CHAPTER FIVE
REGIONAL DEVELOPMENT LAND UTILIZATION AND AGRICULTURE

After independence, as is well-known, the country recognized the vital link between land and livelihood of the masses in rural areas and launched land reform measures. However, such measures in most parts of the country have fallen dramatically short of their objectives, including that of required minimum in terms of homestead land for every family. The grossly inadequate achievements are clearly evident in the distorted land holding patterns. According to the NSSO Report on landholding (2003)[124], 95.65 per cent of the farmers are within the small and the marginal categories owning approximately 62 per cent of the operated land area, while the medium and the large farmers who constitute 3.5 per cent, with 37.72 per cent of the total operated area in their possession. A clear increase is perceptible in the number of landless labourers in the rural areas accompanied by a decline in the wage rate in the agricultural sector. There is also an accompanying decline in the profitability of agriculture. It is estimated that, an average Indian farmer spends about Rs.503 per month as his household expenditure.[125] This has brought about a concentration of poverty amongst the rural landless labourers, marginal and small farmers and the minorities. This chapter looks into land and agriculture in its policy perspective, state actions, availability of land and impact of land utilization with special reference to regional development in Gujarat.

5.1 Operational Land Holding

Despite of the declining contribution of the agricultural sector to the Gross State Domestic Product (GSDP), access to land as a productive asset in an agrarian society like that of India, plays an important role in reducing poverty of people. The land holding pattern of Gujarat shows a trend of fragmentation and roughly 2/3rd of the farming families hold land less than 5 hectares in size (*see table 5.1*). Further, fragmentation is most likely to continue due to divisions in families or part sale of land by the farmers. This will increase the need for collaborative activities amongst the farmers particularly in post harvest and marketing areas of value chain for sustained income from agriculture.

[124] NSSO (National Sample Survey Organisation) conducts survey based on the sample selected from various parts of the country depending on the subject of investigation.
[125] NSSO (2003): *NSSO Survey Data*, 59th Round, PDF, New Delhi.

According to NSSO (2003)[126] estimate, the State has 13.6 per cent landless households in the rural area and 8.5 per cent of its households do not own any dwelling unit. According to the operational holding data (See Table 5.1), in the year 1970-71 about 65.68 per cent of the farmers were within the small and the marginal categories owning approximately 25.78 per cent of the operated land areas while the medium and the large farmers, accounting for 34.32 per cent of the farmers, owned 74.22 per cent of the total area.

In year 2000-01, the overall operational area declined from 11.0 million (1971) to 9.8 million hectares (2001), a loss of two lakh hectares of land. The marginal, small and semi-medium farmers now constitute 84.83 per cent owning the operational land 5.496 million hectares (55 per cent), whereas, the medium and large farmers who account for only 15.12 per cent own 45.03 per cent of the total area. A clear increase is perceptible in the number of landless labourers in the rural areas of central Gujarat and Saurashtra during 1971 to 2001 accompanied by a decline in the wage rate in the agricultural sector.

Table 5.1
Gujarat: Changes in Operational Land Holding (1971-2001)

Size of Holding	1970-71	1976-77	1980-81	1985-86	1990-91	2000-01
Operational Holding Units in '000						
Total Holding	2,433	2,713	2,930	3,145	3,517	4,239
Marginal	579	656	711	801	924	1,297
Small	464	541	635	737	915	1,256
Semi- Medium	555	652	728	785	890	1,043
Medium	601	671	686	678	669	576
Large	234	194	172	145	118	65
Operated Area in 000 Hectares						
Total Holding	10,000	11,073	11,068	9,954	10,292	9,876
Marginal	300	329	375	416	489	692
Small	681	792	930	1,080	1,343	1,834
Semi- Medium	1,597	1,871	2,083	2,233	2,515	2,902
Medium	3,777	4,156	4,209	4,126	4,005	3,343
Large	3,645	2,927	2,506	2,099	1,941	1,104
Holding Size in Hectares						
Total Holding	4.11	4.08	3.78	3.17	2.93	2.33
Marginal	0.52	0.50	0.53	0.52	0.53	0.53
Small	1.47	1.46	1.46	1.47	1.47	1.46
Semi- Medium	2.88	2.87	2.86	2.84	2.83	2.78
Medium	6.28	6.19	6.14	6.09	5.99	5.80
Large	15.58	15.09	14.57	14.48	16.45	16.98

Note: Marginal (< 1ha), Small (1-2), Semi-Medium (2-4), Medium (4-10) and Large (10& above)
Source: Statistical Abstracts (2001-02)

[126] ibid

5.1.1 Population Pressure and Land Availability

The planning commission in its 11th plan document suggests strategy for poverty eradication which identifies poor land man ratio responsible for the regional poverty characteristics in the country. Even in case of Gujarat, the stabilisation of poverty in the backward blocks is due to increase in population pressure on the limited agricultural land.

The poorer regions mainly located in the blocks which are forested and where agriculture is dependent on the rainfall. The dry regions of North Gujarat, Kachchh, Eastern hilly and Forest areas of South Gujarat are prone to poverty. The land availability for the population has reduced substantially over 50 per cent in most parts of the State. However, the population pressure is highest in the central Gujarat. There is high incidence of rural poverty in the central Gujarat despite high growth in agricultural production due to severe decline in Land Man Ratio (See Table 5.2).

Table 5.2
Regional Changes in Land Man Ratio (1981-2011)

		Population (1981-2011)				Land-Man Ratio (1981-2011) in Hec			
Region	**Geographical Area**	**1981**	**1991**	**2001**	**2011**	**1981**	**1991**	**2001**	**2011**
North	30424	6201712	7496275	8940627	10301342	0.490	0.405	0.340	0.295
Central	31662	11528302	14011483	16988476	20269803	0.274	0.225	0.186	0.156
South	23947	5726123	7313291	9707220	12287469	0.418	0.327	0.246	0.194
Saurashtra	64339	9579501	11226026	13434348	15434701	0.671	0.573	0.478	0.416
Kachchh	45652	1050161	1262507	1526321	2090313	4.347	3.615	2.990	2.183
Gujarat	**196024**	**34085799**	**41309582**	**50596992**	**60383628**	**0.575**	**0.474**	**0.387**	**0.324**
Source: Census of India, 1981-2011									

The decline in the per capita availability of land would impact the cropping pattern, which has been also observed in changes from food crops to cash crops in central and south Gujarat. Though the availability of land is better in Kachchh but poor quality of land and lack of irrigation facilities makes crop production less viable.

5.1.2 Land Availability for Agriculture

According to a study on the degraded and wasteland of Gujarat by National Bureau of Soil Survey and Land Use Planning (NBSS & LUP), in Gujarat, about 50 per cent of the area is under cultivation, of which, only one fifth is irrigated. About 10 per cent area is under forests and the remaining 40 per cent is either left barren or unculturable/culturable waste.

The State has experienced strong economic growth due to the comparative socio-economic advancement for some regions over others. The most important dimension in the process of urbanization in the State relates to the shifting importance of the different regions. Fuelled by continuous movement of people from one region of the State to another and by no less important factor of differential natural increase some regions and districts have attained high levels of urbanization in the mainland Gujarat while other regions in eastern Gujarat and Saurashtra have not been able to reach even the 1951 State level of urbanization. Thus, the level of urbanization and consequential industrialisation in Gujarat is on the rise and it has to deal with problems of encroachment on productive agricultural lands. In addition, this is also due to persistent completion between urban and rural land-uses based on more favourable land rates in a free market towards non-agricultural uses. Therefore, it is obvious that, higher level of urbanization would automatically lead to greater proportion of area under non-agricultural uses. In this context, issues relating to the subject of natural resource management generates a somewhat different meaning, as it relates not only to natural resource such as land, its exhaustion or depletion but also equally to its under-use, over-use, and often even its misuse.

The diversion of agricultural land for the non-agricultural purposes has large impact on the dependent population. As per an estimate 67 per cent of cultivators in the State own just 27 per cent of the agricultural land, for more families and communities depend on a piece of land (for work, grazing) than those who simply own it.

For industrial development in the State the Gujarat Industrial Development Corporation (GIDC) has acquired or developed about 305 sq. kms. of area for industrial estates in the last five decades, and for the proposed Special Investment Regions (SIRs), the Government plans to acquire around 4,188 sq. km. of area.[127] Some of the land is Government owned, while a major share belongs to agricultural land. The 4,188 sq. km. area is yet to be acquired and does not include land required for the 90 proposed SEZs in Gujarat.

[127] IE, 2011, News Item, Indian Express, June 30, 2011, Ahmedabad Edition

The state government has proposed 319.68 sq. km land for Special Economic Zones (SEZs), which is a mere 13 per cent of the proposed land for SIRs in the State.[128]

5.1.3 Wasteland and Salinity Ingress in the State

The wasteland (also termed as *degraded land*) includes — land with or without scrub, waterlogged and marshy land, land affected by salinity/alkalinity coastal/inland, shifting cultivation area, degraded pasture/grazing land, degraded land under plantation crop, sandy/inland coastal and mining/industrial wastelands.

According to **National Bureau of Soil Survey and Land Use Planning (NBSS & LUP), Nagpur** estimates (2004) the total degraded area in Gujarat is 3,129 thousand hectares, about 16 per cent of Total Gross Area (TGA). The highly affected districts are Kachchh (595 thousand ha), Surendranagar (404 thousand ha), Patan (317 thousand ha), Jamnagar (196 thousand ha) and Surat (192 thousand ha) (Table 5.3). Among the districts affected by water erosion, Surat ranks first with 160 thousand hectares, followed by Bharuch (114 thousand ha), Valsad (93 thousand ha), Dangs (84 thousand ha), Porbandar (67 thousand ha), Navsari (66 thousand ha), Dahod (60 thousand ha) and Banaskantha (55 thousand ha). This includes erosion in open forest area also.

Saline soils account for 1,559 thousand hectares (8% TGA); of which 579 thousand hectares are in Kachchh. Other areas affected by salinity are Surendranagar (222 thousand ha), Jamnagar (186 thousand ha), Ahmedabad (159 thousand ha) and Rajkot (106 thousand ha). *Sodicity*[129] is also a major problem in Gujarat. Sodicity affected areas account for 545 thousand hectares and highly affected districts are Kachchh (468 thousand ha), Patan (253 thousand ha), Surendranagar (119 thousand ha) and Ahmedabad (96 thousand ha). Wind erosion is active in Patan district and region of the State.

[128] Ibid.
[129] *Sodacity*, is term used for defining the salinity in the top soil.

Table 5.3
Degraded and Wastelands Statistics of Gujarat (Area in '000 ha)

	Degraded and Wastelands Classes*										
Districts	**1**	**2**	**7**	**8**	**11**	**13**	**18**	**19**	**Total of Class**	**Others****	**Total**
Ahmedabad	0	0	159	0	0	96	0	0	255	549	884
Amreli	26	5	7	0	0	0	1	0	39	704	743
Anand	18	0	7	0	0	0	0	0	25	270	295
Banaskantha	55	0	47	0	0	42	0	0	144	935	1079
Bharuch	114	0	20	0	0	0	1	0	135	519	654
Bhavnagar	0	0	77	0	0	14	0	0	91	905	996
Dahod	57	3	0	0	0	0	0	0	60	307	367
Dangs	84	0	0	0	0	0	0	0	84	94	178
Gandhinagar	0	0	0	0	0	0	0	0	0	217	217
Jamnagar	9	0	185	1	0	0	1	0	196	1,206	1402
Junagadh	42	6	29	0	0	0	0	0	77	809	886
Kachchh	0	0	519	0	60	11	5	0	595	3,948	4543
Kheda	35	0	0	0	0	0	0	0	35	388	423
Mehsana	0	0	9	0	0	10	0	0	19	420	439
Narmada	27	3	0	0	0	0	0	0	30	246	276
Navsari	66	0	5	0	0	0	1	0	72	150	222
Panchmahal	24	0	0	0	0	0	0	0	24	500	524
Patan	0	0	63	0	0	253	0	0	317	269	586
Porbandar	67	0	10	3	0	0	0	0	80	151	231
Rajkot	9	0	106	0	0	0	0	0	115	999	1114
Sabarkantha	5	0	0	0	0	0	0	0	5	737	742
Surat	156	4	29	0	0	0	3	0	192	587	779
Surendranagar	62	0	222	3	0	119	1	0	404	637	1041
Vadodara	41	0	0	0	0	0	0	0	41	716	757
Valsad	82	11	1	0	0	0	0	1	95	210	305
Total	979	32	1,495	4	60	545	12	1	3,129	16,473	19683

Notes: Classes*: 1 Exclusively water erosion (>10 tonnes/ha/yr); 2 Water erosion under open forest; 7 Exclusively saline soils; 8 Eroded saline soils; 11 Saline soils under open forest; 13 Exclusively sodic soils; 18 Mining/Industrial waste; 19 Waterlogged area (Permanent)
Others**: Normal agricultural lands, water-bodies, rivers, lakes and habitats etc. (based on the limited reconnaissance survey)

Source: NBSS&LUP **(**National Bureau of Soil Survey and Land Use Planning), Nagpur

Around 1.2 million hectares of land in Gujarat have salt affected soil, which is 15 per cent of the total 8.1 million hectares of salt affected soil reported in the country. This affects the soil health and land productivity particularly in the most affected regions of coastal

Saurashtra and Kachchh. According to Coastal Salinity Prevention Cell (CSPC)[130], Ahmedabad

> "*The state has experienced an increase in agricultural intensity, which in turn has increased the amount of water used per unit of output. In areas of Saurashtra, the change in cropping pattern towards cash crops along with subsidized or free electricity has raised the demand of water for agriculture. The rate of withdrawal exceeds the rate of recharge in the region; this has resulted in lowering of water table and subsequent intrusion of seawater due to reverse hydraulic gradient and capillary action. The intrusion accelerates in the region due to presence of porous limestone.*"[131]

The other reasons cited by the experts in the field for the intrusion of salinity in coastal Saurashtra is loss of mangroves and vegetation, lowered availability of fresh water in rivers due to damming for the salt works, discharge of industries and increase in the pressure of human settlements. The CSPC study (2004) reports, 'the salinity affected areas increased from 1,00,000 hectares in 1977 to 103524 hectares in 2003, implying a 3.5 per cent increase in spite of focused efforts of the Salinity Ingress Prevention Circle (SPIC) in the region.'[132]

According to the SIPC (2005), Government of Gujarat, the study on the extent of salinity in ground water of coastal Saurashtra shows, 379 villages out of 954 or about 40 per cent villages are fully saline (TDS > 2000 mg/litres: whole year). About 177 villages have partially saline ground water (19 %) i.e. TDS > 2000 mg/litres during summer and 398 or 41 per cent villages are probable saline i.e. TDS < 2000 mg/year. For the most part of year, about 60 per cent of regions face shortage of drinking water.[133]

5.2 Regional Water Resources and Development Status

Water is central to the 'development' of any region. Water resource development was initiated in India for 'agriculture' during the initial ten plan periods and for 'industry' led development during the recent two plans in the State. The era of water resource development moved from ground water to surface water based development, which many researchers have pointed out, have benefitted only the medium and large farmers.

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[130] CSPC is a joint initiative of AKRSP (I), Ambuja Cement Foundation (ACF), Sir Ratan Tata Trust and Government of Gujarat. As on 7th April, 2008 CSPC registered itself as a Company under Section 25 of the Companies Act 1956.

[131] Hirway, Indira and Shital Lodhia (2004): "Status of Drinking Water in Gujarat: Towards Sustainable Approach", WP 15, CFDA, Ahmedabad.

[132] CSPC (2011): *A Note on the Salinity Conditions in Coastal Saurashtra, Gujarat*, PDF, accessed from www.cspc.org.in on 22/10/2011.

[133] ibid, 2005 data

The poor and small farmers have not benefited from these massive capital-intensive technological inputs in the water resources development. The capital based tube well (electrified and non-electrified) and canal based irrigation has benefited the economically prosperous regions and farmers. On the other hand, the backward and poor farmer is compelled to rely on the local water harvesting techniques (check dams/field ponds) for their water requirements. The ability of regions to acquire, use and divert water resources has important implications in the development differentials in the State. At present, the surface water resources in the State is diverted from the backward tribal regions to the relatively prosperous central Gujarat, north Gujarat, Kachchh and Saurashtra regions.

Table 5.4 **Area Under Irrigation in Gujarat, 2009**	
Total land held by Operational Holders	99.04 lakh hectares
Actual cultivated area	94.99 lakh hectares
Total cultivated area	107.02 lakh hectares
Cropping intensity	115%
Source-Wise Area Under Irrigation	
Tube Wells	9.41 lakh hectares
Other Wells	15.11 lakh hectares
Canal	4.92 lakh hectares
Other Source	0.35 lakh hectares
Actual irrigated area	29.80 lakh hectares
Total irrigated area	36.28 lakh hectares
Source: http://agri.gujarat.gov.in/department/overview151.html	

Of total gross irrigated area about 17 per cent is irrigated by Government canals and 82 per cent by privately owned tube wells and other wells. Thus, agriculture in Gujarat depends predominantly on ground water. The total Culturable Command Area of the SSP is 1.8 million hectares, covering around 3,112 villages in Gujarat, of which only 0.3 million hectares is complete[134].

[134] Gulati, Ashok et.al (2009): "Agricultural Growth in Gujarat since 2000: Can it be Divadandi (Lighthouse) for Other States", IWMI-IFPRI, PDF, pp.8-9

5.2.1 Regional Exploitation of Water Resources in Gujarat

Gujarat is a water stressed state, with its per capita availability of fresh water at 1,137 M^3 (less than 1700 M^3 per year)[135]. Several regions of the State also suffer from chronic water shortages. This shortage is reflected in the poor availability of potable water in many parts of the State, particularly in North Gujarat, Saurashtra and Kachchh. Though efforts are made to ensure adequate water supply to all, these efforts have not been very successful. There is therefore a need to take a fresh look at the problem and the efforts in order to understand the problem better and to reorient the efforts.

Table 5.5
Ultimate Irrigation Potential through Surface Water in Gujarat
(2001, 2003 and 2009)

(In Lakh Hectares)

Item	Ultimate Irrigation Potential	Irrigation Potential Created Up to June, 2001	Max. Utilisation Up to June, 2001	Irrigation Potential Created Up to June, 2003	Max. Utilisation Putto June, 2003	Ultimate Irrigation Potential	Irrigation Potential created up to June-2009 (cum)	Max. Utilisation upto June-2009 (cum)
1. Surface Water	39.4	16.64	14.24	17	14.81	39.4	30.12	22.59
i) Major & Medium Schemes	18	14.07	12.67	14.1	12.94	18	15.59	12.59
ii) Sardar Sarovar Project (Including conjunctive use)	17.92	-	-	0.25	0.25	17.92	4.87	2.53
iii) Minor irrigation	3.48	2.57	1.57	2.65	1.62	3.48	3.03	1.7
iv) Indirect benefits through Check Dams	-	-	-	-	-	-	5.49	4.66
2. Ground Water (Including private Resources)	25.48	20.3	18.29	20.35	20.34	25.48	0.87	1.2
Government Tube Wells	-	-	-	-	-	-	0.87	1.2
Total (1+2)	64.88	36.94	32.53	37.35	35.15	64.88	30.99	23.79
3. Indirect Benefit through water Conservation Programme	-	-	-	2.15	2.15	-	1.14	1.1
Source: Directorate of Economics & Statistics, Govt. of Gujarat. (ON107)								
Year: Period of fiscal year in India is April to March, e.g. year shown as 1990-91 relates to April 1990 to March 1991.								

[135] According to the norms, per capita availability of water above 1700 M^3 is "satisfactory", 1000-1700 M^3 is "water stress", 500-1000 M^3 is not favourable to human health as well as economic growth and below 500 M^3 is "threat to life".

Most of Gujarat's surface water resources are concentrated in South Gujarat, which has many perennial rivers such as Mahi, Narmada, Tapi, Karjan and Damanganga that carry huge amount of flows annually. Due to low variability in rainfall, the variability in annual stream flows is also low, increasing the dependability.

(a) Irrigation Potential in Gujarat

As per the estimates (Table 5.5), the State has the irrigation potential of about 64.88 lakh hectares from the available surface water and ground water sources including that from the Sardar Sarovar Project (SSP). The surface water has the potential to irrigate 39.4 lakh hectares whereas the ground water can irrigate 25.48 lakh hectares. Given the slow progress in the utilization of SSP canal works, the irrigation potential (17.92 lakh ha) utilization was below 2.53 lakh hectares until year 2009.

The ground water sources utilization for irrigation was below the earlier expected utilization from 20.04 lakh hectares in year 2001 to just 0.87 lakh hectares in year 2009. This might be due to overexploitation of the ground water resources in the previous decades in state. Moreover, the additional water conservation programs (like Watershed, field ponds etc.) by the Government of Gujarat could provide irrigation for barely 1.1 lakh hectares till year 2009.

(b) District-Wise Irrigation Potential

Based on the above estimation of storage and irrigation potential (IP), it is observed that about 30.5 lakh hectares are created through various projects. The highest IP creation is in south Gujarat, especially in Bharuch district (SSP on river Narmada). However, the other rivers in Gujarat like Mahi, Tapi, and Damanganga etcetera have also been utilized in creating large storages for surface irrigation.

Table 5.6
District-Wise Surface Water Status in Gujarat (2004)

District	Gross Storage	Irrigation Potential
Valsad	611.75	65.98
Surat	8,610.72	235.33
Bharuch	10,177.17	1,874.42
Vadodara	199.71	37.55
Panchmahals	2,606.7	93.3
Kheda	41.92	201
Sabarkantha	569.67	71.81
Banaskantha	681	82.59
Mehsana	909.3	57.68
Ahmedabad	9.76	18.74
Surendranagar	198.85	70.33
Bhavnagar	627.96	62.29
Amreli	113.4	13.80
Junagadh	273.17	51.45
Jamnagar	293.11	28.47
Rajkot	755.63	74.74
Kachchh	299.62	19.43
Total	**26,979.44**	**3,058.902**
GS=Mm3, IP='000hec		
Source: Estimated from MoWR Irrigation Project data,		

In contrast to this, north Gujarat, Saurashtra and Kachchh are very poorly endowed with surface water potential as the rivers and rivulets there have only limited seasonal flows. Due to high variability in rainfall, the stream flows also vary remarkably from year to year. The numerous major and medium irrigation schemes built on these three regions during 60s, 70s and 80s impound the monsoon runoff from around 91 basins in Saurashtra, around 100 rivulets in Kachchh, and a few small and big river basins in north Gujarat viz., Sabarmati, Banas, Rupen and Saraswati which are in fact, over-designed.[136]

(c) Regional Ground Water Utilization

Regional ground water utilization in the State has changed in five decades of its formation in association with expansion of land use intensity. Due to poor water harvesting

[136] Kumar, M. Dinesh (2002): *Reconciling Water Use and Environment: Water Resources Management in Gujarat Resource, Problems, Issues, Options, Strategies and Framework for Action*, Report of the Hydrological Regime, Subcomponent of the State Environmental Action Programme supported by the World Bank, prepared for Gujarat Ecology Commission, Vadodara

leading to excessive run off and poor recharging of ground water, and excessive drawl/exploitation mainly to meet the drinking and other daily requirements of the growing population and the newly introduced high yielding variety crops, the ground water potential has dwindled very fast. The number of dark *talukas,* where there is over exploitation of groundwater (over 85% exploitation), is increasing in most of the districts. A study pertaining to 1984-85 to 1998-99 reports that, the dark *talukas,* mostly located in north Gujarat (Banaskantha, Mehsana and Sabarkantha district) has increased from six to twenty-six.

The Gujarat Ecology Commission has published a *taluka*-wise map of the State presenting the utilization data for the groundwater depicting depletion of ground water sources in state by depicting changes in dark *talukas* since 1984 to 1999.

5.2.2 Regional Changes in Irrigation and Net Sown Area

The availability of irrigation per net sown area indicates greater emphasis on the agricultural sector in the State. The development of irrigation sources is important for the development of agriculture, where in reliance on any one source is not possible. Majority of irrigation in the State takes place through ground water sources (tube well or dug well), whereas surface water sources (canal, river or pond) have been limited to irrigate less than 10 per cent of the net sown area. The availability of surface water through canal network contributed towards enhancing the agricultural production in the State, mostly in south (Surat) and central Gujarat (Kheda and Anand) until the SSP was made operational.

The map (Figure 5.1) shows the development of irrigation in the State, the data presents the irrigation intensity reflects the irrigation from all sources based on census 2001. The irrigation development in the State prior to commencement of Narmada Canal shows distinct pattern in which mainland Gujarat is major beneficiary from the irrigation programs. The North Gujarat plains, *Charotar* region (South of Vatrak River to North of Mahi River), Olpad and *Choryasi* plains and some parts of Navsari and Valsad are major beneficiaries.

In Saurashtra parts of Bhavnagar, Junagadh, Amreli and Southern parts of Jamnagar are the major beneficiary of the irrigation system. Thus despite the warning on the increase in salinity ingress the withdrawal of the ground water continued in Saurashtra region.

It is expected that post implementation of distribution canal of Narmada Canal project the irrigation intensity of the main land Gujarat and parts of Saurashtra is going to

increase. However, the slow implementation progress (about 27 per cent of 74626 kms of canal network completed, 2012) and lack of command area development program have not given the expected results.

The data is not available on the bulk withdrawal for agriculture from the Narmada canal from the main branch and sub-branch continues in main land Gujarat as well as in Saurashtra. There is lack of data on the extent of irrigation achieved from these sources. About 1.6 per cent of total cultivable land of Kachchh and 9.24 per cent of cultivable land of Saurashtra are in the Sardar Sarovar Project command area.[137]

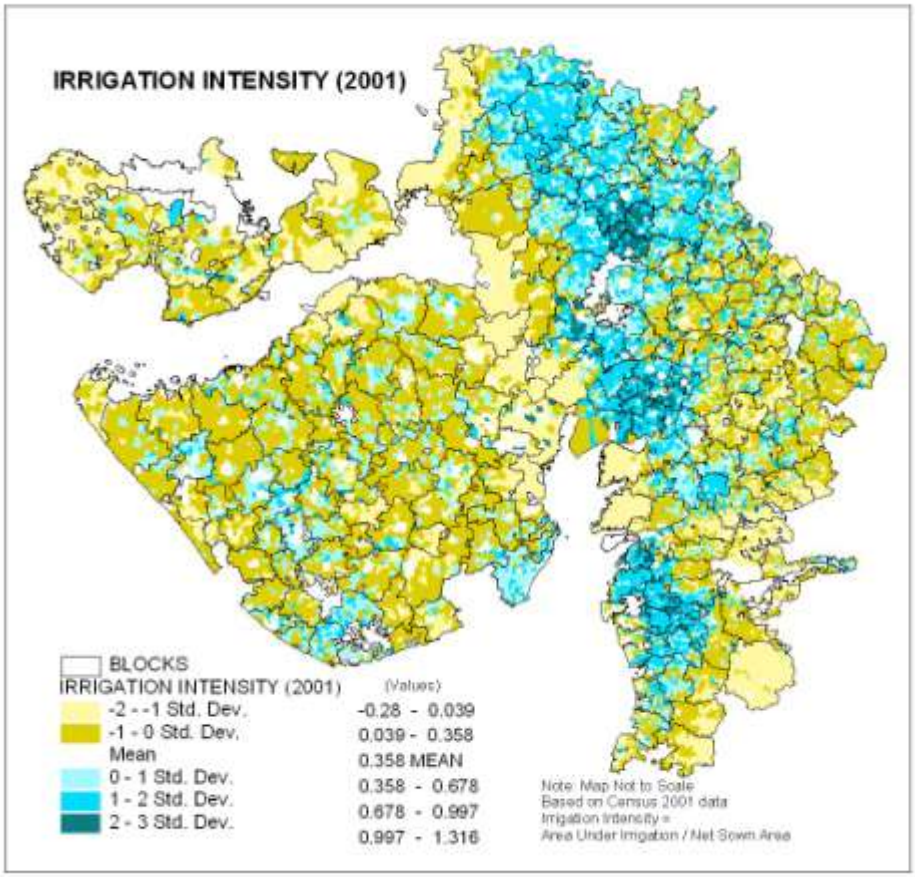

Figure 5.1: Irrigation Intensity in Gujarat -2001

[137]NCA, 2012, http://nca.gov.in/faq3.htm accessed on 20th Dec 2012 6.03 pm

Table 5.7
Source Wise Net Area Irrigated in Gujarat
(1970-1971, 1980-1981, 1985-1986, 1989-1990 to 2004-2005)

(Area in ' 00 Hectares)

Year	Net Area Irrigated by					Gross Irrigated Area (GIA)	Per centage of Net Area Irrigated to Net Area Sown	Per centage of Goss Irrigated Area to Gross Cropped Area
	Govt. Canals (Incl. Panchayat Canals)	Tube wells & Other Wells	Tanks	Other Sources	Total			
1970-71	2,358	10,831	372	147	13,708	-	14.11	-
1980-81	3,668	15,884	408	65	20,026	23,344	20.91	21.72
1985-86	3,585	16,533	253	24	20,395	-	21.57	-
1989-90	4,690	19,606	304	36	24,636	-	26.36	-
1990-91	4,731	19,301	314	30	24,376	29,105	25.74	27.37
1991-92	4,705	18,679	265	66	23,715	-	25.52	-
1992-93	5,570	20,565	256	34	26,425	-	27.42	-
1993-94	5,301	19,709	307	88	25,405	-	28.89	-
1994-95	5,930	23,656	353	82	30,021	-	31.06	-
1995-96	5,735	22,665	417	105	28,922	34,994	33.23	31.83
1996-97	6,125	23,863	292	138	30,418	-	31.56	-
1997-98	6,357	23,687	298	243	30,585	-	31.62	-
1998-99	6,021	24,305	253	245	30,824	-	31.88	-
1999-00	4,923	24,517	178	177	29,795	36,267	31.55	33.89
2000-01	3,476	24,347	153	84	28,060	33,421	29.75	31.84
2001-02	3,824	25,901	132	87	29,944	35,728	31.12	33.11
2002-03	3,804	26,373	135	149	30,461	36,370	32.32	34.21
2003-04	5,997	27,364	262	252	33,875	41,112	34.58	36.00
2004-05	6,762	27,764	334	416	35,276	-	36.19	-

Source: Directorate of Economics and Statistics, Govt. of Gujarat (ON104)

Year: Period of fiscal year in India is April to March, e.g. year shown as 1990-91 relates to April 1990 to March 1991.

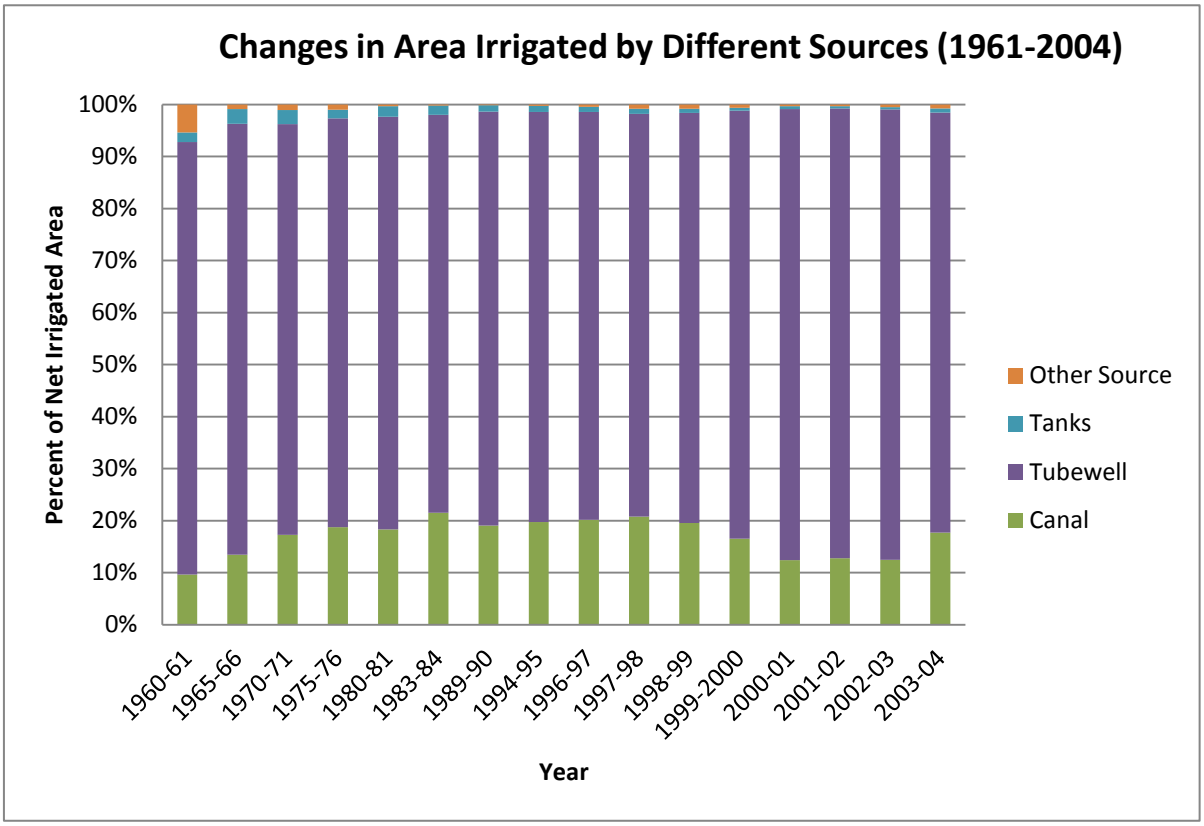

Figure 5.2: Changes in Area Irrigated by Different Source in Gujarat (1961-2004)

5.3 Land use Pattern

The physical, economic and institutional framework taken together determines the pattern of land use of a region or state at any particular time. The existing land use pattern in different regions of Gujarat has evolved as the result of the action and interaction of various factors. These includes the physical characteristics of land, the structure of resources like, available capital and labour, and the location of the region in relation to other aspects of economic development, e.g. those relating to transport as well as industry and trade. This section analyses the land use changes in the State during the during 1971-2004 (Table 5.8) based on the data collected by the Department of Agriculture, Government of Gujarat and published in statistical reports (Figure 5.3).

Table 5.8: Regional Land Use Change (1985-86, 1993-94, 1999-2000 and 2003-04) 1985-86 to 2003-04
(Area in '00 Hectares)

1985-86											
Region	**Geographical Area.**	**Reporting Area**	**Forest**	**Area under Non -Agri. Uses**	**Barren and Unculturable**	**other Grazing Land**	**Land under Misc. Tree**	**Culturable Wasteland**	**Other Fellow**	**Current Fallow**	**Net Area sown**
North Gujarat	29,769	29,294	2,883	1,838	807	1,630	0	646	11	2,344	19,135
Central	32,561	32,037	3,309	2,707	1,738	1,218	0	606	99	1,713	20,666
South	23,703	22,434	5,824	2,220	943	584	42	1028	0	957	12,412
Saurashtra	64,339	58,832	3,881	3,416	5,686	4,356	0	1,734	315	3,887	35,997
Kachchh	45,652	45,652	2,901	700	17,671	700	0	16,006	0	584	7,090
Gujarat	**1,960,24**	**1,88,249**	**18,798**	**10,881**	**26,845**	**8,488**	**42**	**20,020**	**425**	**9,485**	**95,300**
1993-1994											
Region	**Geographical Area.**	**Reporting Area**	**Forest**	**Area under Non -Agri. Uses**	**Barren and Unculturable**	**Pasture and other Grazing Land**	**Land under Misc. Tree**	**Culturable Wasteland**	**Other Fellow**	**Current Fallow**	**Net Area sown**
North Gujarat	29,769	29,293	2,933	1,891	859	1,612	0	552	9	1,143	20,292
Central	32,561	32,017	3,182	2,906	1,695	1,217	0	472	69	1,613	20,864
South	23,703	22,434	5,701	2,351	994	563	40	817	0	325	11,643
Saurashtra	64,339	58,733	3,910	3,506	5,434	4,398	0	1,092	164	2,644	37,587
Kachchh	45,652	45,652	2,886	730	17,056	700	0	16,805	0	1,865	5,610
Gujarat	**1,96,024**	**1,88,129**	**18,612**	**11,384**	**26,038**	**8,490**	**40**	**19,738**	**242**	**7,590**	**95,996**
1999-2000											
Region	**Geographical Area.**	**Reporting Area**	**Forest**	**Area under Non - Agri. Uses**	**Barren and Unculturable**	**Permanent Pasture and other Grazing Land**	**Land under Misc. Tree**	**Culturable Wasteland**	**Other Fellow**	**Current Fallow**	**Net Area sown**
North Gujarat	29,733	29,293	2,933	1,895	861	1,612	0	546	9	1,202	21,233
Central	32,545	32,017	3,238	2,925	1,689	1,218	0	485	43	1,716	22,703
South	23,808	22,434	5,683	2,356	1,013	563	40	824	0	452	12,063
Saurashtra	64,339	58,722	3,915	3,508	5,419	4,398	0	1,151	79	3,175	34,077
Kachchh	45,652	45,652	2,879	730	17,056	700	0	16,812	0	2,562	4,913
Gujarat	**1,96,077**	**1,88,118**	**18,648**	**11,414**	**26,038**	**8,491**	**40**	**19,818**	**131**	**9,107**	**94,989**
2003-04											
Region	**Geographical Area.**	**Reporting Area**	**Forest**	**Area under Non -Agri. Uses**	**Barren and Unculturable**	**other Grazing Land**	**Land under Misc. Tree**	**Culturable Wasteland**	**Other Fellow**	**Current Fallow**	**Net Area sown**
North Gujarat	30,424	29,966	2,927	1,949	892	1,662	0	559	2	1,064	20,911
Central	31,662	31,017	2,977	2,819	1,815	1,161	0	604	38	1,473	20,130
South	23,947	22,679	5,578	2,380	1,160	565	40	754	0	455	11,747
Saurashtra	64,339	58,804	3,986	3,568	5,350	4,415	0	1,116	72	1,932	38,365
Kachchh	45,652	45,652	3,068	737	16,857	700	0	16,734	0	757	6,799
Gujarat	**1,96,024**	**1,88,118**	**18,536**	**11453**	**26,074**	**8,503**	**40**	**19,767**	**112**	**5,681**	**97,952**

5.3.1 Changes in Land Use Pattern (1984-2004)

Land use changes in the State defines the direction of development state had taken during last two decade. The decline in common property resources are more important, also land designated as barren shows increase in main land Gujarat. The land use change is depicted in table 5.9 that shows the regional pattern of land use changes during 1983-84 and 2003-04.

Forested Area: The forested area in central and south Gujarat shows a decline of 10.03 per cent and 4.22 per cent. The loss of forest area was 33,200 hectares in central Gujarat and 24,600 hectares in south Gujarat. However, area under forest in Kachchh shows an increase of 5.76 per cent amounting to 16,700 hectares land mostly under open forests. Over the years, the State registered an overall decline of 1.39 per cent in the area under forest and is left with just over 26,200 hectares of land under this category. Between 1980 and 2003, about 55,977.33 hectares of forested land[138] was transferred to 830 various development projects by the State Forest Department.

Table 5.9: Changes in Land use

Per centage Change in Land use (1983-84 and 2003-04)											
Region	**Geographical Area.**	**Reporting Area**	**Forest**	**Area under Non -Agri. Uses**	**Barren and Unculturable**	**Pasture and other Grazing Land**	**Land under Misc. Tree**	**Culturable Wasteland**	**Other Fellow**	**Current Fallow**	**Net Area sown**
North Gujarat	2.20	2.29	1.53	6.04	10.53	1.96	0.00	-13.47	-81.82	-54.61	9.28
Central	-2.76	-3.18	-10.03	4.14	4.43	-4.68	0.00	-0.33	-61.62	-14.01	-2.59
South	1.03	1.09	-4.22	7.21	23.01	-3.25	-4.76	-26.65	0.00	-52.46	-5.36
Saurashtra	0.00	-0.05	2.71	4.45	-5.91	1.35	0.00	-35.64	-77.14	-50.30	6.58
Kachchh	0.00	0.00	5.76	5.29	-4.61	0.00	0.00	4.55	0.00	29.62	-4.10
Gujarat	0.00	-0.07	-1.39	5.26	-2.87	0.18	-4.76	-1.26	-73.65	-40.11	2.78
Absolute Change in Land Area (in '00 Hectares) 1983-84 and 2003-04											
Region	**Geographical Area.**	**Reporting Area**	**Forest**	**Area under Non -Agri. Uses**	**Barren and Unculturable**	**Pasture and other Grazing Land**	**Land under Misc. Tree**	**Culturable Wasteland**	**Other Fellow**	**Current Fallow**	**Net Area sown**
North Gujarat	655	672	44	111	85	32	0	-87	-9	-1,280	1,776
Central	-899	-1,020	-332	112	77	-57	0	-2	-61	-240	-536
South	244	245	-246	160	217	-19	-2	-274	0	-502	-665
Saurashtra	0	-28	105	152	-336	59	0	-618	-243	-1,955	2,368
Kachchh	0	0	167	37	-814	0	0	728	0	173	-291
Gujarat	0	-131	-262	572	-771	15	-2	-253	-313	-3,804	2,652

[138] Source: Rajya Sabha Unstarred Question No.395, Dated 05.12.2003.

Area under Non-Agricultural Use: During field investigation, the respondents mentioned that, Gujarat has lost the agricultural land to non-agricultural usage. The table shows that over the mentioned 20 years, the area under the non-agricultural usage has increased to 57,200 hectares (5.2 % increase) in the State. Region-wise, the increase in such area has been 16,000 hectares or 7.2 per cent in South Gujarat, 11,100 hectares or 6.04 per cent in North Gujarat, 3,700 hectares 5.29 per cent in Kachchh, 15,200 hectares or 4.45 per cent in Saurashtra, and 11,200 hectares or 4.12 per cent in central Gujarat. The State utilized 11.45 million hectares or 5.5 per cent of its total 196.02 million hectares area for non-agricultural purposes in 2003-04 as compared to only 10.8 million hectares or 5.3 per cent in the year 1983-94 - an increase of 6.5 lakh hectares of land for non-agricultural use in 20 years time period, which amounts to 32,000 hectares of land per annum. These lands cannot have come from only uncultivable or barren land but might also include the agricultural land for development projects required for boosting state economic growth. Though the fact was not investigated in this section, the subsequent section would discuss on the nature of loss of agricultural lands to development projects.

Barren and Uncultivable land: Land like mountains, arid lands, deserts etcetera, which cannot be brought under cultivation except at an exorbitant cost, whether such land is in isolated blocks or within cultivated holdings, should be classed as unculturable or uncultivable land,. Gujarat had 14.26 per cent of its area under the barren and uncultivable land in 1984 that reduced to 13.86 per cent by the year 2004. However, the area under barren and unculturable land reduced by 33,600 hectares in Saurashtra and 81,400 hectares in Kachchh, but in north and south Gujarat, the areas under the barren and unculturable land increased considerably to 8,500 hectares and 21,700 hectares respectively. The decrease in such area might be due to increase in the net sown area, as is the case in Saurashtra, or due to transfer of such land to non-agricultural usage. On the other hand, the increase in such area is directly related to changes like salinity ingress, land pollution - for example abandoned oil wells and sites in north and south Gujarat might result in unculturable land, conversion of agricultural land to mining area or abandoned mining zones – for example in south Gujarat many mines have been closed down after mineral extraction.

Permanent Grazing and Pasture Land: These are land of legislative status granted to local bodies like *Panchayats*, which maintain the required area as per the cattle population. The central and south Gujarat regions show decline in the grazing and pasture land by 5,700 and 1,900 hectares respectively. The north Gujarat and Saurashtra recorded increase in such

land by 3,200 and 5,900 hectares respectively. The decline of pasture land in central and south Gujarat may be associated with the pressure of urban-industrial development on such lands in these regions.

Fallow Land: Fallow land other than current fallows includes all lands, which were taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years. The reasons for keeping a land fallow may be one or more of the following reasons like, poverty of the cultivator, inadequate supply of water, climate, silting of canals and rivers and unremunerative nature of farming, etcetera. The State registered a decrease of 31,300 hectares of fallow land between 1983-84 and 2003-04, which is an indication of better utilization of land in the form of bringing it into cultivation.

An encouraging trend is observed in case of '*current fallows*', which represents cropped areas, which are kept fallow during a particular year. The trend of current fallow has declined in the State during the two years under study by 3,80,400 hectares which is utilized for cropping. Decreasing area under 'current fallows' in all the regions could be the consequence of the concerted efforts of the Government towards increasing agricultural production. North Gujarat and Saurashtra display relatively more areas of 'current fallow' being utilized for cropping with a 'current fallow' land utilisation of 1,28,000 and 1,95,500 hectares respectively. The increase in the number of normal monsoon periods, success of micro-irrigation schemes and availability of water from the Narmada Canal might have been responsible behind this positive impact.

It is also encouraging to note that the area under 'culturable waste' decreased by 25,300 hectares in the State during 1983-84 to 2003-04, probably been brought under cultivation. All regions of the State show decline in area under culturable waste except in Kachchh, where it has increased by 27,900 hectares.

Net Sown Area (NSA): The pressure of increasing population has always been more on the NSA. During the mentioned two decades of 1983-84 and 2003-04, the State has added 2.65 lakh hectares of land to its existing NSA. In per centage terms, it is a marginal increase from 50.62 to 52.06 per cent, against 1.5 times increase in population. The central, south Gujarat and Kachchh however, record a decline in their respective NSAs during the same period, which might be due to accelerated of urban-industrialisation processes in these regions. These regions have registered decline of NSA respectively by 53,600, 66,500 and 29,100 hectares over the last twenty years. On the contrary, there is a rise in the NSA to 1,77,600 and 2,36,800 hectares in North Gujarat and Saurashtra regions respectively.

5.3.2 Regional Changes in Land Utilization

The impact of development in agriculture, urbanisation and industries in regions differently felt; the geographical nature of region and development efforts determines the land utilization. The change in the regional profile of the State over the years has been discussed in the following paragraphs.

North Gujarat: North Gujarat showed an increase in forest cover by about 4,400 hectares or 1.53 per cent between 1984 and 2004. The region added 11,100 hectares land under the non-agricultural usage showing 6.04 per cent increase in such category of land. The reason might be due to increase urbanisation and land utilization for the infrastructure projects. One of the important changes is reduction in the current fallow and other fallow land, is around 1,28,000 hectares land was added to NSA of the region. The Mehsana, Gandhinagar and Patan districts depict better NSA among all the districts of the region, whereas Banaskantha district has low area under cultivation, which of course, improving slowly. This also reflects the success of irrigation schemes in the region and improved socio-economic conditions of the farmers in the region. The improvements might be due to various reasons, such as intervention of various NGOs, impact of watershed projects and availability of better technology. The region registered about 9.3 per cent increase in its NSA, amounting to 1, 77,600 hectares, perhaps by bringing the unutilized cultivable lands under the plough. However, the region has also registered increase in barren and uncultivable lands.

Central Gujarat: Central Gujarat comprising of Ahmedabad, Kheda, Anand, Dahod, Panchmahal and Vadodara shows improvement in the NSA. However, there is decline of NSA in the central Gujarat of 53,600 hectares this must be due to increase in land for non-agricultural purposes for about 11,200 hectares. Even though about 24,000 hectares of fellow land was utilized for the agriculture there is decline in NSA. It's expected that the current fellow may from last two decades are used back for agricultural due to the better rainfall season and increase in availability of irrigation facilities. As reported earlier also there was loss of forested land in this region which might be mostly due to various development projects like reservoirs, canal and road networks. However, the subsequent section would deal specifically for the land loss due to development projects, its evident the Ahmedabad and Vadodara might show increase in non-agricultural purpose due to urbanisation and infrastructure projects. The further losses cannot be ruled out due to increase in urbanisation and other development projects.

South Gujarat: South Gujarat mainly south of Vadodara from Bharuch to Vapi faced major pressure on the development on the agricultural land which records largest decline in Net Sown Area in two periods, of 66,500 hectares. Improvement in irrigation facilities have resulted in more utilization of fellow land for the crops, mostly cash crops and plantation. About 16000 hectares more land is being utilized for the non-agricultural purpose, increasing total to 2,38,000 hectares during 2003-04. The major changes have happened along the major transportation corridors mainly National Highway and Railway networks. During the recent years the proposed special investment regions, special economic zone in the region would yield more land for the non-agricultural purpose. The region also has recorded highest loss of land for the development projects which would be discussed in subsequent section. Forest loss had been mainly recorded in the eastern and southern hilly areas, about 24,600 hectares. It has to be noted that there is increase in barren and uncultivable land in the region, might be result of extensive mining in some *taluka*s and poor soil condition due to pollution from industrial activities mostly in and around Ankleshwar, Bharuch and Vapi industrial complexes.

Saurashtra: The region shows the highest increase in the NSA up to 2, 36,800 hectares due to extensive work during the past two decades mostly related micro irrigation projects, which also documented in study conducted by Ashok Gulati and Others for International Water Management Institute (IWMI) and International Food Policy Research Institute (IFPRI) in 2007. They report, 'Agriculture in Saurashtra and Kutch regions, largely dependent on groundwater, has suffered from water scarcity and groundwater depletion since the 1980's. In the 1990s a decentralized movement for groundwater recharge started in Saurashtra and Kutch by local grassroots organizations and communities. Taking off from this, the State government launched the Sardar Patel Participatory Water Conservation Project (SSPWCP) in 2000 for the construction of water harvesting and ground water recharge structures like check dams, boribunds, village and farm ponds (*khet talavadis*) under a 60:40 scheme in which government contributed 60% of the cost while the farming communities contributed 40 per cent.' [139] However, about 15,000 hectare more land has been utilized for the non-agricultural purposes, mostly for industrial complexes and urban development. There are most declines in fellow land, culturable waste and barren land in the region during last two decades. About 1,95,000 hectares of fellow land has been brought to

[139] Gulati, Ashok et.al (2009): "Agricultural Growth in Gujarat since 2000: Can it be Divadandi (Lighthouse) for Other States", IWMI-IFPRI, PDF, p.9

be used for the agricultural purposes contributing most towards the present (2004-2011) agricultural growth in the State.

Kachchh: Due to poor irrigation facilities and more dependent on the rainfall the net sown area in regions shows decline with loss of over 23,000 hectares of the land. There is increase in dry regions and desertification which can be gauged from the increase in the barren and unculturable land. The decline in Banni grasslands as reported in the studies done Charu Bharwada and Vinay Mahajan[140] in the region which has destroyed coastal ecology as well as livelihood of the people. They also report the over-exploitation and extraction of ground water resulting in increased salinity ingress and severe depletion of water resources. This has resulted in the degradation of land in Kachchh which also have affected agricultural production by reduction in NSA. The recent industrialization might also contribute towards loss of the NSA but facts needs to be ascertained during the field investigation in the region which may be reported in separate section.

The overall financial impact of the salination process is alarming. A study by the department of agriculture, Gujarat, shows that the cropped area before sea ingression in Malia-Lakhpat belt was 11,812 ha bringing an annual income of Rs 605.59 lakh to farmers. This area has reduced to 7,705 ha reducing income to Rs 240.45 lakh, an annual loss of Rs 365.24 lakh.[141]

[140] Bharwada, Charu and Vinay Mahajan (2002): "Drinking Water Crisis in Kutch: A Natural Phenomenon?", EPW, XXXVII (48), , pp. 4859-4866.

[141] Raju, K. C. B. (1992): "Status of Groundwater Resources: Kutch District – Gujarat", paper presented at a seminar on 'Kutch's Water Problems and their Solution', Gandhidham, March. Online PDF Document.

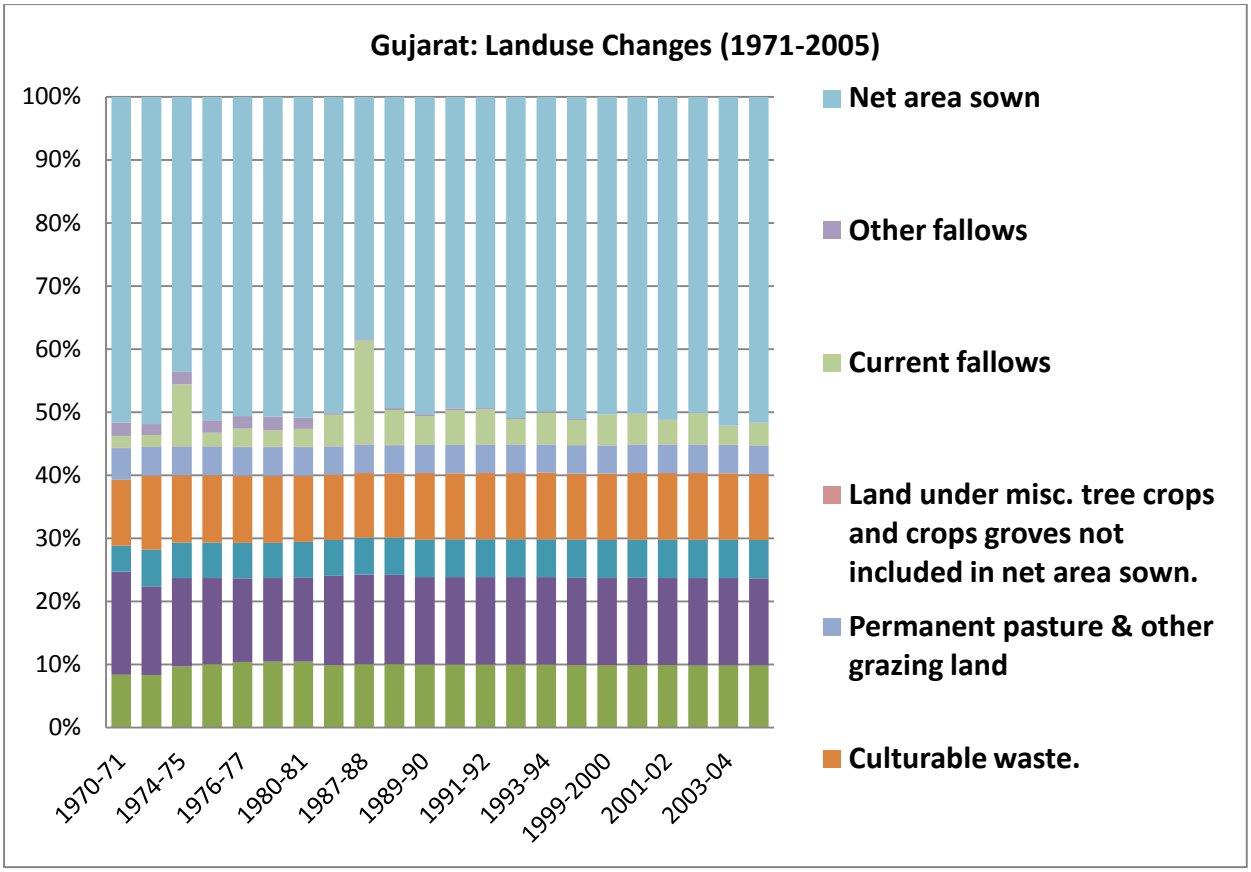

Figure 5.3: Land Use Changes in Gujarat (1970-71 to 2004-05)

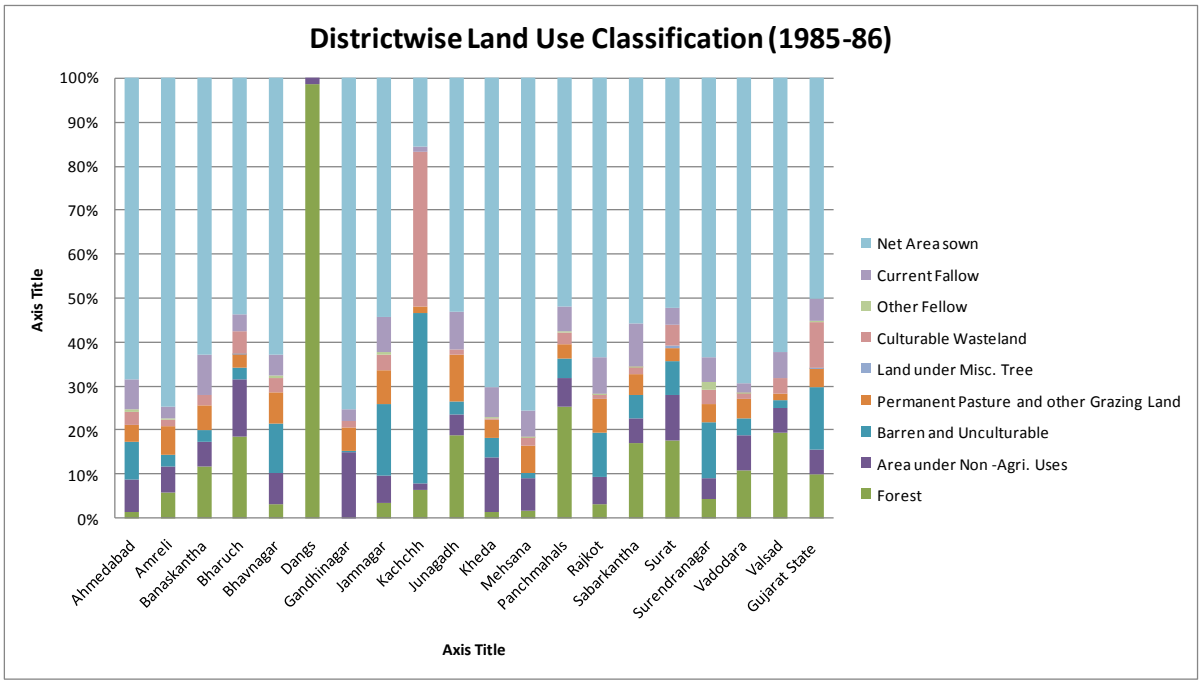

Figure 5.4: Districtwise Land Use Classification (1985-86)

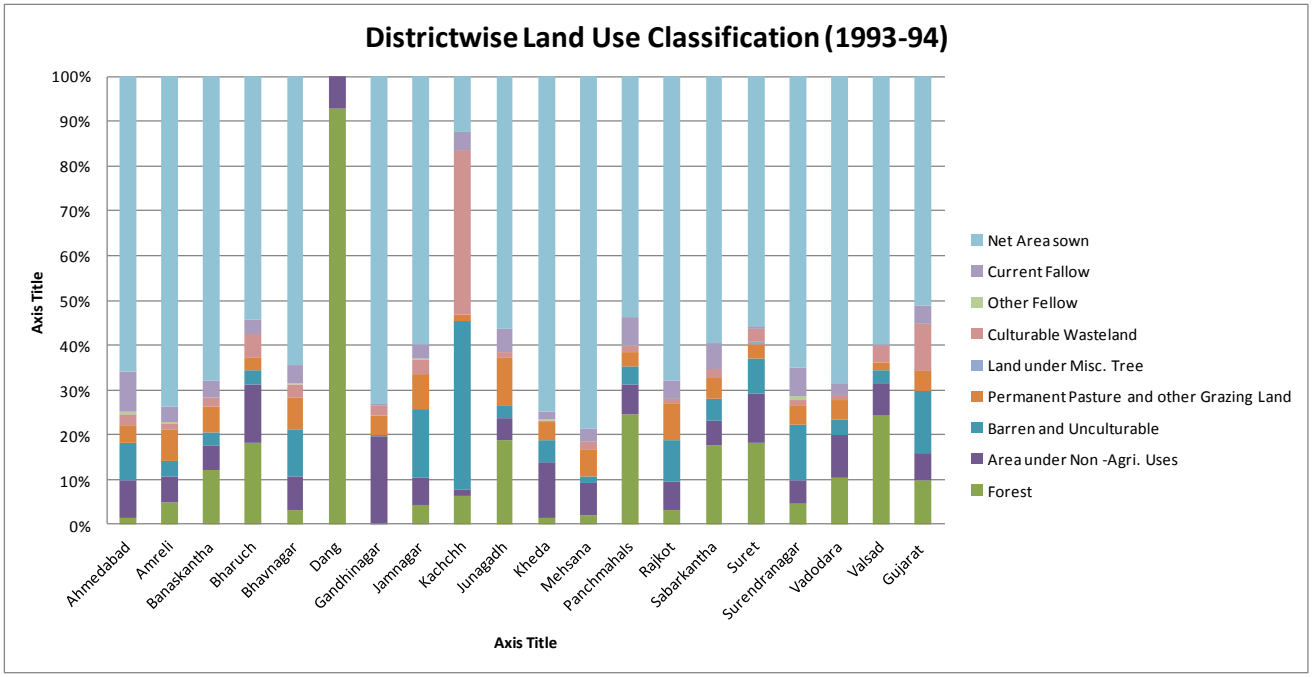

Figure 5.5: Districtwise Land Use Classification (1993-94)

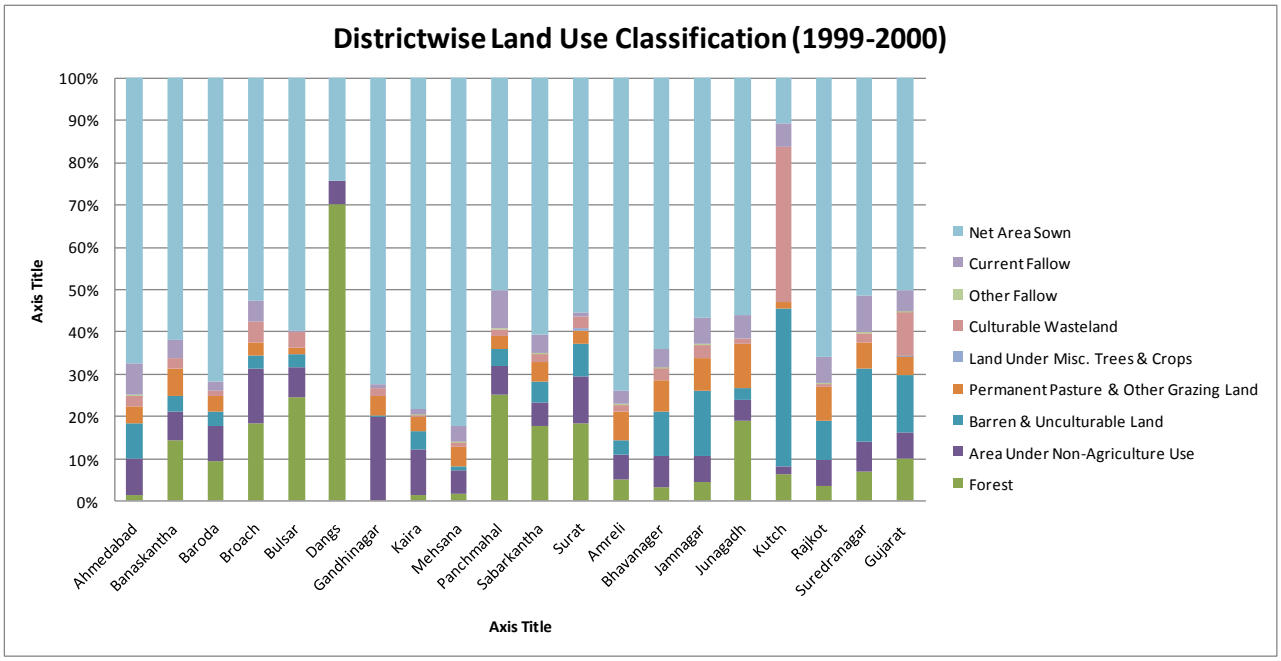

Figure 5.6: Districtwise Land Use Classification (1999-2000)

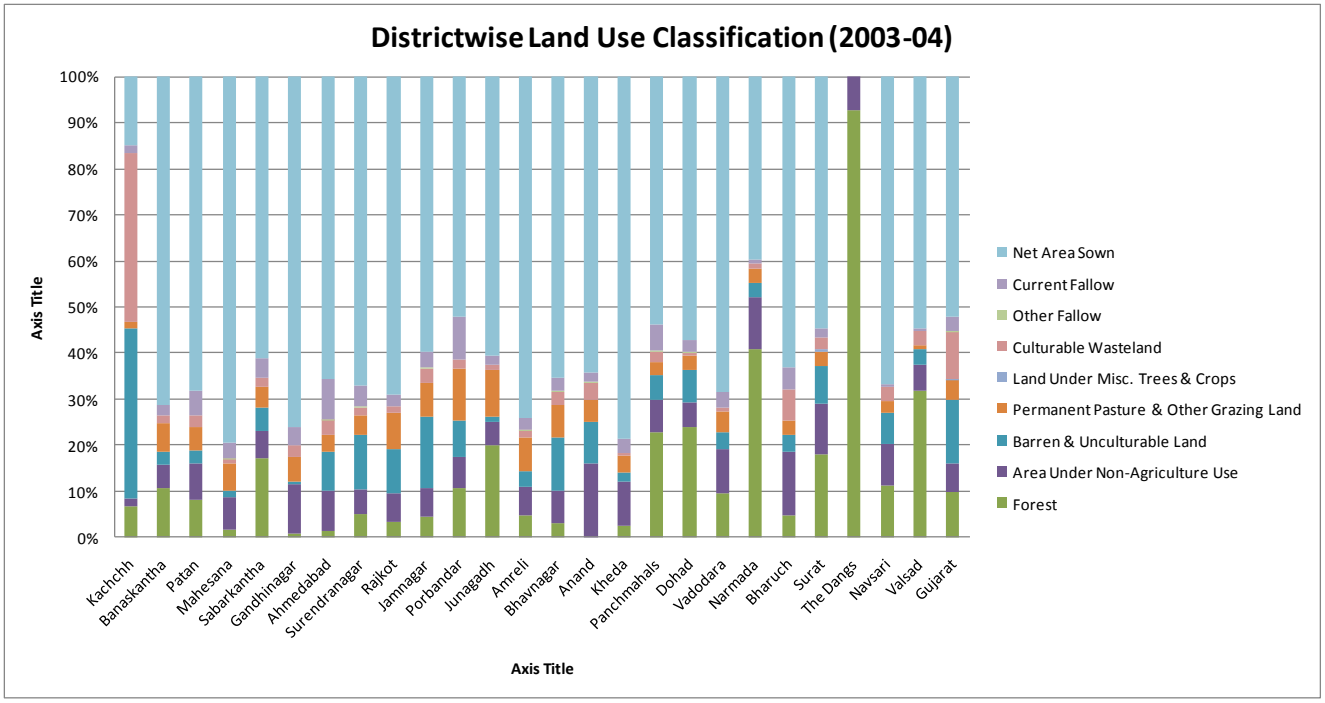

Figure 5.7: Districtwise Land use Classification (2003-04)

5.4 Regional Land Availability and Development Projects

The regional land availability for the people for various activities including agriculture is affected due to quantum of land acquired by the State. The geographical analysis of the land acquisition is an important exercise to understand the probable impact of land loss on the regional development. Key data and information in this section has been drawn from the study conducted during 2004-06 by CCD. The author is grateful for being associated with the study till the year 2009.[142]

5.4.1 Land Acquisition (LAQ) and Displacement by Development Projects

Gujarat has always been amongst the front-runners in the case of large projects. These projects have affected revenue lands and their utilization, common property resources and forested land. This section discusses the distribution of the families displaced or affected by development projects. The investigation and data analysis are based on the study conducted during 2004-2006 for a study commissioned to assess the land acquisition, displacement and resettlement in Gujarat during 1947 to 2004. The data collected on the land acquisition trends presents the shift in the land acquisition in the State since pre-1960

[142] Lancy Lobo and Shashikant Kumar (2007): Development Induced Displacement in Gujarat: 1947-2004, Centre for Culture and Development, Unpublished Report, Vadodara. Note: This was published as book "*Land Acquisition, Displacement and Resettlement in Gujarat – 1947-2004*" by Sage Publication, New Delhi, 2009. The data and information are presented in the section are from the report, however the book version may also contain same facts and information.

(formation of the State), 1961-80, 1980-91 and 1991 to date. These are different phases of development and growth in Gujarat's economy along with the displacement and deprivation of the people. The hectic pace of development and displacement dealing with the regional and sectoral variations in the land acquisition across the periods and locations (see table 5.10).

5.4.2 Development Phases and LAQ in the State

Till the formation of the State in 1960, Gujarat received its share of Independent India's initial planning and attention under the Bombay State. It was quick to invest in the transportation system, connecting major towns and cities. Water resource based projects in Saurashtra and Kachchh were planned with more than 100 small and medium dams planned and constructed until 1957–58. Even though the projects seemed to be completed in haste, the required irrigation channels were not constructed, thereby leaving little scope to irrigate the region. The initial survey for Sardar Sarovar Dam on Narmada River was carried out during this period and it was the State that asked for maximum water and electricity from the Dam. At this point, industries were at a minimum, as most of them were traditional and labour-intensive, with an agricultural and textile base, and Ahmedabad, Vadodara and Surat were the only centres of production, accounting for 70 per cent of Gujarat's industrial development. At this time, land acquisition was mainly for transportation projects i.e., roads, for which the State Government acquired 1.69 lakh hectares of land during 1947–1960.[143] The development of the Kandla port, water resources projects (including the medium irrigation schemes in Saurashtra and Kachchh), and the multipurpose and major irrigation projects were initiated in the eastern and southern regions of Gujarat.

The period between 1960 and 1970 was marked by the development of India's largest petrochemical complex in Vadodara and the mega-industrial estates of Vatva, Naroda, Sachin, Ankleshwar, Nandesri and Vapi. During this period the State also acquired nearly 40,000 hectares of land for the development of industries around urban centres, particularly around Ahmedabad, Surat and Vadodara.

[143] Lobo and Kumar, 2009

Table 5.10
Phase-Wise Distribution of Land Acquisition and Families by Categories

Categories	1947-60		1961-80		1981–90		1991-2004		Unknown		Grand Total	
	LAQ*	FAM**	LAQ	FAM	LAQ	FAM	LAQ	FAM	LAQ	FAM	LAQ	FAM
Water Resources	32,261	30,306	6,74,051	76,119	6,89,958	78,700	5,22,124	68,919	2,794	75	1,921,188	2,54,119
Industries	2,891	369	40,741	4,844	87,181	6,291	49,415	3,541	68	11	180,296	15,056
Mines	24	85	30	1	2,090	98	4,918	257	0	0	7,062	441
Non Hydel	179	332	5,727	317	8,507	394	1,874	118	639	51	16,926	1,212
Defence & Security	60	42	861	64	4,981	109	890	46	81	3	6,873	264
Environment Protection	17	23	1,543	240	289	17	0	0	0	0	1,849	280
Transport and Communication	1,68,625	40,753	3,09,046	56,201	1,75,049	34,236	67,081	13,574	216	116	7,20,017	1,44,880
Human Resources	9,634	495	51,045	954	9,372	271	374	26	0	0	70,425	1,746
Farms & Fisheries	1,080	362	1,837	355	826	45	3	1	0	0	3,746	763
Urban Development	13,605	693	75,258	3,244	32,137	1,306	15,918	3,861	0	0	1,36,918	9,104
Refugee Resettlement	8	4	67	22	0	0	794	43	0	0	869	69
Social Welfare	1,023	330	23,602	1,392	5,444	443	317	22	0	0	30,386	2,187
Tourism	131	27	284	26	99	7	112	9	0	0	626	69
Government Offices	772	305	2,953	226	14,626	139	3,361	125	0	0	21,712	795
Unknown	2,020	749	4,860	670	286	96	351	39	119	97	7,636	1,651
Total	**2,32,330**	**74,875**	**1,191,905**	**1,44,675**	**1,030,845**	**1,22,152**	**6,67,532**	**90,581**	**3,917**	**353**	**3,126,529**	**4,32,636**

Source: Lobo and Kumar (2006), *Data sourced from the State gazettes published for final notification under Section 6 of land Acquisition Act, The family estimation assumed from the LAQ data.* *LAQ= Land Acquired, **FAM= Families

Large dams like Ukai, Madhuban (Damanganga) and Dharoi were planned and executed with great alacrity by the 1980s. For the construction of the Ukai Dam, people from

about 170 villages of Surat district were displaced (as against the 19 villages for the SSP) and relocated in four resettlement sites. The Madhuban Dam oustees, mostly tribal's, were relocated in 15-20 villages, without sufficient rehabilitation plans. The Dharoi oustees were not as lucky as the present day Tehri Dam (HP) oustees, and the whole town, with its age-old temples, schools, wells, houses and markets was submerged without resettling the displaced together. The State had acquired 6.9 lakh hectares of land for the water resources projects.

Land acquisition for roads and transportation doubled during this period, reaching 3.2 lakh hectares. This was done mainly to connect *taluka*s and various districts. The urban centres also expanded their limits, and metropolitan cities like Ahmedabad, Surat, Vadodara, Rajkot, Jamnagar etcetera began to have their own urban development authorities. During this period, urban development authorities in Surat and Ahmedabad were expanding their limits to more than 200 sq. km. requiring large-scale land acquisition for infrastructure. The emergence of small and medium-sized towns also required land acquisition, and about 75,000 hectares were devoted to urban development. Most of the land was taken from the neighbouring villages after paying nominal compensation; no rehabilitation scheme was ever thought of.

A new avenue for the industrial development of the State was created in Surat and Jamnagar districts during 1981-90. The State Government's submission to the industries increasing demands for land was highlighted by the fact that more than 87,000 hectares were acquired for the industries, by way of setting up GIDC estates, granting land to industrial houses and for exploration by the Oil and Natural Gas Corporation. The State also acquired land for the expansion of existing industrial zones in Surat, Bharuch, Ahmedabad, Rajkot, Valsad and Vadodara. Investment in small and medium-scale industries in the State was at its highest during this decade. The environmental damage incurred as a result of the massive industrial development along the major corridors has been highlighted by the pollution data published by the Gujarat Pollution Control Board.

A noteworthy development feature of the State emerged after 1991. While much of the country was attracting private investment in information technology and consumer products, Gujarat was busy attending to the State-sponsored Sardar Sarovar Narmada Nigam, whereby it consolidated land acquisition for canals in Central and North Gujarat, and Saurashtra till the year 2000. By this time, the wide canal network was able to account for 70 per cent of the land acquired for water resource projects. Except in central and south Gujarat, including the Vadodara, Panchmahals, Bharuch and Narmada districts, land was acquired to resettle families displaced by the Sardar Sarovar Project (Dam site and reservoir). More than

300 resettlement sites were constructed for the 1 lakh displaced persons from Gujarat and Madhya Pradesh. The State had acquired a total of 6.6 lakh hectares of land between 1991 and 2004, out of which, the water resource projects now accounted for 60 per cent (5.2 lakh hectares). The land was mainly acquired for the SSP.

By 1991, the State had completed land acquisition for a major part of the canals under the SSP. After 1991, there was no further enhancement of water resource projects (major dams) in the State. The growth of new industrial estates in the State in terms of land requirement also declined. This contributed to the decline of land acquisition during 1991-2004.

Since the late 1990s, the 2002 general elections and the 'Vision 2020' campaign, a significant section of the middle class and of the media have become terribly impatient '*to make India a developed country*', and in pursuit of this goal, they are willing to take a blatantly anti-poor stance[144]. This is evident from the recent demolition of the slums in Mumbai, Delhi (for the commonwealth games), Ahmedabad (for the Sabarmati River Front Development) etcetera. Twenty years ago, industries were wary of asking the Government for land other than the designated requirement for setting up; now they do not hesitate to ask for 60,000 hectares of land for setting up an SEZ. The recent red-carpet welcome given to the industries in the 'Vibrant Gujarat 2007' summit, that attracted Rs.4.1 lakh crores worth of investment, is an indication that Gujarat is one of the most preferred investment destinations in India. The dual need for multipurpose projects like the SSP has created a body of water which can fulfil not only agricultural requirements but also can meet water consumption needs in industrial and urban areas.

5.4.3 Regional Characteristics of Land Acquisition

The regional variation in land acquisition and the differential exploitation of land resources have led, in some cases, to economic development and in others, to economic disaster. The regional variation in land acquisition matches with the land use changes that took place due to the very high growth in the area of non-agricultural land-use and the increase of fallow lands and wastelands.

North Gujarat: North Gujarat provides connectivity to northern India, especially with the recent strengthening of the National and State Highways. The region has three major

[144] Observation by Rohit Prajapati and Trupti Shah (Sahiyar, Vadodara) in a discussion at Workshop at CCD Vadodara

dams: Dantiwada, Meshwa and Dharoi, which generate electricity, as well as water for irrigation. This has benefited the State, which would not have otherwise been able to cope with the drought faced by the north Gujarat region during 1964–74, when more than 70 per cent of the villages suffered human and material losses.

Water resource projects in the region have taken 60 per cent (4.2 lakh hectares) of the total land acquired, affecting 48 per cent of the total families due to land acquisition. Transportation projects, like the National and State Highways in the region, have affected an estimated 40,000 families involving 2.2 lakh persons. The region has the lowest land acquisition for industries, urban development and water resource projects in the State.

Central Gujarat: Central Gujarat, also known as the 'food bowl' of the State, was in need of irrigation alternatives, and land was acquired mostly for the canals located upstream of major rivers like the Sabarmati, Vatrak and Mahi. Though the canal network was constructed by land acquisition, the canals themselves proved to be beneficial to the farmers. Large areas of land were also given up for the Wanakbori thermal power project. Central Gujarat also has the highest amount of land acquired for roads; this was done for the purpose of connecting villages, to boost cooperative movements and participate in 'Operation Flood'. After 1958, massive acquisition for the National Expressway resulted in the loss of 10,000 hectares of prime agricultural land. The green revolution in Gujarat began through agricultural initiatives in Anand and Kheda districts, and ushered a high productivity phase in Vadodara, Surat, the south Ahmedabad, Mehsana, the north Rajkot, Jamnagar, Junagadh and Amreli in Saurashtra. The fertile agricultural belt known as *Charotar* between Anand-Kheda districts did not complain about the land acquired for canals and roads. Field visit data shows that, it was the utilization of Government and *gauchar* (pasture) land on which the Dalits and OBCs depended that had an adverse effect on these people. It must be noted however, that Panchmahal district, being predominantly tribal remained very backward in central Gujarat.

The massive canal network of the major irrigation projects was a boon for central Gujarat. Even though there were numerous check dams, bore wells and *khet talavdi*s (lakes), the State had cited irrigation problems in the region for lack of production rather than loss of agricultural land. Industries around the Vadodara sub-region acquired nearly 2,500 hectares of land. The region accounts for 37 per cent (11.85 lakh hectares) of the total land acquired in the State; of these, 64 per cent (7.5 lakh hectares) were for water resources, 22 per cent (2.75 lakh hectares) for transportation, nearly 5 per cent for industries, and the remaining for other uses. An estimated 1.8 lakh families or 1 million persons were affected by these development projects: nearly 51 per cent by the water resources projects, and 36 per cent by the

transportation ones. Industrial projects have deprived 5,000 families involving 27,000 persons of their cultivable lands in this region.

South Gujarat: South Gujarat seems to have borne the brunt of the State's development demands. Being one of Gujarat's richest forest and mineral reserves, the region was exploited to provide much-needed water for irrigation. Presently identified as a chemical zone, south Gujarat is also renowned for the cultivation of sugarcane for Gujarat's sugar factories. The canal network in the region was mainly developed to facilitate sugarcane farming and horticulture. Developed after the 1980s, this region is home to the chemical and hazardous industrial estates of Gujarat. The golden corridors of the region - from Bharuch to Vapi - have been experiencing rapid industrial development. This region has the largest chemical estates located at Ankleshwar, Vapi and Surat, in addition to the traditional diamond and textile industries of Surat. The textile trade in the region has received a serious setback, with states like Tamil Nadu and Maharashtra contributing a larger share to India's textile trade, post the 1990s. The development of industry in south Gujarat is largely due to availability of human resources, the State's incentives, and lax environmental policies (needs reference).

South Gujarat has also been seriously affected by the transfer of forestlands to development projects, including mining and the timber trade. A major cause of the displacement of the tribal's is the approach and attitude of the Forest Department; people are treated as 'encroachers' on their own land and their presence within the forest is challenged. Of the 35,000 hectares of forest land transferred to the State, nearly 14,000 hectares have been transferred from Surat, Bharuch and Valsad districts.

The 9.2 lakh hectares of land acquired for the water resources and industrial development projects in the region have affected an estimated 1.31 lakh families and 7.2 lakh persons. Of the thin stretch of cultivable land available in the region, 1 lakh hectares were acquired for industries, accounting for 50 per cent of the total land acquired for industries in the State. An estimated 5.2 lakh hectares of land have been acquired for water resources projects, mainly for the dams and canal networks of three multipurpose and a dozen of medium dams.

Saurashtra and Kachchh: Till 1965, this region had developed a small and medium irrigation scheme which helped it to become a major contributor both in the State as well as in the country to the production of edible oil seeds. The development of the road network resulted in the penetration of industries into the region. Kachchh had developed a hub for the Export Processing Zone (EPZ) in Kandla Port since the 1970s. Industrial development in the

district is mainly related to the services required at Kandla Port Trust, under the Free Trade Zone (FTZ), which has been converted to an SEZ to extend the benefits provided to the industries. Traditionally, during British India, Saurashtra - especially Jamnagar, Junagadh and Rajkot districts - was also a developed region for manufacturing diesel engines, brass parts, clocks and tiles. The development of cement and lignite industries provided development potential for other ancillary industries in the region. After the earthquake of 2001, the Government invited industries to Kachchh by easing the region's already lenient tax regime (or structure). Salt and chemical industries were widely developed in the Great and Little Rann of Kachchh. The fragile ecosystem was disturbed and damaged by leasing more than 1,000 hectares of land to large corporates for salt pans, mining or farming.

The Jamnagar Petrochemical Complex is one of the largest concentrations of private and public petrochemical industries in the country. The people in this region were evicted to accommodate the oil and gas terminal to facilitate import by the industries. After the earthquake of 2001, the Government facilitated industrial development near the Marine National Park and the coastal zones of Saurashtra and Kachchh. Nearly 10,000 hectares of the Marine National Park were transferred by the State Government to the industries for salt pans.

The region had figured low on development priority till 1980 and thus, received little attention from policy planners. Since the 1990s, the industrialization policies boosted investment along the Silver Corridors (Ahmedabad-Jamnagar and Rajkot-Bhavnagar). Of the total 3.2 lakh hectares of land acquired for development projects, nearly 66.6 per cent, i.e., 2.3 lakh hectares, were used for water resources projects. The industries in the region have acquired 24,000 hectares of land, mainly for the petrochemical industries around Jamnagar and for the medium industries around Rajkot, Jamnagar, Bhuj, Mundra and Kandla.

5.4.4 Land Acquisition and Families Displaced/Affected

Gujarat has acquired an estimated 1.92 million hectares of land under the Land Acquisition Act for various water resources projects. Approximately 2.41 lakh hectares of forests and 2.85 lakh hectares of Government land have also been utilized by water resources projects. A majority of the land has been utilized by the major irrigation projects.

Table 5.11
Estimated Land Utilized by the Development Projects (1947-2004)

Project Category	Land/Family	Type of Land Utilized			Total	Total Persons Affected/ Displaced
		Revenue	Forest	Govt.		
Water Resources	Land Utilized	19,21,186	10,08,623	1,92,119	31,21,927	
	Families	2,54,119	1,52,471	50,824	4,57,414	23,78,553
Industry	Land Utilized	1,80,296.1	94,655	18,030	2,92,981	
	Families	15,056	9,034	3,011	27,101	1,40,924
Mines	Land Utilized	7,062.646	3,708	706	11,477	
	Families	441	265	88	794	4,127
Non Hydel	Land Utilized	16,925.88	8,886	1,693	27,505	
	Families	1,212	727	242	2,182	11,344
Defence & Security	Land Utilized	6,872.38	3,608	687	11,168	
	Families	264	158	53	475	2,471
Environment Protection	Land Utilized	1,848.13	970	185	3,003	
	Families	280	168	56	504	2,620
Transport & Communication	Land Utilized	7,20,016.50	3,78,009	72,002	11,70,027	
	Families	1,44,880	86,928	28,976	2,60,784	13,56,076
Human Resources	Land Utilized	70,425.44	36,973	7,043	1,14,441	
	Families	1746	1,048	349	3,143	16,342
Farm & Fisheries	Land Utilized	3,745.99	1,967	375	6,087	
	Families	763	458	153	1,373	7,141
Urban Development	Land Utilized	1,36,917.80	71,882	13,692	2,22,491	
	Families	9,104	5,462	1,821	16,387	85,213
Refugee	Land Utilized	869.34	456	87	1,413	
	Families	69	41	14	124	645
Social Welfare	Land Utilized	30,387.02	15,953	3,039	49,379	
	Families	2,187	1,312	437	3,937	20,470
Tourism	Land Utilized	625.43	328	63	1,016	
	Families	69	41	14	124	645
Government Offices	Land Utilized	21,712.45	11,399	2,171	35,283	
	Families	795	477	159	1,431	7,441
Not Known	Land Utilized	7,636.49	4,009	764	12,409	
	Families	1,651	991	330	2,972	15,453
Total	Land Utilized	**31,26,527.00**	**16,41,427**	**3,12,653**	**50,80,606**	
	Families	**4,32,636**	**2,59,582**	**86,527**	**7,78,745**	40,49,472
Source: Lobo and Kumar (2007)						

5.4.5 Impact of Land Acquisition on Land Availability in Regions[145]

Development projects mainly deprive people of their essential sources of livelihood, such as cultivable lands, occupations and homes. The estimated deprivation of families is

[145] Lancy Lobo and Shashikant Kumar (2007): Development Induced Displacement in Gujarat: 1947-2004, Centre for Culture and Development, Unpublished Report, Vadodara.

much higher than the displacement of families. In order to obtain accurate estimates of the deprived, an attempt has been made to document the number of villages whose lands were acquired by development projects between 1947 and 2004. The State Gazette is the major source of this information. In all, data were obtained for 7,220 villages, where the Government acquired private lands for various projects relating to water resources, transportation and industries.

(a) Deprivation by Districts: Nearly 20 per cent of privately owned land was acquired by the State for various development projects. Region-wise figures of deprivation show that respectively more than 26 and 23 per cent of land in south and central Gujarat was acquired for public purpose. As mentioned earlier, the more backward the district, the larger the land acquisition for large-scale projects such as dams and industries. For instance, in Narmada and Bharuch districts, the Government acquired more than 35 per cent of the geographical area. More than 30 per cent households were deprived in north, central and south Gujarat. In those of Ahmadabad's villages, where land has been acquired, more than 84 per cent of the households have been deprived of cultivable lands. The deprivation of tribes is high in south Gujarat. It has a larger demographic share of tribal's and large irrigation projects like the Ukai and Madhuban Dams, and the Sardar Sarovar Project.

The Dalits are mostly deprived of their sources of livelihood in Mehsana, Ahmedabad, Kheda and Anand districts. The causes of deprivation in north and central Gujarat are wells, drill sites and networks of oil companies. The canal networks (mainly SSP canals), transport networks (highways) and industries are also major contributors to their deprivation.

(b) Families Deprived by Development Projects in the State

The vibrancy of villages is a reflection of the economic and social wellbeing of its people. Though projects may take a few villages under their ambit, if they deprive more than 50 per cent of the families of their cultivable lands, the village may lose its identity in about 40 per cent of villages in South Gujarat. It may be said that the larger the families from whom land has been acquired; the worse is their economic condition in the long run. Most of the villages in Mehsana, Surat, Jamnagar, Vadodara and Valsad have about 50 per cent of families who have been deprived of their lands. People affected by the projects can also be termed 'displaced' from their occupation, if not from their homes. They may never be able to regain their socio-cultural standing amongst their fellow farmers in their own regions.

Most cultural and social characteristics of the villages now reflect the loss of land: the results are seen in the decrease in marriage potential, loss of power in the *Panchayats* or agricultural cooperatives and within the community itself.[146] In a caste-based society, the self-esteem of the farmers is determined by their ownership of land. In the tribal regions of south and eastern Gujarat, land defines social interactions; the loss of land to projects froze the growth potential of the affected communities.

The large-scale deprivation of families is less in Saurashtra and Kachchh, confined only to the districts of Porbandar, Junagadh, Bhavnagar, Rajkot and Surendranagar. More than 50 per cent of the villages have less than 35 per cent deprivation in this region.

(c) Deprivation of Tribal's

Tribal ownership of revenue or cultivable lands has always been less as compared to the rest of Gujarat. Sixty per cent of the villages in south Gujarat have the presence of tribal's. The least share of tribal population is in north Gujarat, Saurashtra and Kachchh. South Gujarat shares the highest concentration of tribal's, followed by Sabarkantha, Panchmahals, Dahod and Vadodara. Deprivation amongst the tribal's is high: 40-60 per cent of villages have more than 15 per cent of the population affected by development projects. In Valsad district, nearly 70 per cent of the tribal villages are deprived, where more than 15 per cent of families were engaged in agriculture. These villagers deprived of agricultural land are left with no option but to work as wage labourers in farms, factories and construction sites. The migration to cities and towns is higher from these tribal-dominated districts.

PESA (Panchayats (Extensions to the Scheduled Areas) Act, 1996) inter alia restores the community's command over the natural resources and empowers the Gram Sabha to identify and restore the alienated tribal lands and to protect the tribal way of life. PESA calls for four-pronged strategy for successful implementation; (a) amendment of laws in contradiction to it; (b) putting in place a set of procedural laws in conformity with the true intent of PESA; (c) creating effective support institutions; and (d) capacity building. PESA provisions have not been implemented in the State, however interactions with field activists confirms the belief that a faithful implementation of PESA will go a long way in lessening the turbulence in the tribal areas.

[146] Ibid, based on field survey of about 2000 project affected households and group discussion with other villagers.

(d) Deprivation of Dalits

In more than 65 per cent of the villages in the State, 5-15 per cent of the Dalit families are deprived of lands. More than 20 per cent of the Dalit families in Mehsana and Sabarkantha have been deprived in 10 per cent of the villages. In caste villages, small and marginal farmers have been often pressurized into parting with their lands for projects, while the large and medium farmers often appropriated the benefits provided for the Scheduled Castes in mainland Gujarat. The deprivation of land amongst Dalit families is higher than the other castes in these villages. With small sizes of landholding Dalit families will never be able to regain their property unless special measures are taken. They will be forced to work as farm labourers in the fields of the upper castes in Kheda, Anand, Vadodara, Mehsana and Sabarkantha districts.

(e) Impact on Access to Forest

Forests in Gujarat cover 10 per cent of its geographic area. Actual forests however, cover only 6 per cent.[147] Although the State lost significant forest cover to development projects till 1970, the later years saw a consolidation of forest areas that resulted in the stabilization of forest cover to about 63 million hectares. The degradation of forests as well as their ownership pattern has deprived the tribal's of their livelihood.

The total estimated forest land transferred in Gujarat for all uses since 1960 is 2.1 lakh hectares, of which, nearly 1.71 lakh hectares were used for cultivation, while 35.5 thousand hectares were set aside for all other uses. Decadal changes in forest land transfer reveal an alarming increase in the rate of transfer after the 1990s in the name of liberalization. From the data mentioned above, it is seen that after the 1990s, 70 per cent of the forest land has been transferred to development projects. Kachchh has recorded an increase in forest area from 499 hectares during 1991-2000 to more than 1,400 hectares during 2001-04, i.e. over a span of just four years. This is the result of the numerous incentives offered by the State Government to industries to set their foot on the land owned by the forest Department.

These forests in Kachchh may be ecologically sensitive grasslands, upon which the lives of thousands of animal herding families rely. The Marine National Park in Jamnagar, has reported a transfer of more than 10,000 hectares of land for industries engaged in jetties, salt mining, oil exploration and petrochemicals. Valsad has lost nearly 9,486 hectares of forests, mainly to irrigation projects including dams and canal networks. In Surat district,

[147] Forest Survey of India (1997): *Forest Statistics - 1997*, Govt. of India, Dehradun.

5,000 hectares of land was registered for 'other' projects by the Forest Department, which presumably means industries such as mining and chemicals.

One is compelled to note how easy it was to lose forest lands to development projects in Gujarat. On the one hand, people were thrown out of the forest on the pretext of forest protection and on the other; the Government diverted these lands to uses not directly beneficial to the community**.**

5.4.6 Reduction of Common Property Resources (CPR) in the State

The CPR in the country in general and Gujarat in particular, is changing its utility due to the nature of its utilization and the quantity of resources. The decline of CPRs in the villages is mainly due to the demands and requirements of the State's modern development practices. Earlier, the grasslands and *gauchar* lands of the *Panchayats* were considered one of the most essential components of a village. This use of land has given way to others; either due to land transfer by the Government, non-utilization, or the increasing stall feeding by farmers. Overcrowding due to increase in bovine population affecting the per capita availability of *gauchar* / pasture land and the lack of management are now prompting the utilization of the CPR for other economical activities and diversion of pasture land for the benefit of the *panchayats*.

The analysis of available records shows that most of the CPR lands were being utilized in the traditional manner during the initial years of the formation of the State and basic amenities were provided in the villages. During 1970-1980 a majority of the CPR lands in the district were transferred to the Forest Department for Social Forestry schemes.

It is estimated[148] that the proposed SEZs in the State would acquire nearly 1.0 lakh hectares of land, where 60 per cent is likely to be sourced from the CPRs which are often declared wastelands by the Government. The CPRs form 20 per cent of land use in the villages of Gujarat and account for nearly 12 per cent of the income of the poor.[149]

"The Government of Gujarat has allotted and regularized the CPR land with dual objectives of supporting the socially and economically backward population in the villages, thereby improving their income earning capacity and of providing land for the housing purpose. It distributed land acquired under Land Ceiling Act twice, in 1960 and 1976. By

[148] Kumar, Shashikant (2010): "Land for Industries in Gujarat", a paper presented at Asian Population Association Conference, New Delhi, August 2010. Data Estimated from spatial analysis of Industrial Investments in SEZ and Other details from Index-B (Gandhinagar) & Vibrant Gujarat Reports (2010-11) Government of Gujarat.

[149] News Item in Times of India, 12th August 2006.

1985, 22,277 holdings were allocated to landless families with an average of 2.5 hectares per family. The fertility of most of the land was below average and the allottees had neither skill nor monetary resources to improve the productivity. There existed a possibility of conflict as the poorest section depends upon CPR land for fodder and fuel wood and other minor forest produce (in case of forest). When the CPR land is distributed to a specific group of population or community, neither they nor the rest of the population dependent on CPR land, find it beneficial. Till March 2008, the Government had distributed 7,568.94 hectares of culturable waste to 6,723 beneficiaries amounting to around 38 per cent of the total culturable waste land. Besides, many of the lands have also been distributed to the industrial sector totally unmindful of the people dependent upon them."

The Revenue Department has passed a resolution (2005) under which *gauchar* land can be allotted for industrial use. Many village *gauchars* have been given to large industrial houses like, the Reliance Petroleum (Jamnagar), Adani (Mundra Port), GMDC Mines (Bhavnagar) and now these villages are known for their struggle against land transfer. Transfer of CPR and other sacred groves for development purpose like Government buildings, schools and *Anganwadi* centres etcetera, have been a major reason for their decrease in area (Pandey 2008). Such policies may have serious repercussions and might lead to the unending downward trend of land distribution schemes till there is no common land left.

The Governments of Gujarat with a view to bringing large area of wastelands under productive utilization have come up with Bio-Diesel Policies, public-private partnerships to grant land on lease basis to big industrial houses and individuals, and corporate farmers for cultivation of horticulture and bio fuel trees.[150] Most of the land is on lease for 15 years but field investigation and locals say that, the land is put to uses other than for what it is leased for. Locals suspect that, 'Most of such instances are by investors indulging in *land grabbing* strategy. Instead of horticulture and bio fuels, the land is put to other uses.'

5.5 Agricultural Development

The agricultural development in the State as discussed earlier has been dependent on the two factors i.e. availability of land for agriculture and area under irrigation. There is increase in the Net Sown Area in the regions across the State due to enhancement of irrigation facilities. The subsequent discussion takes place on the growth in the agricultural

[150] GOG(2005): Revenue Department Resolution, Gandhinagar

sector during past five decades. The focus is primarily on the changes in cropping pattern, production, and factors responsible for present condition,

Scholars like Indira Hirway have pointed the decline of agricultural production before post liberalisation till year 2002-03 due to lack of strategy for the agricultural development. However, after the commissioning of Narmada Canal, there is increase in crop production in the State.

Table 5.12
Cropping Pattern in Gujarat 1970-75 to 2001-2006
(Per centage to GCA)

Sr. No	Crop	1970-75	1980-85	1990-95	2001-06
1	Rice	4.60	4.85	5.76	6.29
2	Wheat	4.90	6.26	5.63	6.00
3	Bajra	17.97	13.01	12.9	9.82
4	Total Cereals	42.88	36.74	35.14	28.72
5	Pulses	4.16	6.54	8.77	7.07
6	Total Food Grains	47.04	43.28	43.92	35.80
7	Total Oil Seeds	17.51	23.81	56.08	27.34
8	Total Non Food Crops	52.96	56.72	53.94	64.21
	GCA	100	100	100	100
Source: Agricultural Statistics of Gujarat (1970-75 to 2001-06, Socio-Economic Review, 2007-08, GCA = Gross Cropped Area					

The share of food grain crops in the GCA of the State has declined significantly from 47 per cent in 1970-75 to 38.8 per cent in 2001-06 and the share of non-food crops in GCA has increased during the same period. The share of cereals was about 43 per cent of GCA in 1970-75, which declined to 29 per cent in 2001-2006. The area under rice and wheat has increased during the period whereas the area under *Bajra* (native name for Bulrush Millet) has declined. This is due to increased irrigation availability in the State, especially in the central Gujarat plains (Table 5.12).

5.5.1 Changes in Agricultural Production

The State has recovered recently in its crop production from the initial gains during the 1960-70 and marginal increase during 1970-90 and subsequent fall during 1991-2001 (See Table on Decadal Change). The crop production has registered a substantial increase from year 2003-04 to 2006-07 (Table 5.13).

Table: 5.13
Decadal Change in Crop Production in Gujarat

(in '000 tonnes, Cotton in '000 bales)

Crops	1980-81	1990-91	Change (1981-91)	1995-96	1999-00	2000-01	Change (1991-01)	2001-02	2002-03
Total Cereals	4,438	4,459	0.47	4,287	3,992	2,348	-47.34	4,526	3,294
Food Grains	4,958	5,083	2.52	4,774	4,438	2,549	-49.85	4,906	3,621
Oil Seeds	2,005	2,044	1.95	2,212	1,826	1,656	-18.98	3,630	1,685
Cotton	1,738	1,531	-11.91	2,408	2,146	1,161	-24.17	1,703	1,673

Source: Based on the Socio-Economic Report Data (2004)

The recovery in the food crop and cereal production over the years has been good primarily due to the extensive utilization of irrigation network in the central and north Gujarat. The cropping intensity has increased in most of the irrigated areas resulting in the recovery of commercial crop cultivation. The stabilization of the crops is also a result of the changing technologies involved in the cultivation in the fields limited to high growth areas of the State.

During the decade 2001-2010 the growth rate in agriculture has been fast, between 8 to 10 per cent growth rates was claimed by Government of Gujarat using current prices. However using constant year 2004-05 prices the compound annual growth rate recorded at 3.1 per cent (2005-06 to 2008-09). However Alagh arrives at per centage compound annual growth rate of 5.1 per cent during 2003-04 to 2008-09 using triennium averages of base and terminal years.[151]

5.5.2 Field Irrigation and Peoples Participation in Schemes

The larger impacts are recorded in the Gujarat plains due to decentralized irrigation orientation, success of the watershed programmes, including the construction of farm ponds, check dams, and improvement in water table in the central and north Gujarat. The involvement of people and Non-Governmental Organisations (NGOs) has been good in the districts of Banaskantha, Sabarkantha, Dahod, Godhra, Mehsana, Anand and Kheda. The field evaluation of the some of the projects by the NGOs like BAIF, Sadguru Foundation, Aga Khan Foundation and Unnati etcetera shows substantial success of the watershed projects.

[151] Alagh, Yoginder (2011): '*Globalising Gujarat*', A key note address at a seminar on "Changes in a Globalising Gujarat", organized by Centre for Culture and Development, Vadodara on 9th December 2011

Table 5.14
Production of Major Crop: Gujarat (1960-61 to 2003-04)

(in '000 tonnes)

Year	Rice + Wheat	Coarse Grain	Cereals	Pulses	Food Grains	Groundnut	Oil Seeds	Sugar Cane
1960-61	564	973	1,719	169	1,888	1,214	1,260	130
1970-71	1,605	2,844	4,643	201	4,844	1,869	1,943	228
1980-81	1,957	2,314	4,438	520	4,958	1,616	2,005	790
1985-86	1,437	1,243	2,762	385	3,147	473	964	715
1989-90	1,923	2,430	4,438	572	5,010	1,670	2,580	916
1990-91	2,285	1,993	4,359	624	4,983	983	2,044	1,035
1991-92	1,922	1,440	3,420	419	3,839	711	1,650	974
1992-93	2,373	2,837	5,285	656	5,941	2,200	3,332	1,087
1993-94	1,994	1,533	3,602	549	4,151	596	1,550	1,023
1994-95	3,165	1,988	5,215	546	5,760	2,305	3,684	1,687
1995-96	2,325	1,904	4,287	486	4,774	1,032	2,212	2,060
1996-97	2,760	2,597	5,425	664	6,089	2,368	3,802	1,665
1997-98	2,799	2,637	5,469	618	6,113	2,494	3,866	1,467
1998-99	2,879	2,465	5,399	640	6,038	2,465	3,881	1,734
1999-2000	2,120	1,812	3,992	446	4,438	733	1,826	1,867
2000-01	1,403	1,485	2,936	249	3,185	740	1,738	1,818
2001-02	2,085	2,684	4,832	422	5,254	2,617	3,747	1,707
2002-03	1,772	2,207	4,029	367	4,395	1,086	1,878	1,756
2003-04	3,275	2,749	6,088	649	6,737	4,578	5,850	1,924

Source: Socio-Economic Review (2004-05), Directorate of Economics and Statistics, GoG, Gandhinagar.

5.5.3 Commercial Crops and Horticulture

With the increase in the intensity of irrigation and innovation in technologies the fields in major parts of the State have been experimenting with commercial agriculture. The area under non-food crops have increased substantially in all the regions of state including the tribal regions, dry land areas of north Gujarat, Saurashtra and Kachchh. The improved variety of seeds, fertilizers, drip irrigation facilities, and canal irrigation has helped in gains in the sown area of commercial crops. The programs under the national and state level schemes like National Horticulture Mission were able to enhance the horticulture in the State.

The Department of Agriculture, in consultation with the Planning Commission, has prepared the guidelines for Rashtriya Krishi Vikas Yojana (RKVY) in 2007. The RKVY aims at achieving 4% annual growth in the agriculture sector during the XI Plan period, by ensuring a holistic development of Agriculture and allied sectors.

The list of allied sectors as indicated by the Planning Commission will be the basis for determining the sectoral expenditure i.e. Crop Husbandry (including Horticulture), Animal

Husbandry and Fisheries, Dairy Development, Agricultural Research and Education, Forestry and Wildlife, Plantation and Agricultural Marketing, Food Storage and Warehousing, Soil and Water Conservation, Agricultural Financial Institutions, other Agricultural Programmes and Cooperation.

Each state will ensure that the baseline share of agriculture in its total State Plan expenditure (excluding the assistance under the RKVY) is at least maintained, and upon its doing so, it will be able to access the RKVY funds. The base line would be a moving average and the average of the previous three years will be taken into account for determining the eligibility under the RKVY, after excluding the funds already received. The RKVY funds would be provided to the States as 100% grant by the Central Government. The states are required to prepare the Agriculture Plans for the districts and the State that comprehensively cover resources and indicate definite action plans.[152] The total state income coming from agriculture sector in 1960 was 55 per cent whereas in 2004 it was merely 24 per cent.[153]

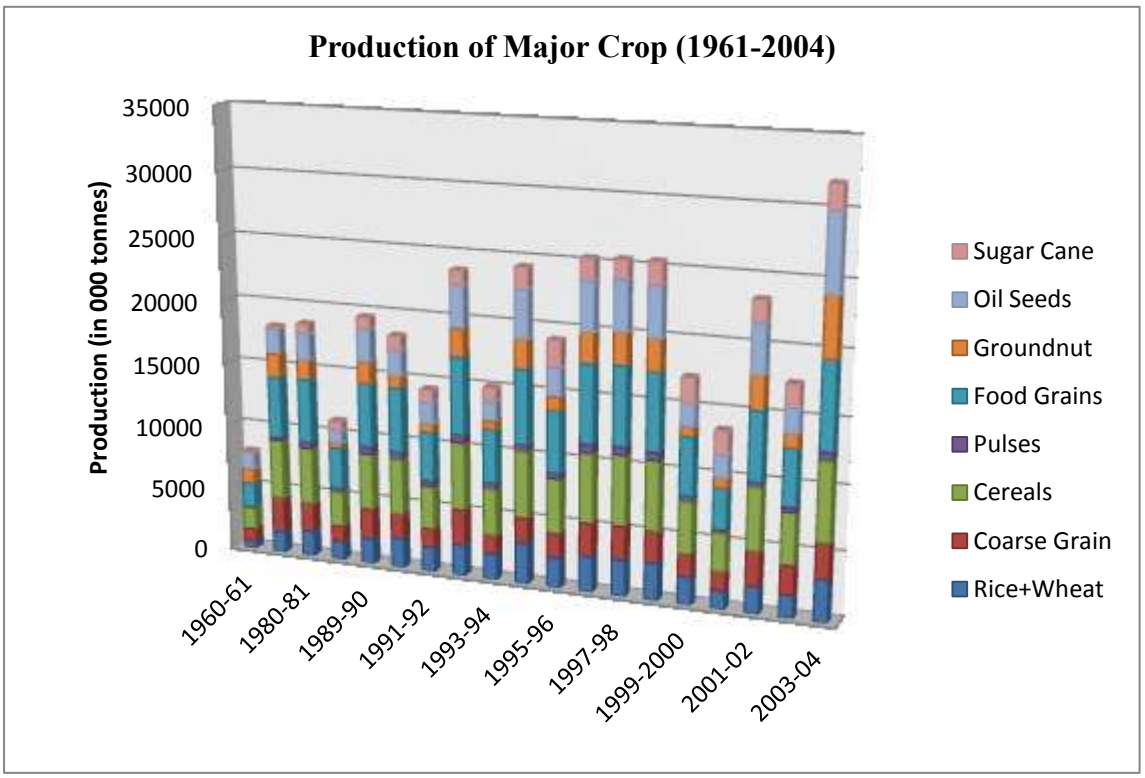

Figure 5.8: Changes in Production of Major Crops in Gujarat (1961-2004)

[152] GOG, Department of Agriculture, website: www.gujaratindia.com, RKSY Scheme, accessed, 08/2009
[153] Kamat M. and Tupe S. (2004): "Indian Agriculture in the New Economic Regime 1971 – 2003", PDF.

5.5.4 Agriculturally Lagging Regions

(a) Eastern Tribal Belt: The eastern hilly regions of the State, dominated by the tribes, have traditionally been devoid of the agricultural advantages the State had gained during the earlier phases of Green Revolution and introduction of modern technologies. Though the crop production has also increased in this belt, but owing to smaller farm sizes, lack of knowledge of the farmers and high production costs, the farmers are unable to reap the benefits. The agrarian reforms through improvement in land (Land Levelling, Plotting etc), distribution of seeds, training and livelihood programmes have reached these areas unevenly. The field visits to these areas revealed neglect of the region by subsequent Governments due to paucity of funds or lack of field contact by the researchers in agriculture.

(b) Kachchh

The largest district and region in the State has poor land resources suited for agriculture. The expanse of the coastal areas and high salinity allows few coarse crops; the areas adjoining the Rann of Kutch and salt pans restrict agricultural growth. The region had good agricultural areas in Bhuj, Anjar, Gandhidham, Mandvi and Mundra which are mainly rain fed. The lack of irrigation facilities and poorly developed land does not allow the growth of area under food crops. Lately, there has been increase in the production of horticulture crops like Dates, Palms, and other fruits due to improved irrigation facilities.

(c) Semi-Arid Regions of North Gujarat

The agricultural areas in the Banaskantha, Patan and Sabarkantha district have not been extensively covered by the surface irrigation schemes. The semi-arid regions in blocks adjacent to Rann of Kutch and Rajasthan faces severe water crisis. The government of Gujarat has taken number of steps for improvement of the irrigation facilities under the Desert Areas Improvement Program. The progress have been slow in these blocks, however, there has been positive results in production of cash crops and vegetables in areas provided with irrigation facilities during last decade.

5.6 Regional Development Change and Impact on Land and Agriculture

Apart from the requirement for agriculture, land is required for the rapid expansion of urban areas, development of National and state level infrastructure and industrial development. The consumption of land for such purposes would reduce the availability of land and would influence the rural population of the State. The shortage of land would affect

the consumption of hinterland adjoining large metropolitan cities like Ahmedabad, Surat, Vadodara, Rajkot and other fast growing cities. The State is pursuing new industrial policies impacting the extent of the land availability. The subsequent section presents the impacts reported on land and agriculture.

5.6.1 Impact of Infrastructure and Industrial Development

The regional industrial development shows increased investments in certain regions vis-à-vis neglect of the eastern Gujarat and Saurashtra with respect to the industries. The distribution of industries shows the change in the number of factories over the period since 1961-2001.

(a) Industrial Development v/s Water Quality and Quantity: As the industrial areas in the State increase, there is a possibility of increase in consumption of water as well as quality deterioration of available water in industrially rich regions. For example, the underground water availability surrounding Ahmedabad, Vadodara and Surat was severely affected by the extraction of water as well as pollution of underground water channel.

The SEZ is likely to further increase pressure on water availability in the State. The SEZ Act (2005) has no mention of the sources of water for the proposed zones; leave aside the question of restrictions or impact assessment. The Gujarat SEZ Act says, "The SEZ developers will be granted approval for development of water supply and distribution system to ensure the provision of adequate water supply for SEZ units".

As per the official website of the Mundra SEZ (Gujarat), it expects to get at least 6 million litres per day from the SSP, as promised by Gujarat Water Infrastructure Ltd. Critical water requirement would be 400 million litres per day. The Comptroller and Auditor General (CAG) of India for Gujarat for the year ending on March 31, 2006, has already criticized the Gujarat Government for extra allocation of 41.1 million litres per day water from the SSP for industries. The CAG report said that this would affect share of water for drought prone areas.[154]

(b) Land Deprivation due to Industrial and Infrastructure Projects: Government of Gujarat has evolved a vision 2010 document, wherein 24 projects of new industrial estates covering an area of 10,350 hectares with an investment of Rs. 7,162 crores by 2010 were anticipated. Most of these new locations are port-based locations suitable for industries, such

[154] CAG, (2006): *Annual Audit report SSP Project*, www.cag.gov.in/html/reports , PDF, p.17

as Pipavav, Mundra, Dahej and some other locations like Moti Khavdi, and Padra etcetera. Preparations of feasibility studies and market surveys through renowned consultants for Pipavav, Mundra, Motikhavdi and Padra are completed. These locations have changed the face for the development of the SEZ by the State.

Development of port and transportation network has been the major focus of the development projects in the State. The inter-connectivity of port to hinterland is visualized under the State port led development policy as visualized by the Gujarat Maritime Board.

Gujarat has experienced multiple displacements by a variety of activities like irrigation, industrial and mining projects and establishment of National Parks and sanctuaries for the protection of wildlife. In the 1960s some 100 villages were submerged fully and 70 more partially by the Ukai Irrigation dam. It affected more than 52,000 people. In the 1970s, 36 out of 59 villages in Gujarat got submerged by the reservoir of Kadana Dam on Mahi River along the Rajasthan border. 21 villages were submerged fully and 21 partially by the Dharoi dam on Sabarmati River. The well-known Sardar Sarovar on Narmada River has submerged 19 villages in Gujarat and more in the neighbouring states. Gujarat has witnessed displacement also by other projects. For example, around 1,000 pastoral families were displaced from the Gir Sanctuary from 1972 onwards. Industrial complexes have acquired land, for example in Vadodara in the late 1970s. Land from more than 50 villages in the district was used for the development of GSFC, IPCL and IOC townships and plants. The conflict between the people and industries is still present because the people say that they have not been given adequate compensation and jobs guaranteed to them.[155]

It has been pointed out by the researchers like Madhav Gadgil and Ramchandra Guha[156] that '*developed states like Gujarat has been caught in its contradictions which it is not able to resolve. The conflicts between those who have and those who are yet to gain access to the natural resources have been high during the last two decades.*'

It is evident from above fact that the State has been eagerly waiting for the investors and ready to help them in acquiring land required for their activities. The Land Acquisition Act has been used by the State to take land from the farmers and provide to the corporate mostly in the name of 'public interest'. The State needs to understand that the development of

[155] Lobo and Kumar, 2007

[156] Gadgil, Madhav and Ramchandra Guha (1997): *This Fissured Land: An Ecological History of India*, Oxford University Press, Delhi, pp. 114-115

people is its duty as a 'welfare state' and it should not merely become a tool in the hands of corporate.

5.7.0 Case Study on Environmental Impact of Industries on Regions[157]

The need for few case studies was imperative in order to assess the environmental impact of the industries. There is no denial that the industries in Gujarat have helped the State in increasing its Gross Domestic Product (GDP). The state has been able to attract investors' in spite of change in political leadership. But these industrial areas have serious environmental impacts which can be ascertained from the following case studies. The study has tried to select some areas in region for detailed analysis mainly from secondary sources and field visits to affected areas.

5.7.1 Central Gujarat: A Case of Water and Land Pollution of Villages near Padra

(a) About Nandesri Industrial Area

The Nandesri industrial area (near Vadodara city) was declared in 1968 and land was acquired from the farmers to set-up industries including the present giant factories by IOC, GACL, RIL (earlier IPCL), GSFC and other 250 other chemical industries under the banner "Petrochemical Complex".

The Gujarat Pollution Control Board (GPCB) was set up in 1974, but actual implementation of its policies began only in 1984. By then, however, much damage had already been done to the ecology of the area as chemical factories simply discharged effluents into the nearby Mini River, or dumped them in low-lying open spaces. Their solid wastes and effluents seeped into the soil and groundwater, rendering fertile land uncultivable and contaminating ground water sources. In 1989, Common Effluent Treatment Plants (CETP) was planned, but even this became operational only in 1992. The Nandesri Industrial Association (NIA) took over the running of the CETP in 1995 after which things got stabilized by 1998.

In short, from 1968 to 1998, the Nandesri industrial area was disposing off its hazardous effluents without treatment into the river or through a common effluent channel. Even today, the outflow of CETP and direct effluent disposal of big companies in the common channel is

[157] Environmental Impact Maps prepared in this section based on various field reports, news item, articles by environmental activists and report of Indian People's Tribunal on Environment and Human Rights (1999), headed by Justice Hosbet Suresh, PDF Document, Inputs from communication received from Mr. Rohit Prajapati, Environment Analyst and Activist in Gujarat.

far from the desirable standard. In the surrounding area of 10-15 kms. nothing grows on land that was once famous for its high fertility and good quality food grains, cotton and mango.

For primary study, land utilization and changing cropping pattern was studied in some sample villages in Padra *taluka* of Vadodara district. It was reported that the villages were getting polluted water from the industrial wastes disposed or leaked in the vicinity. The field assessment carried out with the help from the environmental NGO based in Vadodara.

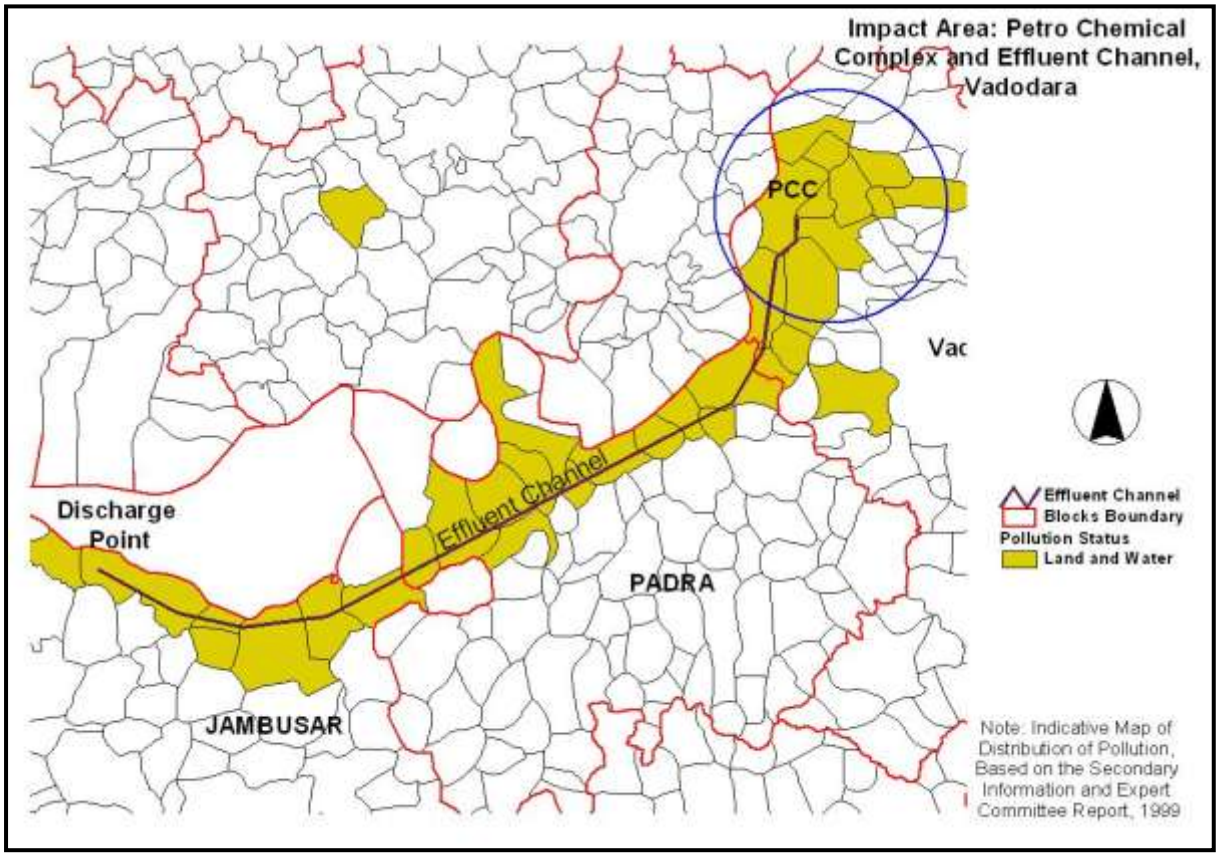

Figure 5.9: Environmental Impact Area: Petro -Chemical Complex (PCC)

(b) Impact Villages

Padra *Taluka*: The Effluent channel passes through Luna, Ekalbara, Umra, Lakdikui, Mujpur and Karkhadi, Vedach villages. The Final Discharge is at J Point Mahi Estuary Sarod (Jambusar *taluka*).

Nandesri village *Panchayat* includes Nandesri, Damapura, Radiapura, Rupapura and Lalpura villages just adjacent to the industrial area. In addition the villages in the vicinity of the petro-chemical complex and within its limits have shown significant impact such as Karachiya, Dashrath, Ranoli, Channi, Bajwa, etc.

(c) Field Assessment

Water quality: The farmers in the villages near to channel reported coloured ground water even if the withdrawal is from more than 200 ft. The extent of pollution can be gauged from the fact that people in some of villages reported abandoning of agriculture and migrated to nearby towns i.e. Padra and Vadodara. The presence of chemical plants close to some of the villages in the notified area and surrounding has affected the yield as well as quality of production. The water quality has suffered not only near the Notified Area but also villages situated 50 kms away from the industrial area. This was due to poorly managed effluent channel.

The report prepared by CPCB (2006) comments on impact of Nandesri (Vadodara) industrial area reveals that dangerous levels of cancerous cyanides, phenols, NH3-N, highly acidic concoctions, Chloroform-1, 2-Dichloroethane, Toluene and dyes with high platinum and cobalt content are being dumped into the river and the Arabian Sea, posing a threat to aquatic life too. The report says, "*The quality of effluent deteriorates along the channel towards its end suspecting downstream industries are discharging its effluent even without treatment*." Even it is reported by Paryavaran Suraksha Samiti (PSS), Vadodara that Public Hearing Committee (2003) accepts contamination of groundwater by toxic chemicals in and around Effluent Channel Project (ECP) in Padra area of Vadodara District, Gujarat.

Crop Changes: An exhaustive study by Sharma (1995)[158] informs contamination of vegetables and crops in Padra *taluka* in his study on the Environmental Impact Assessment (EIA) of the Effluent Channel. Based on soil sample tests, Sharma has reported the presence of 100-250 times higher concentrations of these heavy metals in the top layer of the soil, as the channel water or the contaminated well water is used to irrigate the agricultural fields. Vegetables such as chillies, drumsticks, grains like *Bajra*, wheat, pulses and cash crops like tobacco and cotton grown along the effluent channel were tested to contain high concentrations of these heavy metals. The study notes alarming changes in the contents of total dissolved solid and pH of well water along the channel, indicating seepages of channel effluents into underground aquifers.

[158] Sharma, Avinash H. (1995): "*Environment Impact Assessment along the Effluent Channel from Baroda to Jambusar and at its Confluence with Mahi Estuary at the Gulf of Cambay: With Special Reference to Heavy Metals*", Division of Environmental Biology, Department of Zoology, Faculty of Science, The M. S. University of Baroda, Vadodara.

Impact on agriculture: The Nandesri village *Panchayat* includes Nandesri, Damapura, Radiapura, Rupapura and Lalpura villages just adjacent to the industrial area. According to Kiritbhai Prabhatsingh, the Deputy *Sarpanch* of Nandesri village, some 1,000 farmers of the villages, who grew Bajra, wheat and cotton on their 5,000 *bighas*, at present, are left with nothing but wells that draw reddish yellow water unfit for human and cattle consumption. The crops just wither away, when fed with this well water.

Health Impact: According to doctors, villagers here have reported high incidence of allergic skin, nasal and respiratory problems, long abnormalities like emphysema, blood circulatory disorders and high blood pressures, heart diseases, gastro-enteritis, kidney and renal stones, impotency, infertility etc.[159] The actual check up of the persons were not perform but the scenario were assumed from the complains by the villagers.

Even with the Common Effluent Treatment Plant (CETP), the groundwater continues to be reddish yellow; farmers allege that some 10-15 chemical factories in Nandesri industrial area are discharging their chemical effluents into concealed bore well holes within their factory premises to escape the costs incurred in treating their hazardous effluents. Villagers in Nandesri say, "*our brethren working in the factories know that this (discharging effluents in bore wells) is happening but they do not speak out openly for the fear of losing their jobs. Besides, the companies "manage" officials visiting for inspection and investigation.*"

The 55.3 km. ECP Channel was commissioned in 1983 to carry treated industrial effluent from industries near Vadodara and Nandesri to the estuarine portion of Mahi River at the Gulf of Cambay. The channel was constructed to prevent discharge of effluent into Mahi River near Vadodara. The channel caters to disposing wastes of dyes, fertilisers, chemicals, polymers and refineries. The channel capacity is designed for 32 Million Gallon per Day (MGD) (or 145 MLD) but actual allowed 24 MGD).[160]

The report prepared by the Central Pollution Control Board (CPCB) proved that industries in and around Vadodara are dumping toxic chemicals into Mahi river and the Gulf of Cambay. The effluents being dumped are 15 times more polluted than the accepted norms.

Even though the GPCB consent letter[161] says, "*If it is established by any competent authority that the damage if caused due to ECP to any person or his property, in that case they are obliged to pay the compensation as determined by the competent authority. If any contamination is observed, the matter shall be entrusted to an Expert Agency of repute for*

[159] Discussion with Dr. Maya Valecha and others on health situation of villagers near Channel on 23/10/2006
[160] As per Gujarat Pollution Control Board (GPCB) Order, 2009
[161] Referred to the Consent Order in Letter by GPCB, dated 16th December 2009 to ECPL, Vadodara (pdf doc from ECPL website: http://member.ecplvadodara.com/J111_ECPL/jlogin.php p.4

study and recommendation at the cost of the ECPL and the ECPL shall be liable to implement the recommendation including the compensation".

With this ECPL channel, the pollution problem that was localized at Nandesri got transported to 24 villages over 50 kms. While CETP officials maintain that the parameters of the outflow conform to the standards laid down by the GPCB, the channel's flow is visibly brown and brackish. This channel also gets effluents from Gujarat Refinery and the other big factories of this area.

5.7.2 South Gujarat: Case Study of Water and Land Pollution in Villages near Ankleshwar Region

The Ankleshwar-Panoli-Jhagadia belt in Bharuch, a district in southern Gujarat, is one of the biggest chemical and pharmaceutical hubs in the country. Ankleshwar is known for its industrial township created by the Gujarat Industrial Development Corporation (GIDC), which is one of the biggest in Asia. Ankleshwar also has an office of the Oil and Natural Gas Corporation Limited (ONGC). Today, Ankleshwar has over 5,000 big and small chemical plants. These chemical plants produce products such as pesticides, pharmaceuticals, specialty chemicals and paints. According to an annual research conducted by Blacksmith Institute in 2008, four sites from Gujarat amongst South Asia's 66 most polluted sites.

The report[162] says, "*The Bharuch Enviro Aqua Infrastructure Ltd (BEAIL) collects waste from three GIDC industrial estates – Ankleshwar GIDC, Jhagadia GIDC and Panoli GIDC, and discharges into Amlakhadi, which flows for about 10 kilometres before converging with the Narmada. The rivulet flowing through the industrial estate in Ankleshwar carried extremely toxic, dark brown or black effluents around the year.*"

It further adds, "*The Ankleshwar industrial estates is Asia's largest industrial estate and comprises of approximately 3000 individual units, half of them chemical units that manufactures chemicals like dyes, paints and fertilizers. It has been estimated that 250-270 million litres/day of effluents and 50,000 tonnes of solid wastes/year is generated from the estate. Although the larger industries have their own effluent treatment plants, many of the medium and smaller units have been reported to directly dump their waste into open ditches or into the rivers without prior treatment.*"

[162] Lamont, James (2008): *India grapples with poisonous legacy,* Blacksmith Institute, Online access from http://www.blacksmithinstitute.org/articles/file/FT.com+print.pdf,

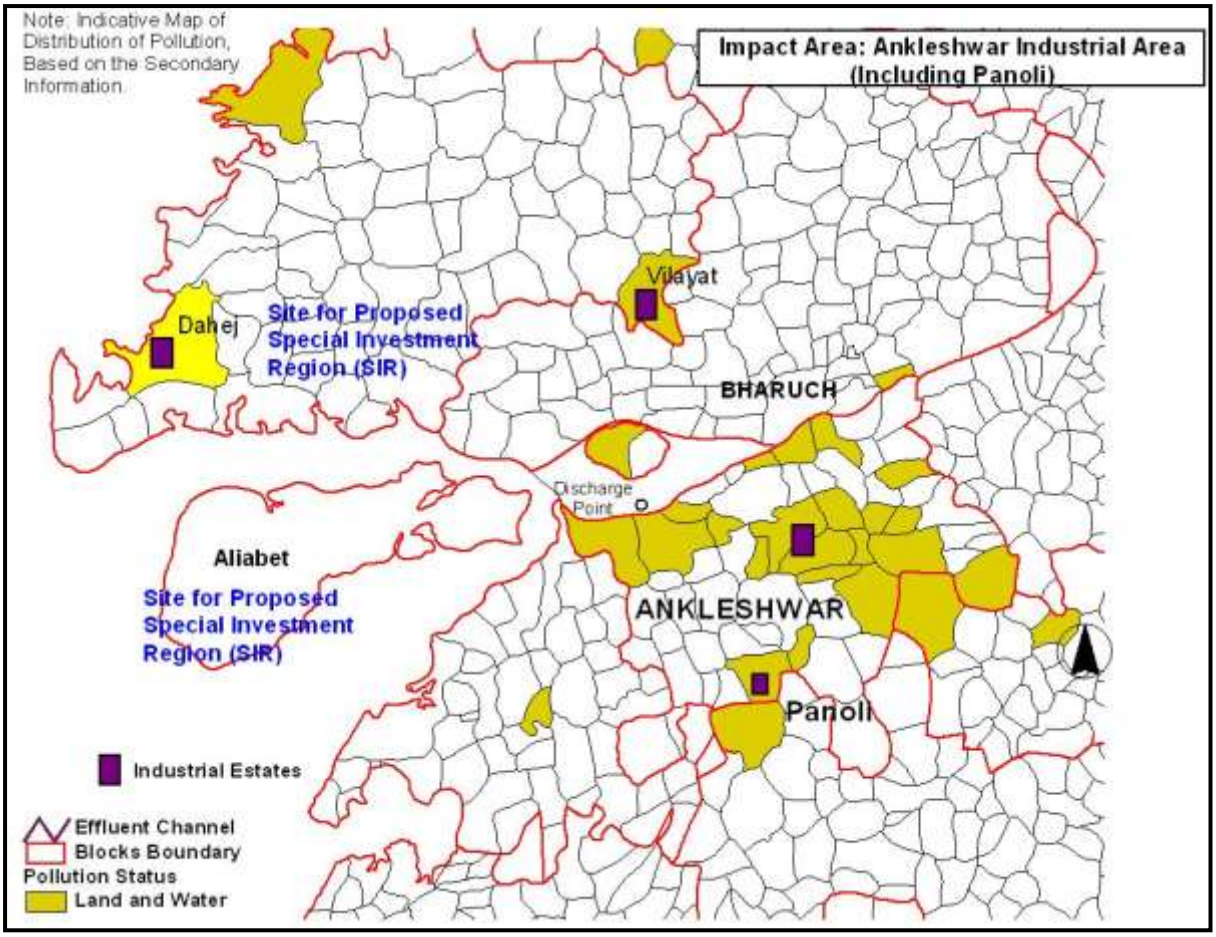

Figure 5.10: Environmental Impact: Ankleshwar-Bharuch Industrial Area

Affected Villages

Sarangpur, Piraman, Dadhal, Koshmdi, Bhadhkodra, Amboli, Sajod, Amratpura, Gadkhol, Chapra, Pungam, Matiyad, Haripura, Dhanturia,

In a study by Central Pollution Control Board (CPCB) and IIT Delhi (2010), Ankleshwar was rated as 'critically polluted' with a score of 88.5 out of 100. The establishment of CETP at the three GIDC discharging sites of hazardous waste in Amalkhadi River, which was supposed to reduce the pollution waste failed to meet the target. However, the Central Government decided to put a ban on the setting up of new industries in the region after the release of the above report.

In March 2008, a team led by Dr. N. J. Pawar, Suyash Kumar, and K. D. Shirke of the Department of Geology, Pune University said it had found critical pollution levels in 38 sample wells around Ankleshwar and from the local stream Amlakhadi. The scholars reported the presence of molybdenum, zinc, lead, nickel, cobalt, iron, cadmium and

chromium in high levels in the well waters. The highest concentration of molybdenum was 2,760 ppb or parts per billion. The WHO standard is 70 ppb. The effluents treated here and in the neighbouring industrial estate of Panoli remain dangerously toxic. The CPCB sets a standard 100 for 'Chemical Oxygen Demand (COD)' of effluent, which simply means that water, has an acceptable organic chemical content and quality. But Ankleshwar "purified" (treated) effluent has a COD value of 1,156. A *Sarpanch* in one of the affected villages claims, "*our groundwater is polluted because of the polluted local streams, Amlakhadi and Chhaprakhadi. But no one in any of the seven villages raises his voice as the village representatives are harassed and court cases are filed against doctors who dare to speak. People lose their jobs if they complain.*"

In the neighbouring Hansot *taluka*, Satish Patel, a former scientist at the Tata Energy Research Institute, recalls how polluted water from some carrying effluents flooded vast grasslands lands in 1994. "Cattle didn't eat grass for the whole year," he says. Mr. Patel, who owns a small shrimp farm nearby Narmada estuary, exclaimed that many fish species have disappearing from the river. Children complain of skin diseases, while even a few hour spent in Ankleshwar, are enough to make your eyes water.

A CPCB survey (2006) found wells along the earthen drains carrying effluents have also been polluted. Indeed, tube wells and hand pumps also produce red water. The farmers from the neighbouring villages complained about change in the colour of wheat and maize grains, the two principal crops of the region.

The Claim of Ankleshwar Industries Association (AIA)

AIA disapproves the blame of pollution on the industries located at the site. The association on its own initiatives in 1993 decided to set up a Common Effluent Treatment Plant (CETP) at a cost of Rs. 2.5 crores. The plant was designed to handle 10 lakh litres per day from 80-100 units mainly for small scale units became operational since March, 1996. Later, Enviro Technology Limited was assigned task to manage Common Effluent Treatment Plant (CETP) on a commercial basis.

The Ankleshwar Environment Protection Society (AEPS), setup by the AIA as far back as 1986, has noted between 3-4 lakh trees here. Its member Mr. S Udani says, "Everyone has ignored the Environment so far, but now our awareness is increasing." Since year 2002 the AEPS along with the Rotary Club's Pollution Control Cell (PCC), has been patrolling the GIDC Estate for defaulters engaged in dumping of hazardous wastes. He mentions, the

defaulters are fined Rs 5,000 for a first offence, Rs 15,000 at the second and Its 25,000 at the third.

5.7.3 Saurashtra: Case Study of Socio-Economic Impacts on the Villages in Jamnagar Region

Jamnagar has one of the largest private investments in the petro-chemical processing industries set up through the initiative of the Reliance Industries Limited (RIL). The RIL utilized approximately 5,000 hectares of land during the setting up of the petrochemical complex. In addition the there is refinery by ESSAR Ltd and Indian Oil Corporations Oil Terminal at Vadinar. The field visit was carried to understand the environmental issues emerging as result of Jamnagar Industrial Complex. The plants do maintain the standards and safety of environmental protection.

Affected Villages (land)

Moti Kavdi (2,000 acres) /Nani Kavdi (70 vigha-pipeline), Sikka (700 vigha-jetty and pipeline-crude storage), Meghpar (1,500 acres, 50-60 families), Padana (3,000 acres), Navagam, Kanalus, Chikari and Gagva. Approximately 5,000 hectares of land is utilized by the RIL.

In addition with the new SEZ policy further extension and new SEZ phase would enhance the land utilization by 10,000 hectares. Apart from the RIL, other industrial giants like the ESSAR and the GSFC, have also set up fertilizer, power and petrochemical plants in the vicinity.

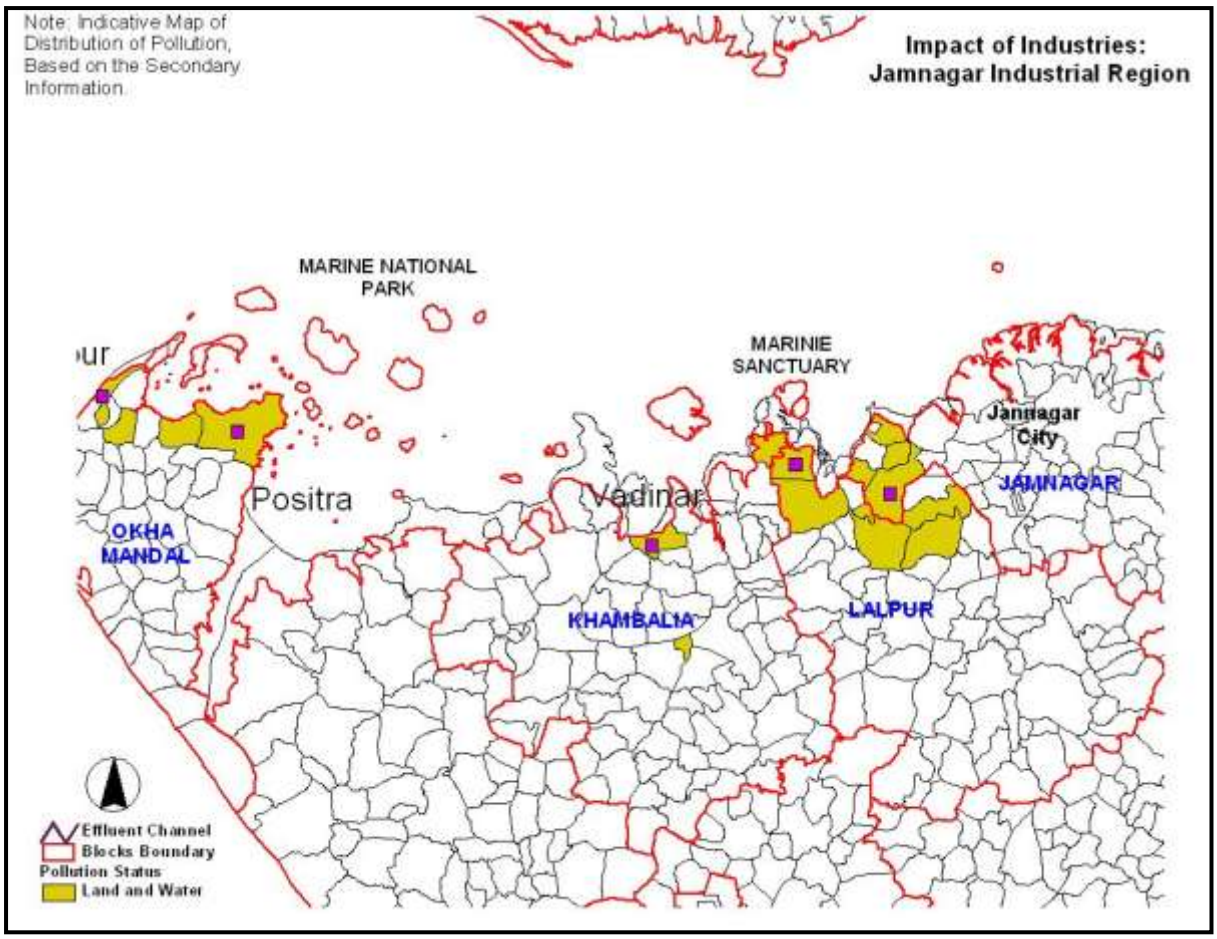

Figure 5.11: Environmental Impact Area: Jamnagar Industrial Region

The industrial area is located close to the Marine National Park which is spread over 162.89 Sq.km and 457.92 Sq.km of Marine Sanctuary in the Gulf of Kutch. In the Gulf of Kutch there are 42 islands fringed by coral reefs, sandy beaches and mangrove swamps which are home to marine species (puffer fish, sea horse, huge green turtles, lobsters, dolphins etc) and exotic birds. It also has 37 species of hard and soft corals. The industries were granted permission during late 1990s to lay pipelines, jetties and other facilities as per the guidelines issued by National Institute of Oceanography and Chief Conservator of Forest and Chief Wild Life Warden, Department of Environment and Forest, Government of Gujarat.[163]

[163] A Supreme Court Case between Essar Oil Ltd. Versus Halar Utkarsh Samiti & Ors, http://www.rishabhdara.com/sc/view.php?case=19398, accessed, April 2009.

The impact on the coastal ecosystem has been immense as proven by the recent studies conducted by the National Institute of Oceanography (NIO), Goa on the Gulf of Kachchh[164] and studies by Gujarat Ecology Commission[165]. Another study reported,

"The biggest victims of this unchecked industrialization (*referring to industries around Gulf of Kutch*) and the resultant pollution and habitat degradation are the local communities. Fishing in particular, traditional fishing has been very negatively affected by environmental pollution and competition from large fishing vessels. Agriculture, which flourished in small pockets, has been destroyed by the degradation of soil and ground water.[166]"

A research conducted by N.N. Jani, Fisheries college, Junagadh Agricultural University (2008) reports that, 'Marine bio-diversity at the park has gone for a toss due to industrial pollution. The presence of power plant and nearby petrochemical units of Reliance and Essar, has led to the release of effluents and oil spills, which has had a severe impact on the biodiversity of the park.'[167]

This is in addition to pre-existing pollution in region by Tata Chemicals which have been reported during the last decade.[168] The Marine National Park (MNP) and the villages on the edges have suffered due to industrial development in the region. The impact has been immense given the reports mentioned above.

Apart from the environment the land utilization has also led to changes in rural life leading to various impacts which was observed during the field visit at Rapar and Bhachau *taluka* in Kachchh in year 2005.

Impact on Rural Life: The field visit was carried out during October-November 2005 at the villages whose lands were acquired for the Reliance Petrochemical Complex. The group discussion revealed that, most of villagers did not agree to sell their land, unlike the *Vania* and *Darbar* castes. The villages where land was purchased by Reliance through the mediation of village elders/headmen, it has resulted in large-scale dissatisfaction among the villagers.

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[164] Nair, V. (2002): *Status of the Flora and Fauna of Gulf of Kutch*, India, National Institute of Oceanography, Goa.

[165] GEC (2007): *State of Environment Report - 2005*, Gujarat Ecology Commission, Vadodara, PDF, accessed from website www.gec.gov.in

[166] Biswas, Nilanjana (2009): *The Gulf of Kutch Marine National Park and Sanctuary: A Case Study, International Collective in Support of Fish Workers*, Chennai, An independent research report, PDF.

[167] Indian Express (2008): News item, www.expressindia.com/latest-news/power-plant-to-come-up-on-jamnagar-marine-park-land/357160/ on 4th September 2008.

[168] Bhopal.net (2012): "Tata's Environmental Crimes in Mithapur: Gujarat", http://news.bhopal.net/2007/02/01/tata-environmental-crimes-in-mithapur-gujarat/ accessed on 22 Nov 2012

The silent victims were the *Bharwads*, *Rabaris* and Dalits, who were exploited by the leading caste of the region, the *Darbars* (the leaders belong to this caste). The company has not paid them a uniform rate for the land, nor has it kept its promise of employing the villagers. Agricultural income in the area has declined due to reduction in land areas. There is a lack of cattle feed as village common *gauchar* land was leased to the Company by the Government. The water level in the wells and employment opportunities has declined.

Affected Villages near Khambalia/Lalpur/Sikka/Vadinar/Salaya etc.

5.7.4 North Gujarat: Case of Land Pollution due to Oil Exploration in Mehsana Region

Oil Exploration in Mehsana and other parts of north Gujarat had been major contributor in the oil and gas production in Gujarat. However, there has been reported impact on the land and water status in the villages having these exploration sites. The major role in exploration is played by ONGC. The Oil and Natural Gas Commission (ONGC) has number of field assets in Gujarat which contributes towards its production from Gujarat. The assets in Gujarat are as under;

Table 5.15
Details ONGC Wells in Gujarat, 2011

Location	Fields	Number of Wells
Ahmedabad	21	2216
Mehsana	18	2118
Ankleshwar	26	1622
Abandoned		1433
Source: http://www.downtoearth.org.in/node/2230, accessed March 2011		

Oil and Natural Gas Commission (ONGC) has been producing about 40,000 barrels of the crude oil from the Mehsana district and other parts of the North Gujarat. An independent estimate suggest that in 'Gujarat there are scores of oil spills polluting no less than 10,000 acres of land in over 1,600 villages mostly from the ONGC well. These spills have managed to ruin farm lands belonging to over one lakh farmers in Gujarat. Most of these oil spills flow

out of the exhausted wells of the ONGC. ONGC has wells in eight districts of Gujarat – Bharuch, Ahmedabad, Mehsana, Kheda, Khambhat, Patan, Gandhinagar and Anand.'[169]

The Comptroller and Auditor General (CAG) in its reports, that 'the condition of the pipeline (Jotana GGS-I to Sobhasan in Mehsana) is not good and leaking frequently. Audit observed that between July 2002 and May 2005 there was 76 instances of leakages. These frequent leakages had interrupted the operation of gas lift wells resulting in loss of production oil, besides causing environmental damages.'[170]

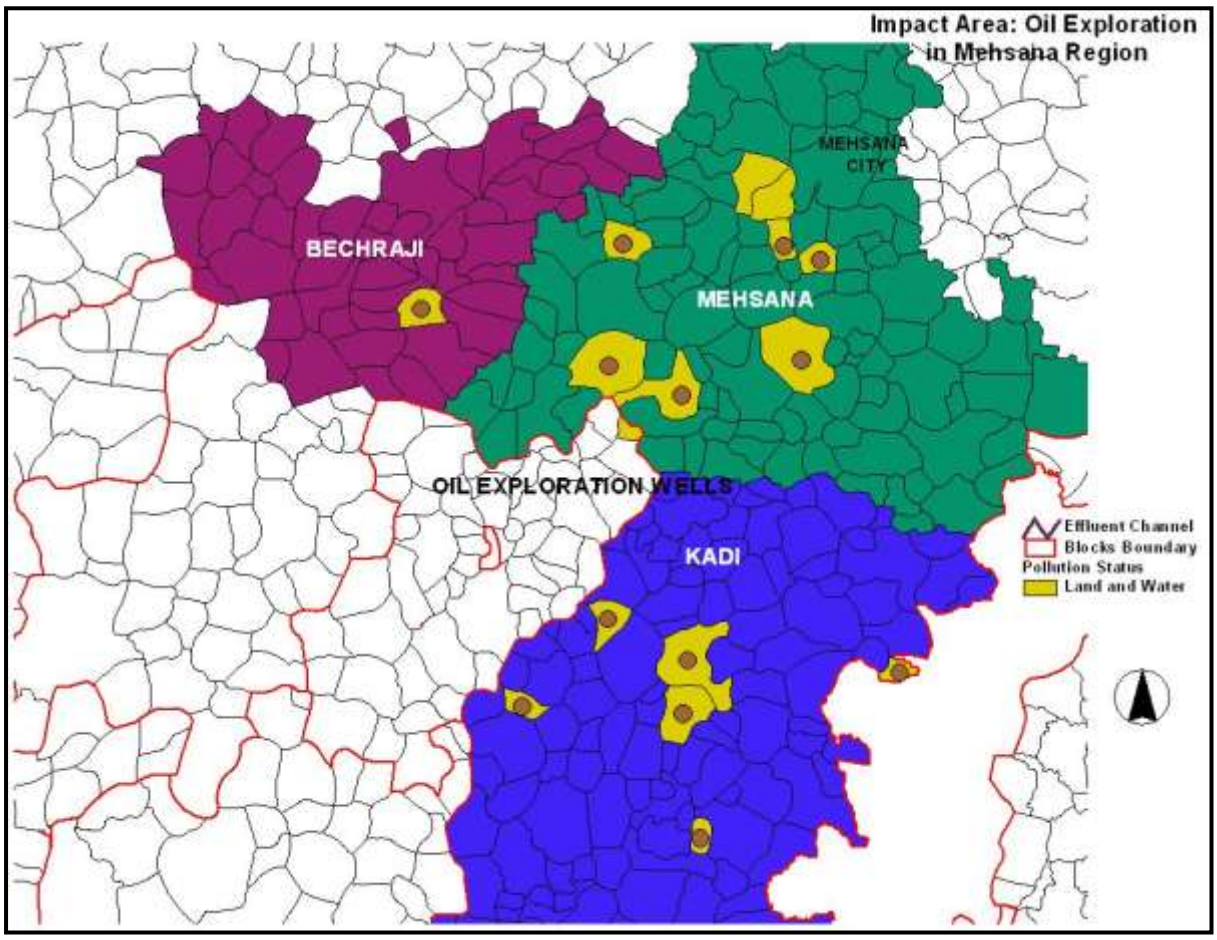

Figure 5.12: Environment Impact Area: Oil Exploration in Mehsana Area

Affected Villages[171]

Merda, Jotana, Santhal, Kadi Town, Jaidevpura, Viraj, Indrap (Bechraji) 30 wells, Visatpura

[169] Counter View (2011): http://counterview.org/2011/01/06/ongc-havoc-in-north-gujarat-another-oil-disaster/ accessed March 2011.
[170] CAG (2011): *Report* (PA 27 of 2009-10, www.cag.gov.in/html/reports/commercial/2009_27PA/chap_7.pdf, p.107.
[171] Also in discussion with President of the 'ONGC Peedit Khedut Samiti' (ONGC-affected farmers' association), Devubha Katha, who is a farmer in Ankleshwar (Bharuch)

Process of Village Land Utilization for Oil Exploration: The first oil well in Gujarat was dug in the Ankleshwar *taluka*, Bharuch and villages of North Gujarat spread over the districts of Sabarkantha, Mehsana, Gandhinagar, Patan and Ahmedabad were regarded as foremost drill sites for the ONGC crude wells.

For the oil exploration, ONGC samples the sites, carries out initial tests of the top soil and sub-soil for which compensation is paid for the crop destruction due to operations performed. This process, in many instances, has damaged the fields permanently. Once the prospective sites are identified for drilling, the land is temporally taken on lease, if oil found extends to 25 years. ONGC at this stage pays the lease rent on per acre basis to the farmer plus the initial crop losses. Under the agreement with the Revenue Department, the ONGC also becomes responsible to repair the top soil and pay compensation for the fertility loss to the farmers. But in most of the cases, the ONGC neither returns the land nor pays the lease even after expiry of the 25 years terms[172]. The compensation at this stage is decided only for the physical value of the land not the opportunity cost which a land owner loses by the way of loss of crop earning.

Situation in Merda Village, *Taluka*: Kadi, Mehsana.[173]

The objective of visiting Merda village was to understand the process impact of land utilization by the ONGC there. The village is mainly inhabited by around 60 families belonging to the *Rabari* community, whose land is acquired since 1972-73 by the ONGC for the Gas Terminals (GGS), Wells and Pipelines. The village now has more than 50 oil wells. The land undertaken for the wells is on lease that amounted to Rs. 65 in 1975 to Rs. 500 in 2004 for per *guntha* of land (one *guntha* is equal to 101.17 Sq.m). For the land which is acquired by the ONGC paid Rs. 2,400 per *vigha* (one *vigha* is equal to 0.33 acres). The village has lost 200 vigha (or 66 acres) for wells and 30 vigha of agricultural land for the GGC. As per the people's statements, 'it is said that ONGC has promised good amount for lease and job to the farmers, but they have not honoured their promise'.

Impact on the village:

- Water level in the village has increased from 150 ft to 450 ft. People have to go for an addition bore of 100 ft even in the existing wells.
- Crop production in the village has declined from 700 kgs. to 240 kgs. per *vigha.*

[172] Based on discussion with Senior Official (Land & Exploration), 2005, Regional Office, ONGC, Vadodara
[173] Based on the Discussion with village elders held at Merda during field visit in February 2006 *Field Notes*, DIDR Study, CCD, Vadodara, 2007

- The villagers used to grow food crops, pulses, cotton and other crops, which has completely stopped since the ONGC came to the village.
- The existing land has become infertile due to constant leakage of crude oil from the pipelines. ONGC has not been paying compensation for such damages.
- Due to ONGC, the portable water in the village has been polluted which is further adding to the woes of the people for drinking water.
- ONGC discharges waste water in the nearby ponds and rivulets damaging the crops, which is also harmful for the animals.
- During the floods, the excess water gets mixed up with the oil damaging the fields and crops permanently.
- ONGC takes land for one well, but eventually drills more than one. In such event, the corporation denies to pay more for damaging the crop.
- Today, the villagers have lost their agricultural land and are depending totally on the animals for their survival.

Though the villagers were made to suffer on the one hand the activities conducted by the ONGC, they also deny paying any taxes to the local *panchayat* citing the exception granted from being activity meant for National development.

5.8 Summery of Issues in Land and Agriculture practices in Gujarat

The analysis in this chapter presented issues concerning land and agricultural practices in the State. The case studies indentified concerns related to availability of land, land utilization changes and relative changes in agriculture. The increased utilization of land for the non-agricultural uses and improved agricultural practices did not result in serious loss of production but would eventually have negative impacts due to increased urbanisation and industrialisation.

5.8.1 Status of Land Utilization and Degradation

The case studies across the region revealed a negative impact of industries on the quality of land and thereby affecting the agriculture. The wide spread contamination of land and water has also affected the agricultural production other than the health implications on humans. Since most of the industries are located the plains the impact would be severe on the livelihood of the rural people. State even though started regulating the industries after

stringent environmental laws the damage has been poorly controlled as reflected in some of the case studies. Given the rapid expansion of industries through SEZ and SIR, there is no guarantee to fact that industries would have similar negative impacts. Regional Environmental scenarios need to be analysed more on the various types of pollutants in order to draw sustainable development planning strategies for future.

5.8.2 Role of the State in Environment Pollution

The State is aware of the damage being caused by the industries to the environment and consequently to the people, but is taking few steps to check the same. It was alleged by environmental activists that, indiscriminate permissions are being granted for starting new industries and expanding existing ones. The State is bending laws to facilitate the industrial lobby and there is no implementation of existing laws. Despite repeated representations no heed is being paid to the woes of the common man. There is no monitoring of the activities carried on by the industrialists. State is taking no action against industries that are discharging untreated effluent despite high visibility of the violation. The residents are deprived of right to livelihood, right to life, right to decent environment and right to enjoy good health, which are fundamental rights enshrined in the constitution. The state is abetting with the industrial lobby in a manner detrimental to the common man. The State should be made accountable for the deteriorating situation. GPCB which is the monitoring authority should be hauled up for dereliction of its duty to monitor, control and protect the environment.[174]

5.8.3 State transferring its Duties to the Private Sector

The State has failed in performing its duties towards people and has in fact transferred some of its duties to the private sector. The researcher noticed that in many places industrialists were supplying drinking water. Such supply of water is irregular and depends on the suitability of the industrialists. The industrial houses are being absolved of polluting the environment and adversely affecting the lives of people merely because they promise to use a portion of their profits towards welfare activities (also termed as Corporate Social Responsibility –CSR). The field visits amongst the industrialized areas the author did not notice significant welfare activity apart from laying some road or providing water supply being conducted by the industrial lobby. The major concern for the health is not properly attended by the industries.

[174] Discussion with environmental action groups in Vadodara, Bharuch and Hazira (Surat) 2005-2009, field notes, 2007-08

5.8.4 Regional Land Utilization and Agriculture

The pressure of industrialisation and urbanisation is varied in the regions of Gujarat. The State's development strategies have effectively exerted pressure along the land situated on the major transportation corridors, i. e. rail and road. The emerging land utilization patterns have seen extensive usage along the National Highways and State Highways. The nodal centers in the regions grew as a result of the population pressure and investment environment it offered to industrial houses. The land along major transportation corridors and urban centers are more prone to be utilized for the non-agricultural purposes. The development of village level infrastructure and connectivity has also enhanced propensity of land conversion. However, there may be positive impact by increasing the earning potential of the farmers. There is need to monitor the land utilization changes in order to have proper food security framework for the State in future. More than 60 per cent of the surveyed households in Saurashtra and Kachchh in the NSSO's *Situation* Assessment *Survey of Farmers,* 2003 showed that they were in debt with an average debt of more than Rs 22,000.

5.8.5 Reasons for the rapid conversion of Agricultural Land for Non Agricultural purpose

The chapter has been able to raise many important points, but from the policy perspective there are points that are quite diversified. The reasons for rapid conversion of agriculture land are summarized as below:

i. **Decreasing incentives from agriculture:** The decreasing economic incentive from the agriculture sector has been cited as one of the major reasons because of which there is conversion of agricultural land. Such decrease has been observed across the regions affecting both cultivators and agricultural labourers. Every year more and more farmers are abandoning agriculture as their primary source of livelihood. Furthermore, farmers also become severely indebted in order to practice agriculture. Moreover, at times because of water shortage agriculture is difficult to practice. This ultimately makes agriculture less viable and profitable.

ii. **Industrialization and urbanization:** The recent Vibrant Gujarat (2003-2010) summits led to the proposal for setting up the information technology, related service industries and others has enhanced urbanization and industrial growth in the State. This is resulting in huge increase in demand of land. The Government of Gujarat has approved to

develop 2 lakh acres for various SEZs. The State Government has proposed to set up 14 new special Investment Regions (with a core town) and theme-based cities which will be along 534 kilometres long Dedicated Freight Corridors (DFC) passing through state. About 1.0 lakh hectares of land will be developed as residential sectors and industrial zones by state-run and private agencies in various part of State. Until year 2010 more than 12,000 hectares of land have been acquired in the State under SEZs proposals with a total investment of Rs. 50,000 Crores. Correspondingly, this huge demand for land to support industrialization and urbanization is leading to exorbitant land rates. Such sky rocketing land prices has sparked widespread legal and illegal conversion of agriculture land for non-agricultural uses.

iii. **Changing aspirations of the people:** Apart from the above reasons, changing aspirations is also responsible for rising disenchantment towards agricultural activities. Increasing opportunities in other sectors of the booming economy tends to drive workers out of agriculture. A large proportion of the youth from rural and semi-urban areas are on their way out of agriculture. This human phenomenon is hard to control unless there are proper incentives to create opportunities in the rural areas.

All these factors are drivers of voluntary and involuntary conversion of agricultural land for non-agricultural purposes. Although it will be hard to curb legal voluntary conversion without making the agriculture sector viable and profitable *per se*, appropriate policy interventions can help in controlling and curbing all involuntary and illegal voluntary conversions of agriculture land.

CHAPTER SIX
REGIONAL PATTERN OF URBANISATION AND URBAN EMPLOYMENT

The proportion of population living in the urban areas is considered for measuring the level of urbanisation in a region, state and country. The urban share of population increases as a result of population growth in urban areas that is partly due to natural increase of population and partly as a result of the migration from rural areas and small towns. The growth of large cities is result of high migration levels induced by economic opportunity offered to people and investment made in the city infrastructure enhancing comfortable living conditions. Ramachandran (1989)[175] identifies three processes that affect urbanisation; (a) the migration of people from rural villages to towns and cities, (b) the migration of people from smaller towns and cities to larger cities and capital cities, and (c) the spatial overflow of metropolitan population into the peripheral fringe villages. These three processes eventually results in general process of urbanisation, metropolisation and suburbanisation.

In the context of India, the urban areas are also an extension of immediate rural setup with continued rural-urban linkages through caste and kinship relationships. The traditional towns supported the caste structure of society by providing distinct residence to the primary urban castes of artisans and traders. The concentration of higher castes Hindus and specialized other religious minorities like Muslims, Christians, Parsis and Jains have traditionally been a common feature of the urban centres of India. Indian urban centres have even also provided opportunities to various lower caste Hindus and the sections of the tribal population, who move towards urban areas from the rural hinterland. This characteristic is common to all parts of India including Gujarat. It was pointed out by A M Shah that '*there are more 'sanskritized' castes in the urban areas of Gujarat than in its rural areas.*'[176]

Urban areas are growth drivers of the economy and cities have been instrumental in sustaining economic growth of developed as well as developing countries. At present, more than half of the World population is urbanised and by the year 2030 it would reach 60 per cent, thereby putting immense pressure on the regional resources and urban areas. Since 1950, spatial distribution of urban concentrations has become more prominent in the

[175] Ramachandran, R. (1989): *Urbanisation and Urban System in India*, Thirty Second Impression 2009, Oxford University Press, New Delhi, p.91

[176] Shah, A. M. (2010): *'The Rural – Urban Networks in India' in 'The Structure of Indian Society: Then and Now*, Routledge – Taylor and Francis, London/Delhi.