CHAPTER-III

THE STUDY AREA: SAURASHTRA REGION

The Saurashtra region has a wide variation due to its topographic condition. The soil of this region is varied and rocky. Except some small pockets of Junagadh, Rajkot and Bhavnagar districts, the remaining part of the region is deficient in rainfall. The mean annual rainfall varies between 400 to 800 and unevenly distributed rainfall is common in this region and consequently, drought occurs frequently in different parts of this region. Because of the combined effect of scarce and erratic nature of rainfall, and of short (not more than 80 km) river course, the surface water resource is far from satisfactory. The forests are inadequate, poor and ill formed. The salinity in the soil and ingression of Sea water in the long coastal strip are special problems of this region.

The region covers 33 percent of population of Gujarat that is 1.12 crore (1991). The fast growing population is now suffering from the problem of unemployment and under-employment. Since Independence, most of the large scale capital intensive industries are located in urban centers which can employ a small portion of the labour force, added annually to the fast growing population. On the other side, the subsistence agriculture alone cannot support even the existing rural population. So the population is migrating towards the large and medium urban centers. Due to rural urban migration, urban centers face many problems, like acute shortage of housing, drinking water, lack
of skilled labor, problems of pollution and inadequate infrastructure. As a result, the urban centers are over crowded and rural areas remain backward. In order to have a balance between over saturated urban centers and sub standard rural base, ABI should be developed in the study area, which is based on agricultural product. It is important to have an overall distribution of all necessary infrastructural facilities in the study area in order to develop the potentiality of the area.

III.A Political Set-up of the Region

The region of Kathiawar is popularly known as Saurashtra region. It comprises of six districts i.e. Surendranagar, Bhavnagar, Amreli, Rajkot, Jamnagar and Junagadh. The region is divided into 69 talukas having 4677 inhabitant villages with a population of 1.12 crore (1991). It forms a part of Gujarat state and is located in the western part of India. It is a peninsula, bulging out in the Arabian Sea and is spread over an area of 64,338 Sq.km. It lies between 20°40' and 23°25' north latitude and 69°53' and 72°20' east longitude as shown in Figure No.III.1. A list of talukas is given in Appendix No.I.1. The term Saurashtra is derived from Sanskrit term “Saurashtra” which means ‘a good state’. The earlier name was Kathiawad, the land of Kathis, who are believed to be the early inhabitants of this region. In the past the region was divided into ten sub regions which were known as Zalawad, Machhukantha, Halor, Okhamanndal, Barda, Sorath, Babariawad, Ghoilwad, Sarvaiya and Kathiwad. The region shares both the land and sea frontiers of the country. The two small deserts, one in the north of Kachchh and the other is between kachchh and mainland of Gujarat, are saline waste.
SAURASHTRA REGION

LOCATION OF THE STUDY AREA

INDEX
- TALUKA BOUNDARY
- DISTRICT BOUNDARY
○ LOCATION OF SAMPLE VILLAGES'
[ ] LOCATION OF SAMPLE TALUKAS

SOURCE: PLANNING ATLAS OF GUJARAT
and have the same origin as the coastal margin of the state. The main land of Gujarat in the East bound it. The important parts of the region is its long coastline, probably the longest as compared to any other states of India, surrounded by the Gulf of Khambat, Arabian sea, and Gulf of Kachchh in the south-east, south, south-west and north-west part of the region respectively.

III.B. Geophysical Features of the Region

The Saurashtra region is irregular in shape with central tableland and the central tableland is surrounded by undulating region with barren hills without any regular trend. This region is covering three districts, that is, Surendranagar, Amreli and Rajkot district. Due to the central plateau most of the rivers have originated from this central tableland and rivers flow radially. The tableland also forms the chief watershed of almost all the rivers of Saurashtra Peninsula, flowing the east, west and the north directions. The surface of the central part rises gently from all sides towards the center, where different hills and ridges are seen e.g., Manda, Gir, Barda and Alech hills are some of the famous ridges in the region as shown in Figure No III.2.

The Saurashtra region has much sub-upland, which are known by local names. Those are Rajkot plateau, the Dhangadhra plateau, Wadwan plateau, Wankaner plateau, and the Amreli plateau respectively. In between these plateaus there are lowland areas e.g., between Dhangadhra - Wadwan plateau and Sabarmati the lowlying area between the.
SAURASHTRA REGION

PHYSIOGRAPHIC CHARACTERISTICS (with relief and drainage)

INDEX

ALTITUDES IN METRES

<table>
<thead>
<tr>
<th>Altitude Range</th>
<th>Legend</th>
</tr>
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<tbody>
<tr>
<td>300 AND ABOVE</td>
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</tr>
<tr>
<td>150-300</td>
<td></td>
</tr>
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<td>75-150</td>
<td></td>
</tr>
<tr>
<td>25-75</td>
<td></td>
</tr>
<tr>
<td>0-25</td>
<td></td>
</tr>
</tbody>
</table>

G = GIRNAR HILL


FIGURE. NO. III.2

-56-
little Rann of Kachchh and the Gulf of Cambay. This northwest to southeast-aligned lowland is a flat surface characterized by sluggish rivers with their braided channels. Midway, between the little Rann and the Gulf of Cambay, is the Nal Lake which was a part of the sea. Saurashtra peninsula was an Island, which was separated by an arm of the sea, joining the Gulf of Kachchh to the Gulf of Cambay in the Cretaceous period. Due to upliftment of the Himalayas in the Territory period, followed by deposition of rivers, Saurashtra become a part of Gujarat from the insular to peninsular position.

III.C. Drainage Pattern

The Physiographic condition of the region gives an idea about the nature of rivers in the peninsula. Most of the rivers and streams have their origin within the territory and the other characteristics are their watercourses are short, rainfed, and are not perennial. There are about 71 rivers and streams. But except eight, Bhadra, Shetrunji, Sukhbhadar, Ozat, Bhogavo, Kalubhandar and Machhu, Brahmani, all of them have a course of less than 80 kms. (Figure No.III.2). Because of the short and rugged course and shallow beds, these rivers are dangerous in the monsoon, particularly, when the rainfall is heavy. Due to non perenniality, there is no possibility of generating hydro electricity. In fact it is possible to utilize river waters through small check dams across these rivers and thus impounding their flow for irrigation.

III.D. Ground Water Resource

Water that infiltrates the soil is called sub surface water and most of it becomes
groundwater. Water in the zone of Saurashtra is mainly ground water. The zone of ground water table varies on the factors like local geology, availability of pores or opening in the formations, recharge and movement of water within the zone from areas of recharges towards pond and composition of rocks and minerals are some of the factors limiting ground water resource in Saurashtra region. As shown in Figure No III.3, the zone of ground water table in Saurashtra by 5 meter of interval in the rainy season (May 1991). The figure shows that major part of the region having ground water table between 10-20 meter by an average, but after monsoon the variation in ground water decrease or during draught condition.

The quality of ground water from recharge area down to the central alluvial zone is within suitable limits for irrigation. The quality however starts deteriorating towards the coast. According to the committee of the “Group on the estimation of ground water resource and irrigation potential from ground water in Gujarat”, the utilisable ground water recharge ha.m / year in Saurashtra region is 453659 (1997), which is 35.30% of Gujarat total.

III.E. Distribution of Soils

Due to particular climate and relief, different types of soils are found in Saurashtra region. Black and Alluvial soil cover major part of the region while the remaining soil groups are scattered all over the region as shown in Figure No. III. 4.
SAURASHTRA REGION

CONTOURS OF WATER TABLE

Source: Gujarat Water Resource Development Corporation, 1992

CONTOUR INTERVALS IN METERS BELOW GROUND LEVEL AT 5 M INTERVAL

FIGURE. NO. III.3
The black soils of lighter shade i.e. medium black soil occur in the central part of Saurashtra plateau. Their colour is a reflection of the milieu of their origin and a lower percentage of the humus content. The medium black soil is not so deep as do not appear to have undergone long distance transportation. They are residual soil, but become thicker and darker when transported to low level areas by soil creep, general rain wash or gullies and deposited there. The clay content of this soil is low. Bhal region on the coast of the Gulf of Cambay has typical deep black soils, formed due to deposition of trap materials, transported through flow of rivers from the plateau of central Saurashtra. In the Ghed of Junagadh these soils have been also formed due to the deposition of basaltic trap material transported by rivers.

The higher fertility and deeper colour of soils in southern Saurashtra as compared to northern Saurashtra is due to restricted the amount of weathering to develop formation of clay, where the rainfall is considerably less. Slope condition have also influenced the distribution of soil cover in the migration of soil from the central part of Saurashtra towards the margin of the plateau or occur in the cost has led to development of a thicker coastal alluvium. But due to tidal influence, the soil suffers from illdrained and not very productive. The sub soil saturation with salt as a result the soil is saline or alkaline.

The northern coast of Saurashtra and Rann of Kachchh are the areas of saline soils. The northern districts of Saurashtra i.e. Jamnagar, Rajkot and Surendranagar have a sandy
Soil Types

- SALINE ALKALINE SOIL
- MEDIUM BLACK SOIL
- ALLUVIAL SANDY SOIL
- COASTAL ALLUVIAL

Source: Ground Water Resource Development, Corporation, 1992

SAURASHTRA REGION

TYPES OF SOIL
soil which is often shallow and unproductive. The northern parts of Surendranagar, lying along the coast carry saline soils. Due to aridity and heat the surface is badly cracked in subsoil zone crystals of gypsum and salt which become regular layer in areas, where the sea has some access and other areas away from the sea, gypsum and salt is replaced by a predominance of calcium carbonate.

There are some soils, which cover a smaller area in Mangrol taluka of Junagadh district. Texturally they are clay-loam to clay in nature. The soil is having low availability of nitrogen, medium level of potassium and high level of phosphorous. The parent material of sandstone develops sandy to loamy sandy soil in texture. From the point of fertility, they are poorly supplied with plant nutrients and is mostly found in western Surendranagar and Wankaner. Whereas ‘Ghad’ soil in south Junagadh and ‘Dhar’ in Amreli and Junagarh.

III.F. Climatic Condition

III.F.1. Rain fall

Rainfall in Saurashtra is confined to four months in the year i.e., from June to September. The rainfall is erratic, variable as well as unreliable. Except some small pockets of Junagadh, Rajkot and Bhavnagar districts the remaining parts of the region is deficient in rainfall. The prospect of agriculture depends upon the timeliness and the distribution pattern of rainfall than that of its quantity. Rainfall in Saurashtra region is ranging from 400 to 800 m.m. per annum, rainfall is about 600mm towards the eastern
region of Saurashtra. Mistry and Modi (1987) have analysed 86 years (1901-1986) of rainfall data to study the rainfall variation as shown in Figure No. III.5. The data reveal that rainfall is not only less, as average but also less than the average in many years. The northern Saurashtra zone receives rains in the range of 400 to 700mm. While the north-west zones receive rainfall between 250 to 500mm. Saurashtra in the southern zone receives maximum rainfall ranging from 625 to 1000mm.

### III.F. 2. Temperature

The effect of rainfall depends on the regions temperature. The summer is usually hot during the daytime but the nights are cool. The winter is mild. The maximum and minimum temperatures recorded in the major cities of Saurashtra are shown in Table No.III.1. The average normal temperature of the region ranges between 15°C to 30°C and average relative humidity is between 50% to 60%.

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Station</th>
<th>Maximum “°C”</th>
<th>Minimum “°C”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Surendranagar</td>
<td>43.00</td>
<td>9.1</td>
</tr>
<tr>
<td>2</td>
<td>Bhavnagar</td>
<td>41.00</td>
<td>12.0</td>
</tr>
<tr>
<td>3</td>
<td>Amreli</td>
<td>42.00</td>
<td>3.6</td>
</tr>
<tr>
<td>4</td>
<td>Rajkot</td>
<td>42.00</td>
<td>5.8</td>
</tr>
<tr>
<td>5</td>
<td>Jamnagar</td>
<td>42.00</td>
<td>6.2</td>
</tr>
<tr>
<td>6</td>
<td>Junagadh</td>
<td>42.00</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Source: Agricultural Department, Ahmedabad.

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SAURASHTRA REGION

RAINY DAYS AND ANNUAL RAINFALL - 1993

INDEX

MEAN RAINY DAYS PER YEAR

<table>
<thead>
<tr>
<th></th>
<th>ABOVE-40</th>
<th>30-40</th>
<th>20-30</th>
<th>BELOW-10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ANNUAL RAINFALL (IN MM)

Source: Agricultural Department, Ahmadabad

FIGURE NO. III.5

-64-
III.G. Agro Climatic Regions

Agro climatically Gujarat state is divided into eight sub zones. The Saurashtra and Kachchh regions are covered under the zone no.V, VI, VII and VIII respectively. The major part of the region is under zone VI, VII and VII. The zone V covers Bhal area of Bhavnagar and Surendranagar districts. Based on climate, rainfall and soil productivity, farmers have adopted cropping pattern, which gives higher yield.

The major portion of Saurashtra region is covered by zone VI and zone VII which are known as south Saurashtra zone and north Saurashtra zone. These reflect cropping pattern as well as rainfall distribution. The main crops grown in this region are pearl millet, sorghum groundnut and cotton.

The north-west zones of northern talukas i.e. near Dhangadhra are placed in zone VIII. The soils are sandy with problems of salinity. The main crops grown are pearl millet, sorghum and kidneybeen. The Bhal region is under zone V as coastal region. It receives almost same amount of rainfall as southern Saurashtra zone receives. The rainfed crops are grown here i.e. wheat, cotton, sorghum, and gram. Some parts of Bhavnagar are good in horticultural crops (arid fruit crops) like guava, pomegranate and ber.

Large variations in topography and rainfall across the region have led to various agroclimatic situations ranging from dry to sub humid condition. Nearly 25% of the area in the western part is of Saurashtra region is considered to be draught prone. Only 46% of
the area is devoted to cultivation while 14.2% additional land is available for the expansion of cultivation.

III.H. Characteristics of Human Resource

III.H.1. Land Use Pattern

Land utilization is influenced by a number of physical, social and economic factors. Initially it is influenced by the physical factors i.e. environmental and geological, later on socio-economic factors such as growing pressure of population on land, advancement of technological know how, market, demand and price response become more pronounced. According to the standard land use

TABLE NO. III.2

Land Utilization in the Saurashtra Region (area in %)

<table>
<thead>
<tr>
<th>Sr</th>
<th>Category</th>
<th>1970-71</th>
<th>1990-91</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cultivated area (Total)</td>
<td>34</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>a. Irrigated</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>b. Unirrigated</td>
<td>18</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>Forest area</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Culturable waste land</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>4</td>
<td>Area not suitable for Cultivation</td>
<td>38</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

classification of census there are four major land use categories in the region. This region is predominantly agricultural. The agricultural area occupies 50% of the total geographical area of the region. While the forest cover is not very significant as it occupies only 5% of the total area. The culturable waste land and the area not available of agriculture occupy an area as 28% and 26% of the total area (1991) respectively. (Table No III.2).

III.H.1.1. Cultivated Area

The major part of the region has dry farming, the distribution of crops and concentration of agricultural land vary from coastal unit to interior unit of the region. According to 1991 census the distribution of agricultural land was highly uneven. Rajkot had the highest percentage (19.86%), while Jamnagar had the lowest percentage (15.84%). The distribution and spatial variation is due to physical factors. In Surendranagar district almost all agricultural land is un-irrigated, (only 12.21%) while Rajkot district was having the highest as 24.55% in 1991 year area under irrigated crop. The irrigated area is only 22% of the total area rest of the area 28% land depends on rain.

III.H.1.2. Forest Area

The forest area of Gujarat is unevenly distributed. The major concentration of the forest is found in the central hilly area of Saurashtra. Three types of forest are seen in the region, Firstly dry mixed deciduous forest, seen in the medium rainfall zone,
comprising of Amreli, Junagarh, and Jamnagar district. The second group consists of dry scrub forest, found in Rajkot, parts of Bhavanagar, and Junagarh. This type of forest occurs in the region, where rainfall is below 600 mm. The last group is mangrove forest, found in coastal creeks, in the region in Jamnagar and Junagarh district. The total area under forest in Saurashtra was 3466.36 sq. km in 1970-71. The area under forests thus contributes 3% of the geographical area of Saurashtra in which Junagarh has the first position whereas Jamnagar and Rajkot are in second and third position respectively. In 1990-91 the area under forest increased upto 5%. But in this period Surendranagar and Jamnagar increased their forest area and became second and third in position respectively, Junagarh is again on the top. In the two decade of 1971-1991, Jamnagar, Rajkot and Bhavanagar decreased their forest area because of industrilization and urbanization in these districts. The area under forest has increased in Surendranagar.

III.H.1.3. Culturable Waste Land

The culturable wasteland includes miscellaneous trees and grooves, permanent pasture and grazing land. The problems behind this land are salinity, alkalinity, erosion, shallowness, lack of fertility of soil. These factors prevent the development of culturable wasteland, which represents the transitional nature of arable land. This land accounts 19% of the total area of the region. When we see the district wise distribution, Junagadh district is having the highest percentage of (22.17%) culturable area and minimum is in Amreli district with 9.80%. These culturable wastelands are available for cultivation but have not been taken up for cultivation owing to their un-economic condition or to some extent most unfavourable condition. The distribution of culturable
wasteland indicates that the higher such land is found in the area due to salinity, alkalinity in the soil. The permanent pasture is grazing lands, which is 7.43% of the total area and is poor in quality. In rainy season, area under pasture and grazing lands has increased but with less rainfall the land does not support cultivation for longer period.

III.H.1.4. Area not Available for Cultivation

The higher proportion of land put to non agricultural uses are due to land used for building, industries, institutions, settlements, roads, railways, embankments, canals, parks etc. This is a strong indicator of industrial development while its low proportion reflects greater stress on agriculture in that area. In Saurashtra region, according to 1990-91 Census, 26% of the total area of the region was barren and unculturable land.

The high percentage of wasteland or barren land are found either in salt affected area while the area having low percentage of barren land is associated with alluvial or cultivated land where irrigation facilities are available.

In short it can be said that; adjustment with the physical environment has been going on over a period of time while on the other side people have created new strategies for development of land utilization with technological knowledge. The impact of physical environment such as uneven and uncertain rainfall, infertile, saline and rocky soil have made certain constraints for the development of optimum land use pattern all over the region.
III.H.2 Agriculture

III.H.2.1. Cropping Pattern

The land as an important resource is put to different uses in Saurashtra and it is found that as much as 50 percent (1991) of the total reporting area is brought under cultivation. This area is distributed among different types of crops and the type of changes that have taken place in the cropping pattern, over a period of time, have been noted. The leading crops of Saurashtra are cotton, jowar, bajra, wheat, oilseeds (Such as groundnut caster seeds, seasum) paddy, sugarcane, gram, udad, mag, barley, chana, pulses-onion, garlic. Vegetables, condiments, spices, fruits, Cereals are also grown in the region, but most of them are consumed locally. (Table.No V.3 and Figure No.V.6).

III.H.2.2. Crop Yields

Crop farming is the principal form of landuse in the region. An obvious consequence of raising crops under the unfavourable soil and rainfall conditions is low with highly unstable yields. This can be seen from the variations in the yield of important crops in the region. It can be noted that near about half of the area was put under the groundnut only, while cotton, bajra, and jowar have occupied the second, third and fourth position respectively in the area. Other crops such as wheat, seasum, sugarcane etc., are less important as it is evident from their area occupied. Continuing this, it could further be seen that there is instability of yield, which was the highest in case of jowar followed by caster, paddy, seasum, bajra and groundnut, and the lowest was found with respect to cotton.
III. I. Demographic Aspects:

The geographical locations, availability of resources and of basic infrastructural facilities have been profound influence on the pattern and concentration of population and settlement in Saurashtra region. According to 1991 census the total population of Saurashtra region was 1.12 crore scattered over 4672 villages in 69 talukas of 6 districts. The concentration of population is more in the central part and also in some parts of the coastal belt. The distribution of population decreases in the western and the northern part of the region because of the physical constraints of low and uncertain rainfall, inefficiency in agricultural support and lack of basic infrastructural facilities.

The main problem behind this is the climate of the region, which is affecting the cropping pattern.

III.I.1. Density of Population

Saurashtra region being an agricultural region the distribution of population is also related to physical features. As per 1991, census the average density of population in the region is 178 persons per Sq. km., which is much lower than the state population density of 210 persons per sq. km. The highest density in Saurashtra is marked in Junagadh district as 226 persons per sq. km., while Rajkot is second at 224 persons per Sq. km. The lowest densities of 111 persons per Sq. km. Are in Jamnagar. (Table No III.3).
The highest density of Junagadh is due to fertile soil, high yield and availability of infrastructural facilities, development of the port. The other supporting factors are fishing activity, cement and soda ash and location of agro based industries.

III.1.2. Growth of Population

Population growth during 1971 to 1991 was 33.26% which is lower than the state average 35.37%. The population growth rate is high in the central part of the region and towards south west because of industrialization and urbanization. The district head quarters are also grown to some extent and the other areas of low growth rate are coastal belt (Table No III.3).

TABLE NO III.3

Demographic Aspects of Saurashtra (1990)

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Districts</th>
<th>Rural</th>
<th>Urban</th>
<th>Total</th>
<th>Density</th>
<th>Literacy</th>
<th>Sex ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Surendranagar</td>
<td>629169</td>
<td>579703</td>
<td>1208872</td>
<td>115</td>
<td>54.77</td>
<td>921</td>
</tr>
<tr>
<td>2</td>
<td>Bhavnagar</td>
<td>1175854</td>
<td>1116172</td>
<td>2292026</td>
<td>205</td>
<td>57.89</td>
<td>949</td>
</tr>
<tr>
<td>3</td>
<td>Amreli</td>
<td>982933</td>
<td>269656</td>
<td>1252589</td>
<td>184</td>
<td>60.06</td>
<td>982</td>
</tr>
<tr>
<td>4</td>
<td>Rajkot</td>
<td>1291958</td>
<td>1222164</td>
<td>2514122</td>
<td>224</td>
<td>66.96</td>
<td>947</td>
</tr>
<tr>
<td>5</td>
<td>Jamnagar</td>
<td>.932716</td>
<td>630842</td>
<td>1563558</td>
<td>111</td>
<td>58.96</td>
<td>949</td>
</tr>
<tr>
<td>6</td>
<td>Junagadh</td>
<td>615483</td>
<td>779376</td>
<td>2394859</td>
<td>226</td>
<td>60.33</td>
<td>959</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6628113</td>
<td>6628113</td>
<td>11226026</td>
<td>188</td>
<td>59.82</td>
<td>951</td>
</tr>
</tbody>
</table>

Source: District Census Hand book (1991)
III.I.3. Sex Ratio

The sex ratio is defined as the number of female population per 1000 males. As per 1991 census the sex ratio of Gujarat is 934 whereas the corresponding ratio for the India is only 930. Gujarat sex ratio is therefore slightly higher than that of the country. The region has an average sex ratio is 951, which is above the Gujarat sex ratio. Out of the six districts only Surendranagar having the below that is 921 sex ratio, whereas, other five districts are having higher sex ratio compared to that of the state because of improving literacy and education. (Table No III.3). In the region only one taluka of Amreli is having number of female population more than of males.

III.I.4. Literacy

Literacy is an important social and cultural attribute for the development of any region. According to 1991 census, among six districts of Saurashtra, the average literacy rate of the region is 59.82%, which is below the state average 61.29%. The main reason for the low literacy is due to impediment of caste and occupation which are directly determined by the predominantly subsistence agricultural economy. The low percentage of literacy is due to low economic condition, which has forced the people to leave school at an early age and to engage themselves as a part of earning members of the family. The regional distribution of literacy rate also shows much variation in relation to their geographical setting, socio-economic condition and availability of basic facilities for education. In the region only Rajkot district shows higher literacy rate i.e 66.96, while all the five districts show below the state average 61.29 literacy level. (Table No.III.3).
The high literacy is found in agriculturally and industrially developed areas while the areas of low literacy are identified in association with poor and subsistence agricultural economy.

III.J. Occupational Structure

The process of economic growth is accompanied by profound changes in the structure of the economy, which is reflected in the corresponding structure of the working force according to occupational structure. The nine industrial categories of workers adopted in 1991 census are grouped into three main categories. These are shown in Table No. V.4. More than 60% of the total population in the region are engaged in the primary sector as cultivator and agricultural labour. Cultivators ranked first constituting 35% of the total working group, followed by agriculture's labourers 22% and other primary workers engaged in livestock, forestry fishing etc., and accounts only 4%. In terms of secondary and tertiary sectors of workers, the percentage is 26% and 13% respectively. (Figure No V.7.a and b)

The development of non primary agricultural economic activities in the region is also good which reflects the percentage of work force engaged in this sector. As per 1991 census 39% of total workers is engaged in household industries, manufacturing and processing, transport, trade and other services.
census 39% of total workers is engaged in household industries, manufacturing and processing, transport, trade and other services.

III.K. Settlement Pattern

Large and highly clustered settlements explain resourcefulness of the land. In economic term it explains the greater carrying capacity of the land to population structure and employment generation. A majority of rural settlement in Saurashtra region is determined by the hydrological factors. Villages are concentrated mainly on river terraces, confluence and in the lower courses of major rivers, where the sub surface water sources can be easily harnessed through well. Here 13.04% of the settlements are in class I cities while class II and III are having 14.99% and 27.53% of settlement with population between 50,000 and 20,000. In the region total 42.02% of the towns are under second and third group. The development is slow due to non availability of infrastructure, as well as job opportunity in non farm activities. (Table No V.5).

III.L. Infrastructural Facilities

Economic development involves an optimal utilization of natural and human resources in the region. It involves maximization in production, equity in distribution and maximization in employment. This in turn improves not only saving, investment and capital formation but also creation and maintenance of an infrastructure. Such an infrastructure has to serve both human and non human capital requirements. And it has
The type and distribution of amenities in each settlement correspond with its size and its geographical location. There are certain facilities and amenities, which are not available in all parts of the region. Even in same talukas where the geographical base and environmental conditions are different the functional hierarchy and spatial regularity in socio-economic development may be observed in the region. The details of amenities are discussed as Chapter No. V. and results are shown in Appendix II.5.

III.L.1. Educational facilities

Economic development makes great demand on the quality of human resources. It is necessary to pay greater attention to improve the quality of education at all levels and improvement in skill of people. This category consists of primary school, secondary school, higher secondary schools and other institutions like college, training centre and adult education centers. There are 5221 primary schools in the region. Some villages are having more than one primary school. Nearly 745 villages are having secondary schools and 68 villages are having higher secondary schools. Among higher order facilities, only 9 villages have colleges and 73 villages are having facilities of other institutions. (Figure No.V.11 a and b).

III.L.2. Medical Facilities

Health is a state of complete physical, mental and social well being and not nearly absence at decease or infirmity. In the region medical facilities include hospitals, maternity home, child welfare centre, dispensary, family planning centre, registered
practitioners, sub registered practitioner, health centre and others. The Medical facilities in the region are insufficient as only 23% of the settlements have facilities like hospital, health centres and dispensary. The development of the facilities shows that the coastal unit and northern eastern part are having more facilities with a belt of central part near Rajkot.

III.L.3. Drinking Water

Among the different facilities availability of drinking water is also important because any settlement is very much dependent on water. Saurashtra region has a major problem regarding drinking water due to scarcity of water and non availability of perennial rivers. Most of the villages depend on surface water collection. The problem is most severe in the northern Saurashtra region, especially during the summer season when some of the villages depend on the tanker’s water, supplied by the government. However, existing pattern of facilities (according to 1991 census) of drinking water shows that there are nearly 1972 villages having tap water, 4520 villages with wells and 1466 villages are with tank water facilities, 267 villages are having tube well facilities in the region. Continuing this, the 2060 villages are with river facilities but most of them are seasonal and only 217 villages are having canal facilities. But in the real situation, available facilities do not support sufficient quantity of water because most of the area is dry. In general the region is suffering from acute problem of drinking water during January to July almost all over the region except for few pockets. (Figure No .V.12 a and b).
III.L.4. Communication Facilities

Communication has a key role to play in the development process and so has the information media. Communication services include postal, telegraph, telecommunication and overseas post. Telegraph and telephone facilities, are seen nearly in 1544 villages. The development of communication infrastructure is crucial to the growth of vital sector like industry and agriculture.

III.L.5. Connectivity

This facility includes crucial role in sustaining economic development of various schemes of the economy. Transport constitutes one of the most important infrastructural facilities for supporting productive and distribution systems. In terms of transport and communication facilities nearly 4355 villages are connected with road and having bus facilities. In terms of railway connectivity, it is only available in 225 villages which are having railway station and only 26 villages are having navigation facilities in the rainy season. However this facility depends on the seasonal character. Some of the villages get disconnected due to water logging conditions during the monsoon season. Figure No V.13.a and b, shows the connectivity facility available in the region.

III.L.6. Power Facility

Energy in terms of electricity is a very essential prerequisite for agricultural and industrial growth. Electrical power is a basic infrastructure for all round economic growth. It is an effective instrument for influencing and spreading of the industrial
development. Nearly 1148 villages in the region are electrified for domestic purpose, and 634 villages are having the electricity for agricultural purpose and only 90 villages have the electricity for all purposes. But the region has the problem of power cut during the summer season.

III.L.7. Industrial Estates

Industrial Estate is a particular area where a group of facilities are constructed in an economic scale, in suitable sizes, with various infrastructural facilities. The aim is to stimulate development of small and medium scale industries in the region. The Gujarat Industrial Development Corporation (GIDC) has sanctioned 42 industrial estates of which 29 estates have been developed. The maximum numbers of industrial estates are in Rajkot district (10), followed by Bhavnagar (9), Amreli district has only 4 industrial estates with low development of industries. It is estimated that there are more than 1500 units working in GIDC Industrial estates in the region. There is no separate agro based industrial estate in the region.

III.L.8. Finance and Banking facilities

Any development needs finance. In other words, an industry, either big or small, cannot be set up without adequate finance. Industrial enterprise requires long term finance for acquiring land, constructing building premises, purchasing, machinery, tools, implements and short term finance is required for the purchase of raw material, payment of wages, holding the stock of finished goods. In other words, an industry depends upon the development of both the capital market satisfying long term finance.
and the money market catering to short term funds. In the region there are 828 commercial banks and 410 co-operative banks. The commercial banks have a vital role in providing short term finance assistance to industries and agriculture. Besides this various schemes have been formulated to provide direct financial assistance for the development of industries and agriculture. (Table No. V.6)

III.L.9. Marketing Yard

The purpose of development of marketing yard is to pay remunerating prices for agricultural produce. It is an essential incentive for increasing agricultural production. A well established regulated marketing system can check unfair trading practices by traders and give remunerative prices to the farmers. Agricultural produce and marketing committee (APMC) are constituted at taluka level under agricultural produce marketing in Oct, 1963. At present 34 main marketing yards are working and giving their services to the farmers as well as to entrepreneurs. The distributors are few so farmers have to go long distance. The post harvest loss is near about 35% to 40%.

III.M. Agro Based Industries (ABI)

Saurashtra region is predominantly an agricultural region endowed with natural resources and a wealth of traditional skills. For production of large variety of Agricultural and horticultural crops the region occupies a prominent position in cash crops such as groundnut, cotton, castor, sugar cane etc.
The region has uneven distribution of agro based industries due to uneven distribution of raw material, and other infrastructural facilities. The region has 3033 agro based units in which 4 talukas have high concentration of industries while 62 Talukas have low concentration. The low concentration shows indirectly low availability of good quality of raw material, financial facilities, marketing facilities and other infrastructural facilities. (Figure No IV.4 .a and b)

Summary of Chapter - III

The fore going account of existing resources, socio economic and infrastructural facilities reveal that there are large socio economic variations among sub regions of Saurashtra region. Moreover there are functional and aerial gaps in location of certain facilities over different sub regions. Saurashtra region has low degree of infrastructural and economic development. Most of the villages in the region are prone to different environmental problems, like salinity/alkalinity, drought, erosion, water logging and fertility of soil.

Due to unfavourable physiographic condition in the region the distribution of population by size and settlement is also sparse. The region has uneven distribution of population density. The problem of under employment and unemployment is due to dependence of people on small agricultural land, which is the main source of income.
The agrarian economy itself is unable to provide continuous work to the people throughout the year, due to non-availability of irrigation. Hence, the additional population cannot be employed on land, and there is no other alternative opportunity for employment. As the agricultural employment is seasonal in nature, large number of people migrate to urban areas for better opportunities. The economic condition of the small and medium farmers is not sufficient, due to low productivity, low income, and physical hazards. Large numbers of families are pushed into poverty. This problem is aggravated by the continuous increase in population.

The low level of literacy and technological knowledge and poor infrastructural facilities, the resources of the region is not fully utilized and rightly managed by the villagers. As a result, production is low with poor quality which cannot sustain the region. They get low return. The region also suffers from industrial activity due to poor economic and social facilities like banking, marketing yard, industrial estate, connectivity. The remote areas suffer more for their isolation from the taluka head quarter being away from main stream.

The region as a whole faces acute problem of water in major part of the year. As a result, the development is restricted to the availability of water bodies. That is why, the distribution of industries and level of urbanization is also restricted. The development of region is not only restricted by economic factor but also by non economic factor for the underemployment of the people, like literacy, medical facilities, lack of information.
facilities, lack of organization and participation of people. These create barriers in the process of regional development.