Chapter Three

Socio-Economic Aspects of Tribal Districts in Gujarat

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3.1 Introduction:

India has a natural resource-based economy where forest, river, mountain, soil and climate play a very important role. Sometimes the change or growth in agriculture and industries can bring change in the equilibrium of the environment. To continue with the challenge of supporting economic growth and meeting the demand of food, India has to put importance on economic growth without interfering with the natural equilibrium. The threat generally emerges from land degradation, decreasing soil fertility, falling groundwater level and diminishing forest cover. Moreover, greenhouse gas emissions due to industrial growth generate the global threat of climate change.

The agricultural scenario is the revelation of land and man interaction (Singh, 1990: 137). For an analysis of land-use, it is essential to shift from generalities to particularities in a country like India, where agriculture is the most important means of livelihood for the majority of people (Ibid:142) including the tribal population of contemporary India. But still there are major obstacles like landlessness, poor irrigation facilities and deteriorating soil quality. These issues directly hinder the agricultural growth (Deshpande, 2016 :16), farm mechanization and income equality, and indirectly on tribal livelihood.

3.1.1 Socio Economic Background of Tribal Livelihood:

The most widely accepted definition of livelihood is provided by Robert Chambers and Gordon Conway, which reads as, "a livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living" (Chambers and Conway, 1991:6).

Analysis through quantitative and qualitative research methods helps in describing both development and problems of interaction between man and the natural surroundings. The study examines problems related to tribal communities and their agricultural production and critical factors regarding this.

3.2 Demographic Changes in Tribal Areas:

The tribal population of India has always been an integral part of the country's rich cultural heritage. The share and growth of Scheduled Tribe (ST) population in India is an important aspect to consider. Understanding the different state-wise, district-wise or *taluka*-wise share of ST population is essential for devising targeted developmental policies. Gujarat, being one of the most vibrant states in the country, has a unique distribution of tribal population. The density, share, and growth of population in the tribal *talukas* of Gujarat are the key indicators of the State's progress towards the upliftment of its tribal communities. Moreover, sex ratio, literacy and access to basic amenities such as safe drinking water are crucial factors that determine the overall well-being of these communities. It is, therefore, imperative that policy makers focus on creating a more equitable and inclusive society by promoting the socio-economic development of the tribal population, not just in Gujarat but across the country.

3.2.1 Tribal Population in India:

India has the second largest tribal population after (Africa). which is ethnically diverse. (https://pib.gov.in and https://tribal.nic.in). The central Indian states of Gujarat, M.P., Chhattisgarh, Jharkhand, Maharashtra, Odisha and Rajasthan have the largest concentration of this population. The ST population of the country which was about 3.01 crores in 1961, accounting for 6.9 per cent of its total population of 43.92 crores, rose to 10.43 crores or 8.6 per cent of the total population of 121.08 crores in 2011. (Govt. of India, 2016: 269).

Geographically, the ST population of India is concentrated in two distinct clusters - Central India and North-Eastern India. According to 2011 Census, Central India is home to around three-fourth (72.87%) of India's total ST population of which, 14.69 per cent lives in Madhya Pradesh, 10.08 per cent in Maharashtra, 9.2 per cent in Odisha, 8.86 per cent in Rajasthan, 8.55 per cent in Gujarat, 8.29 per cent in Jharkhand, 7.5 per cent in Chhattisgarh, and 5.7 per cent in Andhra Pradesh. North East India comprising the states of Assam (3.72%), Meghalaya (2.45%), Nagaland (1.64%), Tripura (1.12%), Mizoram (0.99%), Arunachal Pradesh (0.91%), Manipur (0.87%) and Sikkim (0.20%) form the other distinct cluster accommodating another 11.90 per cent of the country's ST population (Govt. of India, 2013a: 3).

According to the Ministry of Tribal Affairs Annual Report (Govt. of India, 2016a: 29), the entire tribal population of the country, which is 8.61 per cent of the total population, lives in 15 per cent of the country's total area, most of which is geographically inaccessible. Even within the states, they are concentrated in the hilly, forested and agriculturally unsuitable parts (Ahmad, 1999: 115). Though they develop huge consciousness about their surrounding domain, lack of livelihood opportunities forces them to change their social domain and migrate. By doing so they become more unprivileged as the intra-state restrictions on acknowledging STs is almost negligible but inter-state restrictions are there for benefits[4]. However, there are no restrictions on job opportunities for STs offered by the Union Government (Verma, 2017: 13).

Table - 3.1
Share and Growth of Schedule Tribe Population - India
(2001-2011)

Area of Residence	Total Population		ST Population		% to Total Population		% to ST Population		Growth 2001-2011	
	2001	2011	2001	2011	2001	2011	2001	2011	Total	ST
Total	1,02,86,10,328	1,21,05,69,573	8,43,26,240	10,42,81,034	8.2	8.6	100	100	17.7	23.7
Rural	74,23,02,537	83,34,63,448	7,73,38,597	9,38,19,162	10.4	11.3	91.7	90.0	12.3	21.3
Urban	28,63,07,791	37,71,06,125	69,87,643	1,04,61,872	2.4	2.8	8.3	10.0	31.7	49.7

Source:2001 and 2011 Census.

It can be observed from Table 3.1 that the ST population of the country is predominantly rural by residence. This is clear from the fact that 90 per cent of tribal population which is 11.3 per cent of total rural population lives in the rural areas. This high rural population of the tribe is supported by primary activities (Ahmad, op. cit.:133). But the growth rate of rural tribal communities increased only by 21.3 per cent as compared to urban area based tribals (49.7%) during the 2001 to 2011 Census decade, perhaps as a result of rural out-migration rather than urban pull. Growth in the proportion of urban ST population in contemporary India is mostly due to displacement from their traditional rural set ups in various ways like development-induced displacement in Assam (Hussain, 2006: 391-392). Exposure of urban culture upon the *Munda* tribe of the east Kolkata wetlands displaced them from their land and livelihood (Huque, 2018: 54). The land possessed by tribal people of Chhattisgarh and Gujarat are meagre to produce crops to sustain them for the whole year. The tribal territories are mostly devoid of forest cover, from which they could collect non-timber products (Bandi, 2015: 59). Displacement for mining in Jharkhand

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[4] The list of Scheduled Tribes is State/UT specific and a community declared as a Scheduled Tribe in a state need not be so in another state (www.tribal.nic.in).

(Areeparampil, 1996: 1524) is another example of rural out-migration. Besides, being generally unskilled, the tribes find it difficult to fit into the urban economy, other than in the unorganized sector with meagre earnings.

3.2.2 Tribal Population in Gujarat:

The population of Gujarat is an assemblage of communities belonging to heterogeneous ethnic backgrounds. However, according to K. R. Dikshit, lineage of majority of the Gujarat population can be traced back to the 'Gurjars' who came to India with the 'Huns'. These *Gurjars* passed by Punjab and settled in Gujarat (Dikshit, 1970: 150). Other than *Gurjars*, there are *Bhils*, *Kuchis*, *Kathis* and *Rabaris* etcetera. Immigrant communities have formed multicultural societies. The study focuses on the tribal region of Gujarat, which extends over the eastern part of the State.

With 5.97 per cent of the country's area, the state of Gujarat accommodates 4.99 per cent of the country's population. The total population of the State at the 1961 Census was 15,27,326, which increased to 6,04,39,692 by 2011. Out of this, 3.15 crores or 52.15 per cent were males and 2.89 crores or 47.85 per cent were females. Relatively higher proportion (3.47 crores or 57.45 %) of the population is rural by residence (Govt. of Gujarat, 2020a: xii). The State has had a very high population growth of 158 per cent between 1901 and 1961. However, there was wide regional variation in the growth rates. For example, areas with lower urbanization and dominance of agricultural sector displayed higher density of population and less than average growth rate (Ibid: 887).

The present study focuses on 43 dominantly tribal *taluka*s spread over 12 districts of the State. These *taluka*s have more than 50 per cent ST population, and are Integrated Tribal Development Programme (ITDP) and Tribal Sub-Plan (TSP) *taluka*s. According to the 2011 census, there are twelve *taluka*s of Vadodara district, of which Jetpur Pavi, Chhota Udepur, Kavant and Nasvadi *taluka*s are ITDP and TSP areas, and have been selected for intensive investigation in this study. Besides, the neighbouring Sankheda *taluka* has also been considered in the study. As mentioned earlier, these *talukas* have been carved out of Vadodara district to form the new district of Chhota Udepur. The reasons for considering these five *talukas* as study areas are specified below.

1.   One of the major objectives of the study is to investigate the problems of agriculture in areas dominated by the tribes.

2.   Being ITDP areas, these *talukas* are facilitated by the literacy, health, irrigation, agriculture, horticulture, dairy, and animal-husbandry development programmes. It would be worthy to comprehend their impacts on the tribes and their socio-economic life.

3.   The inclusion of Sankheda *taluka*, which has a lesser proportion of the ST population, has been purposefully done to compare the situation of the tribes in two different set-ups.

3.2.3   Demographic Changes (2001-2011) in Tribal Areas of Gujarat:

Large portion of the land of Gujarat falls under arid and semi-arid climatic conditions. The eastern highlands have a large number of streams south of Tapi. Also, the climate of south and south-west Gujarat is more moist compared to the north-eastern portion, which extends up to Rajasthan. Population distribution is maximum in the well-drained areas of south and south-western regions with alluvial soil (Singh, 1971: 884).
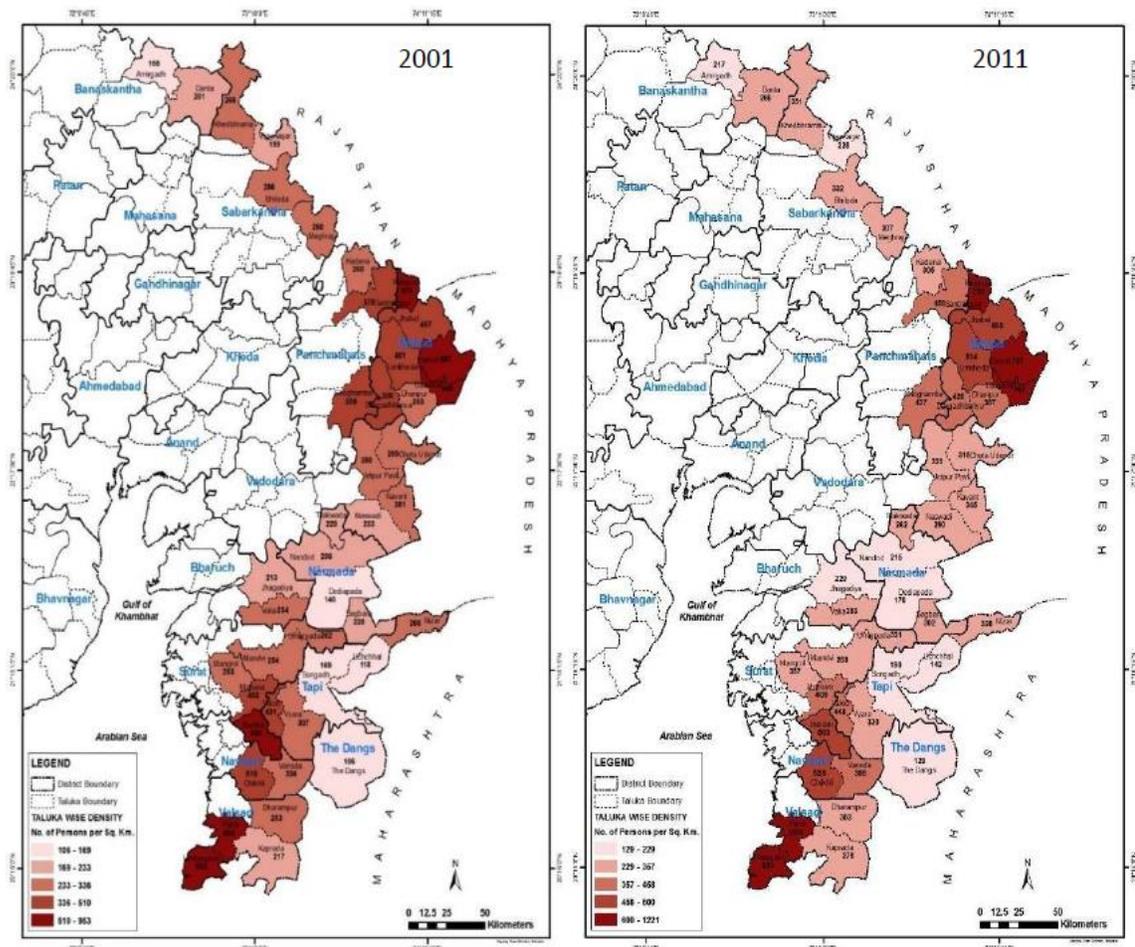
Most of the tribal population of the State is clustered and concentrated all along the eastern part forming a continuous tribal belt from north to south. However, the distribution and density of the region are not the same. The tribal region of Gujarat experienced significant changes in the distribution and density of population during the 2001 and 2011 Census decade. It is clear from Map 3.1 that the tribal region of Gujarat had five different ranges of population density in 2001. Very high density of tribal population of 510 to 953 persons per sq. km. was in Fatehpura (Panch Mahals), Dohad (Dohad), Bardoli (Surat) and Pardi and Umbergaon (Valsad) *talukas*.

High densities of 336 to 510 persons per sq. km. were in the *talukas* of Mahuva (Surat), Bhalod (Tapi), Chikhli (Navsari), Limkheda, Jhalod, and Devgadhbariya (Dohad), and Santrampur (Panch Mahals). Medium density of population (233 to 336 persons per sq. km.) was registered in Khedbrahma, Bhiloda and Meghraj (Sabarkantha), Dhanpur (Dohad), Chhota Udepur, Jetpur Pavi and Kavant (Vadodara), Nizar and Vyara (Tapi), Valia (Bharuch), Dharampur (Valsad), Vansda (Navsari) and Mandvi, Mangrol and Umarpada (Surat) *talukas*.

Low density of 169 to 233 persons per sq. km. was recorded in Danta (Banas Kantha), Vijaynagar (Sabar Kantha), Nasvadi (Vadodara), Tilakwada, Nandod and Sagbara (Narmada), Jhagadia (Bharuch) and Karpada (Valsad) *talukas*. Amirgadh *taluka* of Banas Kantha in the north-east and Narmada, Tapi, The Dangs districts in the south-east had very low density ranging between 106 to 169 persons per sq. km.

At the 2011 census, the relative position of the *talukas* did not alter much except in a few cases. However, there was a minor increase in the level of density in all the *talukas* except for a few. Density in The Dangs (The Dangs) and Pardi (Valsad) *talukas* changed to very low and high densities of population respectively. In Chhota Udepur, Jetpur Pavi, Kavant, and Nasvadi (Vadodara) *talukas* the population densities increased between 2001 to 2011 census decade, but only marginally.

Map - 3.1
Population Density: Tribal Belt of Gujarat (ITDP *Talukas*) (2001 & 2011)

3.2.4 Distribution of Schedule Tribe Population (2001-11):

The tribal population of the country is predominantly rural by residence with multiple dependence on nature. Traditionally, the society and economy of the tribes are intrinsically linked to the immediate surroundings of their natural habitat (Ahmad, 1999: 133; Dash, 1998: 25). Even after more than six decades post-Independence, their rural character has not changed much, indicating the persistence of their continued association with their milieu. Between the Census years of 1961 and 2011, while their total and rural populations have grown by 28.89 (from 3,01,30,184 to 10,42,81,034) and 31.29 (from 2,93,57,790 to 9,38,19,162) per cent respectively, their urban share has increased only by 7.38 (from 7,72,394 to1,04,61,872) per cent. However, the relatively higher growth rate of urban ST population during the decades compared to the growth rates of rural ST population (Table 3.2), indicates probable alteration in their rural-urban shares in the future. As observed earlier (Table 3.1), the proportion of urban ST population in the country has increased from 8.3 to 10.0 per cent during the last two census years.

Table - 3.2
Rural-Urban Share of Scheduled Tribe Population: India
(1961-2011)

Census Year	Population			Decadal Growth Rate		
	Total	Rural	Urban	Total	Rural	Urban
1961	3,01,30,184	2,93,57,790	7,72,394	-	-	-
1971	3,80,15,162	3,67,20,681	12,94,481	26.2	25.1	67.6
1981	5,16,28,638	4,84,27,604	32,01,034	35.8	31.9	147.3
1991	6,77,58,380	6,27,51,026	50,07,354	31.2	29.6	56.4
2001	8,43,26,978	7,73,39,335	69,87,643	24.5	23.2	39.5
2011	10,42,81,034	9,38,19,162	1,04,61,872	23.7	21.3	49.7

Source: Census of India

Table - 3.3
Number and Percentage of Villages by Share of ST Population

Unit	Percentage of ST Population in Total Village Population									
	100		90 – 100		75 – 90		50 to 75		25 to 50	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
India	31,742 (5.3)	21,508 (3.6)	59,549 (10)	63,056 (10.5)	78,508 (13.2)	82,501 (13.8)	1,05,296 (17.7)	1,10,118 (18.4)	1,39,302 (23.5)	1,45,622 (24.4)
Gujarat	1,345 (7.4)	935 (5.2)	3,446 (19.1)	3,531 (19.5)	4,007 (22.2)	4,089 (22.6)	4,934 (27.3)	4,970 (27.5)	6,089 (33.7)	6,085 (33.7)

Source: Govt. of India, 2013a: 9

Villages with 100 per cent tribal population have decreased for both India and Gujarat. Table - 3.3 indicates reduction in the number of villages with 100 per cent tribal population by 1.7

point per cent during the 2001-2011 Census period. On the other hand, there is only a marginal increase of the other classes of tribal villages. At the National level, the highest increase of 0.9 point per cent has been recorded for the smallest group of villages with 25 to 50 per cent of ST population. This is followed by villages with 50 to 75 per cent ((0.7 point per cent increase), 75 to 90 per cent (0.6 point per cent increase) and 90 to 100 per cent (0.5 point per cent increase) tribal population, implying thereby gradual increase in the number of villages with relatively smaller proportion of ST population. In other words, gradually the tribes are losing their dominant status in rural India with increase in the number of villages with lower proportion of tribal population and vice versa.

A similar situation is also observed in the case of Gujarat with minor difference. While the number of villages with 100 per cent tribal population have reduced by 2.2 point per cent, there has been no alteration in the proportion of villages with the smallest (25 to 50%) share of tribal population. However, the number of villages in the other three intermediate categories have gained marginally, as is the case in the country as whole.

The total population of Gujarat as recorded in the 1991, 2001 and 2011 Census was 41,309,582; 50,671,017 and 60,439,692 respectively. The ST population in the corresponding years was 6,161,775 (14.91%); 7,481,160 (14.76%) and 8,917,174 (14.75%). The decadal growth rate of the total population between 2001 to 2011 was 19.28 per cent whereas, the same for ST population was 19.20 per cent (Govt. of India, 2013a: 121).

While Vadodara and Surat districts accommodate around 7 per cent each, The Dangs district retains only about 1 per cent of the total population of the State. Banas Kantha, Sabar Kantha and Panch Mahals districts share about 4 per cent of the total population of the State. Tapi, Valsad, Navsari, Bharuch, Narmada and Dohad have between 1-3 per cent of the State's total population.

Map - 3.2
**Percentage Share of ST Population: Tribal Belt of Gujarat (ITDP *Talukas)*
(2001 & 2011)**
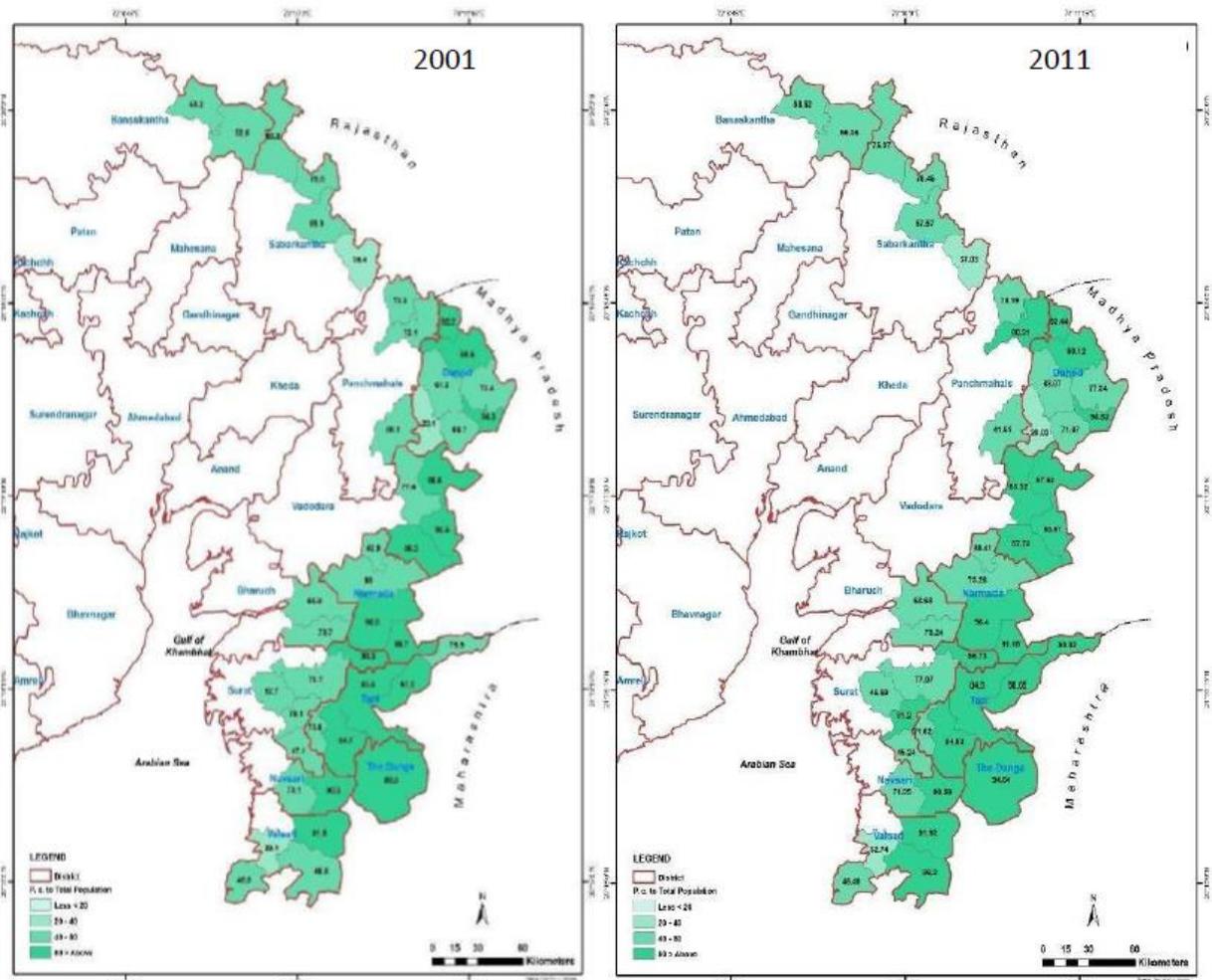
Interesting facts emerge out of the above maps (Map - 3.1 & Map - 3.2). The distribution and concentration of the ST population displays varied spatial patterns. For example, in Goghamba (Panch Mahals)*,* Meghraj (Sabar Kantha), Devgadvariya (Dohad), Bardoli (Surat), Pardi and Umbergaon (Valsad) *talukas*, while density of population is high, percentage of ST population to total population is low. The density of population has increased from 953 to 1,221 persons per sq. km. in Pardi (Valsad), but the percentage share of tribal population to total population of the district has declined from 39.1 to 32.7 between 2001 and 2011.

It is worth noting that in the *talukas* where the percentage share of tribal population to total population is between 75 to 95 per cent, people living per square kilometer is less than 230.

Vijaynagar (Sabar Kantha), Dediapada (Narmada), The Dangs (The Dangs), and Uchchal and Songadh (Tapi) *talukas* are the examples.

The share of tribal population to total population during the 2001 to 2011 decade in Chhota Udepur, Nasvadi, Kavant and Jetpur Pavi *talukas* of Vadodara district has increased, so also the density of population.

Gujarat has had a decadal growth rate of 19.17 per cent as compared to all India growth rate of 17.64 per cent at the 2011 census. Gujarat recorded rural and urban population growth rates of 9.23 per cent and 35.83 per cent respectively (Govt. of Gujarat, 2012a: S7). Population growth rate in all the districts except Dohad (28.4 to 30 %), has slowed down by 2 to 10 per cent during the last two census years, maximum being in Narmada district (25.3 to 14.8%). This might be due to declining natural population growth rate as well as out migration of the population to more developed areas in search employment avenues.

Neither the physical characteristics of the tribal region of Gujarat is uniform, nor the ethnic background and occupation of the tribes. An attempt has been made through Table - 3.4 to present the broad picture of the location and occupation of the tribes of the region by districts.

Table - 3.4:
Districts-wise Spread and Occupation of Tribal Communities

Tribes	Areas / Districts	Occupation
Rathwa	Vadodara, Panch Mahals	Agriculture
Barda, Adibashi or Khandeshi Bhil	Vadodara, Sabar Kantha, Surat, Navsari, Valsad and Bharuch	Agricultural Labourers
Bhil, Barda, Bhil Dungri, Garasia and Bhil Vasava	Panch Mahals, Vadodara and Sabar Kantha	Agriculture
Dhanka, Valvi, Tadviand Tetaria	Vadodara, Bharuch and Surat	Agriculture, Construction and Industrial Labourers
Bavacha, Bamcha	Vadodara, Panch Mahals and Surat	Building, and Road Construction Labourers
Gamit, Gamta, Gavit Mavchi and Padvi	The Dangs, Bharuch, Valsad, Vadodara and Surat	Farm Labourers
Naikda, Nayaka, Cholivala Nayaka, Kapadia Nayaka, MotaNayaka,Nana Nayaka	Vadodara, Valsad, Panch Mahals and Surat	Agriculture
Pardhi	Vadodara	Landless Labourers. Hunting, Fishing
Pardi, Advichincher	Panch Mahals, Valsad, Sabar Kantha and Surat	Agriculture, Hunting and Fishing

Kathodi, Katkari, Dhor Kathodi, Dhor Katkari, Son Kathodi, Son Katkari	Valsad, Sabar Kantha, Bharuch and Surat	Agriculture and Forestry
Kokna, Kokni, Kukna	The Dangs, Valsad, Vadodara and Surat	Agriculture, Forestry, Service Sector
Patelia	Panch Mahals	Mainly Agriculture

Source: Govt of Gujarat, 2013

3.2.5 Urbanization in Tribal *Taluka*s (2001-2011):

As urbanization of any region demarcates the difference in socio-economic conditions from rural region, there are many indices, which portray the influences of urban livelihood on rural. However, these indices of urbanization define the socio-economic development conditions of the region. Setting up water taps may not signify urbanization, but it can lead any rural region towards urban livelihood. As an index of socio-economic development, the share of urban population in the eastern margin of tribal regions shows changes.

Certain aspects of the change in urbanization in Gujarat are:

1.	Natural growth determined by urban birth and death rates.

2.	Rural to urban migration and reclassification of rural areas as urban areas.

3.	Migration from smaller urban settlements to million plus urban settlements of the State.

According to the 2011 census, more than 57 per cent of the total urban population of the State is concentrated in Ahmadabad, Surat, Vadodara, and Rajkot districts. Between 1961 and 2011, the Urban Rural Ratio[5] (URR) in the State more than doubled from less than 35 per cent in 1961 to almost 75 per cent in 2011, whereas the proportion of urban population to total population increased from around 25 per cent to more than 42 per cent during this period. The URR was the lowest in Dohad (9.87%). Other districts with very low URR, where the urban population is less than rural population are Tapi, Narmada, The Dangs, Panch Mahals and Sabar Kantha (Chaurasia, 2022: 6) Urbanization affects tribal communities in two ways. Development in any tribal areas displaces them when there is construction of a large dam or reservoir. Another way, drought due to urbanization can displace them too (Verghese, 2006: 29).

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[5] URR - Urbanization can be analyzed in terms of level, tempo and concentration indicators. A refined indicator of the level or the degree of urbanization is Urban Rural Ratio or URR.

Percentage of urban population to total population remains more or less the same in the *talukas* of Khedbrahma, Dohad, Chhota Udepur, Devgadhbaria and Nandod. The *talukas* of Mangrol, Songadh, Vansda, Jetpur Pavi, Kavant, Nasvadi, Bardoli, Pardi and Umbergaon in south Gujarat are showing an increase in urban population. The share of urban ST population in the total urban population in the *talukas* of Pardi, Umbergaon and Bardoli is relatively higher, varying between 34 to 58 per cent may be due to in-migration.

Map - 3.3
Percentage Share of Urban Population: Tribal Belt of Gujarat (ITDP *Talukas)*
(2001 & 2011)

3.2.6 Literacy in Tribal *Talukas*:

Table - 3.5
Literacy Rates - Total and ST Population

Unit	Percentage of Literates 2001		Gap in Literacy Rate (in Point Percentage)	Percentage of Literates 2011		Gap in Literacy Rate (in Point Percentage)
	Total	ST		Total	ST	
India	64.8	47.1	17.7	73.0	59.0	14.0
Gujarat	69.1	47.7	21.4	78.0	62.5	15.6

Source: Statistical Profile of Scheduled Tribes in India 2013, Ministry of Tribal Affairs, Statistics Division, Government of India, www.tribal.nic.in

As is evident from Table - 3.5, disparity between mainstream and ST literacy rates has remained more than 14 per cent for both India and Gujarat at the last two censuses. While the ST literacy rate was almost equal for both the country (47.1%) and the State (47.7%) in 2001, the point percentage gap between total literacy and ST literacy in Gujarat (21.4) was significantly higher than in the country as a whole (17.7). However, during the next ten years, the STs of Gujarat have remarkably increased their literacy skill resulting in substantial reduction in this gap. As per the 2011 Census, the point percentage gap at the National (14.0) and State (15.6) level has become almost equal.

Whether it is the country or the state, issues that affect low literacy rates among STs could sometimes be traced with reference to community specific enthusiasm towards literacy programmes (Ahmad, op. cit. 1999: 165). In comparison to the Gonds and the Bhils, the educational attainment of the Santhals has been more satisfactory. Literacy rate of the Bhils in Gujarat is better than their counterparts in Madhya Pradesh and Rajasthan. Other than community-wise enthusiasm and growth of literacy, discrimination at school, inaccessible infrastructure, and language related communication problems between teachers and students are other problems restricting literacy growth and increasing drop-outs among STs (Desai and Kulkarni, 2008: 249).

Literacy in the eastern region of the State, where the share of tribal population is mostly more than 50 per cent in the total population, is lower than the *talukas* of the southern region. At the 2001 and 2011 Census, *talukas* which maintained high literacy rates (67.2 to 80.7%) were Umbergaon and Pardi (Valsad), Chikhli (Navsari), Mahuva (2001) and Bardoli (2011) (Surat).

Very low literacy rate of 35.8 to 43.2 per cent at the 2011 Census has been observed in Amirgadh (Banas Kantha), Khedbrahma (Sabar Kantha), Garbada (Dohad), Dhanpur (Dohad), Kaprada (Valsad) and Chhota Udepur and Kavant (Chhota Udepur) *talukas*.

Talukas with moderate to high literacy rate of 43.2 to 69.2 per cent were Danta (Banas Kantha), Meghraj, Bhiloda, Vijaynagar (Sabar Kantha), Kadana, Santrampur, Ghogamba (Panch Mahals), Fatehpura, Jhalor, Limkheda, Dohad, Devgadhvariya (Dohad), Jetpur Pavi, Nasvadi (Chhota Udepur), Dediapara, Tilakwada, Nandod, Sagbara (Narmada), Jhagaria, Valia (Bharuch), Nizar, Ucchal, Songadh, Vyara, Valod (Tapi), The Dangs (The Dangs), Umarpada, Mangrol, Mandvi, Mahuva, Bardoli (Surat), Chikhli, Vansda (Navsari), and Dharampur, Pardi, Kaprada, and Umbergaon (Valsad).

Talukas which showed increase in literacy rate are mostly located in the southern part of eastern tribal region namely, Umbergaon, Vansda, Chikhli, Vyara, The Dangs, Mahuva, Valod, Bardoli, Mangrol, Mandvi, Uchchal, Tilakwada, Umarpada, Dediapara and Valia. Compared to southern *talukas* of eastern tribal region, percentage of literate tribal population in northern and central part remained either unaltered or increased marginally between 2001 to 2011. Dohad district has recorded the lowest literacy rate at 2001 and 2011 Census with 45.2 and 58.8 per cent respectively (Govt. of Gujarat, 2012a: 7). Though literacy rate has increased for most of the tribal districts during the two census decades, the southern districts of the eastern tribal belt show more development in educational attainment than north-eastern districts like Banas Kantha, Dohad and Vadodara.

The Rathwa, Bhil, Gamit, Koli and Baria tribal communities have registered different literacy levels. Dhodia tribes have attained the highest literacy level (75.9 %). Rathwas are taking all opportunities for high school education provided under different Government programmes. Kolis and Barias did not get the benefit of the reservation policy so they are changing and incorporating them into Rathwa communities (Pandey and Pathak, 1997: A-100). Overall, the level of literacy among the STs of Gujarat is better than the STs of other states.

Map - 3.4
Percentage of Literates: Tribal Belt of Gujarat (ITDP *Talukas)*
(2001 & 2011)
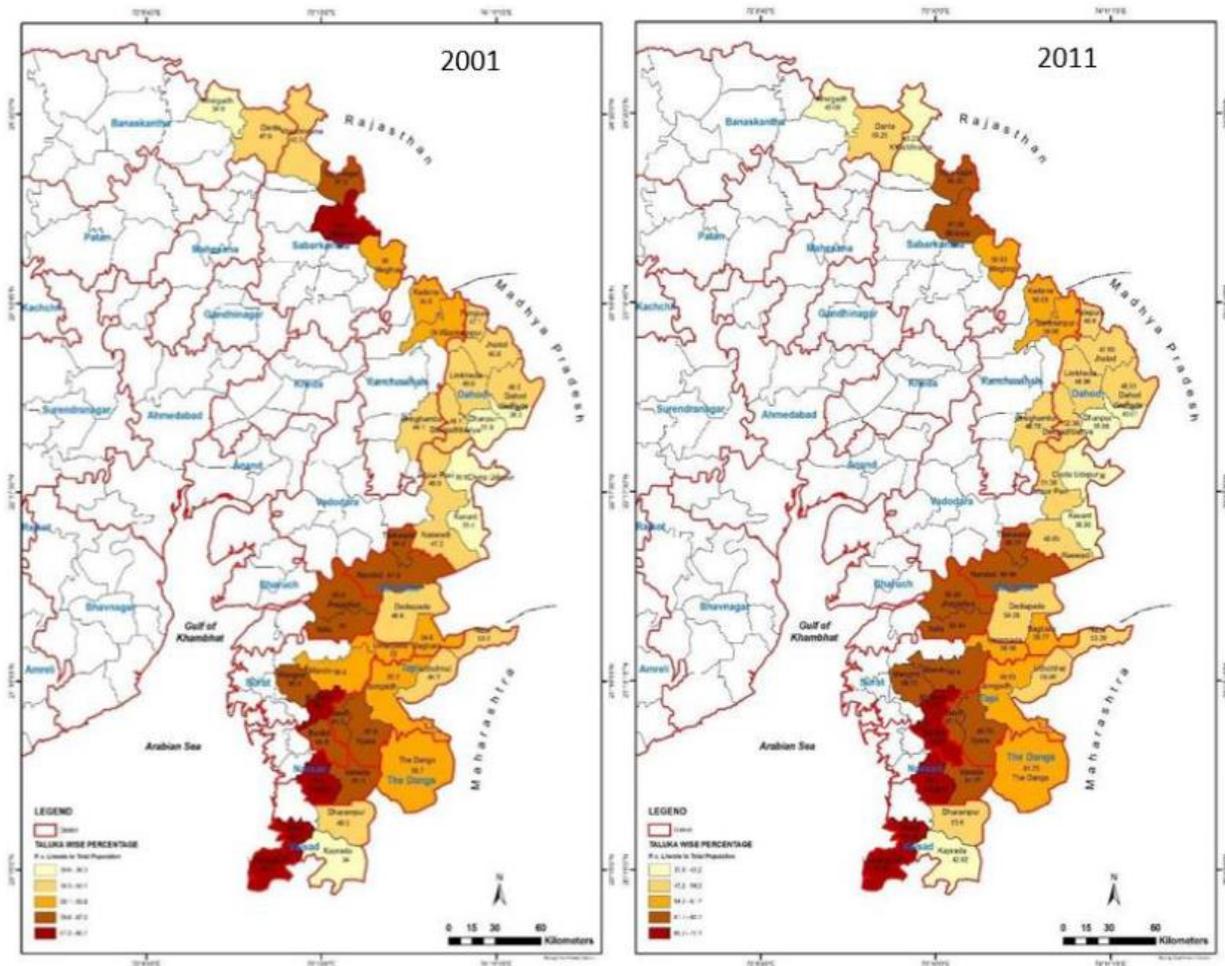
3.3.4 Sex Ratio of ST Population 2001-2011:

The sex ratio in India increased from 933 in 2001 to 940 in 2011, but the same registered decrease in Gujarat from 920 in 2001 to 919 in 2011. Since the first census of Gujarat as a separate state in 1961, the state average sex ratio has decreased consistently, except at the 1981 census.

Table - 3.6
Changes in ST Sex Ratio

Unit	Sex Ratio 2001			Sex Ratio 2011		
	Total	Rural	Urban	Total	Rural	Urban
India	978	981	944	990	991	980
Gujarat	974	978	926	981	984	952

Source: Govt. of India, 2021a

In comparison to the average ST sex ratio of 981 (2011) in the State, the districts of Sabar Kantha, Dohad, The Dangs, Surat, Tapi, Navsari and Valsad have more females than males. It is a very heartening to note that sex ratio of tribal people does not fall below 950 in any of the tribal districts.

Table - 3.7
District-wise ST Sex Ratio
(2001 & 2011)

State / District	Sex Ratio 2001	Sex Ratio 2011		
	Total	Total	Rural	Urban
Gujarat	974	981	984	952
Banas Kantha	949	968	969	960
Sabar Kantha	996	989	992	926
Panch Mahals	956	959	959	951
Dahod	982	993	993	986
Vadodara	956	960	966	906
Narmada	968	969	969	954
Bharuch	948	950	951	943
The Dangs	995	1009	1004	1083
Surat	997	983	995	939
Tapi	-	1022	1022	1020
Navsari	989	1001	999	1011
Valsad	1000	1002	1000	1013

Source: Govt. of Gujarat, 2023c: S-11

Overall, in all the districts, the sex ratio among the rural ST population is higher than their urban counterparts. Similar pattern is observed for the sex ratio in the age group of zero to six years. Thus, the overall decrease in the sex ratio of Gujarat state is mostly not seen in the tribal dominated districts of Gujarat with Surat as an exception.

3.3 Status of Public Infrastructure in Tribal Areas:

For any civilized society, public amenities directly and indirectly strengthen the population pyramid. If public infrastructures like health, drinking water, sanitation have been initiated recently then the result for all age groups may be affected after ten years. Present study tries to understand the background of primary health infrastructure and water tap connection in the tribal districts of Gujarat in order to analyze the condition of productive workforce, safe motherhood and control of epidemics.

3.3.1 Health Infrastructure:

Healthcare is one of the key indicators of socio-economic development. Proper distribution and functioning of public health infrastructure enhances both cultural or physical abilities and outcome of a healthy regional development. Gujarat has adopted a three-tier public health infrastructure system, based on population and geographical situation. Primary health care provides basic amenities to protect, maintain and restore public health. It is the first point of contact between the public and health care system (Pandve & Pandve, 2013: 1) Secondary health care is for both curative and preventive measures. Tertiary healthcare is meant for high level curative care and research studies (Govt. of Gujarat, 2023c: 72).

Table - 3.8
Population Norm Per Health Center

Centre	Population Covered per Centre	
	Plain Area	Hilly/Tribal/Difficult Area
Sub-centre	5,000	3,000
Primary Health Centre	30,000	20,000
Community Health Centre	1,20,000	80,000

Source: Govt. of India, 2013:1

According to the 2011-12 Socio-Economic Review, this three-tier distribution system of healthcare is different with respect to the population covered and the nature of care provided by these PHCs. Primary healthcare centers support the local population with minimum care with preventative aspects. The *talukas* of tribal regions in Gujarat, have lesser than the minimum prescribed number of PHCs and their distribution is uneven. From Rural Health Statistics 2012, it is observed that in place of the required 375 PHCs as per the prescribed norms, the tribal areas of Gujarat had only 358 PHCs. However, the situation has improved of late and this shortfall of 17 PHCs have been covered in 2021 (Govt. of India, 2013: 121).

Map - 3.5
Number of Primary Health Centers: Tribal Belt of Gujarat (ITDP *Talukas)* (2010)
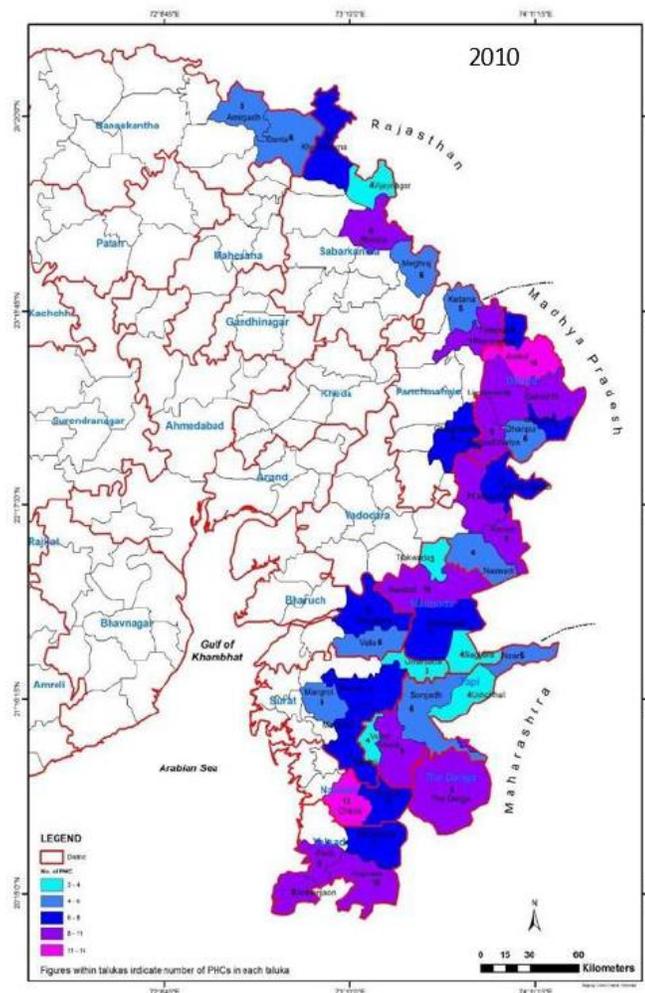
It can be observed from Map - 3.5 that the maximum number of PHCs are established in Jhalod and Chikhli, each *taluka* having more than 11 PHCs. The minimum number of PHCs ranging between 3 to 4 PHCs can be found in Valod, Uchchal, Sagbara, Umarpada, Tilakwada and Vijaynagar. Rest of the *talukas* have medium to high (4 to 11) number of PHCs.

Table - 3.9
Number of Primary Health Centers

District	2010*	PHC Per One Lakh Population Based on 2011 Census	2021#	PHC Per One Lakh Population Based on 2021 (Projected*)
Banas Kantha	80	2.6	125	3.37

Sabar Kantha	68	4.8	49	1.77
Panch Mahals	67	4.1	54	1.96
Dohad	65	3.1	99	3.80
Vadodara	80	2.6	51	1.08
Narmada	23	3.9	28	4.22
Bharuch	38	2.5	46	2.64
The Dangs	9	3.9	10	3.69
Surat	51	0.84	105	2.18
Tapi	30	3.7	39	4.35
Navsari	39	2.9	50	3.48
Valsad	42	2.5	58	2.88

*Source: *Govt. of India, 2013:114. #Govt. of India, 2022*
*Projected population of 2021 for all the above districts was computed by the author.

In some of the tribal districts the number of PHCs have increased adequately like in Banas Kantha, Dohad and Surat. However, in Sabar Kantha, Panch Mahals and Vadodara districts, the number of PHCs has decreased due to sub-division of the districts. Only in The Dangs district the increase in the number of PHCs is not satisfactory.

3.3.2   Water Supply:

Table - 3.10
Proportion of Households by Proximity to Source of Drinking Water

Unit	Percentage of All Households			Percentage of ST Households		
	Within the Premises	Near the Premises	Away	Within the Premises	Near the Premises	Away
India	46.6	35.8	17.6	19.7	46.7	33.6
Gujarat	64.0	23.5	12.4	28.8	46.4	24.8

Source: Govt. of India, 2021a: 161

Provision of drinking water at a common point or nearby location of the habitation through tap makes life much easier in rural areas. Fetching water from a well or pond is time consuming and exhausting. In most of the tribal *talukas, Vanbandhu Kalyan Yojana* hand pump, stand post and water tap connections have been provided through mini-piped water supply schemes.

Map - 3.6
Percentage of Households with Tap Water Connection: Tribal Belt of Gujarat (ITDP
Talukas) (2012)

A total of 2,29,668 tribal families got water tap connections during 2010-11. Map - 3.6 shows that the percentage of households which are having tap water connection is high towards the south of river Narmada. More than 80 per cent of tribal households in Nandod and Dediapada (Narmada), Mangrol and Bardoli (Surat), Nizar (Tapi) and The Dangs (The Dangs) *talukas* have tap water connection. Apart from Narmada district, The Dangs, Surat, Navsari, Bharuch districts are also having more than 56 per cent of tribal households with tap water connection. North of Narmada River, Chhota Udepur, Kavant, Nasvadi and Jetpur Pavi *talukas* of Vadodara district are having less than 56 per cent households with tap water connection.

Kadana (Panch Mahals), Fatepura, Limkheda, Dohad, Ghogamba, Dhanpur and Garbada (Dohad) *talukas* have 7 to 16 per cent of households with tap water connection. Mangrol (Surat) *taluka* is placed at the best position with tap water connection to each and every household.

3.3.3 Transport in the ITDP *Taluka*s:

The transport network is very essential for economic prosperity and communication. The Government of Gujarat initiated the second Gujarat State Highway Project (GSHP II) 2013, covering the cross road network in the State. Project corridor includes four *talukas* of three districts of the 43 ITDP districts, namely, Meghraj of Sabar Kantha, Santrampur and Kadana of Panch Mahals and Sankheda of Vadodara district. The roads constructed under the scheme are;

1. Dabhoi – Bodeli (Vadodara)

2. Dhansura – Meghraj (Sabar Kantha)

3. Lunawada – Khedapa (Panch Mahals)

Table- 3.11
Road Length Per One Lakh of Population in Tribal Districts as on 31st March, 2020

District	Road Length Existing as on 31/3/2020 (in Kms.)			Road Length per One Lakh Population (in Kms.)		Total (in Kms.)
	Surfaced	Un-Surfaced	Total	Surfaced	Un-Surfaced	
Banas Kantha	674	44	718	237.19	15.48	252.68
Sabar Kantha	708	9	717	213.66	2.72	216.38
Panch Mahals	860	0	860	229.69	0.00	229.69
Dahod	3,180	21	3,201	201.16	1.33	202.49
Chhota Udepur	1,760	0	1,760	164.20	0.00	164.20
Narmada	1,340	14	1,354	278.36	2.91	281.27
Bharuch	1,217	4	1,221	249.29	0.82	250.11
The Dangs	939	0	939	434.58	0.00	434.58
Surat	1,796	0	1796	209.58	0.00	209.58
Tapi	1,751	0	1751	257.76	0.00	257.76
Navsari	1,517	0	1517	237.16	0.00	237.16
Valsad	2,556	0	2556	283.12	0.00	283.12

Source: Govt. of Gujarat, 2021a: 46

3.3.4 Mineral Resources in ITDP *Talukas*:

As per provisional estimate, the value of mineral production of the State for the year 2018-19 was Rs. 10,084 crores worth. Provisional estimates show that Limestone production was 35,951, Lignite was 14,534, Bauxite was 3,137 and Dolomite was 1,455 tonnes. (Govt. of Gujarat, 2020a: 34).

Table 3.12
District-Wise Mineral Production (2021-22)

Districts	No. of Mines (2021-22)	Leading Minerals Produced in the Districts
Banas Kantha	462	Marble, Granite, Building Limestone, Limestone, Ordinary Sand, Hard Murrum, Other Building Stones, Calcite
Sabar Kantha	201	Limestone (major), Black Trap, Ordinary Sand, Bauxite, Limestone, Granite, Sand Stone, Quartzite, China Clay, Building Stone, Silica Sand, Bentonite
Panch Mahals	127	Quartz, Black Trap, Ordinary Sand, Quartzite, Granite
Dahod	62	Quartz, Black Trap, Ordinary Sand, Quartzite
Chhota Udepur	391	Fluorspar, Dolomite, Black Trap, Granite, Marble, Ordinary Sand, Gravel, Quartzite
Narmada	35	Black Trap, Ordinary Sand/Gravel
Bharuch	225	Lignite, Silica Sand, Agate, Black Trap, Gravel, Sand, Ball Clay, Ordinary Clay
The Dangs	0	
Surat	199	Lignite, Limestone, Black Trap, Ordinary Sand, Gravel
Tapi	145	Ordinary Sand, Black Trap
Navsari	189	Black Trap, Ordinary Sand
Valsad	80	Black Trap

Source: Govt. of Gujarat, 2023a: 75

Chhota Udepur district, the study area of the present research is rich in certain minerals such as, Dolomite, Quartzite, Granite, Ordinary Sand, Black Trap, Marble, Gravel and Fluorspar (District Survey Report, 2022: 9).

3.4 Amenities Related to Agriculture:

Sabar Kantha, Panch Mahals and The Dangs have good storage capacity for civil supplies. In terms of *pucca* roads, all tribal districts are well connected. However, there has been significant

reduction in the proportion of villages with banks and credit societies. While half of the districts have registered reduction in the proportion of villages with banks, all districts excepting Banas Kantha have registered reduction in the proportion of villages with credit societies. It would not be wrong to expect negative impact on farm mechanization or technology induced farming in the tribal districts due to such reduction.

Table - 3.13
Decadal Percentage Change in Amenities Related to Agriculture in Tribal Areas
(2001 and 2011)

Districts	Storage Capacity in Metric Tons (Civil Supply)			% of villages connected with *Pucca* Roads (Out of total villages in the district)			% of villages having Agricultural Credit Societies (Out of total villages in the district)			% of villages having Banking Facility (Out of total villages in the district)			% of villages connected through Transport Communications		
	2001	2011	Decadal change %	2001	2011	Decadal Change %	2001	2011	Decadal Change %	2001	2011	Decadal Change %	2001	2011	Decadal Change %
Banas Kantha	12250	11750	-4.08	85.7	97.1	13.30	62.4	73.1	17.15	10	11.8	18.00	89.5	98.6	10.17
Sabar Kantha	7950	8450	6.29	84.8	97	14.39	51.3	35.8	-30.21	9.6	9.6	0.00	97.5	99.5	2.05
Panch Mahals	5800	6950	19.83	80.2	94.6	17.96	23	16.2	-29.57	6.7	5.6	-16.42	83.9	97.8	16.57
Dahod	5950	4250	-28.57	82.5	98.3	19.15	16.5	9.7	-41.21	4.3	4.2	-2.33	83	96.8	16.63
Vadodara	13219	11050	-16.41	73.3	88.6	20.87	49.1	18.5	-62.32	6.3	15.9	152.38	72.4	97.7	34.94
Narmada	3750	3450	-8.00	72.1	93.6	29.82	42	11.5	-72.62	3.3	2.5	-24.24	58	94.8	63.45
Bharuch	7500	7000	-6.67	91.3	99.1	8.54	52.8	32.3	-38.83	9.9	10.5	6.06	90	99.2	10.22
The Dangs	920	1240	34.78	59.5	95.1	59.83	10.6	7.8	-26.42	2.3	0.7	-69.57	67.8	91.2	34.51
Navsari	8600	7450	-13.37	97.6	100	2.46	42.5	38.2	-10.12	17.9	16.9	-5.59	99.2	99.2	0.00
Valsad	7000	6750	-3.57	77.1	93.1	20.75	29.6	14.3	-51.69	9.1	8.8	-3.30	86.4	92.4	6.94
Surat	20910	11460	-45.19	88.8	96.1	8.22	67.9	14.1	-79.23	8.1	10.6	30.86	89.2	99	10.99
Tapi*	-	5400	-	-	99.3	-	-	13.1	-	-	4.21	-	-	99.6	-

Source: Census of India, 2001 and 2011.
*On 27th September 2007, the district of Surat was bifurcated into two new districts, viz. Surat and Tapi districts. Hence, the decadal change for Tapi district is not available for 2001 Census (District Census Handbook Part A Tapi, 2011:13).

Percentage of villages connected with *pucca* roads in Chhota Udepur increased by 32.14 per cent during the 2001 and 2011 census, and percentage of villages with Agricultural Credit Society dropped by (-)84.26 per cent. On the other hand, the percentage of villages having banks and transport facilities increased by 165.71 and 56.40 per cent respectively (Govt. of India, 2001: 68, Govt. of India, 2015a: 110).

Perhaps the infrastructural change in the north and eastern hilly region itself is changing the farming from traditional subsistence farming to mechanized high yielding cash crops. This trend is more conspicuous in irrigated plains of the tribal districts, whereas the hilly regions are

using alternative measures for agricultural transformation. The cyclic nature of crop loan to farmers from banks located in the area assists the tribal farmers to avail better irrigation facilities and good crop yields. Most of the banks offer crop loans to tribal cultivators for eleven months duration and after repaying within the term period certain percentage of interests are waived off. Therefore, better yield and improved transport facilities with metalled roads again cyclically boost crop income and repayments of loans. Contrarily, inequality in distribution of banks in some of the districts catering to a smaller number of villages and inadequate number of households to support banking service results in moderate to low yield.

3.5 Status of Agriculture in Tribal Areas (2001-2016):

Gujarat has three main physiographic regions. North Gujarat (Kachchh and Saurashtra), South, and Central Gujarat. Though Gujarat has varying topography, a major part of the State remains dry and parched. The average rainfall varies between 250 mm to 1500mm in the State. Out of the eight agro-climatic zones, five fall under semi-arid and the remaining are sub-humid. Maximum portion of the soil varies from deep black to medium black soils. Out of a total geographical area of 196 lakh hectares, 99.66 lakh hectares or nearly 50 per cent are under Net Sown Area (NSA) (Govt. of Gujarat, 2015:1).

According to Mahesh Pathak and V.D. Shah, there are structural rigidities in area allocation for crops at the National level, where food grain crops continue to claim around 75 per cent of the Gross Cropped Area (GCA). Gujarat had an average of only 47 per cent of GCA under food crops between 1960-63 and 2005-08 (Pathak and Shah, 2010: 18). Farmers in Gujarat are responsive to market demand as they have shifted from food crops to profitable cash crops, like oilseeds, horticulture and non-food commercial crops (ibid:18). However, the cropping pattern of tribal *talukas* depicts more or less stagnant conditions for 2001-02 to 2015-16 quinquennial, even for cash crops and non-food crops.

3.5.1 Net Area Sown in Tribal Districts:

Cultivation is the main occupation of the tribal population of Gujarat. There are two issues regarding yield and cropping patterns in the entire eastern tribal region. One is forest area and other is semi-arid climatic condition. Most of the districts of the eastern belt which belong to Aravalli upland, Vindhyan highland and Narmada valley with higher forest cover, have lesser cultivated

area. This is because the forested area restricts cultivation. Secondly, due to semi-arid climatic conditions in this eastern region of the State rain fed cultivation permits growing only a single crop in most of the cases.

Table – 3.14
Estimated Quinquennial Share of NSA of ST Population

Districts	Percentage of NSA of ST Population to NSA of All Social Groups			
	2001-02	2005-06	2010-11	2015-16
Banas Kantha	4	3	3	3
Sabar Kantha	12	13	13	12
Panch Mahals	20	22	22	17
Dahod	69	68	69	71
Vadodara	23	24	24	53
Narmada	71	68	73	73
Bharuch	15	15	15	15
The Dangs	99	NA	100	100
Navsari	42	42	40	42
Valsad	64	56	57	55
Surat	47	29	30	29
Tapi	NA	80	82	81

Source: National Informatics Center (NIC), Agriculture Census Division, DAC

Figure 3.1
Percentage of NSA of ST Population to NSA of All Social Groups
(2001-02 to 2015-16)
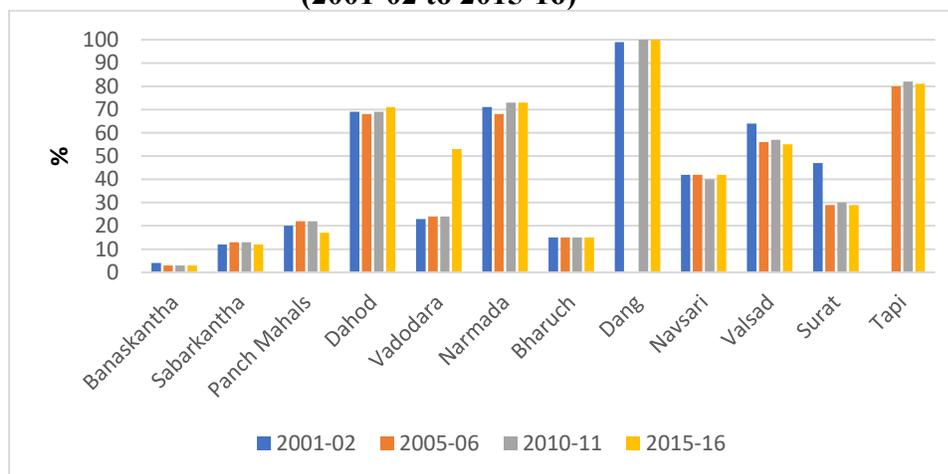
It is clear from Figure - 3.1 that the entire area under cultivation in The Dangs district belongs to the STs. Other than The Dangs, the cultivated area belonging to the STs is also high,

ranging between 60 to 80 per cent in the districts of Dahod, Narmada, Tapi and Valsad. The tribes possess the least proportion of cultivated area of around 10 per cent or less in the districts of Bharuch, Sabar Kantha and Banas Kantha. The steady decline in the proportion of NSA with the tribes in the districts of Valad, Surat and Panch Mahals is a matter of concern and needs to be investigated. However, it can tentatively be ascribed to the progress of the urban-industrial sector in these districts, and associated land alienation and out migration processes.

3.5.2 Changes in Area under Irrigation in Tribal Districts:

Table - 3.15
Percentage Share of Gross Cropped and Irrigated Area of the ST Population in the Area of All Social Groups (Quinquennial)

Unit	Gross Cropped Area			Gross Irrigated Area			Gross Unirrigated Area		
	2005-06	2010-11	2015-16	2005-06	2010-11	2015-16	2005-06	2010-11	2015-16
India ('00 Ha)	147,631	181,545	181,036	28,875	39,596	49,059	118,756	141,948	131,977
India (%)	9.7	9.4	9.4	3.9	4.5	5.1	15	13.4	13.7
Gujarat('00Ha)	9,556	9,676	9,491	1,540	2,633	3,591	8,016	7,043	5,900
Gujarat (%)	9.6	9.2	9.0	4.96	6.2	6.6	11.6	11.2	11.6

Source: Govt. of India, 2015

Surface run-off and groundwater are the two major and traditional sources of irrigation in the tribal districts of Gujarat. The major rivers flowing through the tribal region are Narmada and Tapi. The State had made concerted efforts to increase irrigation water potential, its restoration, maintenance and updating the old irrigation systems (Govt. of Gujarat, 2017a: 15). As it encounters constraints to implement major and medium irrigation projects in the tribal areas, such as regulations pertaining to clearance of forests, environmental problems and local opposition etcetera, importance is laid on minor irrigation projects. Types of minor irrigation projects, which are simple, fast to execute, and easy to adopt are lift irrigation systems, deepening of ponds and construction of check dams (Govt. of Gujarat, 2018: 52). Towards this end, the State Government has implemented programmes to conserve water through (a) check dams, (b) recharging reservoirs/tanks in thrust areas covering 58 lakh hectares of both non-tribal and tribal areas with water from other rivers, and (c) deepening of reservoirs/tanks for effective ground water recharge (Ibid.:45).

Table - 3.16
Irrigation Potential
(Area in Lakh Hectares)

| Region	Geographical Area	Cultivable Area	Irrigation Potential
State	196	124	63.65 (51.33% of Cultivable Area)
Tribal	29.42	16.75	4.16 (24.83% of Cultivable Area)

Source: Govt. of Gujarat, 2018: 45

From Table - 3.16, there is not much potential for harnessing irrigation or irrigated water for farming in tribal areas of the State. This may be due to physical inabilities and seasonal rainfall. But, for the entire State, there is a chance that more than 50 per cent of cultivable area could be brought under irrigation and it is reflected in cropping intensity (CI) of the State. During 1996-97, CI was 114.5 per cent which rose to 141.2 per cent in the year 2019-20. GCA and area sown more than once were observed with a growth of 25 per cent and 185 per cent respectively between 1996-97 to 2019-20 (Report of Government of Gujarat, 2021-22: 2).

Table – 3.17
Quinquennial Percentage of Estimated Irrigated Area under ST Population to Corresponding Area under All Social Groups

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	2	2	4	4
Sabar Kantha	9	7	9	7
Panch Mahals	6	10	15	7
Dahod	79	66	64	70
Vadodara	9	11	10	5
Narmada	43	33	65	55
Bharuch	6	9	11	16
The Dangs	100	NA	99	100
Navsari	17	22	21	32
Valsad	38	34	42	32
Surat	27	18	24	17
Tapi	NA	59	77	79

Source : National Informatics Centre (NIC), Agriculture Census Division, DAC

Figure 3.2
District-Wise Percentage of Irrigated Area of ST Population to Irrigated Area under All Social Groups (2001-02 to 2015-16)
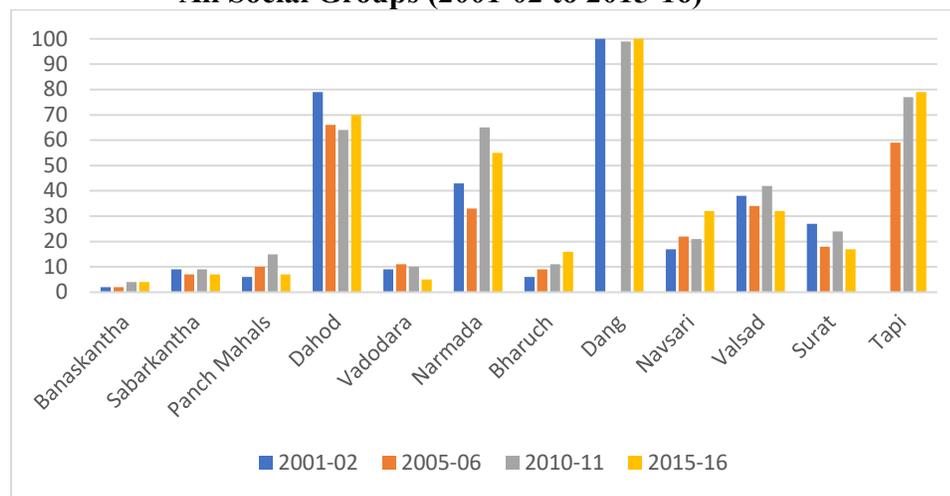
In the tribal areas of Gujarat total 1,01,241 hectares of area have been given benefit of irrigation, which includes 58,966 hectares through 14,352 small check dams, 25,038 hectares through 521 big check dams and 17,237 hectares by deepening of 3,548 ponds. Benefits of lift irrigation have been provided to 49,684 hectares under 1,346 schemes (Govt. of Gujarat, 2023c: 20). From Table - 3.17, it can be observed that in Banas Kantha district, the percentage of area under irrigation has increased only by 2 per cent during 2001-15. Gujarat Government has initiated a micro-irrigation system to increase the area under irrigation over 4.21 lakh hectares in the District. To prevent mixing of brackish tide water in Narmada river, Bhadbhut Yojana has been planned. This project will improve the quality of water in Bharuch and Ankleshwar area for irrigation and also to store potable water. Navsari (32%), Valsad (32%) and Surat (17%) districts have less than one-third of the fields under STs irrigated. The varied geographical characteristics, access to water and facilities developed by district authorities have resulted in changing cropping patterns. In Vadodara (5%), Panch Mahals (7%) and Sabar Kantha (4%) districts, substantial irrigation water is received through Mahi, Orsang, Dev and Karjan River irrigation projects. The Chhota Udepur district (tribal *taluka* separated from Vadodara district), Mahisagar (separated from Kheda and Panch Mahals) and Aravalli (separated from Sabar Kantha) are primarily tribal regions and get ground water irrigation in less than 10 per cent of their cultivated area.

3.5.3   Changes in Agricultural Land Use and Practices:

Dry black to medium black soil dominates the soil types in the north eastern part of the State. The overall Nitrogen-Phosphorus-Potash (NPK) status in Gujarat is low, medium and high respectively. Due to intensive farming, less leguminous plant culture and less addition of farmyard manure accelerate the condition of coarse texture of soil with low content in iron, zinc and sulphur. Copper content in the soil is adequately sufficient in most of the soils of Gujarat. Moderately high zinc is present in Surat and Navsari districts. Sabar Kantha and Panch Mahals districts have high iron induced soil (Govt. of Gujarat, 2020b: 26).

Plate - 3.1
Soil Type of Ambala Village in Chhota Udepur *Taluka*.

(Photo taken on 05 February 2023)

Roy Burman and Sharma have explained the reason behind the failure of initiatives taken to control shifting cultivation and promote settled agriculture among the STs. Introduction of cash crops, horticulture, taungiya[6] and terrace cultivation were some of the initiatives to motivate STs

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[6] The taungya is a system whereby villagers and sometimes forest plantation workers are given the right to cultivate agricultural crops during the early stages of forest plantation.

to change land utilization in different parts of the country. But these efforts could not achieve the desired results due to firstly, unlike the peasants of the plain areas the ST farmers do not look after the seedling properly and secondly, longer gestation period of crops is not preferred by the tribes as they do not have capabilities to bear the cost (Roy Burman and Sharma, 1970: 151,153).

Table – 3.18
Estimated Area under Cultivation (in Hectares) of ST Population and their
Percentage to Area under All Social Groups

District	Year	Area (Ha) under all product categories	Total Cereals (Ha)	Total Pulses (Ha)	Total Oilseeds (Ha)	Total Spices & Condiments (Ha)	Total Vegetables (Ha)	Total Fibers (Ha)	Total Fruits (Ha)	Total Foddar & Green Manures (Ha)	Total Aromatic & Medicinal Plants
Banas Kantha	2000-01	27,902 (3)	19,037 (4)	2,865 (8)	3,698 (2)	68 (1)	2,012 (2)	33 (<1)	NA	185 (<1)	4 (<1)
	2005-06	24,492 (3)	13,921 (4)	2,931 (8)	5,270 (2)	227 (2)	1,538 (2)	359 (2)	19 (15)	203 (1)	24 (1)
	2010-11	31,616 (3)	16,273 (4)	3,009 (7)	7,616 (3)	1,536 (4)	1,034 (1)	895 (3)	NA	1,253 (2)	NA
	2015-16	22,191 (3)	7,938 (3)	1,159 (6)	9,337 (3)	1,833 (3)	145 (<1)	788 (2)	3 (<1)	988 (2)	NA
Sabar Kantha	2000-01	54,157 (12)	41,010 (16)	9,356 (22)	829 (1)	62 (2)	17 (<1)	2,832 (7)	NA	51 (2)	NA
	2005-06	56,977 (13)	40,899 (17)	12,017 (36)	1,014 (1)	41 (1)	12 (<1)	2,929 (3)	6 (1)	56 (3)	3 (5)
	2010-11	63,122 (14)	43,172 (20)	10,290 (31)	6,254 (8)	357 (3)	164 (1)	2,773 (3)	32 (1)	80 (1)	NA
	2015-16	28,726 (10)	20,891 (23)	4,893 (23)	922 (1)	6 (<1)	92 (1)	1,922 (2)	NA	NA	NA
Panch Mahals	2000-01	60,273 (19)	52,130 (21)	7,130 (24)	19 (1)	71 (40)	435 (18)	455 (12)	NA	30 (5)	3 (2)
	2005-06	68,405 (23)	62,931 (23)	4,640 (21)	166 (7)	27 (6)	45 (2)	424 (6)	123 (57)	24 (2)	25 (11)
	2010-11	67,136 (22)	48,419 (20)	7,360 (26)	680 (11)	12 (9)	421 (15)	1,459 (10)	8,715 (64)	70 (14)	NA
	2015-16	35,383 (17)	24,749 (16)	4,905 (25)	1,333 (18)	4 (19)	295 (35)	1,870 (15)	5 (4)	2,194 (16)	28 (18)
Dahod	2000-01	144,201 (69)	137,057 (71)	6,487 (50)	216 (60)	31 (27)	26 (76)	14 (10)	7 (19)	341 (83)	22 (29)
	2005-06	148,438 (68)	143,669 (69)	3,251 (58)	143 (56)	16 (22)	6 (46)	76 (89)	9 (100)	1,248 (59)	20 (22)
	2010-11	147,405 (69)	127,547 (70)	17,989 (65)	998 (50)	114 (70)	5 (71)	170 (78)	1 (100)	577 (82)	4 (100)
	2015-16	145,749 (69)	119,060 (67)	9,624 (70)	16,910 (91)	15 (44)	25 (100)	18 (23)	NA	80 (75)	17 (15)
Vadodara	2000-01	112,502 (25)	53470 (37)	20194 (25)	1,111 (9)	7 (2)	154 (2)	36,585 (20)	169 (3)	787 (15)	25 (6)
	2005-06	118,182 (26)	66,548 (41)	19,125 (27)	1,281 (9)	8 (1)	228 (5)	29,544 (16)	530 (6)	877 (16)	41 (38)
	2010-11	115,450 (27)	61,134 (37)	19,770 (31)	2,593 (13)	120 (8)	878 (8)	30,556 (19)	207 (4)	181 (6)	11 (38)
	2015-16	13,902 (5)	4,169 (5)	1,668 (6)	3,342 (9)	30 (1)	458 (2)	3,044 (3)	737 (7)	454 (7)	NA
Narmada	2000-01	73,028 (73)	33,058 (84)	13,446 (74)	1,142 (69)	176 (98)	64 (47)	22,260 (69)	2,625 (34)	254 (23)	3 (100)
	2005-06	73,600 (69)	35,354 (90)	15,586 (82)	628 (72)	6 (50)	146 (60)	19,761 (49)	1,178 (21)	939 (51)	2 (11)
	2010-11	86,411 (75)	35,869 (92)	14,794 (81)	1,355 (74)	472 (82)	238 (92)	30,481 (66)	2,649 (33)	542 (51)	11 (69)
	2015-16	76,433 (69)	23,498 (86)	18,511 (91)	1,376 (30)	6 (100)	84 (76)	30,000 (60)	2,461 (29)	497 (99)	NA

District	Years	Area under all product categories (Ha)	Total Cereals (Ha)	Total Pulses (Ha)	Total Oilseeds (Ha)	Total Spices & Condiments (Ha)	Total Vegetables (Ha)	Total Fibers (Ha)	Total Fruits (Ha)	Total Foddar & Green Manures (Ha)	Total Aromatic & Medicinal Plants
Bharuch	2000-01	44,892 (16)	8,266 (23)	10,891 (17)	505 (16)	44 (28)	134 (14)	23,993 (15)	666 (8)	369 (6)	24 (89)
	2005-06	42,147 (15)	10,537 (23)	17,182 (29)	896 (36)	5 (4)	124 (14)	12,885 (8)	246 (6)	272 (4)	NA
	2010-11	39,529 (16)	10,468 (22)	15,438 (23)	184 (5)	14 (8)	144 (11)	12,113 (10)	864 (10)	304 (24)	NA
	2015-16	40,623 (14)	10,808 (21)	17,842 (18)	1,654 (18)	241 (81)	80 (1)	7,376 (8)	862 (9)	1,760 (11)	NA
The Dangs	2000-01	50,377 (99)	34,741 (98)	9,027 (99)	5,070 (100)	74 (100)	19 (100)	401 (100)	62 (100)	982 (99)	1 (100)
	2005-06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2010-11	45,170 (100)	36,437 (100)	7,224 (100)	1,315 (100)	93 (100)	92 (99)	9 (100)	NA	NA	NA
	2015-16	56,658 (100)	31,049 (100)	9,624 (100)	2,610 (100)	23 (100)	11,609 (100)	474 (100)	NA	1,269 (100)	NA
Surat	2000-01	142,890 (62)	115,634 (69)	14,141 (67)	3,966 (79)	1,214 (56)	762 (9)	3,973 (46)	2,023 (22)	1,163 (14)	14 (100)
	2005-06	50,718 (47)	42,838 (57)	3,903 (51)	874 (73)	453 (86)	548 (15)	539 (38)	87 (2)	1,476 (11)	NA
	2010-11	47,517 (44)	22,389 (46)	4,929 (65)	16,658 (81)	468 (30)	1,267 (6)	1,031 (48)	453 (7)	322 (91)	NA
	2015-16	53,925 (38)	27,881 (40)	10,741 (58)	3,838 (32)	267 (13)	323 (5)	3,307 (34)	748 (11)	6,820 (43)	NA
Tapi	2000-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2005-06	100,170 (84)	75,856 (86)	9,640 (91)	4,377 (86)	3,322 (75)	208 (90)	3,287 (47)	1,984 (91)	1,496 (96)	NA
	2010-11	89,752 (84)	66,721 (87)	11,741 (90)	6,783 (96)	1,094 (44)	1,823 (52)	1,287 (47)	283 (40)	20 (9)	NA
	2015-16	89,982 (86)	49,981 (86)	23,980 (96)	11,670 (92)	362 (51)	322 (80)	2,622 (43)	1,016 (83)	28 (16)	1 (100)
Navsari	2000-01	46,456 (42)	41,979 (48)	2,111 (85)	32 (17)	3 (50)	106 (40)	28 (10)	1,684 (15)	513 (6)	NA
	2005-06	49,428 (38)	38,933 (49)	1,097 (88)	18 (16)	10 (7)	330 (37)	NA	737 (7)	8,303 (22)	NA
	2010-11	47,174 (42)	33,329 (43)	3,213 (60)	27 (13)	39 (11)	564 (12)	32 (62)	8,810 (35)	1,101 (99)	59 (98)
	2015-16	48,401 (41)	29,566 (54)	1,619 (45)	88 (48)	289 (51)	192 (18)	37 (47)	5,446 (21)	11,164 (36)	NA
Valsad	2000-01	77,718 (59)	64,426 (69)	4,506 (95)	9 (13)	45 (10)	9 (36)	4 (100)	3,357 (18)	5,355 (38)	7 (100)
	2005-06	83,628 (56)	65,224 (64)	4,674 (95)	416 (79)	1 (8)	180 (87)	17 (41)	4,102 (22)	8,970 (39)	44 (100)
	2010-11	83,293 (58)	47,795 (58)	8,847 (80)	2,078 (36)	327 (81)	1,312 (39)	NA	10,602 (39)	12,332 (93)	NA
	2015-16	84,419 (56)	48,109 (58)	10,345 (59)	2,099 (65)	NA	NA	103 (47)	13,361 (44)	10,402 (64)	NA

Source: National Informatics Center (NIC), Agriculture Census Division, DAC;
Percentage is calculated by author.

(i) Area under Cereal Cultivation:

Mahesh Pathak and V.D. Shah have expounded that the area of total cereal has reduced in Gujarat from 41.6 per cent in 1960-63 to 30.4 per cent in 2005-08. They have also added that 86 there is a notable characteristic regarding area under cultivation in Gujarat that, to increase GCA

over limited NSA, farmers are focusing on well recharge, pond deepening, construction of check dams. But in the tribal districts the scenario is not that easy (Pathak and Shah, 2010, 15- 28). From Table - 3.19, it is observed that from 2001 to 2016, area under cereal crops has been declining steadily in all the tribal dominated districts. However, there are some exceptions like Sabar Kantha, The Dangs and Navsari districts, where the cereal area displays a fluctuating trend.

Table – 3.19
Estimated Percentage of Area under Cereal* Cultivation of ST Population to its Corresponding Area under All Social Groups

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	4	4	4	3
Sabar Kantha	16	17	20	23
Panch Mahals	21	23	20	16
Dahod	71	69	70	67
Vadodara	37	41	37	5
Narmada	84	90	92	86
Bharuch	23	23	22	21
The Dangs	98	NA	100	100
Navsari	48	49	43	54
Valsad	69	64	58	58
Surat	69	57	46	40
Tapi	NA	86	87	86

*Considering area under Paddy, *jowar*, *bajra*, maize, *ragi*, wheat, barley, small millets and other cereals.

Figure - 3.3
Percentage of Area under Cereal Cultivation of ST Population to its Corresponding Area under All Social Groups (2001-02 to 2015-16)

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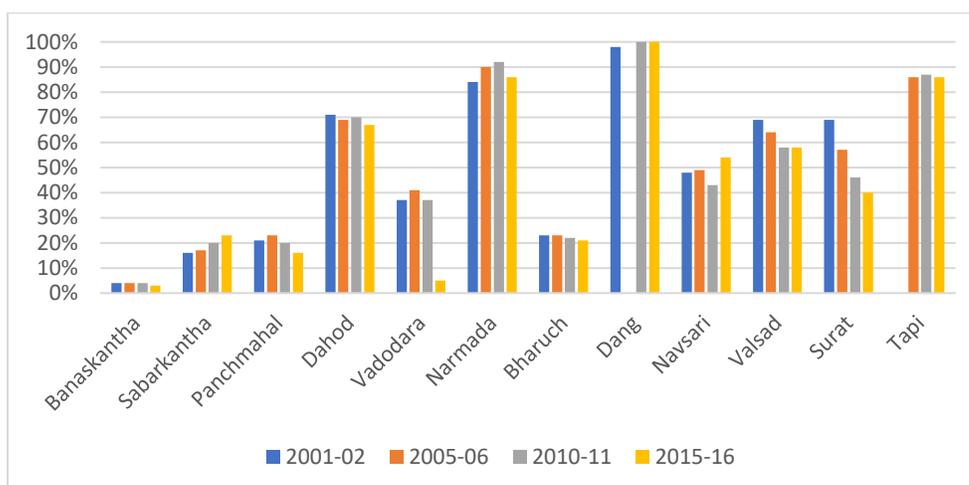
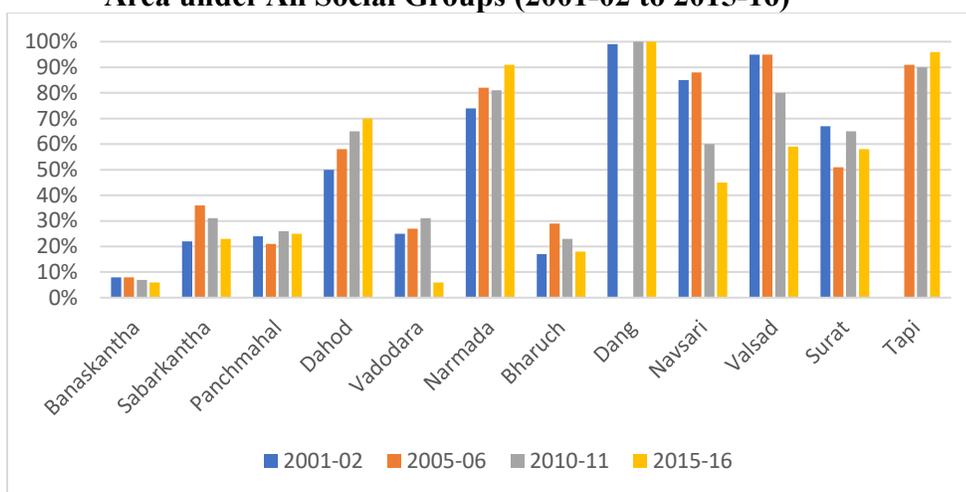**(ii) Area under Pulse Cultivation:**

Area devoted to pulses shows a different picture. It has increased only in the districts of Dohad, Narmada, Bharuch, The Dangs and Tapi, at times substantially. The remaining districts have registered a decline of area under pulses. Vadodara district leads in this respect with loss of area under pulse cultivation from 20,194 hectares to 1,665 hectares during the period of reference.

Table – 3.20
Estimated Percentage of Area under Pulse* Cultivation of ST Population to its Corresponding Area under All Social Groups

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	8	8	7	6
Sabar Kantha	22	36	31	23
Panch Mahals	24	21	26	25
Dahod	50	58	65	70
Vadodara	25	27	31	6
Narmada	74	82	81	91
Bharuch	17	29	23	18
The Dangs	99	NA	100	100
Navsari	85	88	60	45
Valsad	95	95	80	59
Surat	67	51	65	58
Tapi	NA	91	90	96

*Considering area under Gram, tur (arhar), urad, moong, masur, horsegram, bean, peas and other pulses.

Figure - 3.4
Percentage of Area under Pulses Cultivation of ST Population to its Corresponding Area under All Social Groups (2001-02 to 2015-16)

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**(iii) Area under Oil Seed Cultivation:**

Area under oilseed production has increased sharply in Dohad, Panch Mahals, The Dangs, Bharuch, Navsari and Valsad districts between 2010 and 2016. Increase of area under oilseed production is indicating that tribal farmers are changing cropping patterns to commercial crops. Commercial crops are market-oriented which can be related to development of infrastructure.

Table – 3.21
Estimated Percentage of Area under Oil Seed* Cultivation of ST Population to its Corresponding Area under All Social Groups

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	2	2	3	3
Sabar Kantha	1	1	8	1
Panch Mahals	1	7	11	18
Dahod	60	56	50	91
Vadodara	9	9	13	9
Narmada	69	72	74	30
Bharuch	16	36	5	18
The Dangs	100	NA	100	100
Navsari	17	16	13	48
Valsad	13	79	36	65
Surat	79	73	81	32
Tapi	NA	86	96	92

*Considering area under groundnut, caster seed, sesame (*til*), rapeseed and mustard (*toria/ taramira*), linseed, coconut, sunflower, safflower, soya bean, niger seed, oil palm and other oil seeds.

Figure - 3.5
Percentage of Area under Oilseeds Cultivation of ST Population to its Corresponding Area under All Social Groups (2001-02 to 2015-16)
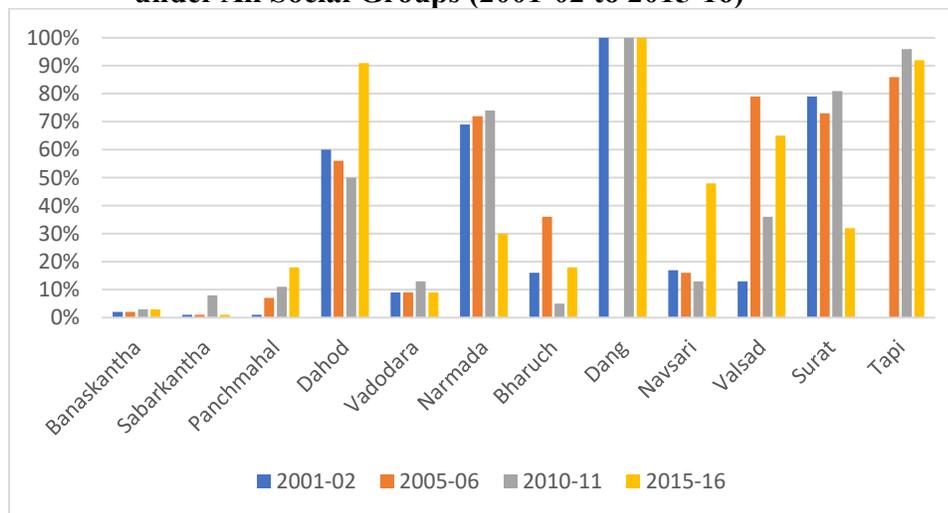
**(iv) Area under Spice and Condiment Cultivation:**

Spices and condiments are cultivated more in the tribal districts of Banas Kantha, Panch Mahals, Narmada and Tapi. In Vadodara district, area under spices by STs are very less and it has reduced from 2010 to 2016.

Table – 3.22
Estimated Percentage of Area under Total Spices and Condiments* Cultivation of ST Population to its Corresponding Area under All Social Groups

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	1	2	4	3
Sabar Kantha	2	1	3	0
Panch Mahals	40	6	9	19
Dahod	27	22	70	44
Vadodara	2	1	8	1
Narmada	98	50	82	100
Bharuch	28	4	8	81
The Dangs	100	NA	100	100
Navsari	50	7	11	51
Valsad	10	8	81	NA
Surat	56	86	30	13
Tapi	NA	75	44	51

* Considering area under Pepper (black), chillis, ginger, turmeric, cardamom, betelnuts (areca nuts), garlic, coriander, cumin seeds, tamarind, fennel/anise seed, nutmeg, fenugreek, cloves, cinnamon, cocoa, beetlvine, *kachola* and other condiments and spices

Figure 3.6
Percentage of Area under Total Spices and Condiments Cultivation of ST Population to its Corresponding Area under All Social Groups (2001-02 to 2015-16)
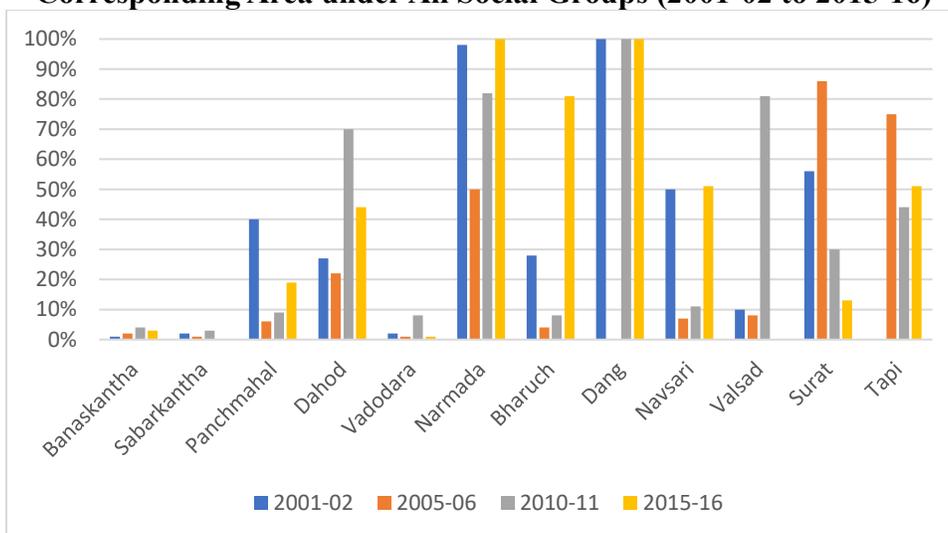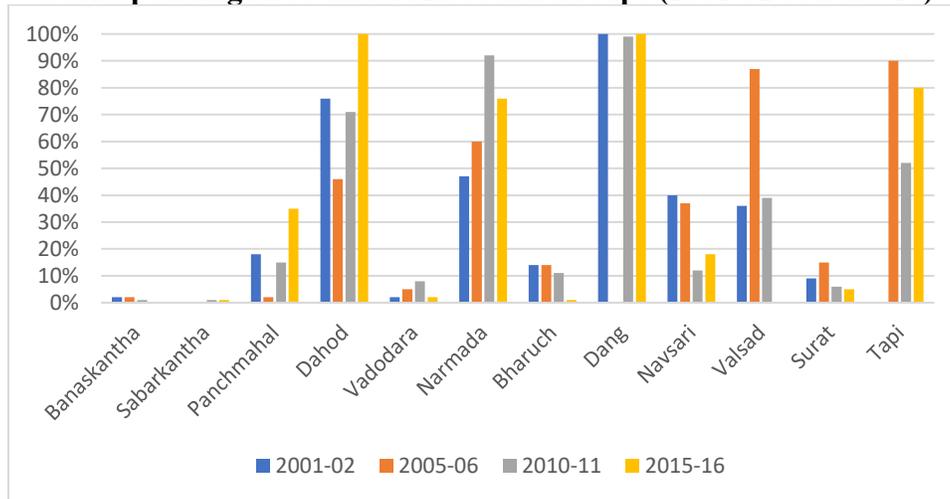
(v) Area under Vegetable Cultivation:

In Panch Mahals and Navsari districts ST population have devoted more than 20 to 30 per cent of cultivated area to all vegetables. Dohad, Tapi, The Dangs and Narmada districts have nearly 70 per cent of area under all vegetables.

Table – 3.23
Estimated Percentage of Area under Total Vegetables* Cultivation of ST Population to its Corresponding Area under All Social Groups

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	2	2	1	0
Sabar Kantha	0	0	1	1
Panch Mahals	18	2	15	35
Dahod	76	46	71	100
Vadodara	2	5	8	2
Narmada	47	60	92	76
Bharuch	14	14	11	1
The Dangs	100	NA	99	100
Navsari	40	37	12	18
Valsad	36	87	39	NA
Surat	9	15	6	5
Tapi	NA	90	52	80

* Considering area under Potato, tapioca, sweet potato, yam, elephant root yam, alocasia and other tubers, onion, carrot, radish, beetroot, turnip tomato, spinach, amaranths, cabbage and other leafy vegetables, brinjal, peas, lady's finger, cauliflower, bottle guard, pumpkin, bitter guard, vench (gaur), drumsticks, green chillies, cucumber and other vegetables

Figure - 3.7
Percentage of Area under Total Vegetables Cultivation of ST Population to its Corresponding Area under All Social Groups (2001-02 to 2015-16)
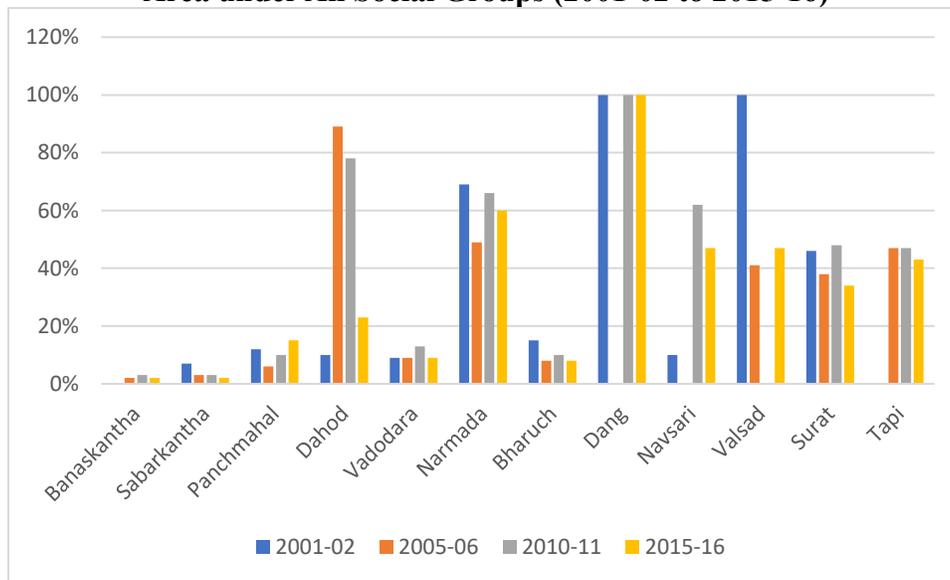
(vi) Area under Fibre Cultivation:

Declining trend of fibre production in the tribal districts of Vadodara, Narmada, Bharuch, Surat and Tapi is reflected in Table - 3.24. Fibre production is important in the districts of Dohad, The Dangs and Panch Mahals.

Table – 3.24
Estimated Percentage of Area under Total Fibers* Cultivation of ST Population to its Corresponding Area under All Social Groups

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	0	2	3	2
Sabar Kantha	7	3	3	2
Panch Mahals	12	6	10	15
Dahod	10	89	78	23
Vadodara	9	9	13	9
Narmada	69	49	66	60
Bharuch	15	8	10	8
The Dangs	100	NA	100	100
Navsari	10	NA	62	47
Valsad	100	41	NA	47
Surat	46	38	48	34
Tapi	NA	47	47	43

* Considering area under Cotton, jute, mesta, sun hemp and other fibres.

Figure - 3.8
Percentage of Area under Total Fibres Cultivation of ST Population to its Corresponding Area under All Social Groups (2001-02 to 2015-16)
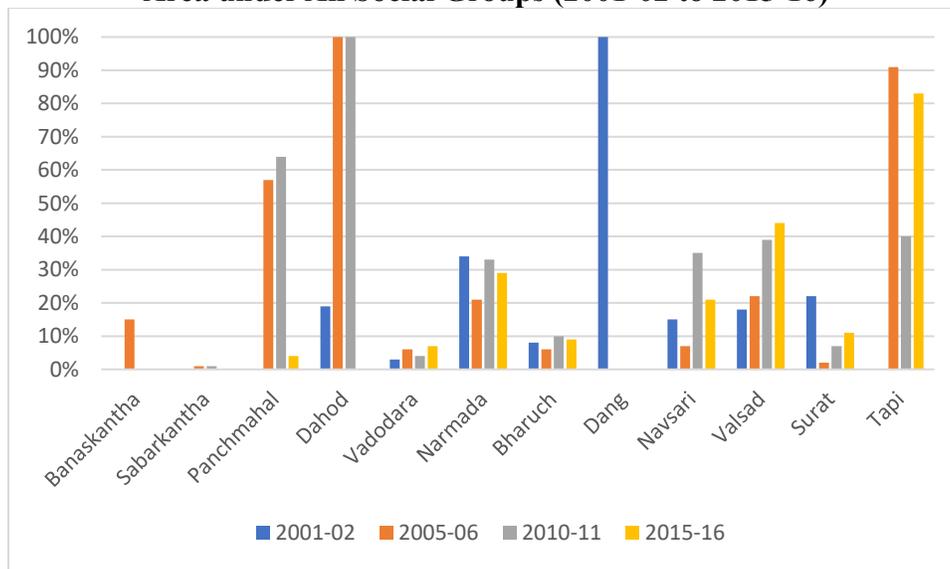
(vii) Area under Fruits Cultivation:

Narmada, Vadodara, Tapi, Valsad, Navsari and Surat districts are important fruit growers. Banas Kantha and Panch Mahals districts do not show any significant development under fruit production or the fields are occupied with crops other than fruits.

Table – 3.25
Estimated Percentage of Area under Total Fruits* Cultivation of ST Population to its Corresponding Area under All Social Groups

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	NA	15	NA	0
Sabar Kantha	NA	1%	1%	NA
Panch Mahals	NA	57	64	4
Dahod	19	100	100	NA
Vadodara	3	6	4	7
Narmada	34	21	33	29
Bharuch	8	6	10	9
The Dangs	100	NA	NA	NA
Navsari	15	7	35	21
Valsad	18	22	39	44
Surat	22	2	7	11
Tapi	NA	91	40	83

* Considering area under Mangoes, orange & kinu, lemon/acid lime, *mosambi* and other citrus fruits, banana, grapes, pear, peaches, plum chiku, pome fruits, papaya, guava, jack fruits, lichi, pineapple, water melon, musk melon, bread fruits, *ber*, *bel*, mulberry, *aonla* and other fruits.

Figure - 3.9
Percentage of Area under Total Fruits Cultivation of ST Population to its Corresponding Area under All Social Groups (2001-02 to 2015-16)


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(viii) Area under Fodder and Green Manure Cultivation:

Scheduled tribe populations generally have livestock rearing as secondary occupation. There is an increasing trend of area occupying fodder and green manure in most of the ITDP tribal districts. But, from 2010-11 to 2015-16, trend shows reduction of area under fodder and green manures in almost all districts perhaps due to increasing demand of food crops and commercial crops.

Table – 3.26
Estimated Percentage of Area under Total Fodder and Green Manure Cultivation of ST Population to its Corresponding Area under All Social Groups

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	0.40	1	2	2
Sabar Kantha	2	3	1	NA
Panch Mahals	5	2	14	16
Dahod	83	59	82	75
Vadodara	15	16	6	7
Narmada	23	51	51	99
Bharuch	6	4	24	11
The Dangs	99	NA	NA	100
Navsari	6	22	99	36
Valsad	38	39	93	64
Surat	14	11	91	43
Tapi	NA	96	9	16

Figure - 3.10
Percentage of Area under Total Fodder and Green Manure Cultivation of ST Population to its Corresponding Area under All Social Groups (2001-02 to 2015-16)
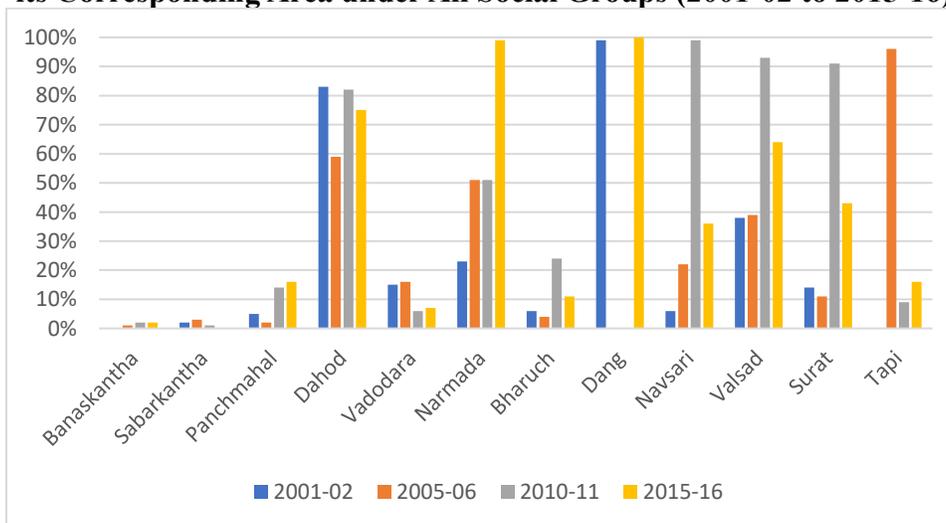
**(ix) Area under Aromatic and Medicinal Plant Cultivation:**

Area under aromatic and medicinal plants in tribal districts of Gujarat is either nil or highly fluctuating over the reference periods except in Dohad, Vadodara and Narmada districts. Ignorance of the ST farmers about the aromatic and medicinal plants and their marketing might be the reason for the situation.

Table – 3.27
Percentage of Area under Total Aromatic and Medicinal Plant Cultivation of ST Population to its Corresponding Area under All Social Group

Districts	2001-02	2005-06	2010-11	2015-16
Banas Kantha	0	1	NA	NA
Sabar Kantha	NA	5	NA	NA
Panch Mahals	2	11	NA	18
Dahod	29	22	100	15
Vadodara	6	38	38	NA
Narmada	100	11	69	NA
Bharuch	89	NA	NA	NA
The Dangs	100	NA	NA	NA
Navsari	NA	NA	98	NA
Valsad	100	100	NA	NA
Surat	100	NA	NA	NA
Tapi	NA	NA	NA	100

* Considering area under *Asgandh*, *isabgol*, *sena*, *moosli* and other medicinal plants, lemongrass, menthol, eucalyptus and other aromatic plants.

Figure - 3.11
Percentage of Area under Total Aromatic and Medicinal Plant Cultivation of ST Population to its Corresponding Area under All Social Groups (2001-02 to 2015-16)
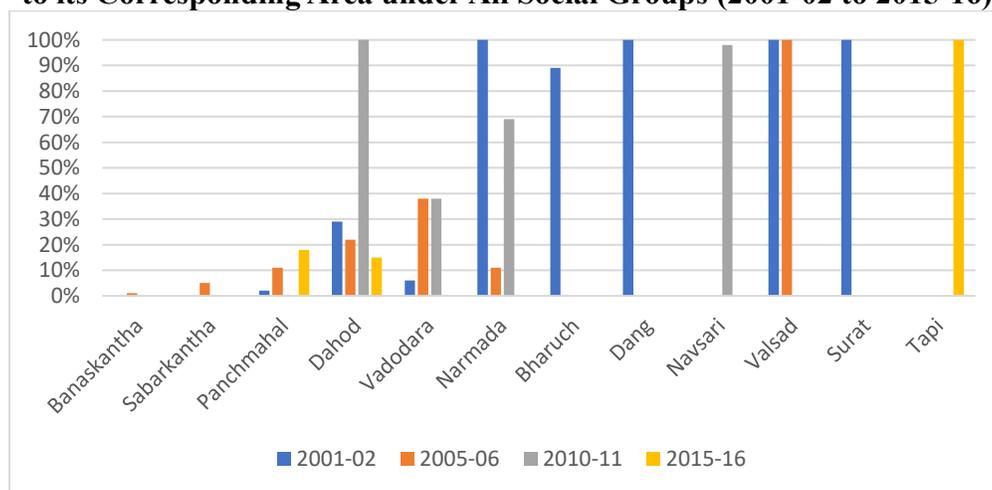
3.5.4 Agricultural Efficiency of Tribal Districts of Gujarat:

The efficiency of agriculture can be more adequately explained on the basis of hectareyield statistics of crops. The spatial variations in physical output from land are the result of combinations of natural environment and human activities. Kendall (1939) developed a method of determining agricultural efficiency based on output per unit area and devised a system of Ranking Coefficient. According to Kendall's method, the sum of the ranks is to be divided by the number of crops (Singh and Dhillon, 1984: 229). The composite index is given by:

$$Ij = \sum_{i=1}^{n} Rij$$

where, n is the number of selected crops and *Rij* is the rank of the *i*th crop in the *j*th area.

<div align="center">

Table - 3.28
Agricultural Efficiency: District-Wise Crop Yield (Kg/Hectare) (2015-16)

</div>

District / Crop	Banas Kantha	Bharuch	Valsad	The Dangs	Panch Mahals	Sabar Kantha	Surat	Dahod	Narmada	Navsari	Tapi	Vadodara/Chhota Udepur*
	Yield (Kg./Hectare)											
Rice	1125	1980	2438	1973	1046	3138	2278	276	598	2510	2100	1411
Wheat	2955	1770	0	1478	1692	2941	2552	1505	1753	2529	1272	3545
Sorghum	1103	1024	1344	1415	1444	1200	1375	0	980	1208	1405	909
Pearl Millet	2345	1969	0	0	1686	2646	2400	2000	1783	0	1667	0
Maize	1658	1320	1500	1321	991	1889	1411	1357	1478	2077	2290	2398
Chickpea	1000	293	887	975	801	885	890	667	912	680	719	895
Pigeon-pea	1114	1144	1046	1231	1731	947	1524	1082	1209	1227	577	1597
Minor Pulses	447	744	656	654	439	653	718	469	720	636	506	577
Groundnut	1862	1795	1452	1427	1809	2527	1660	1526	1429	1400	1759	1592
Sesamaum	112	77	0	0	427	386	567	389	391	0	500	438
Rapeseed & Mustard	1400	1333	0	0	1417	1170	1459	1450	1455	1000	0	2000
Castor	1874	1356	0	0	1221	2029	2111	1952	2083	0	1966	1927
Soyabean	0	0	0	413	832	0	617	785	809	0	813	839
Oilseeds	1819	1307	1406	639	952	2266	248	70	341	1400	817	963
Sugarcane	0	6640	6000	6891	0	0	7700	0	7500	6810	5534	0
Cotton	423	419	0	0	518	598	595	356	482	0	439	691

Source: Govt. of Gujarat, 2020c; *Chhota Udepur district was carved out of Vadodara in 2013.

Table - 3.28 presents the Ranking Coefficients of crop yield in the 12 districts computed on the basis of M. G. Kendall's (1939) method, in which 'lower the Ranking Coefficient, higher is the efficiency' (Singh & Dhillon, 1984:229; Mahmood, 1977: 89). Following this method, the districts were ranked in order of yield of each of the selected 16 crops, and then the ranks occupied by each district in respect of the selected crops were summed up. Because the number of crops is equal for all the districts, the division of the sum of the ranks of each district by the number of crops as per Kendall's method has not been done in the present exercise.

Table - 3.29
Kendall's Ranking Coefficient Based on Yield in Kg/Hectare

District/ Crop	Banas Kantha	Bharuch	Valsad	The Dangs	Panch Mahals	Sabar Kantha	Surat	Dahod	Narmada	Navsari	Tapi	Vadodara/Chhota Udepur
Rice	9	6	3	7	10	1	4	12	11	2	5	8
Wheat	2	6	12	10	8	3	4	9	7	5	11	1
Sorghum	8	9	5	2	1	7	4	12	10	6	3	11
Pearl Millet	3	5	10.5	10.5	7	1	2	4	6	10.5	8	10.5
Maize	5	11	6	10	12	4	8	9	7	3	2	1
Chickpea	1	12	6	2	8	7	5	11	3	10	9	4
Pigeon-pea	8	7	10	4	1	11	3	9	6	5	12	2
Minor Pulses	11	1	4	5	12	6	3	10	2	7	9	8
Groundnut	2	4	9	11	3	1	6	8	10	12	5	7
Sesamaum	8	9	11	11	4	7	1	6	5	11	2	3
Rapeseed & Mustard	6	7	11	11	5	8	2	4	3	9	11	1
Castor	7	8	11	11	9	3	1	5	2	11	4	6
Soyabean	10	10	10	7	2	10	6	5	4	10	3	1
Oilseeds	2	5	3	9	7	1	11	12	10	4	8	6
Sugarcane	10	5	6	3	10	10	1	10	2	4	7	10
Cotton Yield	7	8	11	11	4	2	3	9	5	11	6	1
Ranking Coefficient	99	113	128.5	124.5	103	82	64	135	93	120.5	105	80.5

Source: Based on Agricultural Census, 2015-16

Results:

From this composite index of Ranking Coefficients, the following observations can be made.

(a) The tribal districts that show better efficiency in Maize, Rice, Sorghum and Millet include Chhota Udepur, Sabar Kantha and Panch Mahals.

(b) The agricultural productivity of Surat is greater than that of the other districts with a score of 64.

(c) The district showing the least productivity among these twelve districts is Dohad with a Ranking Coefficient of 135.

(d) Vadodara/ Chhota Udepur has Ranking Coefficient of 80.5, which is comparatively higher than ten out of the twelve districts in efficiency due to its irrigation development.

(e) Sabar Kantha has been one of the most efficient districts due to its access to irrigation, high cash crop yields and productive alluvial plains.

3.6 Changes in Work Participation Rates in Tribal Districts:

The census of India defines work as "participation in any economically productive activity with or without compensation, wages or profit. Such participation may be physical and/or mental in nature. Work involves not only actual work but also includes effective supervision and direction of work. It even includes part-time help or unpaid work on farms, family enterprise or in any other economic activity. All persons engaged in 'work' as defined above are workers."

Table 3.30
Work Participation Rate (in %) in India and Gujarat (1981 to 2011)

Year	Sex	Gujarat		India	
		Rural	Urban	Rural	Urban
1981	Males	54.20	50.2	53.80	49.10
	Females	26.90	6.50	23.20	8.33
1991	Males	54.91	51.08	52.40	48.94
	Females	35.60	7.21	26.70	9.20
2001	Males	55.45	53.91	52.11	50.59
	Females	38.54	9.41	30.79	11.88
2011	Males	57.14	57.18	53.02	53.76
	Females	31.95	11.35	30.02	15.44

Source: Census of India, 1981-2011.

The overall scenario of work participation rate is increasing for male population but for females it is somewhat stagnant after 2001. Although female work participation rate increased in Gujarat after 1991, it dropped by nearly 3 per cent during 2001 to 2011. The work participation of both rural and urban males and females have consistently increased in Gujarat since 1981, excepting for rural females in 2011. Compared to the country as a whole, the participation rates for both males and females of rural Gujarat and males of urban Gujarat are higher. It is only in the case of urban females the State lags behind. It can also be observed from the above table that the participation rate of females in rural Gujarat has decreased between 2001 to 2011, which is not the case with their urban counterparts.

The scenario of employment and opportunities are critical in the eastern tribal belt. According to Indira Hirway, 'the characteristics of Gujarat economy is influenced by uneven distribution of natural resources with regional disparities'. Hirway also added that rural poor in Gujarat are usually concentrated in the northern dry and eastern hilly regions which are environmentally not very sound and lagging behind in terms of infrastructural facilities (Hirway, 2002: 1, 17).

An attempt has been made in this section to understand the changes in the tribal *taluka*s of eastern Gujarat in terms of workers, cultivators and agricultural labourers. The participation rates have been calculated using 2001 and 2011 Census of India data in the following way.

Percentage of Total Workers = (Total Working Population / Total Population) *100.

Percentage of Cultivators = (Cultivators / Total Main Workers)*100.

Percentage of Agricultural Labourers = (Agri. Labourers /Total Main Workers)*100.

For the entire State, although the Work Participation Rate (WPR) for the total male population has increased during 2001 and 2011, the female WPR has decreased. It is also worthy to note that the WPR of cultivators in the State has decreased and the WPR of agricultural labourers has increased during this period. This change is a matter of concern and needs to be examined to determine the reasons behind it.

Table 3.31
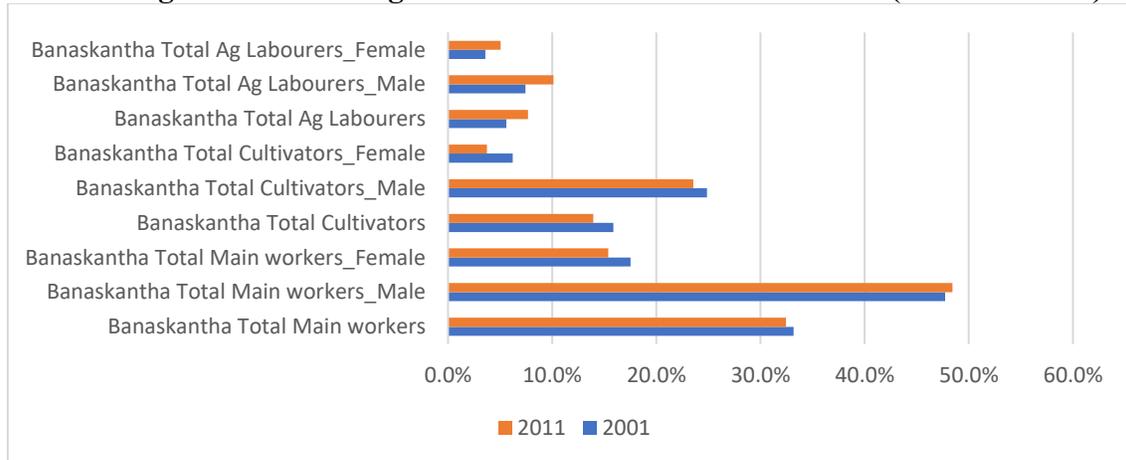**Percentage of Total and Agricultural Workers (2001 and 2011)**

| State/ Districts	Year	Main Workers Total	Main Workers Male	Main Workers Female	Cultivators Total	Cultivators Male	Cultivators Female	Agricultural Labourers Total	Agricultural Labourers Male	Agricultural Labourers Female
Gujarat	2001	33.6	51.1	14.6	9.3	14.1	4.0	6.0	7.6	4.3
	2011	33.7	52.6	13.1	7.9	12.9	2.3	7.4	9.6	5.1
Banas Kantha	2001	33.2	47.7	17.5	15.9	24.9	6.2	5.6	7.4	3.6
	2011	32.4	48.4	15.4	14.0	23.5	3.7	7.7	10.1	5.1
Sabar Kantha	2001	31.8	46.4	16.4	13.9	23.8	3.4	5.1	6.6	3.6
	2011	32.7	48.1	16.6	13.2	23.2	2.7	7.8	9.5	5.9
Panch Mahals	2001	30.5	46.1	13.8	18.4	28.3	7.9	3.3	4.1	2.4
	2011	28.7	45.7	10.6	15.3	26.3	3.7	5.5	6.9	4.0
Dahod	2001	30.3	42.6	17.9	21.3	30.2	12.2	2.5	2.3	2.8
	2011	26.0	39.0	13.0	14.7	25.2	4.0	6.0	5.2	6.9
Vadodara	2001	33.0	51.5	12.9	7.6	12.2	2.6	7.5	9.7	5.1
	2011	32.7	52.1	11.9	6.7	11.8	1.3	8.2	10.9	5.4
Narmada	2001	34.3	48.5	19.3	13.9	20.5	7.0	11.9	15.0	8.7
	2011	32.9	47.0	18.1	9.5	15.3	3.5	17.5	22.8	12.0
Bharuch	2001	34.3	52.5	14.5	5.8	9.7	1.5	11.5	14.4	8.3
	2011	33.9	52.6	13.8	4.6	7.9	1.0	12.6	16.7	8.1
The Dangs	2001	36.7	46.2	27.2	24.4	29.4	19.3	6.3	7.5	5.1
	2011	38.6	47.4	29.8	24.0	30.8	17.3	9.7	9.6	9.8
Navsari	2001	37.2	53.2	20.4	8.2	11.7	4.5	11.0	12.4	9.6
	2011	38.4	55.4	20.7	7.4	11.3	3.3	12.2	14.0	10.3
Valsad	2001	35.7	51.8	18.2	10.2	12.9	7.2	5.4	6.1	4.6
	2011	33.8	50.8	15.5	7.0	10.5	3.2	5.3	6.1	4.4
Surat	2001	39.7	58.8	16.8	4.6	6.1	2.7	7.2	7.2	7.3
	2011	39.6	61.0	12.3	1.7	2.6	0.5	4.5	4.7	4.3
Tapi	2001									
	2011	41.8	53.2	30.5	11.4	17.0	5.8	21.6	23.5	19.7

Source: Census 2001 and 2011

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Figure - 3.12
Percentage of Total and Agricultural Workers - Gujarat (2001 and 2011)
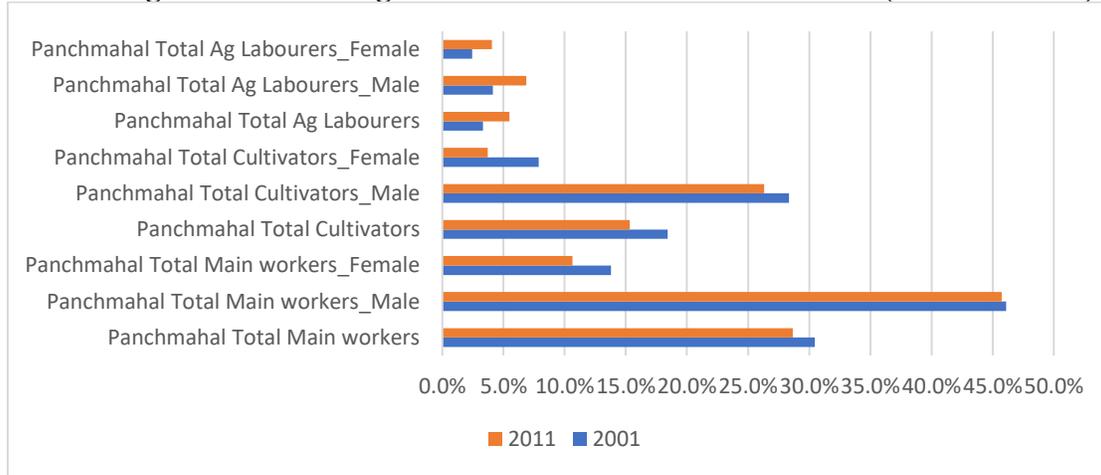

Figure - 3.13
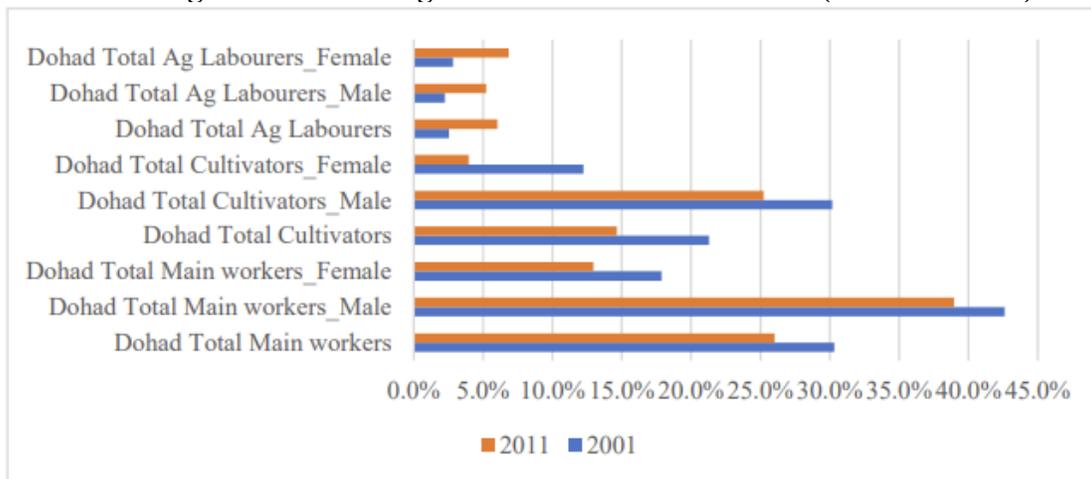**Percentage of Total and Agricultural Workers - Banas Kantha (2001 and 2011)**

Figure- 3.14
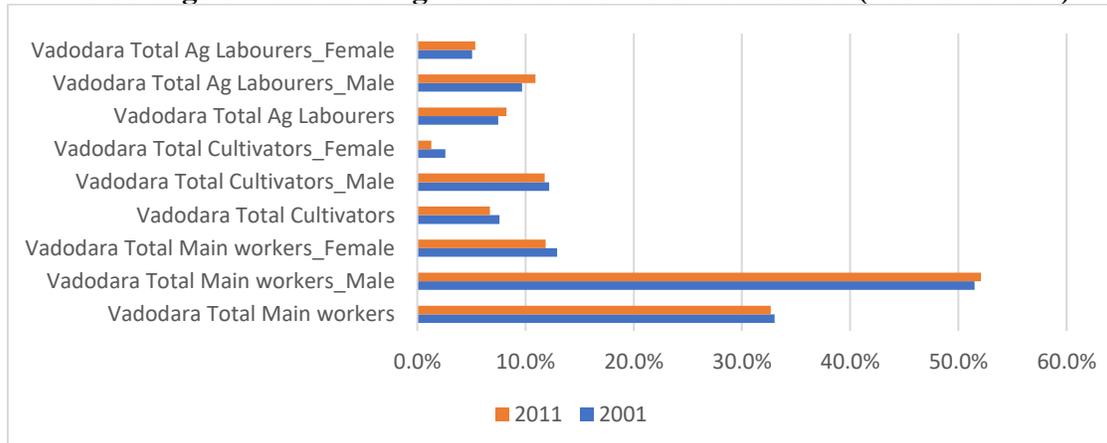**Percentage of Total and Agricultural Workers - Sabar Kantha (2001 and 2011)**
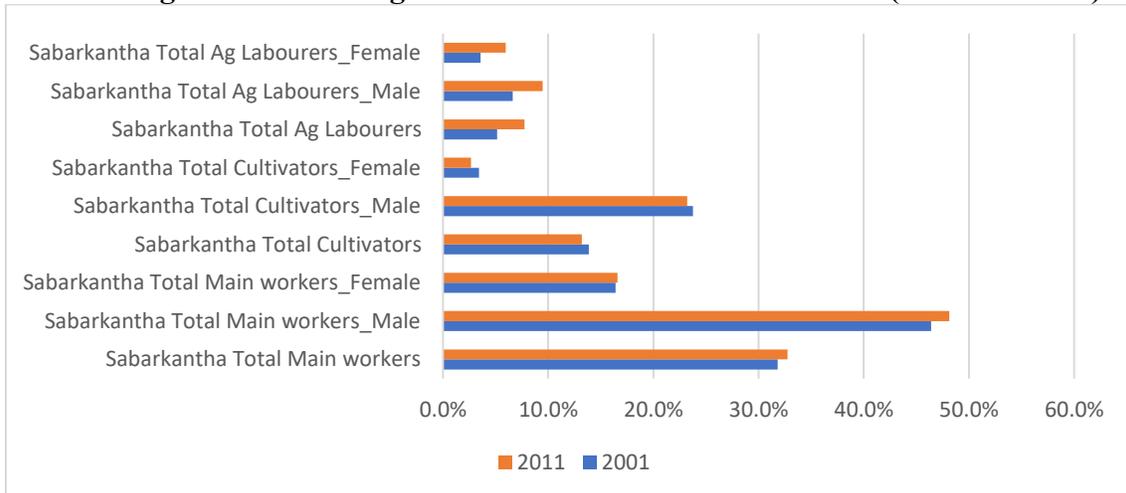
Figure - 3.15
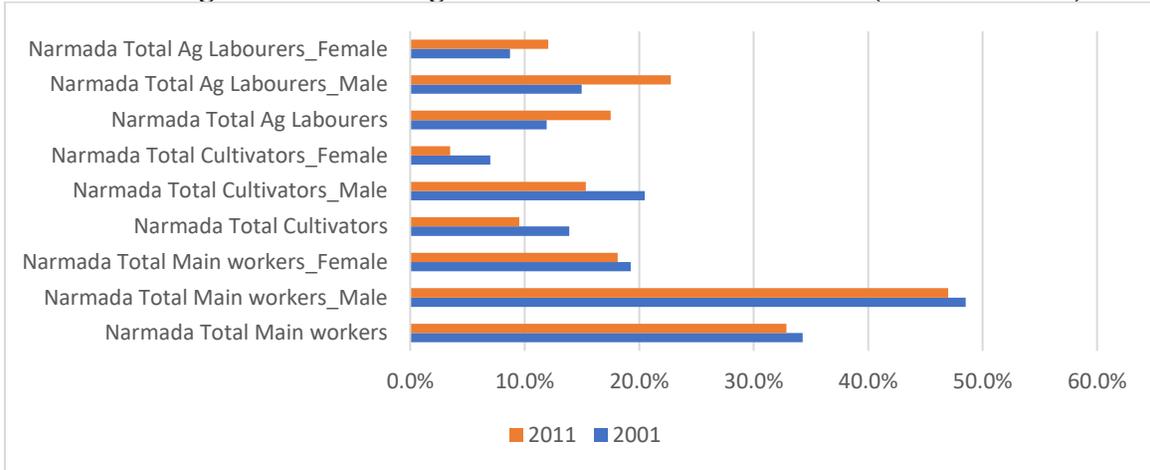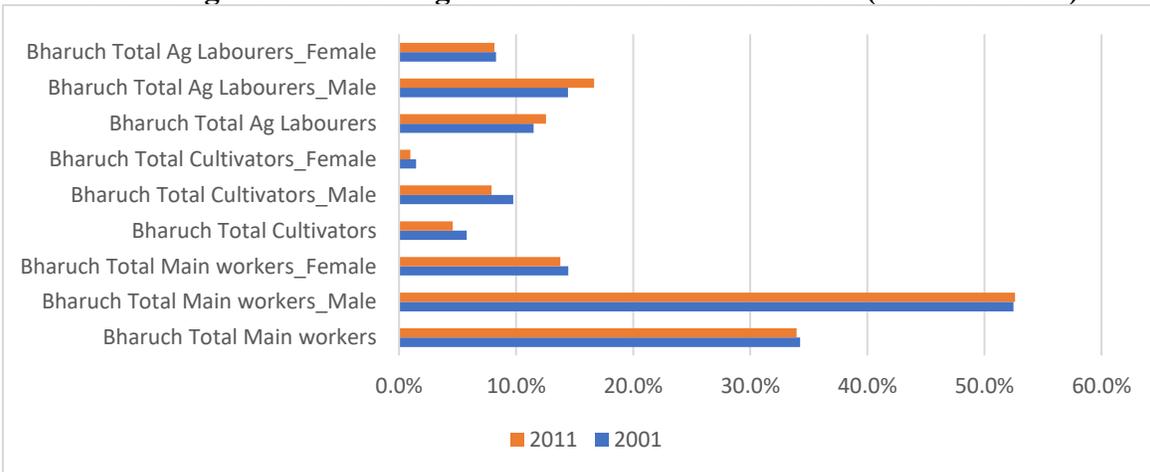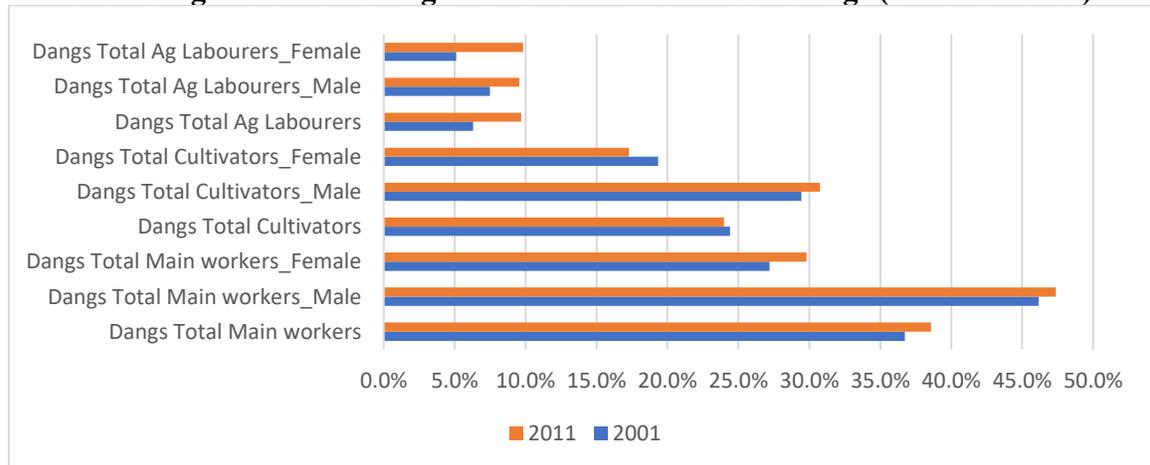**Percentage of Total and Agricultural Workers – Panch Mahals (2001 and 2011)**

Figure - 3.16
Percentage of Total and Agricultural Workers – Dohad (2001 and 2011)

Figure - 3.17
Percentage of Total and Agricultural Workers – Vadodara (2001 and 2011)

Figure-3.18
Percentage of Total and Agricultural Workers – Narmada (2001 and 2011)

Figure-3.19
Percentage of Total and Agricultural Workers – Bharuch (2001 and 2011)

Figure-3.20
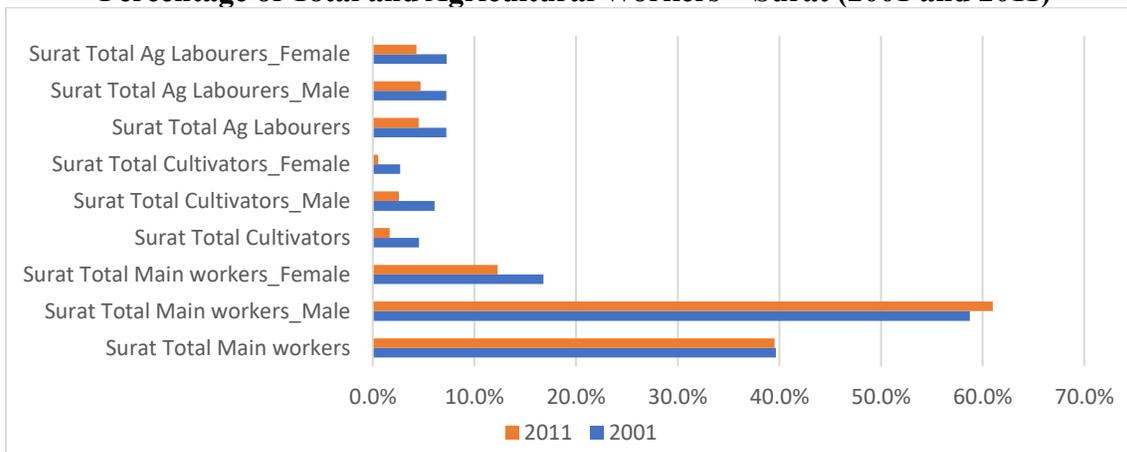**Percentage of Total and Agricultural Workers – The Dangs (2001 and 2011)**

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Figure-3.21

Percentage of Total and Agricultural Workers – Navsari (2001 and 2011)

Figure-3.22

Percentage of Total and Agricultural Workers – Valsad (2001 and 2011)


Figure-3.23

Percentage of Total and Agricultural Workers – Surat (2001 and 2011)

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From the above graphs it is evidenced that, in Sabar Kantha, Navsari and The Dangs districts, the share of total workers, male workers and female workers have increased between 2001 to 2011. On the other hand, Valsad, Dohad and Surat districts have registered a decreasing trend in WPRs for total, male and female workers.

The situation in Banas Kantha, Panch Mahals, Narmada and Bharuch districts has been different, wherein the WPRs for total and female workers have decreased, and the WPR for male workers has increased. Most of the tribal districts show increasing WPR of agricultural labourers and decreasing trend for cultivators during the decade. Exceptional scenario can be observed in Bharuch and Valsad districts where WPR of female agricultural labourers has decreased between 2001 and 2011. In The Dang district WPR for male cultivators has increased between 2001 and 2011, and Surat district shows reduced WPRs for both agricultural labourers and cultivators perhaps due to expansion of urban-industrial sector in the district.

Figure - 3.24
Fitted Line Plot Showing Relation Between Per Cent Change in ST Population and Per Cent Change in Total Main Workers
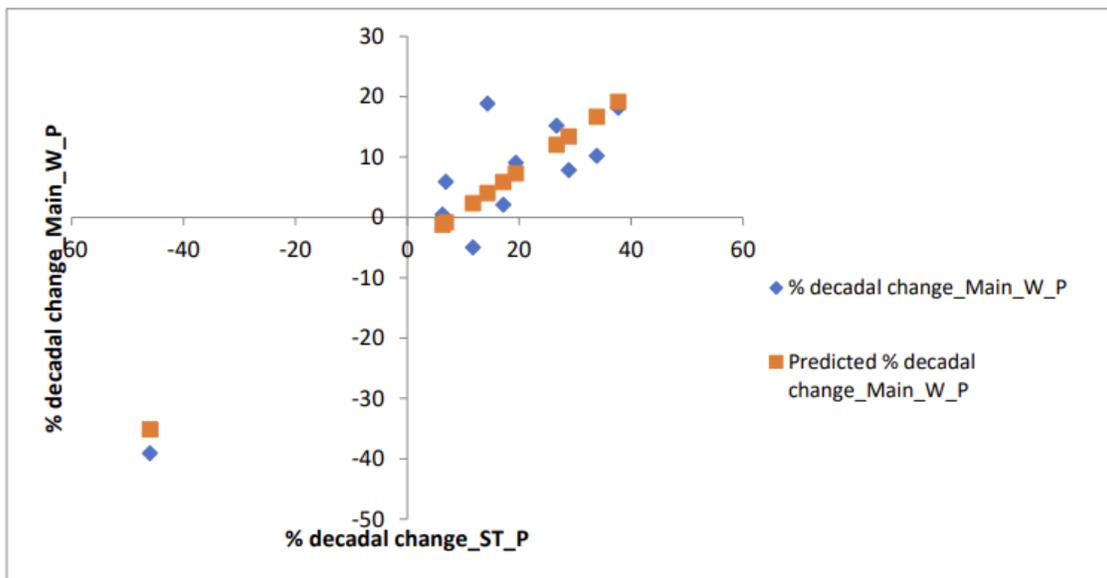
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.910926047
R Square	0.829786263
Adjusted R Square	0.810873626
Standard Error	6.986594083
Observations	11

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ANOVA

	df	SS	MS	F	Significance F
Regression	1	2141.634	2141.634	43.8747	9.65968E-05
Residual	9	439.3125	48.8125		
Total	10	2580.946			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-5.268372161	2.527374	-2.08452	0.066774	-10.98568975	0.448945	-10.9857	0.448945
% decadal change_ST_P	0.648602757	0.09792	6.623798	9.66E-05	0.427092167	0.870113	0.427092	0.870113

From the data we can make the following observations. The multiple R value indicates that there is an extremely significant linear relationship between the predictor and response variables. R square value shows that 82 per cent of variance in the results can be explained by the predictor variable. The standard error, or average distance between observed values and regression values is only 6.98. For 5 per cent significance value, the p-value obtained is lower than 0.05, such that it is almost 0. Also, the 95 per cent confidence interval (0.42, 0.87) does not include 0, all of which prove that per cent decadal change in ST population is an extremely significant predictor for per cent decadal change in total main worker population.

Figure - 3.25
Fitted Line Plot Showing Relation Between Per Cent Change in ST Population and Per Cent Change in Marginal Agricultural Labourers
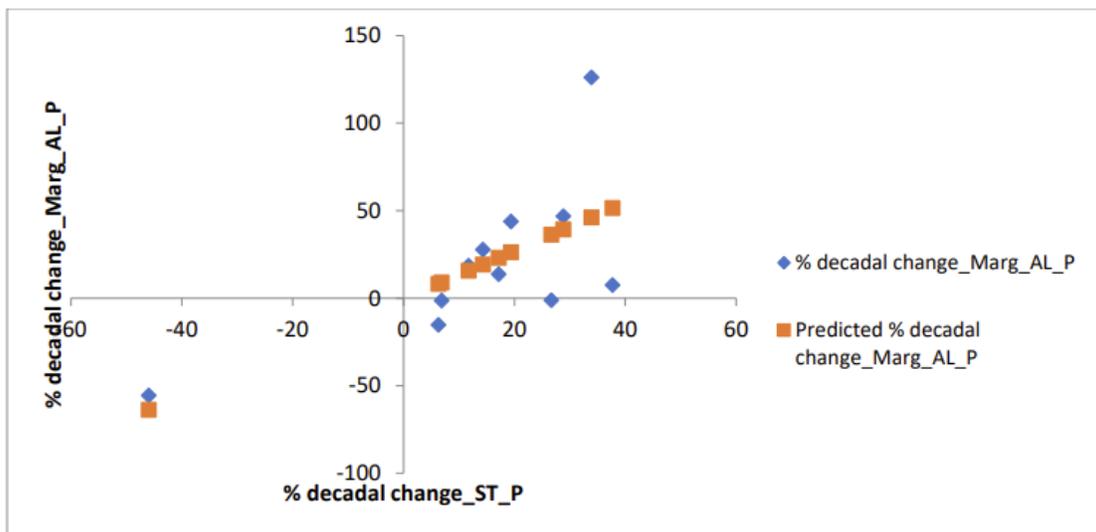
Regression Statistics	
Multiple R	0.684204478
R Square	0.468135768
Adjusted R Square	0.409039743
Standard Error	34.92740249
Observations	11

ANOVA

	df	SS	MS	F	Significance F
Regression	1	9663.76	9663.76	7.921612	0.020226672
Residual	9	10979.31	1219.923		
Total	10	20643.07			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.462740801	12.63486	-0.03662	0.971584	-29.04477235	28.11929	-29.0448	28.11929
% decadal change_ST_P	1.377778078	0.489522	2.814536	0.020227	0.270401663	2.485154	0.270402	2.485154

In this analysis, the multiple R value is more than 50 per cent and close to 1, which indicates that there is a significant linear relationship between the predictor and response variable. The R square value shows that variance in the response variable can be partially explained by the predictor variable, so 46.8 per cent of the variance in percentage decadal change in marginal agricultural labourer population can be explained by percentage decadal change in ST Population.

Consider the significance level to be 5 per cent.

Here, the significance of F is 0.02, which is less than 0.05. Hence, the overall model is statistically significant. Finally, the 95 per cent confidence interval (0.27, 2.48) does not include 0. This only proves that the true value of per cent decadal change in ST population is non-zero, hence it is a significant predictor of the response variable.

Figure - 3.26
Fitted Line Plot Showing Relation Between Per Cent Change in ST Population and Per Cent Change in Main Agricultural Labourers
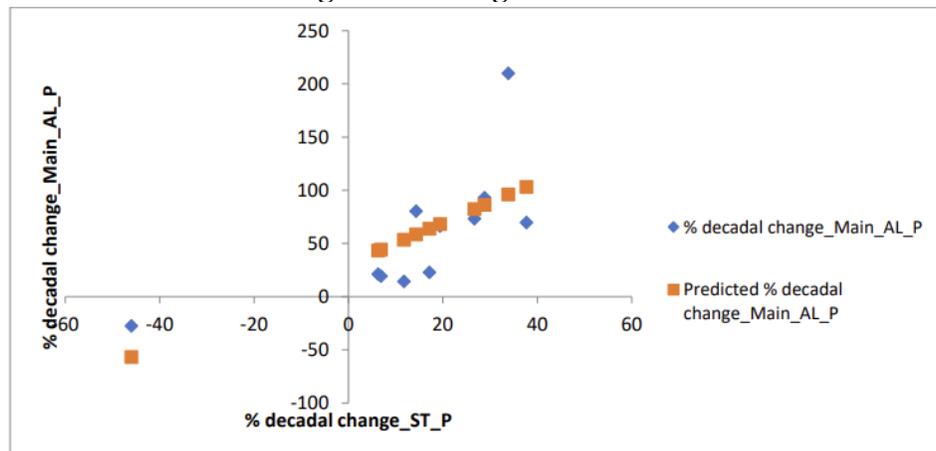
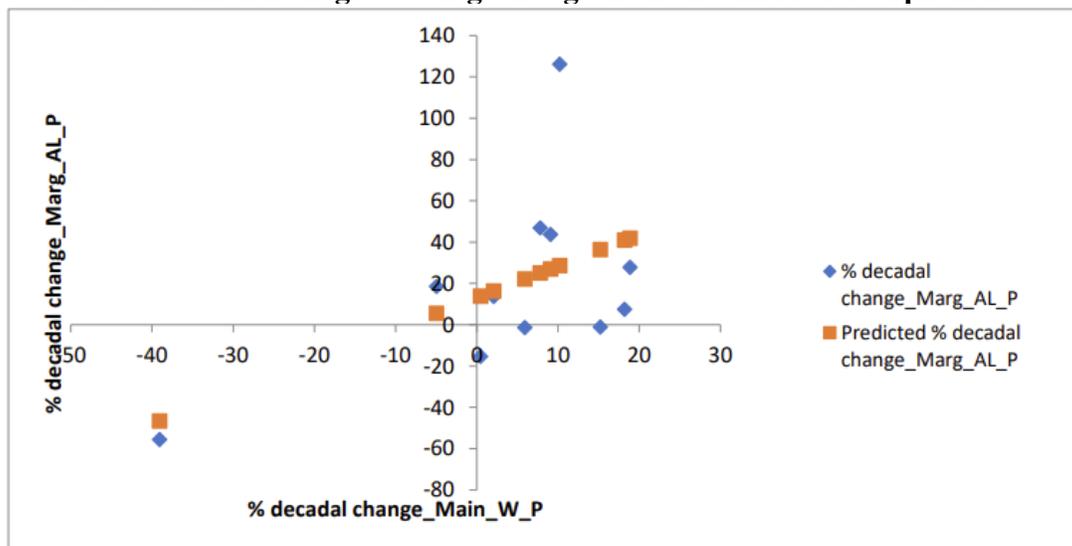| Regression Statistics	
Multiple R	0.695026
R Square	0.483062
Adjusted R Square	0.425624
Standard Error	47.06576
Observations	11

ANOVA

	df	SS	MS	F	Significance F
Regression	1	18630.17	18630.17	8.410205	0.01759436
Residual	9	19936.67	2215.186		
Total	10	38566.84			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	31.08705	17.02586	1.825872	0.101156	-7.42812888	69.60222	-7.42813	69.60222
% decadal change_ST_P	1.912998	0.659647	2.900035	0.017594	0.420774149	3.405222	0.420774	3.405222

From the data we can make the following observations. The multiple R value indicates that there is a significant linear relationship between the predictor and response variables. R squared value shows that 48 per cent of variance in the results can be explained by the predictor variable. For 5 per cent significance value, the p-value obtained is lower than 0.05. Also, the 95 per cent confidence interval (0.42, 3.405) does not include 0, all of which prove that per cent decadal change in ST population is a significant predictor for per cent decadal change in main agricultural labourers population.

Figure - 3.27
Fitted Line Plot Showing Relation Between Per Cent Change in Main Worker Population and Per Cent Change in Marginal Agricultural Labourers Population
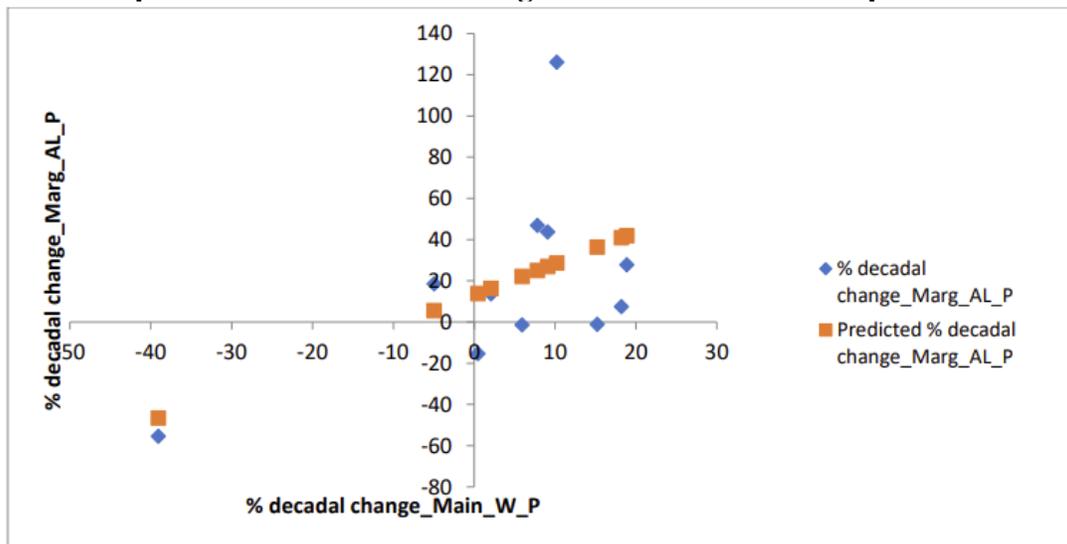

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Regression Statistics	
Multiple R	0.540095
R Square	0.291703
Adjusted R Square	0.213003
Standard Error	40.30637
Observations	11

ANOVA

	df	SS	MS	F	Significance F
Regression	1	6021.64	6021.64	3.706529	0.086329372
Residual	9	14621.43	1624.603		
Total	10	20643.07			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	13.10454	12.55667	1.043632	0.323876	-15.30061369	41.50969	-15.3006	41.50969
% decadal change_Main_W_P	1.527453	0.793385	1.925235	0.086329	-0.26730923	3.322216	-0.26731	3.322216

From the data we can make the following observations. The multiple R value indicates that there is a significant linear relationship between the predictor and response variables. R squared value shows that 29 per cent of variance in the results can be explained by the predictor variable. For 5 per cent significance value, the p-value obtained is slightly higher than 0.05. Also, the 95 per cent confidence interval (-0.26, 3.322) includes 0, all of which prove that per cent decadal change in the main worker population is not a significant predictor for per cent decadal change in the population of marginal agricultural labourers.

Figure - 3.28
Fitted Line Plot Showing Relation Between Per Cent Change in Main Worker Population and Per Cent Change in Main Cultivators Population

SUMMARY
OUTPUT

Regression Statistics	
Multiple R	0.914661
R Square	0.836604
Adjusted R Square	0.818449
Standard Error	8.902428
Observations	11

ANOVA

	df	SS	MS	F	Significance F
Regression	1	3652.057	3652.057	46.08086	8.0105E-05
Residual	9	713.279	79.25322		
Total	10	4365.336			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-13.0283	2.773378	-4.69763	0.001124	19.30211184	-6.75448	-19.3021	-6.75448
% decadal change_Main_W_P	1.189541	0.175234	6.788288	8.01E-05	0.793133238	1.585948	0.793133	1.585948

From the data we can make the following observations. The multiple R value indicates that there is an extremely significant linear relationship between the predictor and response variables. R squared value shows that 83.66 per cent of variance in the results can be explained by the predictor variable. The standard error, or average distance between observed values and regression values is only 8.9. For 5 per cent significance value, the p-value obtained is much lower than 0.05, such that it is almost 0. Also, the 95 per cent confidence interval (0.79, 1.58) does not include 0, all of which prove that per cent decadal change in main workers population is an extremely significant predictor for per cent decadal change in the main cultivators' population.

3.6.1 NFRE: Non-Farm Rural Employment:

Table - 3.32
Decadal Changes (in %) in Occupation of Non-Farm Labourers in Rural population of Tribal Districts of Gujarat

State/ District	Year	Main Cultivators Male	Main Cultivators Female	Agri Labourers Male	Agri Labourers Female	HH Industries & Others Male	HH Industries & Others Female	Marginal Cultivators Male	Marginal Cultivators Female	Marginal Agri Labourers Male	Marginal Agri Labourers Female	Marginal HH Ind & Others Male	Marginal HH Industries & Others Female
Gujarat	2001	22.4	6.3	11.7	6.5	16.2	6.0	1.1	5.9	3.0	10.2	1.1	3.6
	2011	22.0	3.9	15.7	8.3	13.6	4.0	0.9	3.1	3.4	9.8	1.4	2.8
Banas Kantha	2001	27.9	7.0	8.3	4.0	11.7	8.0	11.7	6.6	1.8	7.6	0.8	5.6
	2011	26.8	4.3	11.4	5.7	10.1	6.7	0.7	2.3	2.0	6.3	1.0	4.8
Sabar Kantha	2001	26.6	3.8	7.3	3.9	12.5	9.6	1.1	4.3	3.9	11.9	1.3	7.2
	2011	26.8	3.0	10.7	6.8	10.8	7.9	1.2	3.3	4.2	9.7	1.6	6.7
Panch Mahals	2001	32.3	9.0	4.6	2.8	9.1	3.2	2.6	14.8	4.3	14.7	1.2	3.2
	2011	30.3	4.3	7.7	4.6	7.4	2.4	2.0	6.9	6.1	17.8	2.0	4.8
Dahod	2001	33.1	13.4	2.4	3.1	6.7	2.5	3.8	16.0	4.6	13.7	1.4	2.8
	2011	27.4	4.3	5.6	7.4	5.3	1.6	2.2	5.6	7.6	24.0	2.5	3.0
Vadodara	2001	22.0	4.7	17.2	9.0	12.9	3.0	9.1	5.1	4.6	15.4	1.1	2.6
	2011	22.6	2.5	20.5	10.1	9.5	1.6	0.8	2.2	5.2	16.4	1.2	1.2
Narmada	2001	22.6	7.7	16.5	9.6	9.7	3.1	1.3	5.0	6.1	19.3	1.2	2.9
	2011	16.9	3.9	24.8	13.2	5.4	2.0	0.9	1.5	9.4	22.4	1.2	1.6
Bharuch	2001	13.0	2.0	19.1	11.0	20.8	4.0	0.4	1.5	3.4	10.2	12.0	2.6
	2011	11.6	1.4	24.2	11.9	17.3	3.3	0.5	0.8	3.8	7.4	2.0	1.8
The Dangs	2001	29.4	19.3	7.5	5.1	9.2	2.8	1.6	7.2	3.5	11.8	1.1	0.9
	2011	34.3	19.4	10.1	10.8	3.6	1.9	1.8	7.8	4.6	13.4	0.4	0.8
Surat	2001	15.8	6.3	18.4	16.4	21.5	6.6	0.5	3.0	2.6	8.6	0.8	2.0
	2011	12.4	2.2	22.7	18.1	23.6	4.5	0.3	0.8	2.2	5.8	1.4	1.5
Tapi	2001												
	2011	18.8	6.4	25.9	21.7	9.2	4.2	1.2	2.5	6.5	15.4	1.7	2.3
Nasvadi	2001	16.0	6.1	16.7	12.7	20.5	4.7	0.7	5.7	2.3	7.7	0.9	1.2
	2011	16.2	4.6	19.7	14.3	19.3	4.9	0.9	2.2	3.2	6.3	1.7	1.4
Valsad	2001	17.8	9.6	8.2	6.0	24.1	5.4	1.5	6.8	4.1	10.8	1.6	2.6
	2011	16.6	4.9	9.2	6.4	22.0	6.2	1.8	3.3	5.3	11.5	2.6	2.2

Source: Computed from Census Data 2001 and 2011

The result of computed data depicts that the percentage change in both male and female cultivators for the twelve districts are not increasing on a decadal basis. But the decadal percentage change for male and female agricultural labourers is increasing in all districts. With the exception of male non-farm labourers of Surat, other tribal districts do not show any decadal percentage increase in male and female main non-farmers. Surprisingly from Table- 3.32, it is clearly observed that the decadal percentage change in male and female marginal cultivators has decreased sharply in all the districts except in The Dangs and Valsad. Decadal percentage of male marginal labourers in all the districts increased except in Bharuch and The Dangs. Except for Panch Mahals, Dohad and Navsari districts, in all other districts the percentage of female marginal non-farm labourers decreased between 2001 and 2011.

3.6.2 NTFP: Non-Timber Forest Products:

Forest serves the purpose of sustaining livelihood of tribal people in forest fringe areas[7]. Forest products from the natural habitats of the tribes are deeply interwoven with their day-today life. Systematic collection of forest products like Saal leaves, Kendu leaves, bamboo, honey, medicinal plants etcetera are managed and controlled by the Joint Forest Management Committee. Tribal people in India practice their own governance system where Panchayat Raj institutions through Panchayats Extension to Scheduled Areas Act (PESA) or sector-driven projects like Joint Forest Management (JFM) are considered as superimposed. These two programmes do not recognize the unique characteristics of tribal people, especially their understanding and symbiotic relationship with the forest (World Bank, 2005:22). As on 31st March 2021, the forest area of Gujarat is 21,876.45 sq. km, accounting for 11.15 per cent of the total geographical area of the State. In Vadodara circle the forest area is 3,019.42 sq. km. Government of Gujarat initiated the JFM in1991 and the concept was introduced in Bharuch, Surat, Vadodara and Panch Mahals districts, and later extended to Sabar Kantha, Valsad, Banas Kantha and Gandhinagar districts (Govt. of Gujarat, 2021: 40). Non-timber forest product was collected through Gujarat State Forest Development Corporation (GSFDC) and value procured was Rs. 1,080.44 lakh and the expenditure for NTFP was Rs. 15,860 lakhs in 2001. In 2011-12, expenditure for NTFP was Rs. 1,149.02 lakhs

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[7] NTFP: From the primary survey conducted in all the 6 *taluka*s of Chhota Udepur district, NTFP are still the main source of fuel. From the nearby forest, tribes collect branches of trees which fall on the ground. Most of the cases they collect it with a fear of the forest guards.

and sale value for NTFP was Rs. 973.81 lakhs. A similar trend was observed in 2020-21 as there was an expenditure of Rs. 1,539.63 lakhs when the sale value was only Rs. 341.76 lakhs (Govt. of Gujarat, 2021b: 33).

3.6.3 SEASONAL MIGRATION

The twelve tribal districts of the north eastern region of Gujarat display a trend of seasonal migration mainly in two important ways. Firstly, in the industrial cities of Surat, Ahmadabad and Vadodara, tribal people migrate to grab the opportunities of extra income when there is no rainfall or cultivation. These migrants work as daily wage labourers. Poverty driven migrants go to distant places with contractors or '*mukkadams*' in groups. They work in the transport sector not as regular wage labourers but as ancillary unskilled labourers like head loaders, loaders of trucks, hand cart operators and very few as drivers (Mosse et. al, 2005: 3026). For these migrants, seasonal migration is a defensive survival strategy where poverty is the root cause. They are all 'ecological refugees' (Gadgil and Guha, 1995 cited in Mosse et al, 2005: 3026).

3.7 Conclusion:

The socio-economic condition of scheduled tribes and their households have changed during 2001-2011. But the gap between the scheduled tribes and other social groups have widened. Detailed socio-economic studies of Gujarat tribal region indicate that except for a few *taluka*s, decadal change in population distribution and density remained more or less the same during the last two census years. Decadal growth rate of population has reduced in most of the tribal *taluka*s from 2001 to 2011, perhaps due to migration or sub-division of the *taluka*. Maximum number of tribal *taluka*s are showing higher sex-ratio in rural areas compared to the State average. Data furnished here for agriculture considered all sizes of classes including below 0.5 hectares to more than 20 hectares. Overall literacy rates of the districts of Bharuch, Navsari, Surat and Valsad show a 10-15 per cent decadal increase. However, change in the literacy rates of the tribal *taluka*s is not very significant. Urban areas in the tribal *taluka*s portray higher literacy rates for both males and females and vice versa for rural areas. Primary health centers in most of the districts are ranging from three to eight for the entire *taluka*. Availability of household water connection is medium to

poor for all districts except in The Dangs, Surat and Navsari districts where the percentage of tribal households having water tap connections is the maximum.

Rainfall is unreliable and occurs for a short period of time in all over the country, including Gujarat. Groundwater and surface run-off meet the major demand of irrigation. Poor management of irrigated water and productivity-based availability of water are the main challenges in the eastern region of the State.

The traditional agricultural pattern is changing in terms of cropping pattern. Area under total cereals and pulses remain unchanged or marginally decreased in most of the districts except in Vadodara and Surat. Vadodara and Surat show sharp decline in area under all cereals and all pulses. The study finds that pulses, vegetables and oilseeds have not increased much in areas under ST. Perhaps this is due to the shift in the occupation of tribal people from primary, farm occupation to non-farm activities.

Even though the work participation rate increased for total workers and total male workers for the entire State, it decreased for female participation. Female participation rate decreased in case of cultivators, main non-farm labourers and marginal non-farm labourers but increased for marginal agricultural labourers, which implies that after a short rainy season women workers migrate to longer distances in search of work at the cost of their health, education and welfare. Out of the total twelve districts Sabar Kantha, Navsari and The Dangs districts show overall increase in work participation total population which is reflected in increased cultivated area under different food and non-food production. Analytically it is projected that when main workers increase by 10 per cent, the increase of marginal agricultural labourers is more than 40 per cent. So decadal change of main workers is not a very significant predictor of marginal agricultural labourers. Perhaps tribal people are continuing as agricultural labourers and migrating as labourers under 'muqaddam' to avoid uncertainty of crop failure and to get assured income. For main cultivators, an increase in main workers more than 15 per cent (decadal change) are projecting a certain positive increase. Perhaps as the number of holdings are getting fragmented due to inheritance, main workers and main cultivators are showing positive linear increase.

Primitive technology, stagnant literacy rate for males and females, intervention of exogenous groups, decreasing female cultivator's rate, single crop production emerges as some of the main characteristics of tribal agriculture in the eastern part of the State. Dohad, Narmada, Tapi,

The Dangs and Valsad have moderate to high percentage of net sown area and net irrigated area under ST population. Rest of the districts experience seasonal migration of the tribal population for road construction, to work in the sugar or diamond polishing factories in Surat, as agricultural labourers in Kathiawar or in the neighboring towns.

The State and Central Governments have introduced many schemes for ST population in the eastern part of Gujarat. Under Tribal Sub Plan (Van Bandhu Kalyan Yojana) an outlay of Rs 14,638.29 crore has been sanctioned for different district-wise, scheme-wise expenditure in 2022-23. Out of all the development schemes, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is the most popular one as it ensures employment opportunities in the nearby areas. Jyoti Gram Scheme, Pradhan Mantri Ujjwala Yojana (PMUY), Pradhan Mantri Awas Yojana (PMAY), Pradhan Mantri Krushi Sinchai Yojana (PMKSY) are other important development schemes helping tribal farmers.

The main constraints of the tribal farmers are lack of awareness about the development programmes and getting the benefits out of these.