos and steatite are found in association with ultramafic intrusives into the Aravalli metasediments. The main occurrences are in the Kundol valley (Devnimori, Kundol, Isri) south of Dadhalia, Bhanmer and Thuravas.

In Kundol valley, fractures are the main controls for the formation of steatite and asbestos. Steatite is formed within the ultramafic rock, while asbestos is found in the actinolite-schist near its contact with the ultramafic rock. At Kundol, the major shear fractures are aligned north 25° west to north-west with vertical to steep dips towards east-north-east to north-east. Veins of flaky talc 5-8 cms in width, of light green colour are confined to such fracture, while steatite of light grey to pale blue colour is soft, homogeneous in texture and occurs in bulk. Tests have shown that the steatite can be sawn into desired shapes, drilled and threaded. The asbestos is of amphibole variety, showing the slip and the cross fibre, but extremely brittle and of very low fibre strength.
Fauna

Common animals and Birds found in the forest of Vijaynagar range are given below:

Birds like The Large Green Eerbet, The Griencubreasted Barhet, The Goldenlacked westgacker, The Yellowconted piod woodpecker, The hedwingal, The Common Babbler, The Large Grey Babbler are found in Vijaynagar Range forest. Detail list of animals and birds found Vijaynagar range is given respectively.

Antilope (antilope bezortica), Bear (Ursus labiatus) Chinkara (Gazella bennattii) Four harned antilope (tetraceros quardricornis), Fox (Vulpes bengalensis), Hare (Lepus reficaudatus), Hyaena (Hyaena striata), Jackel (Canis aureus), Leopard (Felis jubatus), Monkey (Mecaca mulatta), Panther (Felis leopardus), Porcupine (Hystrix oristata), Sambar (Rusa aristotelis), Spotted dear (Axis maculatus), Tiger (Felis tigris), Wild bear (sus indicus), Wild cat (Felis chus)

Flora

Forest

In 1952, the national forest policy was declared by Government which emphasized the protective as well as productive role of forests. It suggested as a desirable long-term objective that one third of the land area should be under forests. Forests supply timber, fuel, fodder and other forest products. They have a moderating influence against floods and erosion and help maintain soil fertility. Besides they provide an industrial base to certain industries. Apart from the need of industries, the development of forestry and forest industries is also essential for raising the income of the tribal people living in the forest areas.

The main processes of forest development are consolidation, protection, and establishment of communications, exploitation, re-generation, utilization, research, education and training. The Five Year Plans have laid considerable emphasis on preservation processes, improvement of communications, rehabilitation of degraded forests, establishment of new plantations, better forest management and utilization of the forest produce.

The forests are broadly divided into three classes as below:
Reserved forests are constituted under the provisions of the Indian Forest Act, 1927.

Protected forests are other forests and waste lands Belonging to both Government and private individuals

Reserved and protected forests constitute permanent forest estates maintained for the purpose of producing timber and other produce and for protective purposes. Unclassed forests are largely degraded and unprofitable forests rarely surveyed or subjected to any organized protection or management. In the Sabarkantha district, there are reserved and unclassed forests only. There are no protected forests. The entire forest area is under the Forest Department.

Before integration, the forests were worked in an unscientific manner resulting in overexploitation, malformation and in some cases depletion. After integration settlement and demarcation of the forest areas have been undertaken by the forest Settlement Officer. Except the surveys undertaken by him, no other surveys have been undertaken in the district.

In order to get a clear idea of the forest wealth of the district, the forest data are examined, keeping following points in view, viz. (1) general history of the forests, (2) the area, composition and working of the forests, and (3) special privileges.

General History of the Forests

The history of forests in Sabarkantha district could be traced back to past. It has to be remembered that in the past, the Rulers were the sole owners of these forests and that revenue consideration alone was the generally accepted concept of forest management and that the maximum sustained yield over a period of time was never aimed at. In other words, most of these forests were overworked in the past under the simple and crude formula of cutting as and when they liked. The various State units were under the general control of the Mahikantha Political Agency. But very few attempts were made either to classify the forest (except areas which were parts of the Baroda State) or prepare schemes or plans for its working. In most of the areas even surveys were not undertaken and hence no maps exist at present. Owing
to the lack of control and absence of implementation of proper and sound management policies of the forests, the forests are left in a ruined condition at present.

Fig. 6.9 shows forest map of Vijaynagar area

Fig. 6.10 shows map of Vijaynagar range showing forest and village boundary

Fig. 6.11 shows Round of Vijaynagar range

Fig 6.12 shows Vijaynagar forest range with village boundary and coup number

Fig. 6.13 map shows working circle

Fig. 6.14 forest cover status of Sabarkantha

The information regarding past history of forests available is scanty. Though Forest Department was formed as a separate administrative unit in some of the States, the Dewan was, however, the final authority in all matters of administration, and was next to the Ruler. The public was allowed a free hand in exploiting the forests after payment of necessary duty, fixed by the dewan from time to time. This practice received further impetus during the world War II. The prices of forest produce had soared and the practice of indiscriminate cutting of forests spread unchecked resulting in utter ruin of the forest wealth. After merger of the States, considerable time was spent in recruiting the forest staff and the reorganization of the forest areas.

Forests material from anywhere in the forests in any way, as and when they liked on payment at the scheduled rate. A system of royalty rate auction existed for sometime for the exploitation of firewood and charcoal by contractors.

In 1943-44, the forest areas of the State covered 300 sq. miles. The areas, however, had never been correctly arrived at, as forest settlement and demarcation were never attempted. In some villages even revenue survey had not been introduced. No forest surveys were attempted and no forest maps were prepared. No plantations were also attempted. Cuttings in Narayanpur and Raigadh forests were prohibited and the forests were kept is reserved.
Fig. 6.12  Vijaynagar forest range with village boundary and coup number
Fig. 6.13 Map shows working circle
VIJAYNAGAR STATE

The work of Forest Department in Vijaynagar was co-ordinated with that of the Customs Department. As the entire area of the State was under forests, it was under the control of the State rulers. The entire area of the Vijaynagar State was hilly and under tree growth with a small number of villages interspersed with cultivation. The present state of forests indicates that at one time there must have been very good forests in the State. Even hill-tops are found clothed by the forest cover. During the State regime, wholesale cutting of the forests was seldom resorted to. The ryots were allowed to exploit teak and khair under the selection method after payment of "Custom" duty. This practice resulted in exploitation of the best and marketable trees from the forests. The accessible areas were only worked for the purpose of charcoal.

The State regime had adopted certain modes of sales of forest produce. The forest limits to be exploited were defined by physical limits, and neither survey nor demarcation was done in most of the areas. In the case of disposal of khair, the time-limit and the number of axes to be used for extraction were stipulated. The teak bellies were being extracted departmentally and either exported or sold at the depots at retail rates. Mahuda was sold standing at Rs. 4 per tree for the purpose of house construction. Charcoal and firewood were sold to firewood contractors by the system of royalty popularly known as Customs duty rate per maund of charcoal or firewood. Sawar (Salmalia malabarica) and Saledi (Boswellia serrata) were also extracted from the forests for supply to match factories at Cambay and Porbandar at the rate of Rs. 30 per ton.

The State authorities seemed to have attempted with some success the raising of teak from seeds. However, the attempts were too patchy and haphazard, to be of any consequence.

From the State records, it is gathered that Swar (Salmalia malabarica) seeds appear to have been attempted by random dibbles in the forests and at kiln sites and had meet with the same fate as that of teak. Artificial regeneration of fule species is also said to have been attempted, on charcoal kiln sites. Some years before merger, the Baval was raised along the moist banks of annals. However, the attempts were never made very seriously and systematically.
EFFECTS OF PAST SYSTEMS OF MANAGEMENT

The public had enjoyed very liberal privileges of cutting the trees as they liked, thereby causing lot of damage to the forests. At best trees were removed repeatedly by them. Moreover, regular heavy grazing and annual fires have left no scope for the natural regeneration to come up, but only accelerated the pace of erosion during the rains. This was the state of affairs in Idar and other petty States. The Ruler of Vijaynagar State did not allow the situation to aggravate, as he allowed the cutting of tree on the basis of a selection method. This system though impoverished the quality of the growing stock, yet preserved the soil cover and helped the natural regeneration of the species. In other words, it replenished most of the stock that was lost. Rigorous forest protection during the State regime has manifested itself by the existence of well-wooded hills as well as plains, e.g. at Vireshwar, Attarsumba, etc., where even though teak is absent, there is predominance of many of the injailies which are usually susceptible to damages by fires.

THE AREA, COMPOSITION AND WORKING OF THE FORESTS

The total forest area in the district in 1969-70 was 641.55 sq. kms. Of which 531.19 sq. kms. Was reserved forests and 110.36 sq. kms. Was unclassed forests. In major part soil has become poor and shallow at many places due to removal of natural crop which has contribute towards further deterioration. The distribution of the forests is limited by the influence of biotic factors of man's interference and topographical factors. The major portions are confined to the hills and to flat areas where rigorous legislation on forest conservancy was in vogue. The areas which were formerly under forests were sold by the rulers to the Patidars of Gujarat and the Kanbis of Kutch. They cut the forests and made lands fit for cultivation after putting in immense labour and spending large amounts. There cultivable areas have been formed into farms called Kampas.

The forests of Sabarkantha represent mixed dry deciduous type of forests, varying considerably in composition, condition and density, partly on account of geognostic variation but chiefly due to the injuries caused by man. The forests are generally confined to the hills where a variety of species occur changing with the elevation. The geological formations do not vary much on hills which account for the
dominance of one single species, i.e. teak. The teak forms up to 60 per cent of the crop in Vijaynagar Range and up to 80 per cent of the crop in other teak forests. The paucity of rainfall and long spells of dry months coupled with the unfavourable local factors have limited the dimension of the plants. The teak is favourably supported by quartzitic and granitic strata. Mahuda is generally common on plains. Preponderence of undergrowth of Jayaparvati (Nyctanthes arbot-tristis) occurs generally growing on the lower summits of hills of Vijaynagar and Vadali Ranges. In Dholwani (excluding some areas) parts of Vadali and Bhiloda Ranges, teak is particularly absent. Attempts made in the past to introduce teak in the area were met with little or no success.

The teak forests of Vijaynagar Range are better in quality than those in any other Ranges and are capable of producing sound timber even up to about 36" girth. Rest of the teak forests are of inferior quality. The forests in Malpur and Maghodi areas consist of young coppice crop below 12 years in age.

Vijaynagar Range where the crop is somewhat sound and straight as the forests were worked less on permits.

Superior Teak Forests – This occurs in Vijaynagar and eastern parts of Dholwani Range. At some places Khakhara (Butea monosperma) is also found largely associated with teak. The natural regeneration of teak is seen at some places.

In the teak forests described above the general flora consists of the following species:

Top Canopy – Teak. Sag (Tectona grandis), Sadada (Terminalia tomentosa), Shisham (Dalbergia latifolia). Tanach (Ougeinia dalbergoides), Bia, Bible (pterocarpus marsupium), Kalam (Mitragyna parviflora), Sawar (Salmalia malabarica), Timru (Diospyros melanoxylon), Humb (Millusa tomentosa), Savan, Shivan (Gmelina arborea), Salai (Boswellia serrata), Limdo (Aszadirachta indica), Kalo or Pilo Shirish (Albizzia lebbek), Kada, Karai, Kadhai (Sterculia urens), Moyano (Lannea coromondelica), Mahuda (Madhuka latifolia), Dhav Dhavdo (Anogeissus latifolia).
Under Storey – Kakad (Garuga pinnata), Bavat (Acacia arabica), Karanji (Pongamia pinnata), Dhav, Dhavdo (Anogeissus latifolia), Amla (Emblca officinalis), Bili (Aegle marmelos), Rohan (Soymida febrifuga), Saragwa (Moringa pterigosperma), Khakharo (Butea monosperma), Vino (Capparis grandis), Kagar, Khalger (Acacia ferruginea), Aniyar (Acacia leucophlea), Alledi, Ailadi (Morinda tinctoria), Dudhi (Wrightia tinctoria), Gal or Mindhal (Randia dumatorum), Hingol (Balanites ageyptica), Ghat-bor (Zizyphus xylopyra), Vico (Gynmnosporia montana) and Bamboo (Dendrocalamus strictus).

Undergrowth – The undergrowth is generally absent on the plains. But on hills it generally comprises the following species, viz. Jayaparvati (Nyctanthes arbor-tristsis), Mardasing (Belcteres isora), Awal (Cassia auriculata), Ker (Capparis aphylla) and coarse thatch grasses.

Injuries to which the crop is Liable:

The main causes of injury to the forests are felling under permit system (Old Vijaynagar State) illicit cuttings, grazing, unauthorised cultivation, insects fires, drought and frosts.

Permit System:

In the ex-Vijaynagar state areas, local adivasi people are allowed certain quantity of timber for bonfire purpose on permits or payment of nominal permit fee. When the coups were under exploitation most of the coup material had to be given away under permits.

Illicit Cutting:

Earlier this was restricted to the domestic requirement of the villages but with the increasing population and rising prices of timber and fire wood, villagers find it more lucrative to trade illegally in timber and fire wood than work in the forest. Dry fuel wood brought on head loads finds a ready market in all bigger villages and towns. It is mostly the ladies, who indulge in cutting and collecting firewood from the forest areas. This has resulted in considerable depletion of forest around the towns and villages.
Grazing:

District Sabarkantha has 436000 cattle population. It has 459000 buffaloes and 47000 sheep & 306000 goat population respectively. The district has 3000 camels and 57000 population of Mules, donkeys and dogs. The district livestock population of 1310000. In addition to native live stock population. (Anon 1997-98)

Pressure of grazing in forest areas is very heavy. Except for the area under regeneration and those that are fenced, the rest are open to grazing through the year round. Large heads of cattle including sheep, goats, and camels migrate into Gujarat every year from Rajasthan. Every blade of green foliage available is grazed and browsed and trees are heavily lopped and pollarded by graziers. Over grazing has resulted in hardening of soil and due to frequent trampling, new regeneration does not get a chance to establish those root stocks persists for some time.

Unauthorized cultivation:

Unauthorized cultivation is limited in Range Forest but in the recently acquired forests it is extensive. The forests are not demarcated on the ground it is difficult to determine the extent of encroachment.

Insects: damage by insects is negligible

Fires: Fires are not common, although some areas do get burnt. The damage is not very significant.

The forests are in process of retrogression and deteriorating fast. The impact of biotic factors, especially man and cattle has rendered them open and devoid of regeneration. (The rampant annual fires have caused further damage). The once tree clad hills are on the process of denudation and quite a large portion of it is completely devoid of any kind of tree growth. The quality and stocking of the crop is generally poor and the regeneration is lacking. It is therefore essential to bring first those forests to normal condition, with regard to regeneration, stocking and distribution of age classes.
In order to pressure the site quality and also protect the tree-clad hilly areas against any kind of exploitation by excluding them from working. The denuded hills are blank areas are required to be afforested by suitable techniques and with suitable species as quickly as possible to prevent further degradation of the areas by erosion and exposure. Working circle, their distribution and reasons for their constitution.

With the above objectives of management in view, the following working circles are constituted:

1. Afforestation W. C.
2. Main W. C.
3. Protection W. C.

The area under this working circle is 8983.59 Ha. The area included bears in place to place teak of young to middle age, mixed and miscellaneous type of forests. These areas are either hilly, undulating to plane or with ravines along the riverbanks. Density of the vegetation in hilly areas is poor scattered large blanks created due to biotic factors. In ravine areas, open scrub type of forest with large blanks are common. Most of the areas were under Jagirdars. Who exploited the areas, unscientifically leaving only stamps for the future. Some areas bear good young coppice growth of teak etc species. Soil conditions are still suitable for afforestation provided adequate soil and moisture conservation measures are under taken. These areas are susceptible to heavy soil erosion. A good portion of the included area hold miscellaneous mixed plantations carried out recently with soil and moisture conservation and good protection measures. Some of the plantations are quite successful. Observing past experience of artificial regeneration carried, in order to check soil erosion and to improve vegetation, these areas will be afforested with suitable species supported by suitable soil and moisture conservation work and protection measures.

Main W. C.:
The area allotted to this W. C. is 2869.68 Ha. The areas included in this W. C. are of varying configuration starting from undulating to gentle slope of hills having mixed type of tree growth, interpressed with young to middle aged teak crops, at different places, though part of it is poor, mal formed and stunted. These are heavy pressure from privilege holders of Vijaynagar, for the supply of small size timber, Bamboos, firewood etc. These are no commercially exploitable mature crops in the whole division so these will not be any prescription for commercial exploitation in the present W. P.

P. W. C.

The area of this W. C. is 5303.90 Ha. All the remaining forest areas having poor, mixed miscellaneous types not covered under AWC and MWC are included in this working circle. The areas are hilly and steep with shallow soil exposed bolder and rocks bearing poor vegetation growths requiring protection and improvement. The areas are also very much susceptible to soil erosion siltation of dam and rivers and are not capable of being artificially regenerated some areas which have already been covered under plantation before the implementation of this W.P. have also been included under this working circle.

Improvement scheme is prescribed under which dead, dying crooked and mal formed stocks will be removed and congestion of plantation crop will be cleaned and thinned judicially. Regeneration will be mostly by natural means, supplemented by artificial plantation of suitable species where possible.

Block and Compartments:

No Compartments or Blocks have been formed due to non availability of 1 = 15840 (4" = 1 MILE) scale, topographical maps, pending availability of toposheets, a village is taken as unit of forest working plan.
Statement showing some of the birds found in Vijaynagar Range, Sabarkantha District.

1. Little Cormorant
   *Phalacorocorax nigro* (Vieillot)

2. Darter or Snake-bird
   *Anhinga rufa* (Daudin)

3. Spoonbill
   *Platalea leucorodia* (Linnaeus)

4. Crested Honey Buzzard
   *Pernis Ptilorhynchus*

5. Common Pariah Kite
   *Milvus Migrans* (Boddaert)

6. Barhminy kite
   *Haliastur indus* (Boddaert)

7. Shikra
   *Accipiter badius* (Gmelin)

8. Crested Serpent Eagle
   *Spilornis Cheela* (Latham)

9. Marsh Harrier
   *Circus aeruginosus* (Linnaeus)

10. Short-toed Eagle
    *Circaetus gallicus* (Gmelin)

11. Laggar Falcon
    *Falco biarmicus jugger* (Gray)

12. Kestrel
    *Falco tinnunculus* (Linnaeus)

13. Blackbreasted or Rain Quail
    *Coturnix coromandelica* (Gmelin)

14. Red Spurfowl
    *Galloperdix Spadicea* (Gmelin)

15. Rock Bush-quail
    *Perdicula argoondah*

16. Grey Jungle fowl
    *Gallus Sonneratii* (Temminck.)

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17. whitebreasted waterhen
   *Amaurornis Phoenicurus* (Pennant)

18. Indian Moorhen
   *Gallinula chloropus* (Linnaeus)

19. Coot
   *Fulica atra* (Linnaeus)

20. pheasant-tailed Jacana
   *Hydrophasianus chirurgus* (Scopoli)

21. Green Sandpiper
   *Tringa ochropus* (Linnaeus)

22. Cream - coloured Courser
   *Cursorius cursor* (Latham)

23. Common Green Pigeon
   *Treron phoenicoptera* (Latham)

24. Blue Rock Pigeon
   *Columbia livia* (Gmelin)

25. Ring Dove
   *Streptopelia decaocto* (Frivaldszky)

26. Red Turtle Dove
   *Streptopelia tranquebarica* (Hermann)

27. Large Indian Parakeet or Alexandrine
   *Psittacula eupatria* (Linnaeus)

28. Blossom - headed Parakeet
   *Psittacula cyanocephala* (Linnaeus)

Fig. 6.15 shows Grey Hornbill found in Vijaynagar forest
Fig 6.16 shows Grey Tit found in Vijaynagar range
Fig. 6.16  Grey Tit found in Vijaynagar range