CHAPTER-7
MICRO-LEVEL ANALYSIS –SPATIAL AND STRUCTURAL CHARACTERISTICS

7.1 Introduction

This chapter focuses on the spatial and structural characteristics of the sample villages. An attempt has been made with the help of data generated through primary investigation to highlight aspects that are directly or indirectly related to the health of the population. For the purpose, information has been gathered from the selected villages of Vadodara district through primary survey with the help of structured household schedules, personal observation and RRA technique. Random sampling method has been adopted at all levels, i.e. at the *taluka,* the village and the household levels. The regional frame of the district has been adopted to group the *talukas*. Four *talukas* from each frame is selected for detailed investigation. Analysis of secondary level data for the villages of the selected *talukas* has enabled the study to identify intra-*taluka* variations and selection of the *talukas* for detailed study at village level. Based on the detailed study, the villages have been categorized into two groups, viz. non-tribal or plain area village and tribal or hill area village. From each group four villages have been selected for detailed investigation at the household level.

The villages selected from the non-tribal or plain areas of the district are Tundav village (Savli *taluka*), Kelanpur village (Vadodara *taluka*), Vadu village (Padra *taluka*) and Handod village (Karjan *taluka*). The villages selected from the tribal or hilly areas are Chalamali village (Jetpur Pavi *taluka*), Tejgadhh village (Chhota Udaipur *taluka*), Palasani village (Nasvadi *taluka*) and Navalja village (Kavant *taluka*) (Figure – 7.1 / Refer Fig 2.1)

7.2 Profile of Sample *Talukas*

At the 2011 Census, Vadodara district had 12 *talukas.* On the basis of physical parameters as well as social composition, the four *talukas* of Chhota Udaipur, Kavant, Jetpur Pavi and Nasvadi display distinct characteristics with hilly terrain having predominance of the ST population and greater proportion of area under forest cover. The remaining eight *talukas* accommodate relatively higher proportion of non-tribal,

urban-industrial population and are endowed with plain land suitable for agricultural purposes. As mentioned earlier, the study has considered the four predominantly tribal/hilly *talukas* and four non-tribal *talukas* from the plain areas of the district. One village each from all the eight *talukas* has been selected as representative sample of the *talukas* for in depth investigation. The characteristics of the sample *talukas* are presented briefly below.

7.2.1 Vadodara *Taluka*:

Vadodara *taluka* lies in the western margin of the district, which is part of the Gujarat Plains. It is the most urbanized (90.70% of urban population) and industrialized *taluka* of the district with predominance of non-tribal population (95.15%). The share of tribal population in the *taluka* total population is very less (4.85%). It has the highest (77.39%) percentage of female literacy in the district. It is surrounded by Savli *taluka* in the north, Vaghodia *taluka* in the north-east, Dabhoi *taluka* in the south-east, Karjan *taluka* in the south and Padra *taluka* in the south-west. Mahi River marks north-west boundary of the *taluka* demarcating it from Padra *taluka*. Other rivers draining the *taluka* include Vishwamitri River flowing in the center, and Jambuva and Dhadhar Rivers flowing on the southern side of the *taluka*. The *taluka* is spread over an area of about 40,438.3 hectares, of which 1.81 per cent area is under forest cover and 76.22 per cent is under net sown area. The *taluka* accommodates a total population of 20,09,434 in 4,47,490 households.

There are 98 primary schools, seven secondary schools, six senior secondary schools and two engineering colleges in the *taluka*. The *taluka* has 36 Primary Health Sub-Centers (PHS), five Primary Health Centers (PHC), one Central Health Centers (CHC), one T.B clinic (TBC), one Allopathic Hospital (HA), one Alternative Medicine Hospital (HO) and three dispensaries (D). Vadodara *taluka* is well connected by a National Highway (NH-8) and broad gauge railway lines from north to south and several State Highways (SH-6, SH-11, SH-87, SH-158) (Census of India, 2011).

7.2.2 Savli *Taluka*

Savli *taluka* lies in the north and north-western side of the Vadodara district and has a plain topography. The *taluka* is surrounded by Vadodara *taluka* in the south-west, Vaghodia in the south-east, Anand district in the north-west, Kheda

district in the north and Panchamahal district in the north-east. Mahi River demarcates the *taluka* from Anand district in the north-west. The *taluka* is criss-crossed by several rivers such as Mesari, Goma, Karad and Vishawamitri. The *taluka* covers a total area of 77618.5 hectares of which an insignificant portion (0.16%) is under forest cover. Rather, much of the geographical area (76.52%) of the *taluka* is under the plough. The share of urban population in the *taluka* is meager (7.24%) and majority of its population leaves in its 136 villages. The entire population (2,55,009) of the *taluka* lives in 52,708 households. Majority of the population in the *taluka* belongs to different non-tribal communities and the share of the ST population is only around seven per cent (7.26%). Spread of literacy among the female segment (60.09%) of the *taluka* population is not very impressive although it has 174 primary schools, 16 secondary schools, seven senior secondary schools. It may be noted here that school education system of Gujarat does not have middle schools. For higher education the *taluka* has one engineering college, one medical college, one polytechnic and one vocational training centre. The *taluka* has 45 Primary Health Sub-Centers (PHS), six Primary Health Centers (PHC), one Central Health Centre(CHC) and two Hospitals – Alternative Medicine (HO). Savli *taluka* is well connected by state highways and broad gauge and narrow gauge railway lines. All settlements of the *taluka* are approachable by bus services also (Table 7.1).

7.2.3 Karjan *Taluka*

Karjan *taluka* lies in the south-west side of Vadodara district and is characterized by plain topography. Karjan *taluka* is surrounded by Padra, Vadodara and Dabhoi *taluka s*in the north and Sinor *taluka* in the east. The *taluka* is drained by Dhadhar River in the north-west, and Bhuki and Narmada Rivers in the southern part of the district. Forest cover accounts for an extremely small proportion (0.04%) of its total geographical area of 58,616.3hectares. Rather, major portion (83.78%) of the *taluka* is under cultivation.

The total population of the *taluka* is 1,67,579 divided into 35,374 households. Less than one-fifth (18.14%) of the *taluka* population live in its urban areas. The scheduled population accounts for a quarter (25.33%) of the *taluka* total population of which majority belongs to the SC category. Lower female literacy rate (64.75%) in the *taluka* is an indication of lacking spread of education among the population. There are 108 primary schools, 19 secondary schools, nine senior secondary schools, one

degree college of arts, science and commerce and one vocational training centre. The *taluka* has 29 PHSs, five PHCs but no CHCs, two allopathic hospitals and two dispensaries. Karjan *taluka* is connected with broad gauge and narrow gauge railway lines, NH-8 and two state highways (SH-160 and SH-161) and important metal roads (Table 7.1).

7.2.4 Padra *Taluka*

Padra *taluka* is also characterized by a plain topography and is situated in the south-west side of Vadodara district. The *taluka* is bordered by Vadodara *taluka* in the north and northeast and Karjan *taluka* in the south. Mahi and Dhadhar Rivers respectively mark the north and south boundaries of the *taluka*. More than three-fifth (77.80%) of the total geographical area of 52,189.6 hectares is put to agriculture and a very small proportion (0.66%) is under forest cover. The *taluka* has a total population of 2,65,901 persons and total numbers of households are 55,104. A very small segment (17.55%) of the population lives in the urban centers of the *taluka* and among the females, the level of literacy is also low (64.40%). There are 115 primary schools, 22 secondary schools, five senior secondary school sand two vocational training centers. There are33 PHSs, seven PHCs, six dispensaries and three Mobile Health Clinics (MHC). The *taluka* is well connected by with SH-6 and SH-160and narrow gauge railway lines running southwest to northeast of the *taluka* (Table 7.1).

7.2.5 Jetpur Pavi *Taluka*

Jetpur Pavi *taluka* is characterized by hilly topography located in the northeast of Vadodara district. The *taluka* is bordered by Sankheda *taluka* in the west, Nasvadi *taluka* in the south, Kavant *taluka* in the southeast and Chhota Udaipur *taluka* in the east, Dohad district in the north and Panchmahals district in the northwest. Major rivers draining the *taluka* are Unchh, Heran, Sukhi and Orsang. Out of a total geographical area of 80,034.1 hectares, 10.79 per cent is covered under forests and 64.98 per cent is net sown area. The population of 2,61,425 persons lives in 49,416 households of the *taluka*. The share of urban population (3.01%) and female literacy (40.48%) is very less. It is predominantly a tribal *taluka* of Vadodara district with a very high (83.33%) share of the ST population in the total population. The *taluka* has 282 primary schools,23secondary schools, five senior secondary schools, three degree

colleges and one vocational training school. The health infrastructure of the *taluka* includes 62 PHSs,11 PHCs, one CHC, five hospitals, one MCH. The *taluka* is connected by SH-11, SH-156 and SH-162 and a narrow gauge railway lines (Table 7.1).

7.2.6 Chhota Udaipur *Taluka*

Chhota Udaipur *taluka* is a hilly area situated in the north-east side of Vadodara district. The *taluka* is bordered by Dohad district in the northwest, Jetpur Pavi *taluka* in the west and southwest, Kavant taluka in the southeast and Madhya Pradesh in the east. Sukhi, Ani and Orsang Rivers drain its 76,144.7 hectares of area. A large portion (27.15%) of the *taluka* is covered with forests and less than half (46.86%) of it is under the plough. A total of 41,803 households accommodate 2,41,377persons. It is predominantly a tribal *taluka* with a share of 87.62 per cent of ST population in the total population. Less than one-third (29.38%) of the female segment in the population has attained the literacy aptitude. Among all the predominantly tribal *talukas* of the district, Chhota Udaipur *taluka* has the highest share of urban population (10.68%). There are 214 primary schools,16 secondary schools, five senior secondary schools in the *taluka*. The *taluka* has 49 PHSs, eight PHCs, one CHC and one dispensary. SH-11, SH-62 and SH-193 and one broad gauge railway line connect the *taluka* with other areas (Table 7.1).

7.2.7 Nasvadi *Taluka*

Nasvadi *taluka* is another hilly *taluka* of the district located in the northeastern side. The *taluka* is surrounded by Sankheda *taluka* in the northwest, Jetpur Pavi *taluka* in the north, Kavant *taluka* in the east and Narmada district in the southwest. Nasvadi *taluka* is drained by Ashwini, Men and Narmada Rivers. It is spread over a total area of 53,186.2 hectares of which around a quarter (24.23%) is under forest cover and 59.08 per cent under net sown area. Total population of *taluka* is 1,55,443 and the total number of households is 29,033. Both the urban share (5.20%) and female literacy (40.38%) in the *taluka* are very less. There are 243 primary schools, eight secondary schools and three senior secondary schools in the *taluka*. The health infrastructure of the *taluka* includes 27 PHSs, five PHCs,2 TB Clinics (TBC), two dispensaries and 45 MCHs. The *taluka* is connected by SH-5, SH-159 and metalled roads and broad gauge railway line (Table 7.1).

Table-7.1 : Characteristics of the Sample *Talukas* (2011)

Taluka	Relief	Dist. from District HQ (kms.)	Total No. of Villages	Total Area (in Hectare)	Total Population	Total No. of Households	Net Area sown (in%)	Forest Area (in %)	Urban Population (in %)	ST Population (in %)	Female Literates (in %)
Vadodara	Plain	0	82	4,04,38.3	2009434	4,007,490	76.22	1.81	90.70	4.85	77.39
Savli	Plain	35	136	7,76,18.5	255009	52,708	76.52	0.16	7.24	7.26	60.09
Karjan	Plain	32	93	5,86,16.1	167579	35,374	83.78	0.04	18.14	25.33	64.75
Padra	Plain	15	82	5,21,89.6	265901	55,104	77.80	0.66)	17.55	3.04	64.40
Chhota Udaipur	Hilly	100	144	7,61,44.7	241377	41,803	46.86	27.15	10.68	87.62	29.38
Kavant	Hilly	125	131	6,05,71.9	210002	37,414	55.79	15.76	4.55	93.51	29.26
Jetpur Pavi	Hilly	85	212	8,00,34.1	261425	49,416	64.98	10.79	3.01	83.33	40.48
Nasvadi	Hilly	85	216	53186.2	155443	29,033	59.08	24.23	5.20	87.72	40.38
Vadodara district	Plain/Hilly	**0**	**1,533**	**8,77,106**	**4165626**	**41,65,626**	**70.29**	**8.32**	**49.59**	**27.60**	**63.57**

Source: Census of India (2011): District Census Handbook: Vadodara

7.2.8 Kavant *Taluka*

Kavant *taluka* is also characterized by a hilly topography located in southeastern part of Vadodara district. The surrounding administrative units of the *taluka* are Jetpur Pavi *taluka* in the northwest, Nasvadi *taluka* in the southwest and the state of Madhya Pradesh in the east. The *taluka* is drained by River Hiren in the north and River Men in the south. It has a geographical area of 60,571.9hectares of which 15.76 per cent is under forest cover and 55.79 per cent under net sown area. A total of 37,414 households provide shelter to its 2,10,002 population.

Kavant *taluka* has the highest share of ST population (93.51%) among all the *talukas* of the district. Majority of the population is rural by residence with only 4.55 per cent living in the urban area. Although there are 198 primary schools, seven secondary schools and three senior secondary schools, the female literacy rate in the *taluka* is miserably low (29.26%). The *taluka* has 42 PHSs, eight PHCs, three TBCs, one dispensary and 32 MCHs. The *taluka* is connected by SH-62 and metalled roads (Table 7.1).

7.3 Profile of the Sample Villages

As mentioned above, from every sample *taluka* one village has been selected for detailed investigation using primary data generated through personal field investigation. Thus, there are a total of eight sample villages for this study. Out of these, four villages are from the plain areas wherein the share of the non-tribal population in the village total population is very high, and four villages are from the hilly areas wherein the share of the tribal population in the village total population is very high. The characteristics of the sample villages are presented in the following paragraphs in detail based primarily on 2011 Census of India data.

7.3.1 Kelanpur village

Kelanpur village is located on the eastern margin of Vadodara *taluka*. The total area of Kelanpur village is 847.4 hectares. Total population of the village is 2,929 and total child population (age group 0-6) is 319, which accounts for about ten per cent (10.89%) of the total population. The sex ratio of the village (980) is higher than the district level sex ratio of 934. Almost half the population of the village belongs to the scheduled category of which majority (41.86%) is ST and a small proportion (8.60%) is SC (Fig.7.1). Level of literacy in the population is relatively

low (69.03%). Almost two-third and around half (46.67%) of the total population and female population respectively returned themselves as main workers, However, only about 10.79 and 7.45 per cent of all the main workers of the village are engaged as cultivators and agricultural labourers. Being located at a distance of only 12 kilometers from Vadodara city, a significant proportion of the working population of the village gets opportunities to find avenues in the non-agricultural pursuits.

The village can be approached by metalled and unmetalled roads as well as by the state highway (SH-11). Drinking water is available to the village population through taps, hand pumps and tube wells. For irrigation purposes wells and tube wells are used. The village has one primary school, one PHC and PHS. With respect to communication facilities, the village has a post office, one sub-post office, telephone connection, Mobile Phone Coverage (MPC) and Internet Cafes/Common Service Centre (CSC) (Table 7.2 and 7.3).

7.3.2 Tundav Village

Tundav village is located in the southwest part of Savli *taluka*. The total area of the village is 1,431.2 hectares. It accommodates a population of 6,102 persons of which 12.44 per cent are children below six years of age. Sex ratio of village (926) is lower than the district average. The SC and ST segment of the village population account for 8.41and 5.90 per cent respectively of the total village population (Fig.7.1). Nearly seventy per cent (66.98%) of the population is literate. A large proportion of the entire population (83.33%) and female population (68.31%) are engaged as main workers. Among the main workers, agricultural labourers (55.59%) account for the largest share followed by cultivators (19.44%).

Approach to the village is possible through metalled and unmetalled roads, state highway and major district roads. Bus and railway services are available to the village population at a distance of more than ten kilometers. The village is located 21 kilometers away from Vadodara city. Source of drinking water in the village is tap, well, tube well and hand pump. For the purposes of irrigation, villagers use well, tube well and other sources. Village has one primary school and one higher secondary school. Health infrastructure in the village is facilitated by one PHC and one PHS. Village has communication facilities of post office, public call office, telephone connection, MPC and CSC (Table – 7.2 & 7.3).

Plate - 7.1: Tundav village (Non-Tribal area: Savli *taluka*)

7.3.3 Handod Village

Located in the northwestern part of Karjan *taluka*, Handod village spreads over an area of 1,020.0 hectares. The village has a total population of 2,095 persons including 261 or 12.46 per cent children of less than six years of age. The sex ratio in the village is exactly same as that in the district (934). About one-third of the village population belongs to the scheduled communities of SCs (7.92%) and STs (22.7%) (Fig.7.1). A significant percentage (74.27%) of the population in the village has attained the literacy skill. Majority (89.99%) of the total population and female population (76.25%) are engaged as main workers. Although the share of cultivators is relatively higher (31.05%), agricultural labourers (52.93%) outnumber the cultivators.

The village can be approached by metalled and unmetalled roads, footpaths, major district and other roads. Village has transport services of bus and railway available at a distance of 5 to 10 kms.Nearest town from the village is Karjan (6 kms.). People get drinking water from tap, hand pump and tube well. Main source of irrigation is tube well both with and without electricity. The village has one primary school and one higher secondary school. It has one PHC, one Maternity and Child Welfare Center (MCW), one Family Welfare Centre (FWC) and one Ayurvedic Hospital (HA). Communication facilities for the village population includes one sub-post office, telephone connection, post & telegraph office, MPC and CSC (Table 7.2 & 7.3).

7.3.4 Vadu Village

Vadu village is located in the central part of Padra *taluka* covering a total area of 874.0 hectares. The village provides shelter to 9,626 persons of which 1,319 are under six years of age accounting for about 14 (13.70) per cent of its total population. Sex ratio of the village is lower than the district sex ratio with 915 females per 1,000 males. Social composition of the village is marked by dominance of non-scheduled population with a meager presence of the SC (3.46%) and ST (0.20%) population (Fig.7.1). A significant segment of the village population (71.80%) has attained literacy. Majority (88.83%) of the working population in the village are in the main worker category, and among the female workers this share is also high (61.13%). Among all the main workers, cultivators and agricultural labourers account for 35.43 and 44.45 per cent respectively. The village can be approached by metalled and unmetalled roads, footpaths, major and other district roads. Bus and rail transport (<5 kms.) can be availed to reach the village. The nearest town of Padra is 12 kilometers away from the village. For water supply tap, well, tank, tube well, hand pump and river are the available sources in the village. Water for the purpose of irrigation is derived from well and electrically operated tube wells. The village has one pre-primary school, three primary schools and one higher secondary school. There is one PHC, one PHS, one MCW and two medicine shops in the village. Communication facilities in the village include one sub-post office, post & telegraph office, telephone connection, mobile phone coverage and internet cafes/common service centre (Table 7.2 & 7.3).

7.3.5 Tejgadh Village

Tejgadh village is located on the western part of Chhota Udaipur *taluka*. The village is drained by Ani and Orsang Rivers. Geographical spread of the village is 1,140.10 hectares accommodating some 6,545 persons of which 809 or 12.36 per cent are below six years of age. Sex ratio of village (949) is slightly above the district average. This is a predominantly tribal village with around 72 per cent ST population. The SC population share in the village is less than ten (9.70) per cent (Fig.7.1). Share of literate population in the total population is relatively less (53.92%) in the village. Proportion of main workers is also relatively less (59.54%), more so among the female segment of the village population (37.04%). Agricultural labourers account for

a major (43.34%) chunk of the main workers, while less than a third (27.78%) of them is registered as cultivators.

Plate - 7.2: Hilly area / Tribal area of Chhota Udaipur *taluka*

Metalled and unmetalled roads, state highways (SH-11 & SH-193) and major district roads connect the village with other areas. Bus and rail (10 + kms.) services are available to reach the village. Chhota Udaipur (14 kms.) is the nearest town from the village. For the purposes of drinking and other uses, villagers make use of water from tap, well, tube well, hand pump and the rivers. Irrigation is done with the help of water from well and tube well. Educational infrastructure in the village includes four primary schools, one higher secondary school and one senior secondary school. Health facility is delivered to the village population through two PHSs, one PHC. The village also has one Veterinary Hospital (VH). The village has one post office, telephone connection, public call office, mobile phone coverage and internet cafes/common service centre (Table 7.2 & 7.3).

7.3.6 Navalja Village

Navalja village is located in the central part of Kavant *taluka*. Spread over an area of 537.3hectares, the village accommodates 1,972 persons among whom 263 or 13.34 per cent are below six years of age. The village has a balanced sex ratio (1,002), much higher than the district. Almost the entire village population (99.80%) belongs to ST community. Level of literacy in the population is low (46.35%) (Fig.7.1). A

large segment of the population (77.83%) is engaged as main worker. The proportion of main workers among the female population of the village is relatively high (50.96%). Opportunity outside the agricultural sector is almost nonexistent for the main workers of the village. This is clearly evident from the high level of participation (96.11%) of the main workers as cultivators (91.22%) and agricultural labourers (4.89%). Village can be approached by metalled road (SH 62) footpath and other district road, by bus services and railway services (10 + kms). Nearest town is Chhota Udaipur (32 kms.). Sources of drinking water are tap, well, tube well and hand pump. Water for the purposes of irrigation is available from wells, tanks and river. There are two primary schools in the village. Health infrastructure in the village includes one PHS and one PHC. Village has communication facilities of sub-post office, telephone, mobile phone coverage and internet cafes/common service centre (Table 7.2 & 7.3).

7.3.7 Chalamali Village

Chalamali is a village with mixed social composition and is located in the southern side of the hilly area in Jetpur Pavi *taluka*. Total area of the village is 284.4 hectares. The village is drained by Heran River. It has a total population of 1,306 persons, of which 127 or 9.72 per cent are below six years of age. Sex ratio of the village (946) is slightly above the district average. The SC and ST population respectively account for 7.66 per cent and 38.36 per cent of the total village population (Fig.7.1). Around 70 (70.37) per cent of the village population is literate. Most of the working population (83.94%) in the village is main worker and all the female workers are main workers. Dependence on agricultural pursuits is relatively less, as less than sixty (54.68%) per cent of the main workers are engaged as cultivators (19.96%) agricultural labourers (34.72%).

The village can be approached by mettaled road, foot path and major district road by bus and railway services (10 + kms). Village lies beside SH-162 and SH-157. Nearest town is Bodeli (22 kms.). Sources of drinking water are tap, well, hand pump and river. Well and tank water is used for irrigation purposes by the cultivators. Chalamali village has one pre-primary school, one primary school, one higher secondary school and one senior secondary school. There is one PHC, one PHS and one veterinary hospital in the village. Communication facilities in the village include post office and telephone connection (Table 7.2 & 7.3).

7.3.8 Palasani Village

Palasani village is located in the northern side of the hilly area of Nasvadi *taluka* and has a total area of 414.7hectares. River Ashwini flows through the village. Slightly above one thousand (1,232) people reside in the village of which 169 or 13.72 per cent are below six years of age. Sex ratio of village is 919, which is less than the district average sex ratio. A major chunk of the village population belongs to the SC (14.04%) and ST (47.73%) segment (Fig.7.1). Level of literacy is relatively less (55.03%). Most of the working population (90.30%) of the village is engaged in work as main worker, more so in case of the females (99.30%). However, dependence agricultural wage labour (61.72%) is much higher than dependence on cultivation (33.20%).

Table-7.2 : Characteristics of the Sample villages (2011)

Name of Village	Population				Sex ratio	Literates (%)	Main Worker (%)			C	AL
	Total	Child (0-6) (%)	SC (%)	ST (%)			Total	Male	Female		
Tundav (Savli)	6,102	759 (12.44)	513 (8.41)	360 (5.90)	926	4,087 (66.98)	83.33	87.16	68.31	19.44	55.59
Kelanpur (Vadodara)	2,929	319 (10.89)	252 (8.60)	1226 (41.86)	980	2022 (69.03)	67.14	70.18	46.67	10.79	7.45
Handod (Karjan)	2,095	261 (12.46)	166 (7.92)	477 (22.77)	934	1,556 (74.27)	89.99	94.92	76.25	31.05	52.93
Vadu (Padra)	9,626	1,319 (13.70)	333 (3.46)	19 (0.20)	915	6,911 (71.80)	88.83	94.29	61.13	35.43	44.45
Tejgadh (Chhota Udaipur)	6,545	809 (12.36)	635 (9.70)	4,706 (71.90)	949	3,529 (53.92)	59.54	77.13	37.04	27.78	43.34
Navalja (Kavant)	1,972	263 (13.34)	0 (0.00)	1,968 (99.80)	1002	914 (46.35)	77.83	96.40	50.96	91.22	4.89
Chalamali (Jetpur Pavi)	1,306	127 (9.72)	100 (7.66)	501 (38.36)	946	919 (70.37)	83.94	96.21	56.50	19.96	34.72
Palasani (Nasvadi)	1,232	169 (13.72)	173 (14.04)	588 (47.73)	919	678 (55.03)	90.30	99.30	62.86	33.20	61.72

Source: Census of India (2011): District Census Handbook: Vadodara.
C: Cultivators; AL: Agricultural Labourer.

The village can be approached by state highway (SH-157), mettaled road and other district roads. Bus and railway services (10 + kms.) are available. Nearest town is Bodeli (27 kms.). People get drinking water from tap, well, hand pump and river. Well and tank water is used for irrigation purposes by the cultivators. The village has one primary school. There is one PHC, one PHS and one MCW, one Family Welfare Centre (FWC) and one dispensary in the village. The village has facilities of sub post

office and telephone connection (Table 7.2 & 7.3). All eight villages have *anganwadi* centers and Accredited Social Health Activist (ASHA).

Table-7.3 : Profile of Sample villages - Availability of Amenities

Sample Village	Area of village (in Hectare)	Approach to village	Availability of Transport Service with Distance (inkms.)	Nearest Town With Distance (inkms.)	Source of irrigation
Kelanpur (Vadodara)	847.4	SH,PR,KR	BS,RS	Vadodara(12)	WE,TWE
Tundav (Savli)	1,431.2	SH,MDR,PR,KR	BS,RS(10+)	Vadodara(21)	WE,TWE, O,T
Handod (Karjan)	1,020.0	MDR,CDR,PR,KR,FP	BS,RS(10+)	Karjan(6)	TWE,T
Vadu (Padra)	874.0	SH,MDR,CDR,PR,KR,FP	BS,RS(<5)	Padra (12)	WE,TWE
Tejgadh (Chhota Udaipur)	1,140.1	SH,MDR, PR,KR,	BS,RS(10+)	Chhota Udaipur(14)	W,TW
Navalja (Kavant)	537.3	ODR,PR,FP	BS,RS(10+)	Chhota Udaipur(32)	W,R,T
Chalamali (Jetpur Pavi)	284.4	MDR,PR,KR	BS,RS(10+)	Bodeli(22)	WE,T
Palasani (Nasvadi)	414.7	SH,ODR,PR	BS,RS(5-10)	Bodeli(27)	W,WE,T

Source: Census of India (2011): District Census Handbook: Vadodara.

NH: Connected to National Highway; **SH:** Connected to State Highway; **MDR:** Connected to Major District Road; **ODR:** Other District Road; **PR:** Pucca Road; **KR:** Kutchcha Road; **FP:** Foot Path; **BS:** Bus; **RS:** Railway Station; **W:** Well; **WE:** Well (with electricity); **TW:** Tube Well; **TWE:** Tube Well (with electricity); **TK:** Tank; **R/C:** River/Canal; **L:** Lake; **O:** Other.

Continued….

Village	Drinking Water	Education	Medical	Communication
Kelanpur	T,HP,TW	P	,PHC,PHS, MCW RMP(2),H(10+)	PO,SPO,PH, MPC,CSC
Tundav	T,HP,TW, W,TK,L	P, S	PHC, PHS,	PO,PCO,PH, MPC,CSC
Handod	T,HP,TW	P,S	PHC,PHS,MCW, HA,FWC.	SPO,PH,PCO, MPC,CSC
Vadu	T,HP,TW, W,TK	PP,P(3),S,C (<5)	PHC,PHS,MCW, MS(2),H (10+)	SPO,PTO,PH, MPC,CSC
Tejgadh	T,HP,TW,W, TK,R/C	P(4),S,SS,C (10+)	PHC,PHS(2),VH,MH, MCW, CWC, CHW,H (10+)	PO,PCO,MPC ,CSC,PH
Navalja	T,HP,W,R/C	P(2),S(5-10), SS(5-10) ,C(10+)	PHC,PHS, VH, CHW,H (<5)	SPO, MPC, CSC,PH
Chalamali	T,HP,W,R	PP,P,S,SS,C(10+)	PHC, PHS, MCW, CWC (2), FWC, TB, RMP, CHW, H (10+)	PO,PH
Palasani	T,HP,W,TW,R/C	P, S(5-10),SS(5-10) , C(10+)	PHC,PHS,MCW,FWC,D	SPO,PH,MPC,CSC

Source: Census of India (2011): District Census Handbook, Vadodara.

Note:
PP: Pre- Primary School, **P:** Primary School **S:** Higher Secondary School, **SS:** Senior Secondary School, **C:** College, **T:** Tap water, **W:** Well Water, **TK:** Tank Water, **TW:** Tube Well Water, **HP:** Hand pump, **R:** River Water, **C:** Canal, **L:** Lake, **O:** Other, **PHC:** Primary Health Centre, **PHS:** Primary Health Sub-centre, **HC :** Health Centre, **FWC:** Family Welfare centre, **MCW:** Maternity & Child Welfare, **MH:** Maternity Home, **CWC:** Child Welfare entre, **TB:** TB Clinic, **RMP:** Registered Private Medical Practitioner, **H:** Allopathic Hospital, **HA:** Ayurvedic Hospital, **HU:** Unani Hospital, **H Home:** Homeopathic hospital, **CHW:** Community Health Worker, **O:** Other, **D:** Dispensary, **MS:** Medicine Shop, **VH:** Veterinary Hospital, **PO:** Post Office, **SPO:** Sub Post Office, **PCO:** Public call office, **PTO:** Post & Telegraph Office, **PH:** Telephone connection, **MPC:** Mobile Phone Coverage, **CSC:** Internet Cafes/Common Service Centre

7.4 Surveyed Households

For the purpose of this study, a minimum of fifty households from each of the eight sample villages were selected. This was purposefully done to keep the sample size manageable. Depending on the total number of households in the sample villages, the percentage of households surveyed for the study varied between 2.61 per cent in village Vadu to 18.38 per cent in Palasani village. The proportion of population covered varied between 3.48 per cent in village Tejgadh and 19.64 per cent in village Palasani. (Table -7.4).

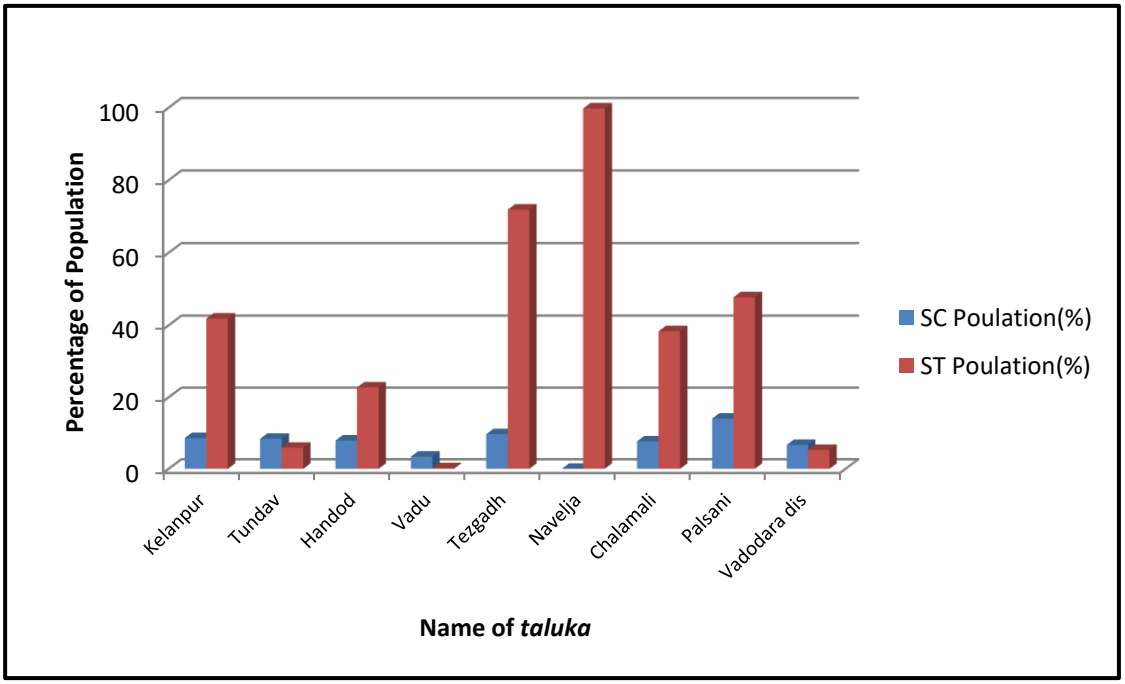
Table-7.4 : Sample villages - Number and Percentage of Households and Population

Sample village	Number of Households			Population (2011)			Population Surveyed	
	Total (2011)	Surveyed Households		Total	Male	Female	Total	Percentage
		Total	Percentage					
Kelanpur	614	50	8.14	2929	1479	1450	231	7.88
Tundav	1116	50	4.48	6102	3169	2933	252	4.12
Handod	466	50	10.72	2095	1083	1012	234	11.16
Vadu	1916	50	2.61	9626	5027	4599	254	2.63
Tejgadh	1252	50	3.99	6545	3358	3187	228	3.48
Navalja	399	50	12.53	1972	985	987	267	13.53
Chalamali	311	50	16.07	1306	671	635	250	19.14
Palasani	272	50	18.38	1232	642	590	242	19.64

Source: Census of India (2011): District Census Handbook: Vadodara.

It may be reiterated here that out of the eight sample villages, four villages namely, Tejgadh, Navalja, Chalamali and Palasani are predominantly tribal villages. The proportion of SC population in the sample villages is meager (less than 10%) excepting in Navalja and Palasani. While the former has no SC population, the latter has registered around one-seventh (14.04%) of its population under the SC category.

Figure-7.1 : Sample villages - Share of SC and ST Population (2011)



Source: Census of India (2011): District Census Handbook: Vadodara

7.5 Micro-Level Analysis of Primary Data

An attempt has been made in the present section to investigate the veracity of the generalizations derived on the basis of secondary data in the earlier chapters. The intention is to corroborate or contradict these findings at micro-level with the help of primary data. For the purpose, information on social, cultural, economic and infrastructure/basic amenities in the non-tribal and tribal *talukas* of Vadodara district have been considered. These include, information on land size, age sex structure, religion, occupation, house types, housing condition, electricity, source of water, toilet facility, types of cooking fuels etcetera.

7.5.1 Land Size Category

Land is a productive asset and access to land generally reflects the social and economic status of the owner. However, with economic diversification, complete dependence on land tends to decrease and non-agricultural avenues provide economic sustenance to the population. The study reveals that large proportions (49%) of the households of the non-tribal sample villages are land less. Another about a third of the house hold sown very small pieces of land. The households having 0.01-1.00 acres and 1.01-2.00 acres respectively account for 15.50 and 14.50 per cent of all the sample households of the non-tribal villages. Thus, the percentage of households having no land and having small land holdings add up to almost 80 (79%) per cent. On the other hand, the proportion of households in possession of the largest size land holdings (> 5 acres), is slightly less than ten (9.50%) per cent in the non-tribal villages (Table 7.5).

Landlessness in the tribal villages is comparatively lesser (33.00%) than in the non-tribal villages. Taken together, the landless households and the households with the smallest size land holdings, account for a lesser percentage (71%) of households in the total sample households of the tribal villages. Even the percentage of households possessing more than five acres of land is higher (11.00%) in the tribal villages in comparison to the non-tribal villages.

On the whole, distribution of land in both types of villages is highly unequal. Larger the size of landholding, smaller is the proportion of households. As one moves from the land less category upwards along the land size category in both types of villages, the percentage of households keep decreasing, excepting in the largest size of more than five acres.

Table - 7.5 : Households by Land Size Category

Land size (in acres)	Percentage of Households	
	Non -Tribal villages	Tribal villages
Landless	49.00	33.00
0.01-1.00	15.50	24.50
1.01-2.00	14.50	13.50
2.01-3.00	2.50	8.00
3.01-4.00	4.50	5.50
4.01-5.01	4.50	4.50
5.01 & Above	9.50	11.00
All Categories	100	100

Source: Computed by the researcher from field data.

7.5.2 Religious and Social Composition

Hindu and Muslim are the two religious groups found in the sample villages. Majority of the Muslim households in both types of villages are either landless or have the smallest size of land holdings. This is more so in the tribal villages.

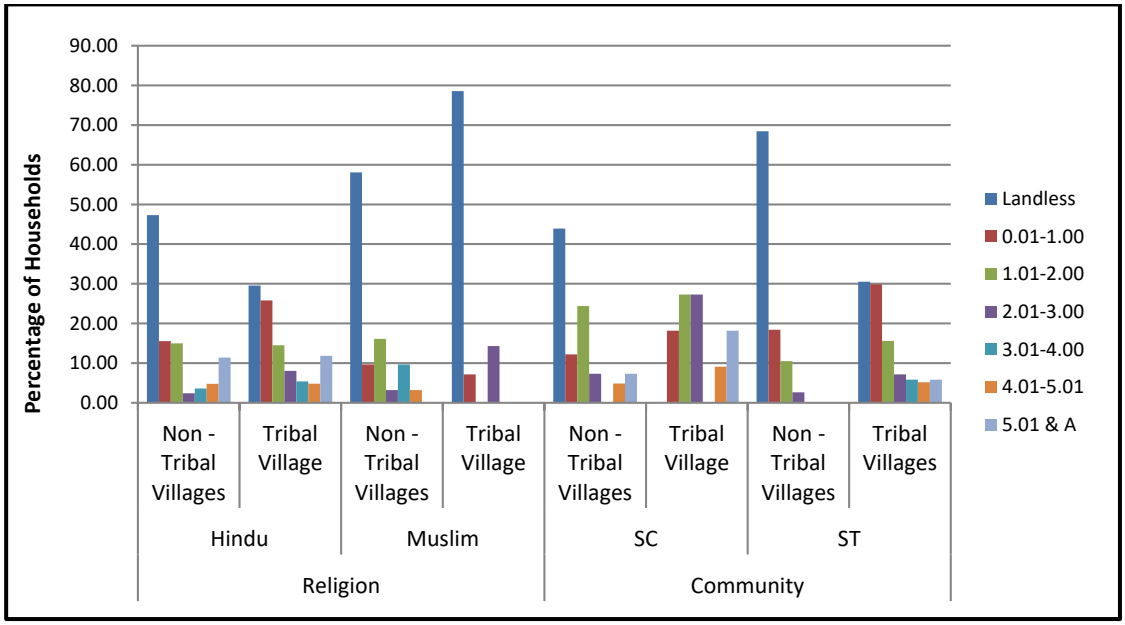
While the Hindu households belong to Patel, Rajput and Brahmin castes in the non-tribal villages, the tribes belong to Tadvi, Vaniya, Rathawa, Nayak and Vankar tribes in the tribal villages. SC households are mostly confined to the non-tribal villages and mostly landless (43.90 %) or marginal (24.39 %) land owing households. The proportions of SC households in the tribal villages are very less and are the owners of marginal or small sizes of land. Relatively less proportion (30.52%) of ST households in the tribal villages is landless and with increasing size of land size holding, the percentage of tribal households keep on decreasing (Table 7.6 & Fig. &.7.2).

Table - 7.6 : Religious and Social Composition by Land Size Category

Land size (in acres)	Percentage of Households							
	Religion				Community			
	Hindu		Muslim		SC		ST	
	Non - Tribal villages	Tribal villages	Non - Tribal villages	Tribal villages	Non - Tribal villages	Tribal villages	Non - Tribal villages	Tribal villages
Landless	47.31	29.57	58.06	78.57	43.90	0.00	68.42	30.52
0.01-1.00	15.57	25.81	9.68	7.14	12.20	18.18	18.42	29.87
1.01-2.00	14.97	14.52	16.13	0.00	24.39	27.27	10.53	15.58
2.01-3.00	2.40	8.06	3.23	14.29	7.32	27.27	2.63	7.14
3.01-4.00	3.59	5.38	9.68	0.00	0.00	0.00	0.00	5.84
4.01-5.01	4.79	4.84	3.23	0.00	4.88	9.09	0.00	5.19
5.01 & A	11.38	11.83	0.00	0.00	7.32	18.18	0.00	5.84
Total	100	100	100	100	100	100	100	100

Source: Computed by the researcher from field data.

Figure - 7.2 : Religious and Social Composition by Land Size Category



Source: Computed by the researcher from field data.

7.5.3 Age-Sex Structure

A reference to the age structure by land size categories reveals insignificant differences between the tribal and non-tribal villages (Table-7.7a & 7.7b). A large segment (more than 70%) of the population in both types of villages is in the working age group of 15 to 59 years – to be specific 70.39 per cent in the non-tribal and 72.11 per cent in the tribal villages are in the working age group. The proportion of population in the senile age group of 60 and above is also significantly high, which is an indication of higher life expectancy. This may be the consequence of availability of better health care facilities and enhanced awareness and consciousness among the population. The share of population above 60 years of age tends to increase with increase in the size of land holding, indicating association of economic wellbeing with health. It is however disheartening to note that the proportion of child population in the villages particularly in the households with larger land size holdings is miserably low. It is also clearly evident from the two tables that with increase in the size of land holding the proportion of child population, particularly in the age group of below four years of age, tends to decrease (Table-7.7a & 7.7b). Perhaps the family planning practices among the large land owners is more popular than among the small land owners or the landless.

Table - 7.7a : Non-Tribal villages- Age Structure by Land Size Category

Land Size (in acres)	Age Group-Wise Percentage of Population							
	< 4	5.0-14	15-24	25-34	35-44	45-59	60+	Total
Landless	4.97	20.32	27.31	17.61	10.61	12.87	6.32	100
0.01-1.00	9.46	14.19	18.92	21.62	12.16	15.54	8.11	100
1.01-2.00	5.56	15.97	24.31	16.67	12.50	17.36	7.64	100
2.01-3.00	10.00	30.00	35.00	15.00	5.00	5.00	0.00	100
3.01-4.00	2.22	8.89	24.44	33.33	13.33	11.11	6.67	100
4.01-5.00	0.00	6.82	31.82	6.82	13.64	20.45	20.45	100
5.01 & Above	2.94	9.80	20.59	21.57	10.78	23.53	10.78	100
Total	**5.30**	**16.42**	**25.11**	**18.75**	**11.33**	**15.25**	**7.84**	**100**

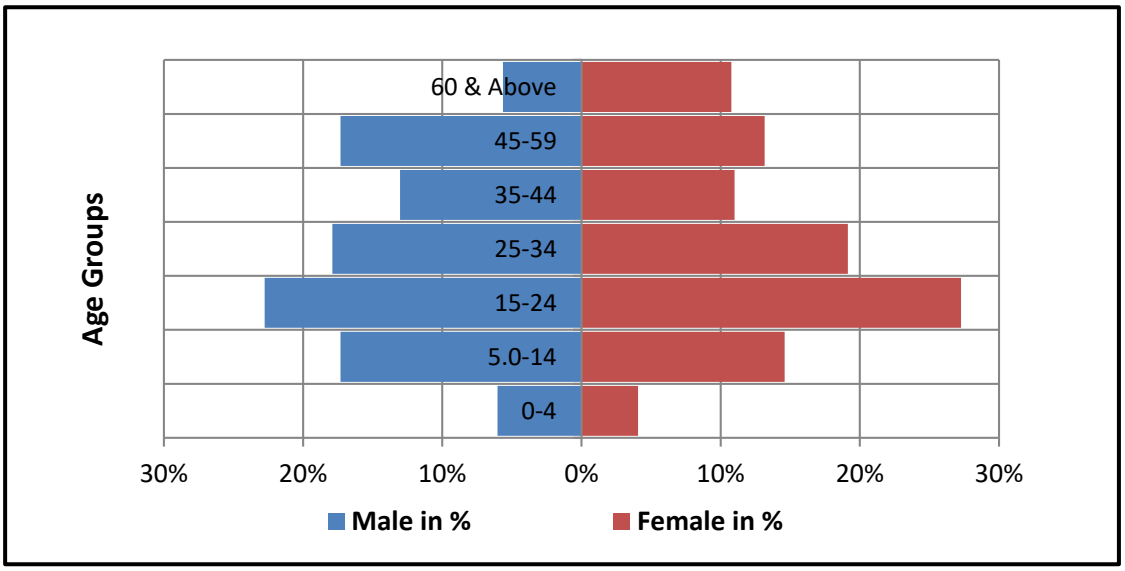
Source: Computed by the researcher from field data

Table –7.7.b : Tribal villages -Age Structure by Land Size Category

Land Size (in acres)	Age Group-Wise Percentage of Population							
	< 4	5.0-14	15-24	25-34	35-44	45-59	60+	Total
Landless	8.06	15.81	20.00	18.06	11.61	18.06	8.39	100
0.01-1.00	7.01	9.35	24.30	20.09	11.68	19.16	8.41	100
1.01-2.00	3.13	14.06	23.44	15.63	14.84	21.09	7.81	100
2.01-3.00	6.67	13.33	21.33	13.33	21.33	18.67	5.33	100
3.01-4.00	3.57	16.07	23.21	12.50	12.50	17.86	14.29	100
4.01-5.00	2.33	9.30	23.26	11.63	16.28	23.26	13.95	100
5.01 & Above	1.77	13.27	15.93	20.35	16.81	22.12	9.73	100
Total	**5.75**	**13.31**	**21.41**	**17.47**	**13.74**	**19.49**	**8.84**	**100**

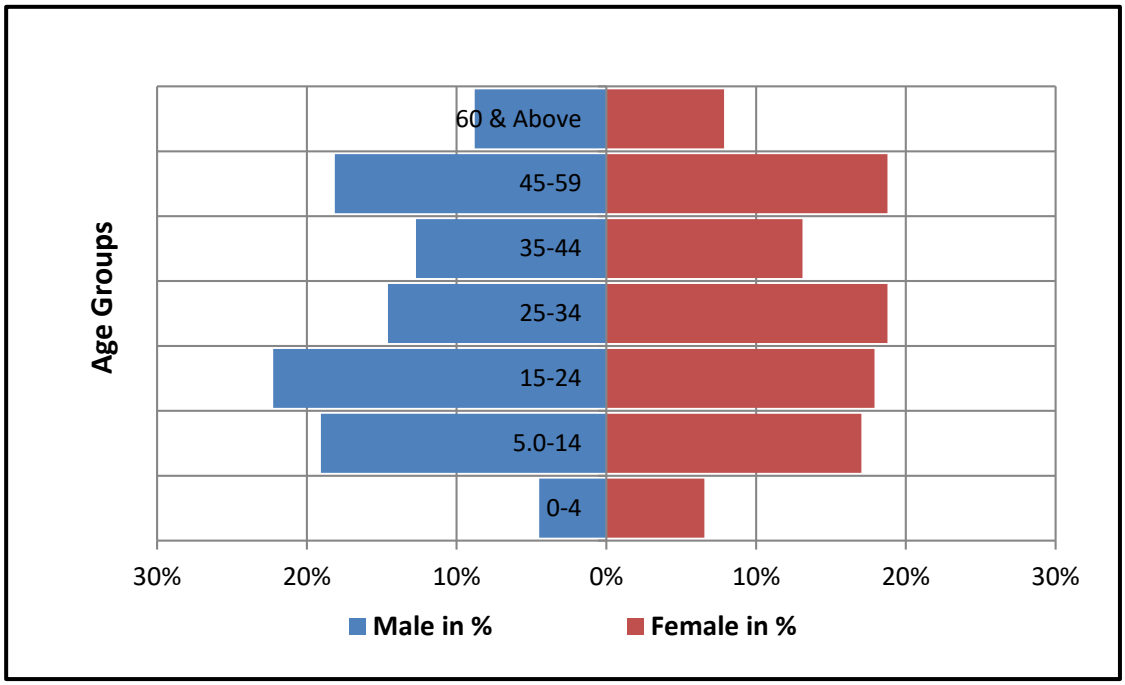
Source: Computed by the researcher from field data

Figure - 7.3a : Age Sex Pyramid of Non-tribal villages



Source: Computed by the researcher from field data.

Figure - 7.3b : Age Sex Pyramid of tribal villages



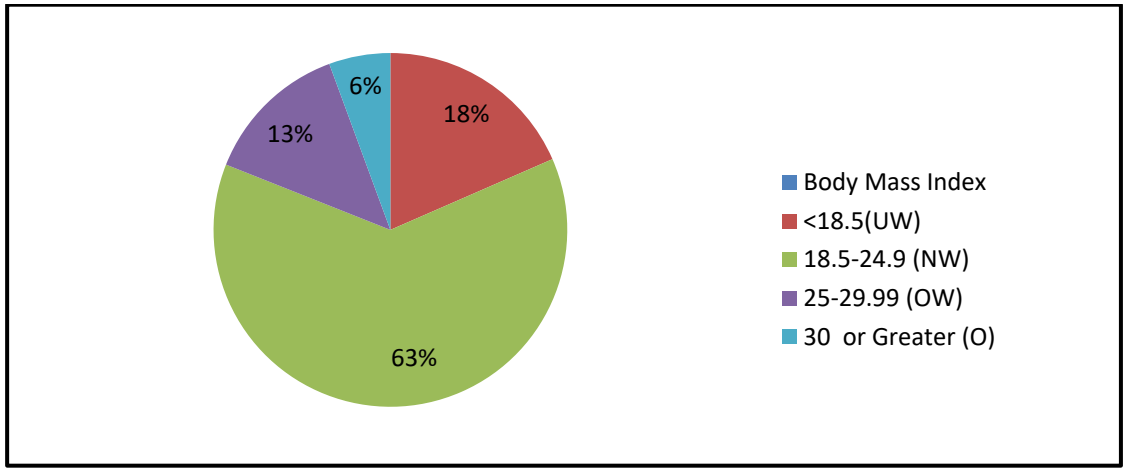
Source: Computed by the researcher from field data

7.5.4 Nutritional Status:

Body Mass Index (BMI) is a measure of weight adjusted for height, calculated in kilograms divided by the square of height in meters (kg/m^2) (https://www.cdc.gov/obesity/downloads/bmiforpactitioners.pdf).With the help of BMI measurement for all the population of the sample households of both tribal and non-tribal villages, it was found that 63.75 per cent has normal weight (18.5-24.9),17.89 percent are thin or underweight (<18.5), 12.92 percent are overweight (25-29.99) and 5.43 percent are obese (30 or above).There is not much of difference in this regard between the tribal and the non-tribal village BMI indices. However, the non-tribal villages differ from the tribal villages when the land size category wise BMI indices are compared. While there emerges no noticeable association of the BMI indices with land size categories in the tribal villages, the non-tribal villages display some association. It is clear that in the non-tribal villages, the proportion of underweight population tends to decrease with increasing size of land holdings (Table 7.8).

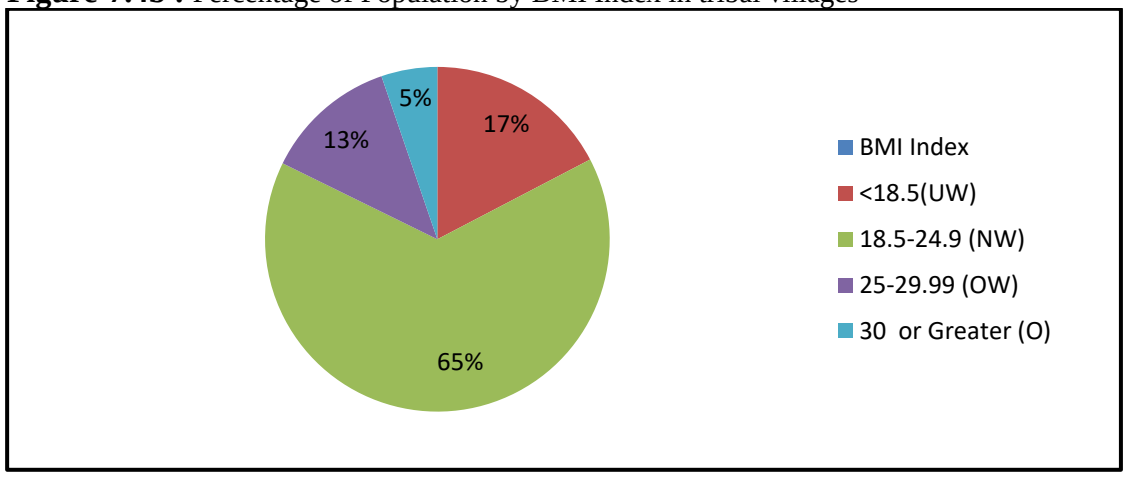
Plate - 7.3: Underweight men and women of Navalja village (Tribal area: Kavant *taluka*)

Figure-7.4a : Percentage of Population by BMI Index in Non-tribal villages



Source: Computed by the researcher from field data.
UW: Under Weight, NW: Normal Weight, OW: Over Weight, O: Over Weight.

Figure-7.4b : Percentage of Population by BMI Index in tribal villages



Source: Computed by the researcher from field data.
UW: Under Weight, NW: Normal Weight, OW: Over Weight, O: Over Weight.

Table –7.8 : BMI Index by Land Size Category

Land Size (in acres)	Percentage of Population by BMI Index									
	Non -Tribal village					Tribal village				
	<18.5 (UW)	18.5-24.9 (NW)	25-29.99 (OW)	30 or Higher (O)	Total	<18.5 (UW)	18.5-24.9 (NW)	25-29.99 (OW)	30 or Higher (O)	Total
Landless	25.21	55.87	10.89	8.02	100	15.22	64.35	12.17	8.26	100
0.01-1.00	19.83	64.66	11.21	4.31	100	17.99	69.84	11.64	0.53	100
1.01-2.00	13.73	61.76	20.59	3.92	100	24.27	68.93	3.88	2.91	100
2.01-3.00	11.76	82.35	5.88	0.00	100	21.88	71.88	1.56	4.69	100
3.01-4.00	13.16	71.05	10.53	5.26	100	14.29	73.81	9.52	2.38	100
4.01-5.00	2.27	81.82	15.91	0.00	100	14.29	65.71	17.14	2.86	100
5.01 & Above	6.10	70.73	19.51	3.66	100	13.54	44.79	31.25	10.42	100
Total	**18.45**	**62.57**	**13.37**	**5.61**	**100**	**17.35**	**64.91**	**12.48**	**5.26**	**100**

Source: Computed by the researcher from field data.
UW: Under Weight, NW: Normal Weight, OW: Over Weight, O: Over Weight

7.5.5 Marital Status

Marital status of the population in the two types of villages is by and large similar with slightly above half the population ever married and around two fifth (42%) of the population unmarried. There is complete absence of never married category people in the tribal villages, while a small proportion (0.21%) of the population of the landless households in the non-tribal villages reported as such. The incidence of death of the spouse is reportedly higher in the non-tribal villages in comparison to the tribal villages. While separation from the spouse is uncommon in the non-tribal villages, it is reported in small proportion (0.34%) among the landless households of the tribal villages. Any relationship between marital status of the population and land size holding is not noticed (Table 7.9a & 7.9b).

Table –7.9a : Marital Status by Land Size Category- Non -Tribal villages

Land Size (in acres)	Percentage of Population						
	Married	Unmarried	Never married	Widow	Widower	Separated	Total
Landless	49.16	43.88	0.21	5.27	1.48	0.00	100
0.01-1.00	54.55	40.26	0.00	3.90	1.30	0.00	100
1.01-2.00	51.70	44.22	0.00	3.40	0.68	0.00	100
2.01-3.00	57.14	42.86	0.00	0.00	0.00	0.00	100
3.01-4.00	53.33	44.44	0.00	2.22	0.00	0.00	100
4.01-5.00	59.09	38.64	0.00	2.27	0.00	0.00	100
5.01 & Above	58.00	37.00	0.00	4.00	1.00	0.00	100
Total	**52.08**	**42.44**	**0.10**	**4.26**	**1.12**	**0.00**	**100**

Source: Computed by the researcher from field data.

Table –7.9b : Marital Status by Land Size Category- Tribal villages

Land size (in acres)	Percentage of Population						
	Married	Unmarried	Never married	Widow	Widower	Separated	Total
Landless	56.90	40.40	0.00	1.35	1.01	0.34	100
0.01-1.00	54.77	43.98	0.00	1.24	0.00	0.00	100
1.01-2.00	55.88	41.91	0.00	2.21	0.00	0.00	100
2.01-3.00	48.72	48.72	0.00	2.56	0.00	0.00	100
3.01-4.00	53.57	41.07	0.00	5.36	0.00	0.00	100
4.01-5.00	60.00	37.50	0.00	2.50	0.00	0.00	100
5.01 & Above	57.14	39.10	0.00	1.50	2.26	0.00	100
Total	**55.84**	**42.11**	**0.00**	**1.84**	**0.20**	**0.00**	**100**

Source: Computed by the researcher from field data

7.5.6 Level of Education

Spread of education among the tribal and non-tribal segment of the population seems to have reached a similar status, although the tribal population is marginally lagging behind the non-tribes. Members of the largest size of land holdings (more than 5 acres) in both type of villages are mostly (more than 80%) educated and the share of illiterates among them is the least (Table 7.10a & 7.10b).

Table-7.10a : Percentage of Population by Level of Education- Non -Tribal villages

Land Size (in acres)	Percentage of Population							
	Illiterate	Literate Only	Primary	Secondary	Higher Secondary	Graduate	All Educated	Total
Landless	31.59	6.59	34.55	13.86	11.36	2.05	61.82	100
0.01-1.00	29.01	10.69	17.56	15.27	19.85	7.63	60.31	100
1.01-2.00	28.36	6.72	26.87	23.13	9.70	5.22	64.92	100
2.01-3.00	36.84	0.00	36.84	10.53	5.26	10.53	63.16	100
3.01-4.00	25.58	4.65	27.91	13.95	9.30	18.60	69.76	100
4.01-5.00	45.24	4.76	4.76	16.67	23.81	4.76	50.00	100
5.01 & Above	11.83	4.30	23.66	24.73	15.05	20.43	83.87	100
Total	**29.16**	**6.65**	**28.16**	**16.63**	**13.08**	**6.32**	**64.19**	**100**

Source: Computed by the researcher from field data.

Table-7.10b : Percentage of Population by Level of Education- Tribal villages

Land Size (in acres)	Percentage of Population							
	Illiterate	Literate Only	Primary	Secondary	Higher Secondary	Graduate	All Educated	Total
Landless	34.93	2.18	25.76	12.66	15.72	8.73	62.87	100
0.01-1.00	31.68	5.45	31.19	15.84	13.86	1.98	62.87	100
1.01-2.00	34.92	5.56	30.16	24.60	4.76	0.00	59.52	100
2.01-3.00	29.17	1.39	25.00	15.28	26.39	2.78	69.45	100
3.01-4.00	49.09	3.64	12.73	16.36	10.91	7.27	47.27	100
4.01-5.00	38.10	14.29	9.52	19.05	14.29	4.76	47.62	100
5.01 & Above	15.69	3.92	27.45	13.73	17.65	21.57	80.40	100
Total	**32.37**	**4.35**	**26.21**	**16.18**	**14.37**	**6.52**	**63.28**	**100**

Source: Computed by the researcher from field data

7.5.7 Occupational Structure

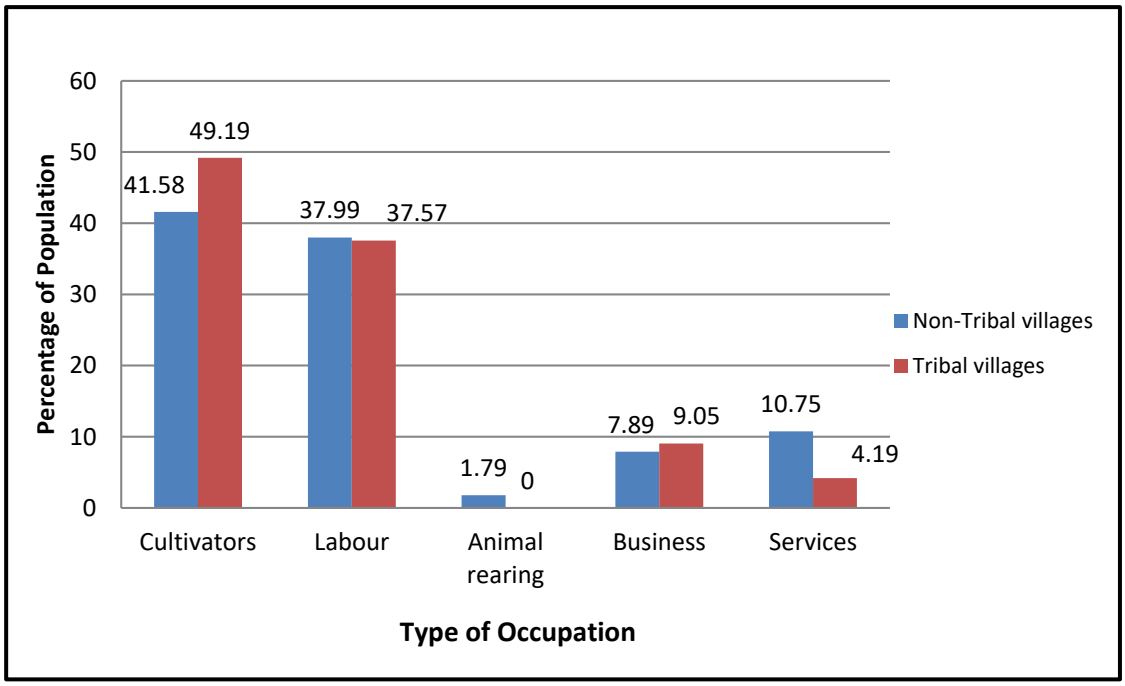
Occupation is one of the most important aspects of demographic characteristics. The rural population generally performs a variety of activities for eking the bread (Plate – 7.4 ,7.5 and 7.6) other than crop cultivation. The Census of India registers these works under main and subsidiary activities depending on the number of days one is engaged in such a work. However, for the purpose of this study, such categorization has not been considered as the intention was to explore only the type of activities the sample population engages itself in. The data gathered through primary investigation reveals that majority of the working population in both type of villages are engaged in agricultural activities. While the proportion of such workers in the non-tribal villages is 79.57 per cent (41.58% cultivators and 37.99 agricultural labourers), it is higher (86.76%) in the tribal villages (49.19% cultivators and 37.57% agricultural labourers). This is indicative of the fact that non-agricultural sectors provide lesser economic opportunities in the tribal villages. Even animal rearing is uncommon in the tribal villages, while 1.79 per cent of workers in the non-tribal villages are engaged in this activity. Rather, a relatively higher proportion (9.05%) of the workers in the tribal villages has taken to business than in the non-tribal villages (7.89%). Service sector provides opportunity to around one-tenth (10.75%) of the workers in the non-tribal villages, which is much less (4.19%) in the tribal villages (Fig. 7.5 and Table 7.11a & 7.11b).

Plate - 7.4: Women working in field of Navalja village (Tribal area: Kavant *taluka*)

Plate - 7.5: Basket weaving in Palasani village (Tribal area: Nasvadi *taluka)*

Plate - 7.6: Vegetable Vending in Vadu village (Non-Tribal area: Padra *taluka)*

Figure -7.5 : Occupational Structure of Non-Tribal and Tribal villages

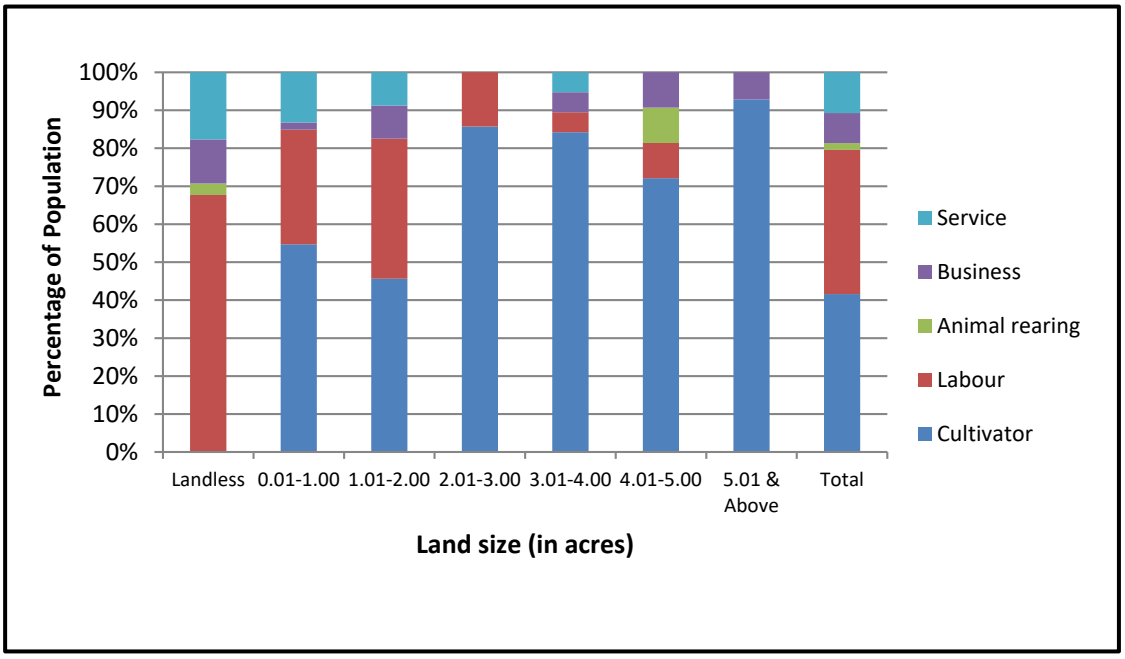


Source: Computed by the researcher from field data

A perusal of the economic activities undertaken by the population in different land size categories makes interesting revelations (Table 7.11a & 7.11b). It can clearly be seen that with increase in the land holding size the proportion of cultivators increases and the proportion of agricultural laboures decreases. This is true in case of both non-tribal and tribal villages. A very small percentage (2.72%) of workers of the tribal villages in the landless category also cultivates crops by leasing in land. Otherwise, workers belonging to all land size categories of the tribal villages earn

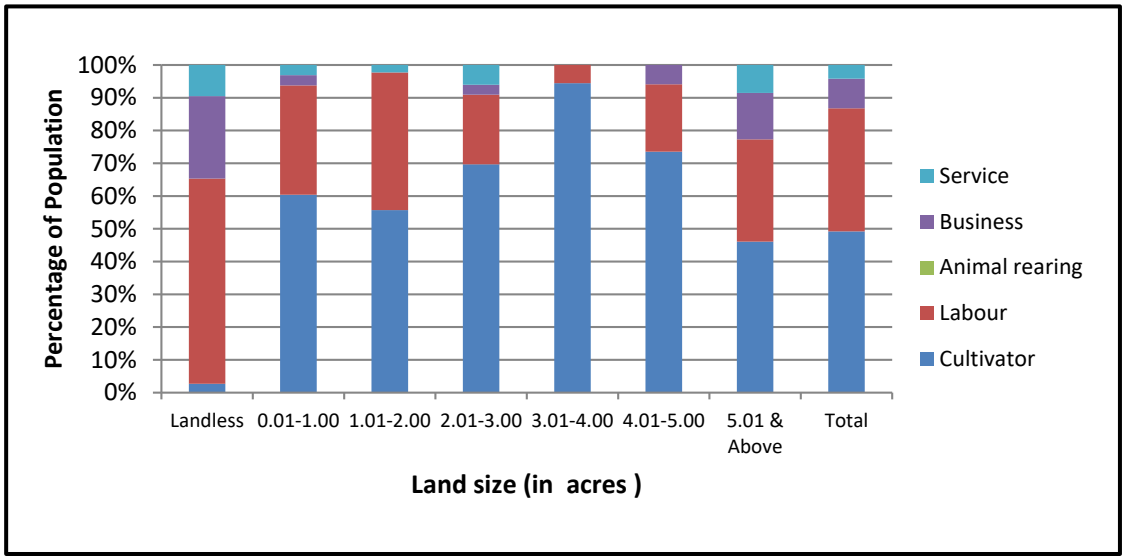
their bread through all types of activities in varying proportions and/or seasonally migrating out in search of work. Limited scope of the agricultural sector in the village or in the neighbouring villages forces the wage earners to migrate to Saurashtra in search of agricultural work, and in search of casual labour in the urban unorganized sector, particularly construction, of the cities of Rajkot, Vadodara and other urban centers in the state. On the other hand, in the non-tribal villages, the large land owners generally refrain from any type of wage earning. Rather, a few of them are engaged in business and service sector. Population engaged in business run grocery shop, do tailoring work in and outside the village. A significant proportion of the workers in the non-tribal villages find avenue in the service sector. Being located nearer to the urban-industrial center of Vadodara, the proportion of workers engaged in the service sector is much higher (10.75%) in comparison to the tribal villages (4.19%) which are located relatively farther away from Vadodara city. The survey found people employed in the police department, banks, schools and colleges as teachers, and as class four employees like driver etcetera. It is worth noting that the highest proportion workers engaged in business and services in both types of villages belong to the landless households followed by the households with the largest size of holdings (Fig. 7.5a & 7.5b; Table 7.11a & 7.11b).

Figure-7.5a : Occupational Structure by Land Size Category in Non -Tribal villages



Source: Based on field data.

Figure-7.5b : Occupational Structure by Land Size Category in Tribal villages



Source: Based on field data.

Table – 7.11a : Occupational Structure by Land Size Category -Non-Tribal villages

Land Size (in acres)	Percentage of Population					
	Cultivators	Labour	Animal Rearing	Business	Services	Total
Landless	0.00	67.68	3.03	11.62	17.68	100
0.01-1.00	54.72	30.19	0.00	1.89	13.21	100
1.01-2.00	45.63	36.89	0.00	8.74	8.74	100
2.01-3.00	85.71	14.29	0.00	0.00	0.00	100
3.01-4.00	84.21	5.26	0.00	5.26	5.26	100
4.01-5.00	72.09	9.30	9.30	9.30	0.00	100
5.01 & Above	92.86	0.00	0.00	7.14	0.00	100
Total	**41.58**	**37.99**	**1.79**	**7.89**	**10.75**	**100**

Source: Computed by the researcher from field data.

Table – 7.11b : Occupational Structure by Land Size Category - Tribal village

Land Size (in acres)	Percentage of Population					
	Cultivators	Labour	Animal Rearing	Business	Services	Total
Landless	2.72	62.59	0.00	25.17	9.52	100
0.01-1.00	60.42	33.33	0.00	3.13	3.13	100
1.01-2.00	55.73	41.98	0.00	0.00	2.29	100
2.01-3.00	69.70	21.21	0.00	3.03	6.06	100
3.01-4.00	94.44	5.56	0.00	0.00	0.00	100
4.01-5.00	73.53	20.59	0.00	5.88	0.00	100
5.01 & Above	46.10	31.21	0.00	14.18	8.51	100
Total	**49.19**	**37.57**	**0.00**	**9.05**	**4.19**	**100**

Source: Computed by the researcher from field data

7.5.8 Level of Income

Income of the surveyed households has been documented by the present researcher by observation and categorized in ordinal scale purposefully to avoid wrong assessment. On the basis of this assessment, the data have been tabulated and presented in Table 7.12. One can notice a very clear association of level of income with the land size holdings, i.e. larger the size of land holding, higher is the level of income. This is more so in the non-tribal villages, where ten or less percentage of households without land or with small holdings (less than 2 acres) find a place in the high income category. On the other hand, none of households with more than 2 acres of land are placed in the low income category. The situation in the tribal villages is however, slightly different, wherein no clear pattern emerges. But, a large proportion of the landless households in the tribal villages are better off in comparison to their non-tribal village counterparts. While more than 90 (90.82%) per cent landless households in the non-tribal villages fall under medium or low income category, in the tribal villages their proportion is much low (77.28%). However, unlike in the non-tribal villages, no clear cut association between level of income and land size holding can be observed. One can find some households reporting under the low and medium income category despite having large land holdings. This may be due to the quality of land, lack of required agricultural infrastructure and method of cultivation etcetera.

Table – 7.12 : Level of Income of Households by Land Size Category

Land Size (in acres)	Percentage of Households							
	Non -Tribal villages				Tribal villages			
	Low	Medium	High	Total	Low	Medium	High	Total
Landless	44.90	45.92	9.18	100	25.76	51.52	22.73	100
0.01-1.00	19.35	74.19	6.45	100	34.69	55.10	10.20	100
1.01-2.00	6.90	82.76	10.34	100	22.22	74.07	3.70	100
2.01-3.00	0.00	60.00	40.00	100	5.88	82.35	11.76	100
3.01-4.00	0.00	66.67	33.33	100	0.00	100	0.00	100
4.01-5.00	0.00	44.44	55.56	100	11.11	77.78	11.11	100
5.01 & Above	0.00	5.26	94.74	100	4.55	27.27	68.18	100
Total	**26.00**	**53.00**	**21.00**	**100**	**21.39**	**59.20**	**19.40**	**100**

Source: Computed by the researcher from field data.

7.5.9 Electricity Connection:

According to NFHS-4, Gujarat-2015-16, 96 percent of households in the state have electricity connection which is slightly lower than the National average of 97.5 per cent. The sample villages of this study too display a similar situation. The tribal villages however compare better with the National average than the non-tribal villages. But, in both type villages, the households without electricity connection belong to the smaller size land owners (Table 7.13).

Table – 7.13 : Availability of Electricity Connection by Land Size Category

Land Size (in acres)	Percentage of Households with Electricity Connection					
	Non -Tribal village			Tribal village		
	Yes	No	Total	Yes	No	Total
Landless	94.90	5.10	100	100	0.00	100
0.01-1.00	100	0.00	100	97.96	2.04	100
1.01-2.00	93.10	6.90	100	92.59	7.41	100
2.01-3.00	100	0.00	100	93.75	6.25	100
3.01-4.00	100	0.00	100	100	0.00	100
4.01-5.00	100	0.00	100	100	0.00	100
5.01 & Above	100	0.00	100	100	0.00	100
Total	**96.50**	**3.50**	**100**	**98.00**	**2.00**	**100**

Source: Computed by the researcher from field data

7.5.10 Toilet Facility

Toilet facility is one of the most important requirements for maintaining good health, hygiene and sanitation in any area. Unfortunately however, this facility is not available to all the households of either type of villages. One even does not find any association of the facility with land size holdings, although a higher proportion of the households in the large size holding category have access to toilets (Table 7.14).

Plate - 7.7: House with toilet facility in Tejgadh village (Tribal area: Chhota Udaipur *taluka*)

Table – 7.14 : Availability of Toilet by Land Size Category

Land Size (in acres)	Percentage of Households with Toilet Facility					
	Non -Tribal village			Tribal village		
	Yes	No	Total	Yes	No	Total
Landless	24.74	75.26	100	36.36	63.64	100
0.01-1.00	41.94	58.06	100	18.37	81.63	100
1.01-2.00	35.71	64.29	100	22.22	77.78	100
2.01-3.00	60.00	40.00	100	43.75	56.25	100
3.01-4.00	33.33	66.67	100	45.45	54.55	100
4.01-5.00	100.00	0.00	100	33.33	66.67	100
5.01 & Above	71.43	28.57	100	63.64	36.36	100
Total	**38.50**	**60.50**	**100**	**34.00**	**66.00**	**100**

Source: Computed by the researcher from field data.

7.5.11 Financial Help from the Government

The Government is providing financial help to the families below poverty line and landless agricultural labourers in the rural areas all over the country for construction of house under the Sardar Awaas / Indira Awas Scheme. There are several other schemes pertaining to employment, education and health etcetera for the rural population. However, the surveyed population in the sample villages have availed the benefits of housing scheme only. Although one does not notice any clear pattern by land size holding in availing the facility, unlike the non-tribal villages, the families of every land size category of the tribal villages have availed the facility in varied proportions (Table 7.15).

Table – 7.15 : Financial Help Availed by Land Size Category

Land Size (in acres)	Percentage of Households							
	Non -Tribal villages				Tribal villages			
	Financial Help Availed			Type of Financial Help	Financial Help Availed			Type of Financial Help
	No	Yes	Total	Sardar/ Indira Awaas	No	Yes	Total	Sardar/ Indira Awaas
Landless	81.72	18.28	100	100	84.85	15.15	100	100
0.01-1.00	83.33	16.67	100	100	75.51	24.49	100	100
1.01-2.00	86.21	13.79	100	100	66.67	33.33	100	100
2.01-3.00	80.00	20.00	100	100	68.75	31.25	100	100
3.01-4.00	100	0.00	100	100	90.91	9.09	100	100
4.01-5.00	100	0.00	100	100	66.67	33.33	100	100
5.01 & Above	89.47	10.53	100	100	90.91	9.09	100	100
Total	**85.05**	**14.95**	**100**	**100**	**79.00**	**21.00**	**100**	**100**

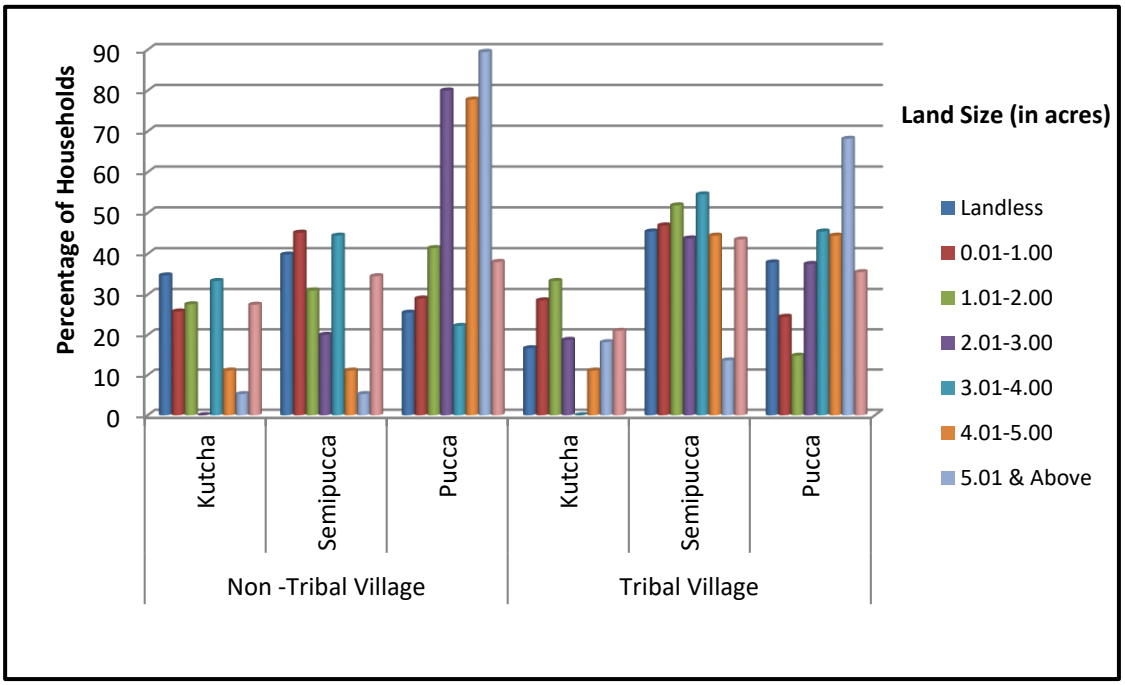
Source: Computed by the researcher from field data.

Plate - 7.8: **House constructed under scheme of Sardar Awas Scheme in Kelanpur village (Non-tribal area: Vadodara *taluka*)**

7.5.12 House Types

House is one of the most important assets of a family that gives not only protection from the natural forces but also from ailments caused by animals, insects and pests etcetera. Good quality of house, good energy efficiency and ventilation is related to good health (Ige et. al. 2018). There is an association of housing condition and its effects on health, diseases, sanitation, obesity, respiratory diseases, physical activity, crime, etcetera (Bonnefoy, 2007). Maximum protection is possible if the house is constructed using solid construction materials. Not all families particularly in the rural areas of India are able to afford such houses. The same is evident from the data generated through field investigation of the sample villages of the study area (Table 7.16 & Fig. 7.6). There are three common types of houses in the sample villages such as, *pucca*, semi *pucca* and *kutcha* houses. *Kutcha* houses made up of mud floors and thatched roofs, which develop cracks and provide shelter to rodents and insects which spread diseases. As is evident, a significant proportion of the houses in both types of villages are either *kutcha* or semi *pucca*. This is more so among the households with no land or small land holdings. Relatively higher proportion of the large land owning households of the non-tribal villages have been able to construct *pucca* houses in comparison to their counter parts of the tribal villages.

Fig. – 7.6 : Type of House by Land Size Category



Source: Computed by the researcher from field data

Table – 7.16 : Type of House by Land Size Category

Land Size (in acres)	Percentage of Households							
	Non -Tribal villages				Tribal villages			
	Kutcha	Semi *pucca*	*Pucca*	Total	*Kutcha*	Semi *pucca*	*Pucca*	Total
Landless	34.69	39.80	25.51	100	16.67	45.45	37.88	100
0.01-1.00	25.81	45.16	29.03	100	28.57	46.94	24.49	100
1.01-2.00	27.59	31.03	41.38	100	33.33	51.85	14.81	100
2.01-3.00	0.00	20.00	80.00	100	18.75	43.75	37.50	100
3.01-4.00	33.33	44.44	22.22	100	0.00	54.55	45.45	100
4.01-5.00	11.11	11.11	77.78	100	11.11	44.44	44.44	100
5.01 & Above	5.26	5.26	89.47	100	18.18	13.64	68.18	100
Total	**27.50**	**34.50**	**38.00**	**100**	**21.00**	**43.50**	**35.50**	**100**

Source: Computed by the researcher from field data.

Plate - 7.9: *Kutcha* house in Palasani village (Tribal area: Nasvadi *taluka)*

7.5.12.1 Type of Floor and Roof

Floors of around 40 (42.71%) of the households in the non-tribal villages are made up of mud and the remaining (57.29%) of concrete materials. Majority of the houses belonging to landless, marginal and small land owning households have mud floors. On the other hand majority of the houses belonging to the large land owning households have concrete floors. Similar is also the pattern with reference to the roof of the house. The highest proportion of houses belonging the landless and small and marginal land owning households have either thatched or asbestos roofs (Table 7.17a). However, in the tribal villages one does not come across any association between size of land holding and type of floor or roof (Table 7.17b).

Table – 7.17a : Type of Floor and Roof by Land Size Category- Non -Tribal villages

Land Size (in acres)	Percentage of Households						
	Floor Type			Roof Type			
	Mud	Concrete	Total	Thatch	Asbestos	Concrete	Total
Landless	53.68	46.32	100	27.55	43.88	28.57	100
0.01-1.00	42.86	57.14	100	17.65	61.76	20.59	100
1.01-2.00	42.86	57.14	100	22.58	38.71	38.71	100
2.01-3.00	20.00	80.00	100	0.00	40.00	60.00	100
3.01-4.00	55.56	44.44	100	22.22	66.67	11.11	100
4.01-5.00	0.00	100.00	100	0.00	33.33	66.67	100
5.01 & Above	5.56	94.44	100	0.00	15.79	84.21	100
Total	**42.71**	**57.29**	**100**	**20.49**	**43.90**	**35.61**	**100**

Table – 7.17b : Type of Floor and Roof by Land Size Category- Tribal villages

Land Size (in acres)	Percentage of Households						
	Floor Type			Roof Type			
	Mud	Concrete	Total	Thatch	Asbestos	Concrete	Total
Landless	39.39	60.61	100	13.64	51.52	34.85	100
0.01-1.00	63.27	36.73	100	23.53	54.90	21.57	100
1.01-2.00	89.36	10.64	100	62.96	22.22	14.81	100
2.01-3.00	50.00	50.00	100	16.67	38.89	44.44	100
3.01-4.00	36.36	63.64	100	27.27	36.36	36.36	100
4.01-5.00	44.44	55.56	100	11.11	44.44	44.44	100
5.01 & Above	26.09	73.91	100	18.18	13.64	68.18	100
Total	**55.00**	**45.00**	**100**	**24.02**	**42.16**	**33.82**	**100**

Source: Computed by the researcher from field data

7.5.12.2 Number of Rooms in the House

Availability of sufficient living space in a house prevents spread of diseases. Thus, number of rooms in a house is also related to health of the members of the family. If the number of rooms is less, the possibility of the spread of communicable diseases become higher, e.g. spread of respiratory ailments, tuberculosis and skin disease is enhanced under such conditions. As is evident from Table 7.18, in both types of villages, majority of the large land owners have more than one room in their houses and vice versa. With increasing size of land holding, the proportion of households having three or more number of rooms increases with minor deviations.

Table – 7.18 : Number of Rooms by Land Size Category

Land Size (in acres)	Percentage of Households With Number of Rooms							
	Non -Tribal villages				Tribal villages			
	1 Room	2 Rooms	3 or More Rooms	Total	1 Room	2 Rooms	3 or More Rooms	Total
Landless	23.47	52.04	24.49	100	21.21	50.00	28.79	100
0.01-1.00	12.12	54.55	33.33	100	34.69	42.86	22.45	100
1.01-2.00	3.57	57.14	39.29	100	11.11	51.85	37.04	100
2.01-3.00	20.00	0.00	80.00	100	0.00	43.75	56.25	100
3.01-4.00	0.00	57.14	42.86	100	0.00	27.27	72.73	100
4.01-5.00	0.00	10.00	90.00	100	11.11	55.56	33.33	100
5.01 & Above	0.00	0.00	100.00	100	4.55	13.64	81.82	100
Total	**14.57**	**45.73**	**39.70**	**100**	**18.00**	**42.50**	**39.50**	**100**

Source: Computed by the researcher from field data.

7.5.12.3 Condition of Ventilation in the House

Ventilation condition in the house is very important for living and is seen in terms of total numbers of doors and windows for proper circulation of air that affects ventilation. Without proper ventilation in a house, probability of illness among the family members increases. Ventilation of the house is associated with incidence of asthma, allergy etcetera. On the other hand, good ventilation reduces the dust mites and moisture level (Wargocki, 2013).

The condition of ventilation in the houses surveyed was personally observed by the researcher while conducting the household survey. It was observed that majority of the households of both types of villages have either good or moderate ventilation. The ventilation is bad in only around 11 and 4 per cent of the households in the non-tribal and tribal villages respectively. These households mostly belong to the landless or small and marginal land owners (Table 7.19).

Table – 7.19 : Condition of Ventilation by Land Size Category

Land Size (in acres)	Percentage of Households with Ventilation							
	Non -Tribal villages				Tribal villages			
	Good	Moderate	Bad	Total	Good	Moderate	Bad	Total
Landless	24.49	55.10	20.41	100	33.33	59.09	7.58	100
0.01-1.00	45.16	54.84	0.00	100	18.37	77.55	4.08	100
1.01-2.00	51.72	44.83	3.45	100	25.93	70.37	3.70	100
2.01-3.00	40.00	60.00	0.00	100	56.25	43.75	0.00	100
3.01-4.00	44.44	44.44	11.11	100	63.64	36.36	0.00	100
4.01-5.00	77.78	22.22	0.00	100	44.44	55.56	0.00	100
5.01 & Above	89.47	10.53	0.00	100	81.82	18.18	0.00	100
Total	**41.50**	**47.50**	**11.00**	**100**	**38.00**	**58.00**	**4.00**	**100**

Source: Computed by the researcher from field data

7.5.12.4 Condition of Cleanliness in the House

Condition of cleanliness is assessed in terms of arrangement of things in the house, sanitation and hygiene etcetera. It is interesting to note that the condition of cleanliness is relatively better in the houses of the tribal villages in comparison the non-tribal villages. While about 12.50 per cent of the houses of the non-tribal villages were observed to have very poor cleanliness, this proportion is as low as 2.50 per cent in the tribal villages. However, in this case also one can observe a clear association between land size holding and cleanliness. The houses with larger size of land holdings have good or moderate type of cleanliness, whereas most of the houses noted under the bad cleanliness category belong to the landless and small and marginal

landowners. The highest proportion (21.43%) of unclean houses is seen among the landless category households of the non-tribal villages (Table 7.20).

Table –7.20 : Condition of Cleanliness by Land Size Category

Land size (in acres)	Percentage of Households with Cleanliness							
	Non -Tribal village				Tribal village			
	Good	Moderate	Bad	Total	Good	Moderate	Bad	Total
Landless	24.49	54.08	21.43	100	31.82	63.64	4.55	100
0.01-1.00	38.71	58.06	3.23	100	18.37	79.59	2.04	100
1.01-2.00	51.72	41.38	6.90	100	14.81	81.48	3.70	100
2.01-3.00	40.00	60.00	0.00	100	56.25	43.75	0.00	100
3.01-4.00	44.44	44.44	11.11	100	54.55	45.45	0.00	100
4.01-5.00	77.78	22.22	0.00	100	44.44	55.56	0.00	100
5.01 & Above	89.47	10.53	0.00	100	86.36	13.64	0.00	100
Total	**40.50**	**47.00**	**12.50**	**100**	**36.00**	**61.50**	**2.50**	**100**

Source: Computed by the researcher from field data.

7.5.13 Location of Dwelling Place

Location of the residential unit has definite implications on human health. Specially, residential units located in the low lying and flood prone areas remain highly susceptible to various types of water borne diseases. As is evident from the two tables on the location of dwelling places in the selected non-tribal and tribal villages (Table 7.21a & 7.21b), a good proportion of the residential units are located in low lying/flood prone area or near water bodies like, river and pond. Some units of the non-tribal villages belonging to the households without any land are also located near garbage dumping area and industrial area, where chances of getting affected by pollutants become very high. The tribal villages, because of their hilly and undulating topographical characteristics, have a lesser proportion of residential units located particularly in the low lying/flood prone area. In fact, characteristically, the tribal villages under investigation like all tribal villages of mid-Indian tribal belt are located far away from the flood prone areas of the plains. Rather, water logging of the low lying areas during the rainy season remains an issue in such areas. Besides, absence of industries in the tribal belt in general and in the sample villages in particular has enabled the population to remain away from industrial pollutants and garbage. As far as the association of residential units by land size category with the type of locations is concerned, it is difficult to conceive any definite pattern, particularly in the tribal villages. However, in the non-tribal villages, one can see some sort of relationship, wherein majority of the large land owners have their residential units away from low

lying and polluting areas and some of the landless families have their residential units in the low lying and polluted areas.

Table –7.21a : Location of Dwelling Place by Land Size Category- Non -Tribal villages

Land Size (in acres)	Percentage of Residential Units Located Near Different Types of Area								
	Flood Prone	Near River	Near Pond	Garbage Dumping	Industrial	Beside Road	Beside Railway	Steep Slope	Total
Landless	15.86	10.34	2.76	1.38	8.97	20.69	21.38	18.62	100
0.01-1.00	46.15	0.00	0.00	0.00	11.54	23.08	11.54	7.69	100
1.01-2.00	51.61	0.00	3.23	0.00	12.90	16.13	16.13	0.00	100
2.01-3.00	50.00	0.00	0.00	0.00	0.00	25.00	25.00	0.00	100
3.01-4.00	54.55	0.00	0.00	0.00	18.18	18.18	0.00	9.09	100
4.01-5.00	15.38	15.38	0.00	0.00	23.08	23.08	0.00	23.07	100
5.01 & Above	14.81	3.70	0.00	0.00	33.33	37.04	11.11	0.00	100
Total	**24.23**	**6.92**	**1.92**	**0.77**	**12.69**	**24.23**	**16.54**	**12.69**	**100**

Source: Computed by the researcher from field data.

Table –7.21b : Location of Dwelling Place by Land Size Category -Tribal villages

Land Size (in acres)	Percentage of Residential Units Located Near Different Types of Area				
	Flood Prone	Near River	Steep Slope	Beside Road	Total
Landless	12.70	39.68	7.93	39.68	100
0.01-1.00	17.95	10.26	20.51	51.28	100
1.01-2.00	14.29	23.81	4.76	57.14	100
2.01-3.00	12.50	37.50	0.00	50.00	100
3.01-4.00	15.38	23.08	0.00	61.54	100
4.01-5.00	22.22	11.11	0.00	66.67	100
5.01 & Above	33.33	19.05	4.76	42.86	100
Total	**17.03**	**26.37**	**8.24**	**48.35**	**100**

Source: Computed by the researcher from field data.

7.5.14 Drinking Water Facility

Availability of safe drinking water is an essential requirement for good health. A large percentage (64.93%) of the households in the non-tribal villages has access to piped water that is supplied through the Government after being properly treated. On the other hand, less than half (48.89%) of the households in the tribal villages have access to such water supply. Use of ground water through hand pumps serves the purpose of a substantial percentage (43.11%) of households in the tribal villages. One fails to notice any relationship between land size holding and access to safe drinking water in either type of villages (Table 7.22).

Plate - 7.10: Water stored in underground tank in Tejgadh village (Tribal area: Chhota Udaipur *taluka*)

Plate - 7.11: Hand Pump in Navalja village (Tribal area: Kavant *taluka)*

Table –7.22 : Drinking Water Facility Type by Land Size Category

Land Size (in acres)	Percentage of Households by Source of Drinking Water							
	Non -Tribal village				Tribal village			
	PW	GW(HP)	WW	Total	PW	GW(HP)	WW	Total
Landless	68.57	18.10	13.33	100	76.71	23.29	0.00	100
0.01-1.00	63.89	30.56	5.56	100	24.07	64.81	11.11	100
1.01-2.00	38.71	25.81	35.48	100	33.33	60.00	6.67	100
2.01-3.00	80.00	0.00	20.00	100	57.89	36.84	5.26	100
3.01-4.00	77.78	11.11	11.11	100	57.14	42.86	0.00	100
4.01-5.00	77.78	11.11	11.11	100	58.33	33.33	8.33	100
5.01 & Above	60.00	15.00	25.00	100	21.74	43.48	34.78	100
Total	**64.93**	**20.38**	**14.69**	**100**	**48.89**	**43.11**	**8.00**	**100**

Source: Computed by the researcher from field data
Note: PW: Piped water, GW: Ground water and WW: Well water.

7.5.15 Availability of Separate Kitchen Space

Availability of space for kitchen is also related to human health. If there is no separate space for kitchen in the house and food is cooked in the living room, then the

smoke generated can cause indoor air pollution and lead to different respiratory diseases. As is clear from Table 7.23, majority of the houses in the non-tribal (58.00%) and tribal (54.50%) do not have a separate space for the purposes of cooking. The average picture however, tends to differ across different land size categories. A clear pattern emerges, where larger the size of land holding, higher is the proportion of households with separate space for the kitchen. This generalization holds true for both types of villages. Thus, maximum percentage of households in both types of villages does not have separate space for kitchen and it is more so among the households with no land or with less land.

Plate - 7.12: Kitchen space in house in Tejgadh village (Tribal area: Chhota Udaipur *taluka)*

Table –7.23 : Availability of Separate Kitchen Space by Land Size Category

Land Size (in acres)	Percentage of Households Having Separate Space for Kitchen					
	Non -Tribal village			Tribal village		
	Yes	No	Total	Yes	No	Total
Landless	32.65	67.35	100	31.82	68.18	100
0.01-1.00	48.39	51.61	100	34.69	65.31	100
1.01-2.00	31.03	68.97	100	55.56	44.44	100
2.01-3.00	20.00	80.00	100	68.75	31.25	100
3.01-4.00	66.67	33.33	100	60.00	40.00	100
4.01-5.00	66.67	33.33	100	55.56	44.44	100
5.01 & Above	78.95	21.05	100	72.73	27.27	100
Total	**42.00**	**58.00**	**100**	**45.50**	**54.50**	**100**

Source: Computed by the researcher from field data

7.5.16 Use of Kitchen Fuel

Traditional cooking fuel creates air pollution with emission of large quantities of smoke containing carbon dioxide, which in turn leads to breathing problem and

diseases related to respiratory system. Unfortunately, in either type of villages, only around one fifth of the households use biogas and LPG for cooking purposes, which are harmless. Households in the tribal villages are relatively better off with regard to the use of wood, as only 22.46 per cent of the tribal households use wood for cooking against 50.78 per cent in the non-tribal villages. However, use of kerosene (22.46%) and dung cake (29.95%) is much higher in the tribal villages in comparison to the non-tribal villages. With regard to variation across land holding size in the use of harmless cooking fuel, one can see a direct relationship. With increasing size of land holding the use of biogas and LPG increases in both types of villages. While majority of the landless and small land owning households depend on kerosene, wood and dung cake, majority of the large land owners make use of modern cooking fuel, particularly LPG (Table 7.24a and 7.24b).

Table –7.24a : Use of Kitchen Fuel by Land Size Category- Non-Tribal villages

Land Size (in acres)	Percentage of Households Using					
	Biogas	**LPG**	**Kerosene**	**Wood**	**Dung Cakes**	**Total**
Landless	0.00	13.04	14.49	60.14	12.32	100
0.01-1.00	1.79	17.86	16.07	50.00	14.29	100
1.01-2.00	0.00	19.51	12.20	58.54	9.76	100
2.01-3.00	0.00	9.09	36.36	36.36	18.18	100
3.01-4.00	4.55	13.64	22.73	40.91	18.18	100
4.01-5.00	0.00	35.00	20.00	25.00	20.00	100
5.01 & Above	0.00	45.45	9.09	30.30	15.15	100
Total	**0.62**	**19.31**	**15.58**	**50.78**	**13.71**	**100**

Source: Computed by the researcher from field data.

Table –7.24b : Use of Kitchen Fuel by Land Size Category - Tribal villages

Land Size (in acres)	Percentage of Households Using					
	Biogas	**LPG**	**Kerosene**	**Wood**	**Dung Cakes**	**Total**
Landless	5.26	18.95	25.26	25.26	25.26	100
0.01-1.00	0.00	4.55	20.45	20.45	54.55	100
1.01-2.00	0.00	12.50	25.00	25.00	37.50	100
2.01-3.00	12.50	18.75	25.00	25.00	18.75	100
3.01-4.00	0.00	25.00	25.00	25.00	25.00	100
4.01-5.00	0.00	60.00	20.00	20.00	0.00	100
5.01 & Above	0.00	100.00	0.00	0.00	0.00	100
Total	**3.74**	**21.39**	**22.46**	**22.46**	**29.95**	**100**

Source: Computed by the researcher from field data.

7.5.17 Possession of Material Assets

An investigation of material assets in possession of the sample households, particularly those which are of direct or indirect utility in maintaining health of the family members, has been attempted in this section. Tabulation of the data pertaining to the material assets have been calculated per household and presented in Table 7.25a and 7.25b. It can be said that every household in the non-tribal villages, has at least one or near to one asset helpful in dissemination of information and knowledge, such as TV (0.75) and mobile (0.78). However, possession of radio (0.28) and computer (0.09) is very less. While possession of assets helpful in transportation like, bicycle (0.53) and motorcycle (0.36) is moderate, possession of animal drawn cart (0.03), tractor (0.08) and car/jeep (0.05) is very poor. Possession of refrigerators (0.22) useful in preserving eatables is highly uncommon. Possessions of the households in the tribal villages are relatively less in comparison to the non-tribal villages. Among the different assets, radio (0.28), TV (0.75), mobile (0.81), refrigerator (0.22), bicycle (0.53) and motorcycle (0.36) are in possession of households of all categories of land size in varying proportion. Of these, TV and mobile is in possession of almost all households. It is however clear that there is a direct relationship of material possessions and the land size holding. In other words, higher the size of land holding, higher is the possession of material assets (Table 7.25a and 7.25b).

Table – 7.25a : Per Household Possession of Material Assets by Land Size Category Non-Tribal villages

Land Size (in acres)	Assets									
	Radio	TV	Mobile	Com puter	Refri gerator	Tractor	Bicycle	Motor cycle	Animal Drawn Cart	Car/ Jeep
Landless	0.13	0.66	0.72	0.04	0.08	0.00	0.44	0.29	0.01	0.03
0.01-1.00	0.16	0.77	0.77	0.00	0.13	0.03	0.55	0.19	0.03	0.00
1.01-2.00	0.21	0.86	0.83	0.03	0.21	0.03	0.48	0.34	0.03	0.03
2.01-3.00	0.60	0.40	0.80	0.00	0.20	0.00	0.60	0.20	0.00	0.00
3.01-4.00	0.56	0.78	0.67	0.00	0.22	0.00	0.56	0.44	0.00	0.00
4.01-5.01	0.89	1.00	1.00	0.33	0.67	0.22	0.67	0.56	0.00	0.11
5.01 & Above	0.84	0.89	0.95	0.47	0.89	0.58	0.89	0.95	0.11	0.26
Total	**0.28**	**0.75**	**0.78**	**0.09**	**0.22**	**0.08**	**0.53**	**0.36**	**0.03**	**0.05**

Source: Computed by the researcher from field data

Table – 7.25b : Per Household Possession of Material Assets by Land Size Category Tribal villages

Land Size (in acres)	Assets									
	Radio	TV	Mobile	Computer	Refrigerator	Tractor	Bicycle	Motor cycle	Animal Drawn Cart	Car/ Jeep
Landless	0.18	0.65	0.77	0.12	0.24	0.00	0.58	0.42	0.00	0.08
0.01-1.00	0.04	0.51	0.76	0.00	0.02	0.00	0.41	0.29	0.00	0.00
1.01-2.00	0.11	0.63	0.70	0.00	0.00	0.00	0.48	0.33	0.00	0.00
2.01-3.00	0.31	0.56	1.00	0.00	0.00	0.00	0.63	0.50	0.00	0.06
3.01-4.00	0.09	0.64	0.91	0.09	0.09	0.09	0.55	0.73	0.00	0.00
4.01-5.01	0.22	1.00	1.00	0.11	0.11	0.11	0.44	0.33	0.00	0.11
5.01 & Above	0.55	0.82	0.86	0.45	0.45	0.45	0.50	0.73	0.09	0.36
Total	**0.19**	**0.64**	**0.81**	**0.10**	**0.15**	**0.06**	**0.51**	**0.43**	**0.01**	**0.08**

Source: Computed by the researcher from field data

7.5.18 Livestock

Livestock like cow, buffalo and goat are used for products like milk, egg and meat. Bull is used for ploughing purposes. Almost half (45.50%) of the households in the non-tribal villages has some kind of livestock, wherein buffalo (0.75) is very common. Possession of cow (0.34), goat (0.24), bull (0.22), donkey (0.01) and chicken (0.07) are very less per household. Possession of livestock in the tribal villages is relatively higher than in the non-tribal villages. More than 60 (61.00%) per cent of the households of these villages own one or other type of livestock. A large percentage (61.00%) of households in the tribal villages has been nurturing domestic animals. Possession of buffaloes (0.80) is very common even in the tribal villages. Other livestock commonly in possession of households of every category of land size are cow (0.48) and bull (0.45). Possessions of goat (0.15), donkey (0.01) and chicken (0.15) are very less and confined mostly to the landless and the small land owning households. It is interesting to note a direct relationship between land size holding and possession of livestock in both types of villages, wherein larger the size of land holding, higher is per household number of livestock (Table 7.26a & 7.26b).

Plate -7.13: Livestock's in Navalja village (Tribal area: Kavant *taluka*)

Table –7.26a : Access to Livestock Assets by Land Size Category - Non -Tribal villages

Land Size (in acres)	% of Households Possessing	Number of Livestock Per Household					
		Cow	Bull	Buffalo	Goat	Donkey	Chicken
Landless	20.41	0.07	0.02	0.19	0.18	0.02	0.03
0.01-1.00	51.61	0.19	0.06	0.68	0.39	0.00	0.00
1.01-2.00	68.97	0.52	0.21	1.10	0.10	0.00	0.07
2.01-3.00	80.00	1.00	0.00	1.60	0.40	0.00	0.20
3.01-4.00	77.78	0.44	0.22	1.44	0.56	0.00	0.44
4.01-5.00	77.78	1.00	0.78	1.67	0.67	0.00	0.00
5.01 & Above	89.47	1.16	1.26	2.16	0.11	0.00	0.21
Total	**45.50**	**0.34**	**0.22**	**0.75**	**0.24**	**0.01**	**0.07**

Source: Computed by the researcher from field data

Table –7.26b : Access to Livestock Assets by Land Size Category -Tribal villages

Land Size (in acres)	% of Households Possessing	Number of Livestock Per Household						
		Cow	Bull	Buffalo	Camel	Goat	Donkey	Chicken
Landless	31.82	0.18	0.11	0.38	0.00	0.17	0.02	0.17
0.01-1.00	79.59	0.49	0.57	0.65	0.06	0.37	0.00	0.14
1.01-2.00	66.67	0.59	0.30	0.52	0.00	0.00	0.00	0.19
2.01-3.00	62.50	0.19	0.31	1.31	0.00	0.00	0.00	0.00
3.01-4.00	72.73	0.64	0.00	1.36	0.00	0.00	0.00	0.00
4.01-5.00	77.78	3.33	3.78	0.56	0.11	0.00	0.00	0.00
5.01 & Above	81.82	0.64	0.36	2.18	0.00	0.00	0.00	0.00
Total	**61.00**	**0.48**	**0.45**	**0.80**	**0.02**	**0.15**	**0.01**	**0.12**

Source: Computed by the researcher from field data

7.5.19 Location of Cattle Shed

Keeping the livestock inside the house for security purpose is common in both types of villages. This practice is expected to directly affect human health. The share of households keeping livestock inside the living area is much higher in the non-tribal villages (53.27%) than in the tribal villages (41.41%). This practice seems to have no relationship with the land size category (Table 7.27).

Table – 7.27 : Location of Cattle Shed by Land Size Category

Land Size (in acres)	Percentage of Households					
	Non -Tribal village			Tribal village		
	Outside House	Inside House	Total	Outside House	Inside House	Total
Landless	47.06	52.94	100	42.86	57.14	100
0.01-1.00	60.00	40.00	100	70.73	29.27	100
1.01-2.00	48.72	51.28	100	63.16	36.84	100
2.01-3.00	20.00	80.00	100	50.00	50.00	100
3.01-4.00	42.86	57.14	100	37.50	62.50	100
4.01-5.00	37.50	62.50	100	85.71	14.29	100
5.01 & Above	43.75	56.25	100	47.83	52.17	100
Total	**46.73**	**53.27**	**100**	**58.59**	**41.41**	**100**

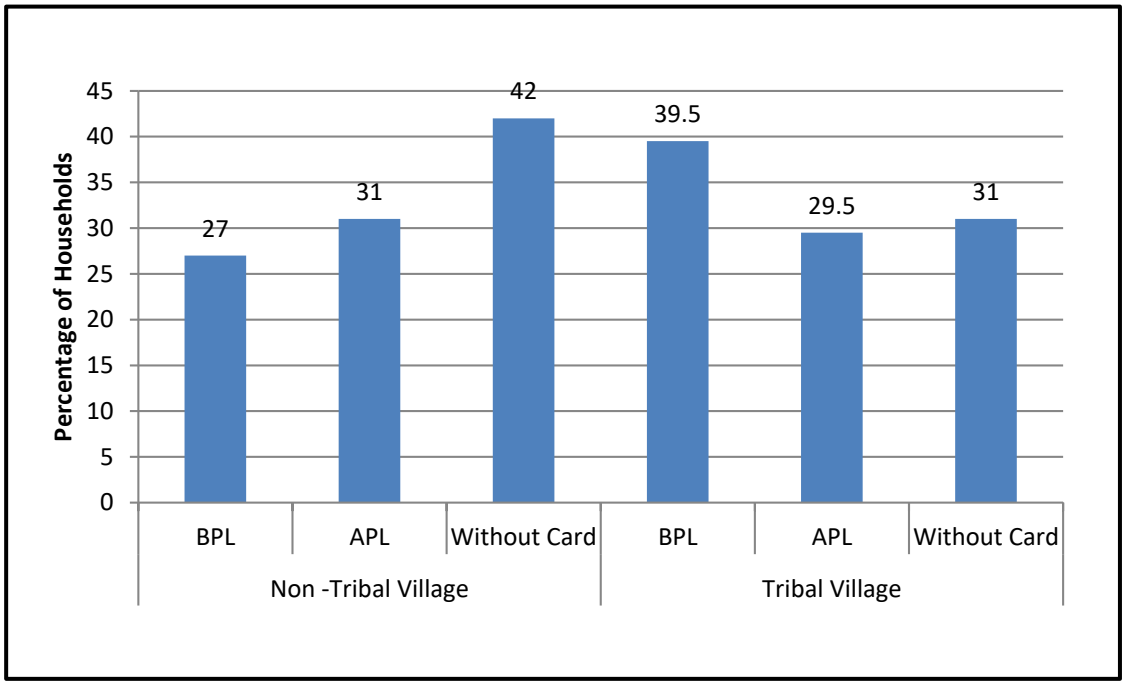
Source: Computed by the researcher from field data.

7.5.20 Types of Cards

With an intention of identifying households below and above poverty line and provide necessary incentives for their alleviation, the households in the rural areas of the country are designated above or below poverty line and provided cards accordingly. From among the sample households of the study villages, a large segment in the non-tribal villages (42%) and the tribal (31%) has not been designated as either BPL or APL. However, from among those designated, the proportion of BPL households is much higher (39.5%) in the tribal villages as compared to the non-tribal (27%), indicating a higher level of poverty in the former (Fig. 7.7). Besides, the proportion of BPL households (39.5%) in the tribal villages is higher than the proportion of APL households (29.5%) and reverse is the case non-tribal villages (27% & 31% respectively). A perusal of the percentage of households by land size categories (Table 7.28) further indicates that there is a direct relationship between land size and poverty level in the tribal villages. However, no clear relationship is

observed in case of the non-tribal villages, may be due to the availability of different sources of income in these villages.

Figure - 7.7 : Type of Card by Land Size Category



Source: Computed by the researcher from field data.

Table – 7.28 : Type of Card by Land Size Category

Land Size (in acres)	Percentage of Households							
	Non -Tribal villages				Tribal villages			
	BPL	APL	Without Card	Total	BPL	APL	Without Card	Total
Landless	20.41	13.27	66.33	100	32.31	26.15	41.54	100
0.01-1.00	32.26	64.52	3.23	100	66.00	16.00	18.00	100
1.01-2.00	41.38	44.83	13.79	100	44.44	22.22	33.33	100
2.01-3.00	40.00	40.00	20.00	100	43.75	37.50	18.75	100
3.01-4.00	55.56	33.33	11.11	100	27.27	36.36	36.36	100
4.01-5.00	11.11	44.44	44.44	100	22.22	55.56	22.22	100
5.01 & Above	21.05	36.84	42.11	100	4.55	59.09	36.36	100
Total	**27.00**	**31.00**	**42.00**	**100**	**39.50**	**29.50**	**31.00**	**100**

Source: Computed by the researcher from field data.

7.6 Conclusion

This chapter focused on the spatial and structural characteristics of the sample villages. The required data were generated through primary investigation to highlight aspects that are directly or indirectly related to the health of the population. For the purpose, information has been gathered from the selected villages of Vadodara district

through primary survey with the help of structured household schedules, personal observations and RRA technique. Random sampling method has been adopted at all levels. The study has considered four predominantly tribal/hilly *talukas* and four non-tribal *talukas* from the plain areas of the Vadodara district. One village each from all the eight *talukas* has been selected as representative sample of the *talukas* for in depth investigation.

A minimum of fifty households from each of the eight sample villages were selected. This was purposefully done to keep the sample size manageable. Depending on the total number of households in the sample villages, the percentage of households surveyed for the study varied between 2.61 per cent in village Vadu to 18.38 per cent in Palasani village. The proportion of population covered varied between 3.48 per cent in village Tejgadh and 19.64 per cent in village Palasani.

The study reveals that large proportions (49%) of the households of the non-tribal and 33.00 per cent households of the tribal are landless. The population of the sample villages belongs to Hindu and Muslim religions. The population belonging to the Muslim religion is highest in the non-tribal villages and majority (58.06%) of the Muslim households is landless. Similarly, the SC households belong to the non-tribal villages and are mostly landless. The incidence of landlessness in the tribal villages is however relatively less (30.52 %).

A large segment (more than 70%) of the population in both types of villages is in the working age group of 15 to 59 years – to be specific 70.39 per cent in the non-tribal and 72.11 per cent in the tribal villages. The proportion of population in the senile age group of 60 and above is also significantly high, which is an indication of higher life expectancy.

There emerges no noticeable association of the BMI indices with land size categories in the tribal villages, while the non-tribal villages display some association. It is clear that in the non-tribal villages, the proportion of underweight population tends to decrease with increasing size of land holdings.

Marital status of the population in the two types of villages is by and large similar with slightly above half the population ever married and around two fifth (42%) of the population unmarried. There is complete absence of never married category people in the tribal villages, while a small proportion (0.21%) of the population of the landless households in the non-tribal villages reported as such. The incidence of death of the spouse is reportedly higher in the non-tribal villages in

comparison to the tribal villages. While separation from the spouse is uncommon in the non-tribal villages, it is reported in small proportion (0.34%) among the landless households of the tribal villages. Any relationship between marital status of the population and land size holding is not noticed.

Study reveals that a very large proportion of the population in both types of villages is engaged as main worker and majority of them are engaged in agricultural activities. While the proportion of the main workers in the non-tribal villages is 79.57 per cent (41.58% cultivators and 37.99 agricultural labourers), it is higher (86.76%) in the tribal villages (49.19% cultivators and 37.57% agricultural labourers). This is indicative of the fact that non-agricultural sectors provide lesser economic opportunities in the tribal villages. Even animal rearing is uncommon in the tribal villages, while 1.79 per cent of workers in the non-tribal villages are engaged in this activity.

It can clearly be seen that with increase in the land holding size the proportion of cultivators increases and the proportion of agricultural labloures decreases. This is true in case of both non-tribal and tribal villages. Workers belonging to all land size categories of the tribal villages earn their bread through all types of activities in varying proportions and/or seasonally migrating out in search of work. Limited scope of the agricultural sector in the village or in the neighbouring villages forces the wage earners to migrate out to in search of agricultural work and casual labour in the urban unorganized sector. On the other hand, in the non-tribal villages, the large land owners generally refrain from any type of wage earning. Rather, a few of them are engaged in business and service sector. Being located nearer to the urban-industrial center of Vadodara, the proportion of workers engaged in the service sector is much higher (10.75%) in comparison to the tribal villages (4.19%) which are located relatively farther away. It is worth noting that the highest proportion workers engaged in business and services in both types of villages belong to the landless households followed by the households with the largest size of holdings.

One can notice a very clear association of level of income with the land size holdings, i.e. larger the size of land holding, higher is the level of income. This is more so in the non-tribal villages, where ten or less per cent of the households without land or with small holdings (less than 2 acres) find a place among the high income category. On the other hand, none of the households with more than 2 acres of land are placed in the low income category. The situation in the tribal villages is however,

slightly different, wherein no clear pattern emerges. But, a large proportion of the landless households in the tribal villages are better off in comparison to their non-tribal village counterparts. While more than 90 (90.82%) per cent landless households in the non-tribal villages fall under medium or low income category, in the tribal villages their proportion is much low (77.28%). However, unlike in the non-tribal villages, no clear cut association between level of income and land size holding can be observed. One can find some households reporting under the low and medium income category despite having large land holdings. This may be due to the quality of land, lack of required agricultural infrastructure and method of cultivation etcetera.

With respect to percentage of households having domestic electricity connection, the state as a whole (96%) lags behind the National average of 97.5 per cent. The sample villages of this study too display a similar situation. The tribal villages however compare better with the National average than the non-tribal villages. But, in both types of villages, the households without electricity connection belong to the smaller size land owners.

Toilet facility is one of the most important requirements for maintaining good health, hygiene and sanitation in any area. Unfortunately however, this facility is not available to all the households of either type of village. One even does not find any association of toilet facility with land size holdings, although a higher proportion of the households in the large size holding category have access to toilets.

There are several Government sponsored schemes pertaining to housing, employment, education and health etcetera for the rural population. However, the surveyed population in the sample villages have availed the benefits of housing under the Sardar Awaas / Indira Awas Scheme only. Although one does not notice any clear pattern by land size holding in availing the facility, the families of every land size category of the tribal villages unlike the families of the non-tribal villages, have availed the facility in varied proportions.

A significant proportion of the houses in both types of villages are either *kutcha* or semi *pucca*. This is more so among the households with no land or small land holdings. Relatively higher proportion of the large land owning households of the non-tribal villages have been able to construct *pucca* houses in comparison to their counter parts of the tribal villages.

Majority of the houses belonging to landless, marginal and small land owning households have mud floors. On the other hand, majority of the houses belonging to

the large land owning households have concrete floors. Similar is also the pattern with reference to the roof of the house. The highest proportion of houses belonging the landless and small and marginal land owning households have either thatched or asbestos roofs. However, in the tribal villages, one does not come across any association between size of land holding and type of floor or roof.

Availability of sufficient living space in a house prevents spread of diseases. For example, spread of respiratory ailments, tuberculosis and skin disease is enhanced due to lack of sufficient living space in the house. Majority of the large land owners in both types of villages, have more than one room in their houses and vice versa. With increasing size of land holding, the proportion of households having three or more number of rooms increases with minor deviations.

The condition of ventilation in the houses surveyed was observed to be either good or moderate in majority of the households of both types of villages. The ventilation is bad in only around 11 and 4 per cent of the households in the non-tribal and tribal villages respectively. These households mostly belong to the landless or marginal and small land owners.

Condition of cleanliness is assessed in terms of arrangement of things in the house, sanitation and hygiene etcetera. It is interesting to note that the condition of cleanliness is relatively better in the houses of the tribal villages in comparison the non-tribal villages. The houses with larger size of land holdings have good or moderate type of cleanliness, whereas most of the houses noted under the bad cleanliness category belong to the landless and marginal and small landowners. The highest proportion (21.43%) of unclean houses is seen among the landless category households of the non-tribal villages.

Location of the residential unit has definite implications on human health. Specially, residential units located in the low lying and flood prone areas remain highly susceptible to various types of water borne diseases. A good proportion of the residential units are located in low lying/flood prone area or near water bodies like, river and pond. Some units of the non-tribal villages belonging to the households without any land are also located near garbage dumping area and industrial area, where chances of getting affected by pollutants become very high. The tribal villages, because of their hilly and undulating topographical characteristics, have a lesser proportion of residential units located particularly in the low lying/flood prone area. In fact, characteristically, the tribal villages under investigation like all other tribal

villages of mid-Indian tribal belt are located far away from the flood prone areas of the plains. Rather, water logging of the low lying areas during the rainy season remains an issue in such areas. Besides, absence of industries in the tribal belt in general and in the sample villages in particular has enabled the population to remain away from industrial pollutants and garbage. As far as the association of residential units by land size category with the type of locations is concerned, it is difficult to conceive any definite pattern, particularly in the tribal villages. However, in the non-tribal villages, one can see some sort of relationship, wherein majority of the large land owners have their residential units away from low lying and polluting areas and some of the landless families have their residential units in the low lying and polluted areas.

Availability of safe drinking water is an essential requirement for good health. A large percentage (64.93%) of the households in the non-tribal villages has access to piped water that is supplied through the Government after being properly treated. On the other hand, less than half (48.89%) of the households in the tribal villages have access to such water supply. Use of ground water through hand pumps serves the purpose of a substantial percentage (43.11%) of households in the tribal villages. One fails to notice any relationship between land size holding and access to safe drinking water in either type of villages.

Availability of space for kitchen is also related to human health. If there is no separate space for kitchen in the house and food is cooked in the living room, then the smoke generated can cause indoor air pollution and lead to different respiratory diseases. Majority of the houses in the non-tribal (58.00%) and tribal (54.50%) villages do not have a separate space for the purposes of cooking. The average picture however, tends to differ across different land size categories. A clear pattern emerges, where larger the size of land holding, higher is the proportion of households with separate space for the kitchen. This generalization holds true for both types of villages. Thus, maximum percentage of households in both types of villages does not have separate space for kitchen and it is more so among the households with no land or with less land.

Traditional cooking fuel creates air pollution with emission of large quantities of smoke containing carbon dioxide, which in turn leads to breathing problem and diseases related to respiratory system. Unfortunately, in either type of villages, only around one fifth of the households use biogas and LPG for cooking purposes, which

are harmless. Households in the tribal villages are relatively better off with regard to the use of wood, as only 22.46 per cent of the tribal households use wood for cooking against 50.78 per cent in the non-tribal villages. However, use of kerosene (22.46%) and dung cake (29.95%) is much higher in the tribal villages in comparison to the non-tribal villages. With regard to variation across land holding size in the use of harmless cooking fuel, one can see a direct relationship. With increasing size of land holding the use of biogas and LPG increases in both types of villages. While majority of the landless and small land owning households depend on kerosene, wood and dung cake, majority of the large land owners make use of modern cooking fuel, particularly LPG.

It can be said that every household in the non-tribal villages, has at least one or near to one asset helpful in dissemination of information and knowledge, such as TV and mobile. However, possession of radio and computer is very less. Possessions of assets helpful in transportation are not very satisfactory.

Possessions of livestock in the tribal villages are relatively less in comparison to the non-tribal villages. Almost half of the households in the non-tribal villages have some kind of livestock, wherein buffalo is very common. Possession of other domestic animals is very less per household in the non-tribal villages. Possession of livestock in the tribal villages is relatively higher than in the non-tribal villages. Here again, possession of buffaloes is very common. Although households of every category of land size is in possession of cow and bull, other domestic animals like goat donkey and chicken are mostly nurtured only by the landless and households with smaller pieces of land, particularly of the tribal villages. It is interesting to note a direct relationship between land size holding and possession of livestock in both types of villages. In other words, larger the size of land holding, higher is number of livestock per household. The share of households keeping livestock inside the living area is much higher in the non-tribal villages than in the tribal villages.

A large segment of households in both types of villages has not been designated as either BPL or APL. Meaning there by a significant proportion of the households in the sample villages has not been issued any type of card. However, from among those designated and issued card, the proportion of BPL card households is much higher in the tribal villages as compared to the non-tribal villages, indicating a higher level of poverty in the former.