

CHAPTER - 5

Adaptation to Environment and Economy

5.1 Adaptation to Environment

In this chapter effort has been drawn up to show the impact of nature (physiography) on the socio-economic as well as cultural environment of forest villagers of the study area. The relief and geomorphology are responsible factor for the development of settlement pattern, population distribution, road and communication, land use, agriculture and other socio-economic activities. In fact, life in this hilly, rugged and dense forests area is tough and quite expensive. To a great extent, these natural parameters/ factors determine the level of economic development as it is clear that, due to ruggedness terrain conditions; there is no scope for better livelihood such as development of large-scale marketing, agricultural farming, communication network system etc. In this connection it can be mentioned that as different physical factors or parameters have its own effective role, which directly and indirectly determines the form, type, location and shape of settlements as well as cultural landscape. Here it has been tried to deals how villagers adapted in different physical situations and obstacles; and physiographic-economic relation in different activities along with separate altitude location of villages.

5.1.1 The physical characteristics of sample villages

There are some parameters which are used to describe the physical character of the sample villages. Since the purpose of the study is to show relation among forest and villagers, so only those physical parameters have been considered into account which has direct relation of the forest related activities. The type of forests, relief and slope, settlement type and site, type of soil around the village, altitude of village, climate etc. are the prime characteristics which have been taken into consideration during the time of field observation.

5.1.2 The site characteristics

The table 5.1 shows the different nature of physical characteristics of sample villages. Locationally, villages are situated in valley slope, inside the forest, beside river bank, on hill slopes and flat hill-tops. Out of 17 villages, 2 have valley sites, 2 are located on hill-slopes, 8 are located inside the forests (core area), and 5 villages are beside the forests and 2 on the hill-tops. Out of the 17 sample villages, 9 villages have scattered type of settlement 2 are linear and rest 6

have compact and semi compact type. The site of the settlement has been the main factor responsible for this type of settlement. The dispersed settlements are sited beside the forest area; besides two settlements is located Buxa hill top such as Adma and Chunabati village. Due to lack of land, settlements inside the forest area are compact and two linear settlements also formed along unmetalled road inside the forest.

Table 5.1 Physical characteristics of the sample villages.

Sl. No.	Forest village	Site of the Settlement	Type of settlement	Type of natural vegetation	Valley type	Soil type	Relief	Altitude
1	Lehra	B.F	SCA	P.F	-	Sandy clay	EV	156 m
2	Suni	B.F	SCA	P.F	FLA	Sandy clay	EV	156 m
3	Garo Basti	W.F	COM	STD	-	Sandy clay	EV	202 m
4	Gadhadhar	B.F	SCA	PF	WID	Silt clay	EV	212 m
5	Poro	W.F	COM	STD	-	Sandy clay	UND	235 m
6	Nimati and Dabri	W.F	SCA	STD	-	Silt clay	UEV	235 m
7	Gangutia H.A	W.F & V.S	COM	STD	NAR	Sandy rocky	UND	306 m
8	Adma H.A	H.T	SCA	STD	-	Sandy rocky	HRUG	846 m
9	Raimatang H.A	H.S	SCA	STD		Sandy rocky	RUG	487 m
10	Bhutri forest basti H.A	H.S	LIN	STD	NAR	Sandy clay	UND	367 m
11	Gudamdabri	B.F	LIN	RF	-	Sandy clay	EV	179 m
12	Chunabati H.A	H.T	SCA	STD	-	Sandy rocky	HRUG	887 m
13	Bhutiabasti	W. F and R.B.A	COM	RF	FLA	Sandy Rocky	UEV	256 m
14	Sankosh	W.F and V.S	SCA	STD and RF	WID	Sandy loam	UND	312 m
15	Lapraguri	W.F	COM	PF	-	Sandy clay	EV	257 m
16	Santrabari H.A	W.F	SCA	STD	-	Sandy rocky	UND	467 m
17	Balapara	B.F	COM	PF	-	Sandy clay	EV	233 m

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017).

Note: Settlement site: B.F=Beside forests, W.F=Within forests, H.T=Hill top, H.S=Hill slope, R.B.A=River bank area, V.S=Valley slope.

Type of settlement: LIN=Linear settlement, COM=Compact settlement, SCA=Scattered settlement.

Type of natural vegetation: STD=Sub-tropical moist deciduous, S.F=Savannah forests, P.F = Plain forests, R.F=Riverine forests.

Valley type: WID=Wide valley, NAR=Narrow valley, FLA: Flat valley.

Relief: EV=Even relief, UEV=Uneven relief, UND=Undulating plain relief, RUG=Rugged relief, HRUG= Highly rugged relief.

5.1.3 The characteristics of natural vegetation

The natural vegetation cover acts as rain banker and rain holder of the earth. It is mentioned that the trees also act like millions of tiny dams and check the flow of water like a barrage (Khullar, 2002). The study area covered by huge dense forest of evergreen, deciduous, coniferous, savannah and other forest. The sample villages are located in the areas covered by four types of vegetation regimes, namely, the sub-tropical moist deciduous, savannah forests, plains forests, riverine forests. There are 10 villages in the zone of sub-tropical deciduous type, 5 villages are in the zone of plain forests, and 3 are in the zone of riverine forests and left are in the zone of savanna moist type and mix type.

The pattern of altitude-vegetation is coincidence according to relief height (table-5.1) as the sub-tropical forests such as sal, teak, sisoo, khair etc. are found to occur at a height of above 500 m and the villages around this are Adma, Chunabati, Bhutri, Gangutia of Buxa hill forests. In the middle and lower altitude (below 500 m), there are villages having plain forest and riverine forests vegetation and it is found within 8 villages that belong to the trees such as semal, khair, asathwa, neem, amlaki, radha chura, debdaru and villages namely Sankosh, Lapraguri, Balapara. Besides mixed and savanna forests are covered around the villages that located in the lower flat surface namely Gudamdabri, Lerha, Suni, Garo Basti etc.

5.1.4 The soil characteristics

The other physical aspect which influences the forest and forest village is the soil. The soil is the primary factor of land use in any region. The formation of soil is influenced by the local climate and topography. The agriculture and agricultural pattern is also depended on the physical and chemical characteristics of soil as well as altitude, thickness and distribution of soil. In order to know the relationship between the characteristics of soil and land use pattern, soils have been studied on the basis of types and composition status. The locations of villages, altitude, nearby flat surface and valley areas of villages' have been selected randomly to observe these characteristics. While the type of soil in the valley and nearby area of the villages' remains almost the same, there are obvious differences in their depth and erosional status at different locations. The soils are generally sandy dominated with mixtures of boulder, rock, clay and silt in varying degree. The sandy clay soil is found in 8 village locations, whereas, sandy rocky soil is available in 6 villages. There are 2 villages with silt clay and sandy loam soils in one village (table 5.1). Most of the valley soils are found steep hard sandy rocks soil. The high altitude soil

in these villages' is sandy rocky and loam. The average depth of the soils is between 10 and 25 cm. but it varies from less than 10 cm. in high altitude soil to more than 40 cm. in the flat plain surface and river valley soil. The erosional status also shows the marked difference between valley and high locations. In valleys, moderate to high erosion is noticed. There are only 5 villages having no erosion of soil in their valley portion while all other villages' located in valley suffers from severe erosion. In case of highland locations, however, 4 villages (Chunabati, Adma, Raimatang, Bhutri village) have severe erosion while 2 (Ganguitia, Santrabari) villages have moderate erosion.

5.1.5 Pattern of land use

Man is a bio-geographical factor and has greatly modified the natural landscape. Therefore, it is essential to deal with both, the physical as well as cultural landscape before any enquiry is made regarding the use of the land (Giri, 1976). Land use pattern directly or indirectly controlled by relief. In this context it can be said that the relief indirectly influences farming by modifying the climate and by affecting the degree of accessibility, the case of cultivation and the consequential changes in soil, erosion and patterns (Singh, 1974). Also the type of soil and thickness, size and distribution of arable land, selection of crops ultimately depended on the relief. The land use pattern of the villages is important in order to know their adaptation with relief, dense forests environment and other works such as cultivation as well as the land lying unused and other practice etc. The type of land use pattern presented in table 5.2. There are large areas under the categories of cultivable waste and area not capable for cultivation and it is apparent among highland village area.

Table 5.2 Land use pattern of sample villages.

Sl. No.	Forest village	Area under different land use categories (Village-wise in acre), 2015								
		Food crop		Horti-culture		Cultivable waste land		Uncultivated land	Barren land	Total land (acre)
		IR	UIR	IR	UIR	IR	UIR			
1	Lehra	-	14.42	-	2.57	-	3.21	-	-	20.20
2	Suni	-	19.27	-	2.21	-	4.50	2.1	-	28.08
3	Garo Basti	-	57.78	-	4.51	-	8.23	-	1.3	71.82
4	Gadhadhar	-	68.19	-	2.12	-	3.34	2.45	-	76.10
5	Poro	-	51.29	-	3.45	-	2.57	1.09	-	58.40
6	Nimati and Dabri	-	70.91	-	4.13	-	4.98	-	2.10	82.12
7	Gangutia H.A	-	23.47	-	17.02	-	3.61	3.95	2.80	50.85

8	Adma H.A	-	17.89	-	14.62	-	3.92	2.87	1.79	41.09
9	Raimatang H.A	-	19.16	-	9.59	-	4.67	3.23	1.99	38.64
10	Bhutri forest basti H.A	-	12.04	-	11.31	-	3.93	2.59	2.17	32.04
11	Gudamdabri	-	53.75	-	2.23	-	5.12	-	3.27	64.37
12	Chunabati H.A	-	15.71	-	10.45	-	4.34	-	2.98	33.48
13	Bhutiabasti	-	11.39	-	8.94	-	3.07	-	4.31	27.71
14	Sankosh	-	65.85	-	8.67	-	4.32	-	-	78.84
15	Lapraguri	-	27.42	-	5.88	-	6.96	-	2.21	42.47
16	Santrabari H.A	-	36.73	-	23.67	-	2.78	1.26	2.89	67.33
17	Balapara	-	19.02	-	2.83	-	3.11	-	-	24.96
Total		-	584.29		134.2		72.66	19.54	27.81	838.50
%			69.68		16.00		8.67	2.33	3.32	100.00

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017).

From the above table it is noticed that the majority of lands uses were recorded under food crop and it accounted for about 69.68 % of the total owned land of sample household. The higher proportion of land under agriculture means it shows better scope for livestock rearing. In case of horticulture field, the land holding size has been recorded 134.20 acre (16 %), for cultivable waste land, it is 72.66 acre (8.67 %); for uncultivated land and barren land it is observed 19.54 acre (2.33 %) and 27.81 acre (3.32 %) respectively.

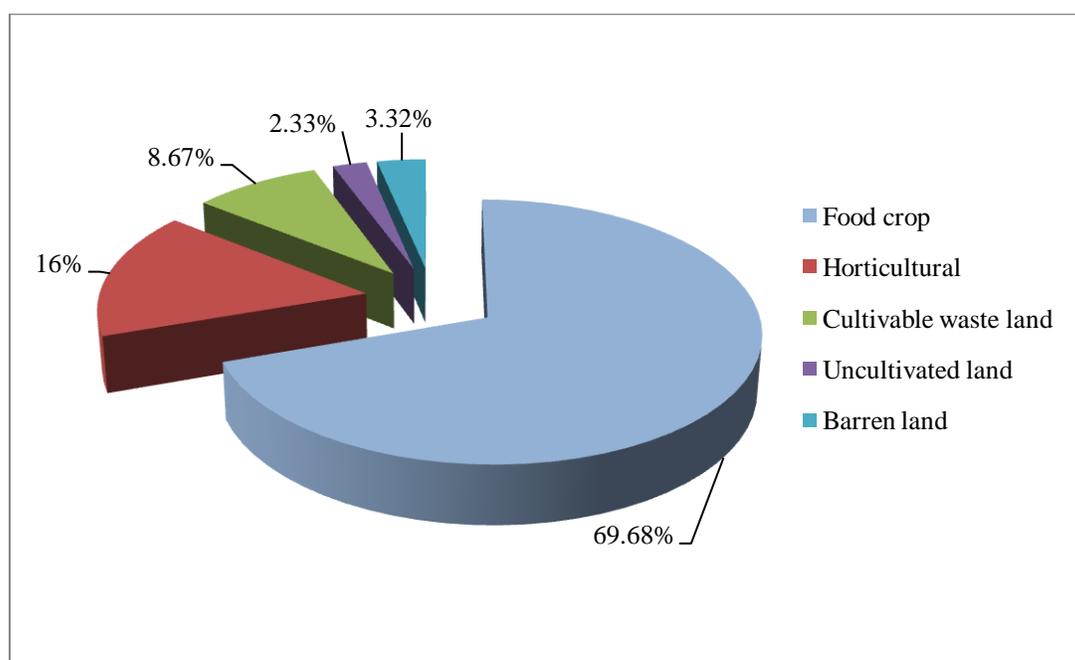


Figure 5.1 Land use pattern, 2017

The uncultivated land mainly observed in surrounding of the high altitude forest villages as well as barren land noticed in low land or plain area villages and villagers referred that along rivers side sandy land and stony waste land as barren land. The horticulture practice is found more in number among high altitude villagers such as Amda, Bhutri, Chunabati, Santrabari etc. and comparatively less practice noticed in plain area villagers. It is totally opposite in case of food crop practice.

5.1.6 Food habit

The main food of the Meches of Gudamdabri and Balapara villagers, are rice, fish, goat's meat, duck, fowl, pigeon, buffalo meat, pig and a variety of vegetables. They also drink milk and used mustard oil for cooking food. The blood of pig is cooked with vegetable curry. 'Marrow' is obtained from bones of pig, deer and goats. 'Kharodoi-bodai' is used for flavouring curries. It is made from the twigs of one kinds of pulse called 'kalai' and mustard plant, the roots of the cotton plant and root of plantain trees. These are well dried and burnt; the ashes (Kharodoi) are put in to a bamboo basket called 'Khardoi-Kholong' and water is poured over the ashes. This water drips through into a vessel and is called Khardoi-bedai. Roselle is eaten and is cooked with khardoi-bedai, with diminishes the acid taste. Along with the rice, they eat various types of wild edible, tubers, green leaves, fruits, especially Jackfruit.

Bhutias live in Chunabati, Adma and Buxa areas of this study area. The staple food of the Bhutias are rice, pork, beef, ducks, fowls, deer, barley, marua, fish, both dried and fresh, butter, cheese, Indian corn, and vegetables of all sorts. Oranges, pineapples, jack, plantains and other fruits are eaten. Milk is seldom drunk even by the sick. There is a marked preference for dried fish, pork and beef; the latter is often cut into strips and dried, and is used from day to day. Marrow, whenever obtainable, is used. In this case bones are broken and marrow is taken from them and is cooked eaten with vegetables. Blood is also used as an item of food, especially the blood of pig. It is mixed with meat finely minced which is made into 'sausages'. Along with these they consume different types of fruits, roots, leaves from the nearby forest.

The main food of the Ravas of Suni, Ghadhar, Poro (N), Garo Bsati villagers' is rice. Fish of every kind is eaten; also flesh of pig, deer, goat, ducks, fowls and pigeons. Large grasshoppers and locusts are also their food. Vegetables of all kinds are eaten. Indian corn is grown by the Ravas and is eaten raw, when tender or is boiled, roasted or parched when too ripe. Milk is drunk by few Ravas. They enjoy curd and eat it with beaten rice. The blood of pig is cooked up with

vegetable curry and is much relished. Mustard oil is used for making curries. Vegetable curries are cooked with 'hari and cheka'.

The main staple food of Nepalese's of Gangutia, Raimatang, Sankosh, Santrabari, Bhutia basti, Bhutri forest basti villagers' is rice and wheat; besides they consume different vegetables, roots and tubers, tender stem of bamboos and mushrooms that are collected from the forest. They also eat meat, generally goat, cow, pig, poultry and fish of all kinds. Women eat the same food as men and there are no restrictions on the widows of any kind. Oranges, mangos, bananas, apples, and other fruits are eaten. All Nepalese community people use mustard oil food, sometimes cooked in butter or lard. The men use tobacco to smoke differently. Both men and women were addicted to alcohol consumption.

Santals of Lehra and Gadhadhar villagers' are animal eaters for a long time. Their usual food includes rice, frogs, snakes, rats, earthworms, shells and snails. Now rice and wheat is their main food. They also eat meat, generally goat, pig, poultry and fish of all kinds. Santals prefer having 'Tari and Haria' wine (one kinds of country wine made of decaying rice) on the various occasions. They also consume wine, brandy, arrack and toddy, which are available from the nearby towns. They consume pulses, roots and tubers which are available in the forest, and the vegetables that are available in the local markets and which are grown by them, same times they purchase the vegetables that are all available in the local market. They also consume non-alcoholic drinks such as coffee, tea and milk. Men smoke cigarettes and beedies.

The Oraons of Garo basti and Gadhadhar are non-vegetarians; they are animal eaters for a long time. Their usual food includes rice, wheat, frogs, snakes, earthworms, shells and snails. Besides they consume pulses, roots and tubers which are available in the forest, and the vegetables that are common in the local area and produce by locals. Oraons consumes local drinks such as 'Tari' and 'Haria' wine (one kind of local wine made of decaying rice) on the occasions. Men and women both smoke tobacco, cigarettes and beedies.

5.1.7 Fuel used

It is observed from the table (table 5.3) that villagers are using forests wood, dry benches, leaves as fuel for cooking. About 99.20 % of the households are using wood for cooking which collected from the forests. And almost all of household of Lehra, Suni, Poro, Nimti & debri, Adma, Raimatang, Butri forest basti, Gudamdabri, Chunabati, Lapraguri and Balapara villagers are using wood as fuel for cooking and other purpose. Only six of the all sampled household

(0.80 %) are using gas as fuel for cooking and for other purpose they are also using forest wood as fuel. In this context it is reported that 61.60 % of the total village energy requirement was met by wood fuel of forests, during 1992-93 and 30.35 % met by other commercial fuel and bio-fuel contributed only 8.05 % (Natarajan, 1996). The table 5.3, below shows that in the study area majority of the villagers' are depending on the nearby forests for cooking and other purpose.

Table 5.3 Fuel used for cooking (households-wise).

Sl. No.	Forest village	Fuel used for cooking (Sampled households)					Total sampled households
		Forest wood	Coal	Kerosene	Gas	Cow Dung	
1	Lehra	22 (100)	-	-	-	-	22 (100%)
2	Suni	28 (100)	-	-	-	-	28 (100%)
3	Garo Basti	71 (98.61)	-	-	1 (1.39)	-	72 (100%)
4	Gadhadhar	61 (96.83)	-	-	2(3.17)	-	63 (100%)
5	Porro	61 (100)	-	-	-	-	61(100%)
6	Nimati and Dabri	68(100)	-	-	-	-	68 (100%)
7	Gangutia H.A	54 (98.18)	-	-	1 (1.82)	-	55 (100%)
8	Adma H.A	55 (100)	-	-	-	-	55 (100%)
9	Raimatang H.A	55 (100)	-	-	-	-	55 (100%)
10	Bhutri F. basti H.A	45 (100)	-	-	-	-	45 (100%)
11	Gudamdabri	63 (100)	-	-	-	-	63 (100%)
12	Chunabati H.A	54 (100)	-	-	-	-	54 (100%)
13	Bhutiabasti	29 (96.67)	-	-	1(3.33)	-	30 (100%)
14	Sankosh	59 (98.33)	-	-	1 (1.67)	-	60 (100%)
15	Lapraguri	47 (100)	-	-	-	-	47 (100%)
16	Santrabari H.A	64 (98.46)	-	-	1 (1.54)	-	65 (100%)
17	Balapara	35 (100)	-	-	-	-	35 (100%)
Total		871 (99.20)			7 (0.80)		878 (100%)

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017)

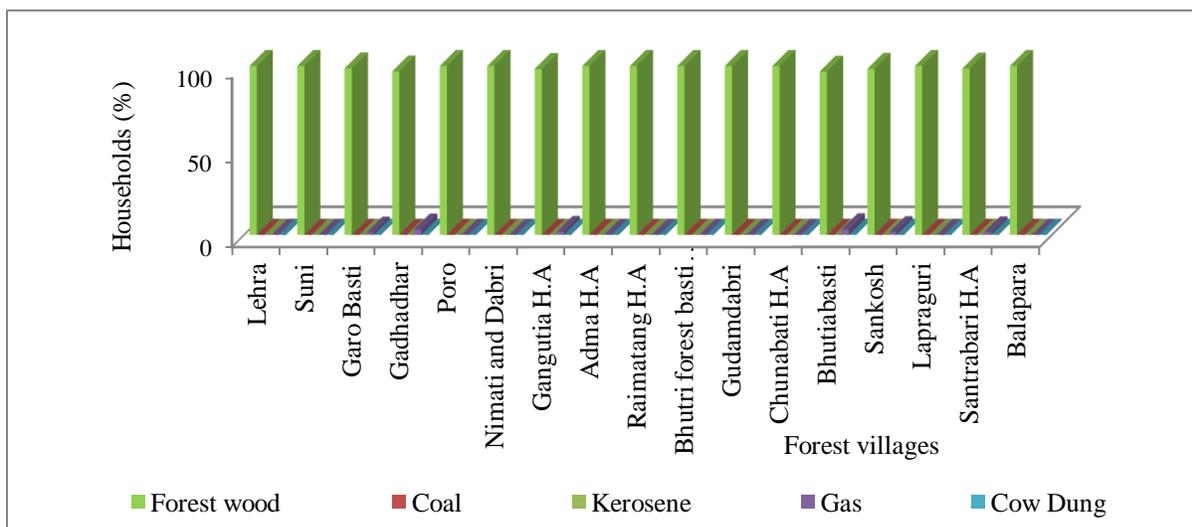


Figure 5.2 Fuel used of households (village-wise).

Table 5.4 Fuel wood used for cooking (kg).

Sl. No.	Forest village	Fuel wood for domestic use (kg)			
		Total surveyed households	Total fuel demand in a month	Fuel wood from forest	Fuel wood from other sources
1	Lehra	22	3300	3300	-
2	Suni	28	4620	4620	-
3	Garo Basti	72	12960	12780	180
4	Gadhadhar	63	10395	10065	330
5	Poru (N)	61	10065	10065	-
6	Nimati and Dabri	68	11220	11220	-
7	Gangutia H.A	55	11550	11340	210
8	Adma H.A	55	8250	8250	-
9	Raimatang H.A	55	9075	9075	-
10	Bhutri forest basti H.A	45	8100	8100	-
11	Gudamdabri	63	9450	9450	-
12	Chunabati H.A	54	8910	8910	-
13	Bhutiabasti	30	4500	4350	150
14	Sankosh	60	11700	11505	195
15	Lapraguri	47	7050	7050	-
16	Santrabari H.A	65	8775	8640	135
17	Balapara	35	5775	5775	-
Total		878 (100 %)	145695	144495 (99.18 %)	1200 (0.82 %)

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017).

A total of 145.695 ton of fuel wood (table 5.4) was used by the study villagers in a month and of this 144.495 ton of wood originated from the contiguous forest and rest from non-forest sources.



Plate 5.1 Fuel woods collected for consumption by the villagers in Gangutia village.

Beside fodder, green manure, dry branches etc. were extracted from forests source in a daily or weekly basis throughout the year. All the villagers used fuel wood extracted from the forest where 99.18 % fuel used from forest wood in a month by the villagers and only 0.82 % of fuel is used from different sources such as gas, cow dung and others. This suggests that the most important forest product used by the villagers is forests' wood, whereas the other products were not regularly used throughout the year except rainy season.

5.1.8 Water facilities

Primarily the villagers depend on their traditional water resource such as river, natural reservoir and spring. During winter and summer season they face difficulty to get water, since many of the springs, rivers and reservoirs are dried up. The table below explains the source of available water facilities based on village wise.

Table 5.5 Availability of water facilities (village-wise).

Sl. No.	Forest village	Source of water facilities (Sampled house hold)							Total sampled households
		Canal	Well	Tap	Spring and Pipe line	River	Pond	Tube well	
1	Lehra	-	5 (22.73)	-	-	-	-	17 (77.27)	22 (100%)
2	Suni	-	4 (14.29)	-	-	-	-	24 (85.71)	28 (100%)
3	Garo Basti	-	8 (11.11)	-	-	-	-	64 (88.99)	72 (100%)
4	Gadhadhar	-	6 (9.52)	-	-	-	-	57 (90.48)	63 (100%)
5	Poro	-	14 (22.95)	-	-	-	-	47 (77.05)	61 (100%)
6	Nimati and Dabri	-	11 (16.18)	-	-	-	-	57 (83.82)	68 (100%)
7	Gangutia H.A	-	9 (16.36)	-	40 (72.72)	-	-	6 (10.91)	55 (100%)
8	Adma H.A	-	-	-	55 (100)	-	-	-	55 (100%)
9	Raimatang H.A	-	-	-	55 (100)	-	-	-	55 (100%)
10	Bhutri forest basti H.A	-	45 (100)	-	-	-	-	-	45 (100%)
11	Gudamdabri	-	7 (11.11)	-	-	-	-	56 (88.88)	63 (100%)
12	Chunabati H.A	-	-	-	54 (100)	-	-	-	54 (100%)
13	Bhutiabasti	-	-	-	30 (100)	-	-	-	30 (100%)
14	Sankosh	-	6	-	-	-	-	54	60 (100%)

			(10)					(90)	
15	Lapraguri	-	-	-	-	-	-	47 (100)	47 (100%)
16	Santrabari H.A	-	8 (12.31)	-	-	-	-	57 (87.69)	65 (100%)
17	Balapara	-	-	-	-	-	-	35 (100)	35 (100%)
Total		-	123 (14.01)		234 (26.65)	-	-	521 (59.34)	878 (100%)

H.A= High Altitude, (Prepared by the researcher based on field survey, 2017).

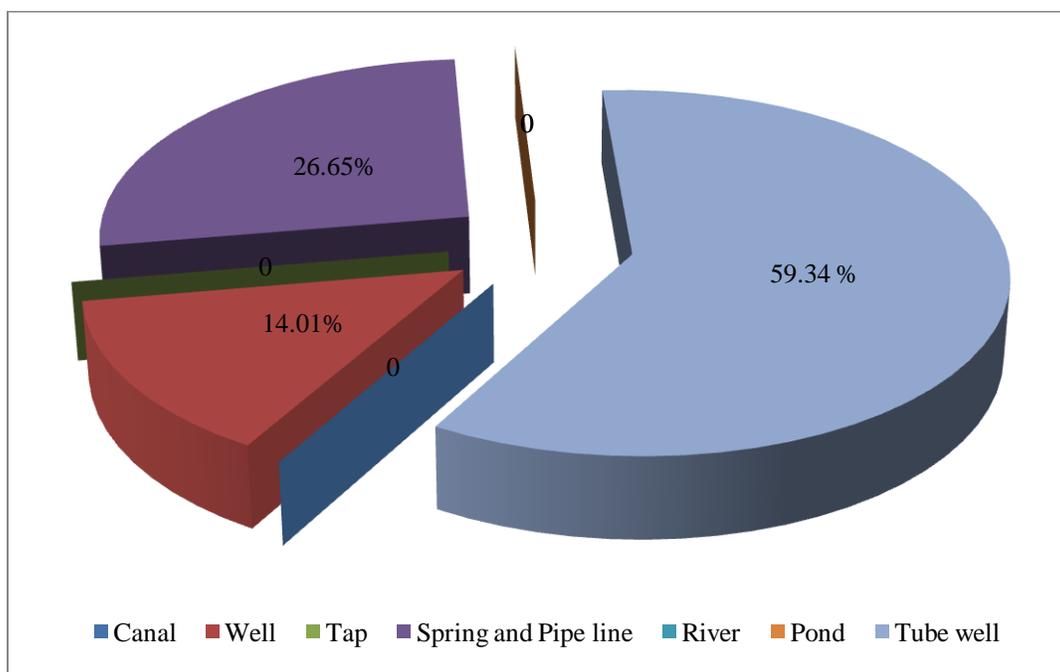


Figure 5.3 Source of water facilities used by households.

The table 5.5 shows that all villages are using tube well water, spring and pine line water and well water by 59.34 %, 26.42 % and 14.24 % respectively. In high altitude and hill villages all households are depending on spring and pipe line for water facilities, such as Adma, Chunabati, Raimatang, Santrabari and Bhutia basti. Above 80 % households of nine villages are having water facilities by tube well and such villages are Balapara, Santarabari, Sankosh, Gudamdabri etc. So above table shows that very remote villages, high altitude and hilly area villages are not getting protected water for drinking and other domestic purpose. Even there is no water tank or canal facility.



Plate 5.2 Pipe line water supply at Chunabati village.

5.1.8.1 Proximity of water sources

The table 5.6 shows that contiguity of source water based on the sampled household of villagers. Out of the 878 households, about 822 (93.62 %) households (taking both of street pipe and street tube well or well) are having proximity of source of water from outside. Only 56 households (6.38 %) having water provision within the house premise and surrounding.

Table 5.6 Proximity of source of water facilities (Sampled households).

Sl. No.	Forest village	Premises of House	Out side		Total sampled households
			Street pipe	Street Tube well or well	
1	Lehra	3 (13.64)	-	19 (86.36)	22 (100%)
2	Suni	-	-	28 (100)	28 (100%)
3	Garo Basti	13 (18.06)	-	59 (81.94)	72 (100%)
4	Gadhadhar	7 (11.11)	-	56 (88.89)	63 (100%)
5	Poro (N)	2 (3.28)	-	59 (96.72)	61(100%)
6	Nimati and Dabri	15 (32.06)	-	53 (77.94)	68 (100%)
7	Gangutia H.A	-	55(100)		55 (100%)
8	Adma H.A		55(100)		55 (100%)
9	Raimatang H.A		55(100)		55 (100%)
10	Bhutri F. basti H.A		-	45 (100)	45 (100%)
11	Gudamdabri	2 (3.17)	-	61 (96.83)	63 (100%)
12	Chunabati H.A		54 (100)		54 (100%)
13	Bhutiabasti		30 (100)		30 (100%)
14	Sankosh	3 (5)	-	57 (95)	60 (100%)
15	Lapraguri	2 (4.26)	-	45 (95.74)	47 (100%)
16	Santrabari H.A	5 (7.69)	-	60 (92.31)	65 (100%)
17	Balapara	4 (11.43)	-	31 (88.57)	35 (100%)
Total		56 (6.38 %)	249 (28.36 %)	573 (65.26 %)	878 (100 %)

H.A= High Altitude, (Prepared by the researcher based on field survey, 2017)

The villagers' of Gangutia, Adma, Raimatang, Chunabati, Bhutia basti, Suni, and Bhutri forest Basti having water provision from outside. Only 15 households (32.06 %) of Nimti and Dabri have the proximity of water source inside the house which is more among all the villages.

5.1.8.2 Water storage facilities

Polluted water storage and consume is the prime causes of unhealthy and water related disease of the villagers. The households in the study area store the water in cistern, drum, utensil, bucket and pitchers. The table 5.7 shows village wise water storage facilities of the households.

Table 5.7 Water storage facilities (village-wise).

Sl. No.	Forest village	Cistern	Drum	Utensil	Bucket	Pitcher	Total sampled households
1	Lehra	-	-	7 (31.82)	11 (50)	4 (18.18)	22 (100 %)
2	Suni	-	-	11 (39.29)	15 (53.57)	2 (7.14)	28 (100 %)
3	Garo Basti	-	15(20.83)	7 (9.73)	50 (69.44)	-	72 (100 %)
4	Gadhadhar	-	-	10 (15.87)	47 (74.60)	6 (9.52)	63 (100 %)
5	Poro (N)	-	11 (18.03)	4 (6.56)	37 (60.66)	9 (14.75)	61(100 %)
6	Nimati and Dabri	-	16 (23.53)	-	44 (64.71)	8 (11.76)	68 (100 %)
7	Gangutia H.A	-	51 (92.73)	-	4 (7.27)	-	55 (100 %)
8	Adma H.A	-	55 (100)	-	-	-	55 (100 %)
9	Raimatang H.A	-	55 (100)	-	-	-	55 (100 %)
10	Bhutri forest basti H.A	-	35 (77.78)	-	10 (22.22)	-	45 (100 %)
11	Gudamdabri	-	-	3(4.76)	46 (73.02)	14 (2.19)	63 (100 %)
12	Chunabati H.A	-	54 (100)	-	-	-	54 (100 %)
13	Bhutiabasti	8 (26.67)	22 (73.33)	-	-	-	30 (100 %)
14	Sankosh	-	-	-	55 (91.67)	5 (8.33)	60 (100 %)
15	Lapraguri	-	-	-	39 (82.98)	8 (17.02)	47 (100 %)
16	Santrabari H.A	4 (6.15)	51(78.46)	-	8 (12.31)	2 (3.07)	65 (100 %)
17	Balapara	-	-	-	32 (91.43)	3 (8.57)	35 (100 %)
Total		12 (1.37 %)	365 (41.57 %)	42 (4.78 %)	398 (45.33 %)	61 (6.95 %)	878 (100 %)

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017).

Out of the 878 households, about 398 households (45.33 %) and 365 households (41.57 %) are used buckets and drums as water storage facilities respectively. Only about 6.95 %, 4.78 %, and 1.37 % households are using pitcher, utensil and cistern to store collected water. In village wise figure, it has been mentioned that in high altitude hill villages' 90 to 100 % villagers followed drums to store water since they have lot of scarcity of water and only within a particular time water has been supplied through pipe line. Such villagers are of Gangutia (92.73 %), Adma (100 %), Raimatang (100 %), and Chunabati (100 %). For Chunabati and Adma villages', water has been taken through water pipe line from the Bhutan hill water reservoir.

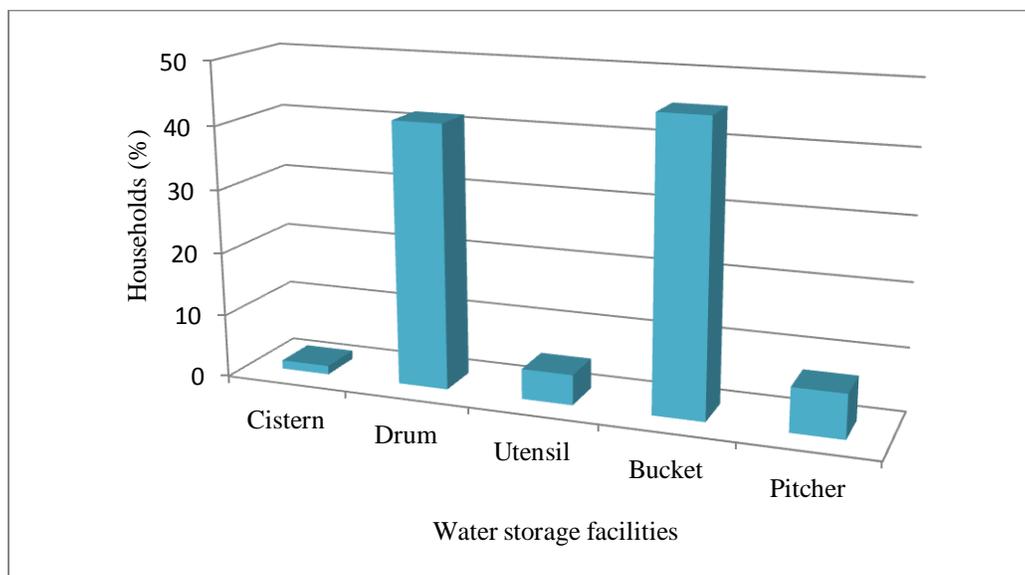


Figure 5.4 Water storage facilities.

5.1.9 House type

The table 5.8 shows the type of houses of 878 households in the study area. It is observed from the table that majority of the households that is about 770 household (87.70 %) are living in the wood and tin house. Only about 58 (6.61 %) and 50 (5.69 %) households are living in the thatched and pacca house. Due to easy and good availability of wood, most of the house used wood to make walls, windows, door even stage like floor or platform for environmental adaptation. For roof, villagers used tin which has long serviceable than wood. The number of pacca house are seen more than others in the Lera (68.18 %) and Suni (82.14 %) village, because only this two forest village has taken under 'Gitanjali Project' through which beneficiaries got pacca house. There is no stone and tiled house observed in the study village.

Table 5.8 Types of house (village-wise).

Sl. No.	Forest village	Stone & Tin	Wood and Tin	Pucca (concrete with tin)	Thatched and wood	Tiled	Total sampled households
1	Lehra	-	7 (31.82)	15 (68.18)	-	-	22 (100 %)
2	Suni	-	5 (17.86)	23 (82.14)	-	-	28 (100 %)
3	Garo Basti	-	65 (90.28)	-	7 (9.72)	-	72 (100 %)
4	Gadhadhar	-	45 (71.43)	-	18 (28.57)	-	63 (100 %)
5	Poro (N)	-	57 (93.44)	4 (6.56)	-	-	61(100 %)
6	Nimati and Dabri	-	61(89.71)	-	7 (10.29)	-	68 (100 %)
7	Gangutia H.A	-	55 (100)	-	-	-	55 (100 %)

8	Adma H.A	-	51 (92.73)	-	4 (7.27)	-	55 (100 %)
9	Raimatang H.A	-	47 (85.45)	-	8 (14.55)	-	55 (100 %)
10	Bhutri forest basti H.A	-	45 (100)	-	-	-	45 (100 %)
11	Gudamdabri	-	58 (92.06)	-	5 (7.94)	-	63 (100 %)
12	Chunabati H.A	-	52 (96.30)	-	2 (3.70)	-	54 (100 %)
13	Bhutiabasti	-	30 (100)	-	-	-	30 (100 %)
14	Sankosh	-	53 (88.33)	4 (6.67)	3 (5)	-	60 (100 %)
15	Lapraguri	-	47 (100)	-	-	-	47 (100 %)
16	Santrabari H.A	-	61 (93.85)	4 (6.15)	-	-	65 (100 %)
17	Balapara	-	31 (88.57)	-	4 (11.42)	-	35 (100 %)
Total			770 (87.70 %)	50 (5.69 %)	58 (6.61 %)		878 (100 %)

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017).

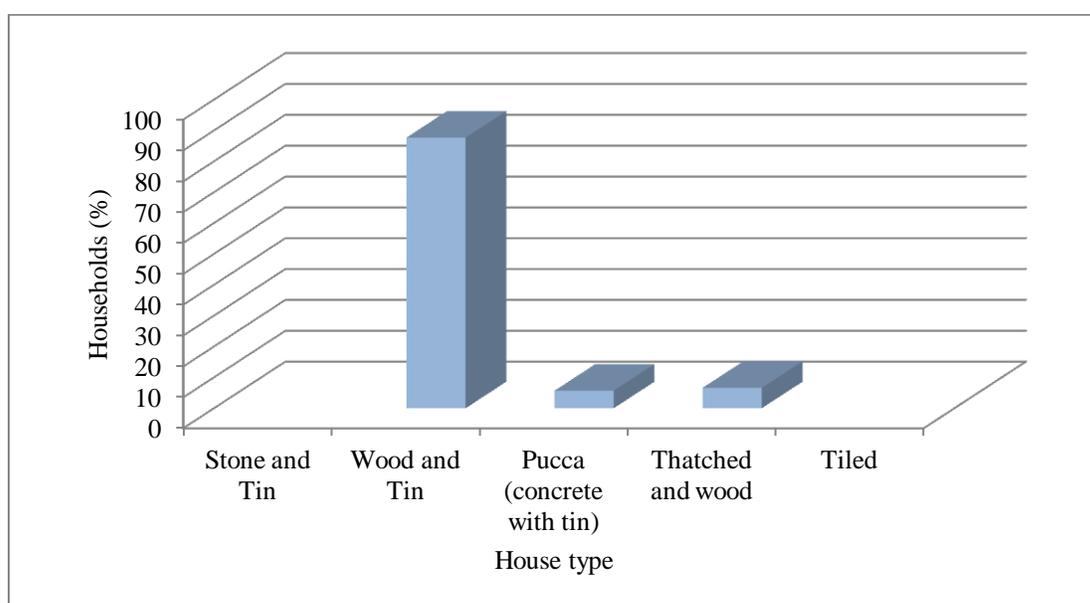


Figure 5.5 House types of villagers.

5.1.10 Dependency on forest produces

Generally forest villagers are found in interior and fringe forest areas with dense and fair forest. Hence villagers' economy is closely connected with the forest. The forests not only provide them food, materials to build houses, fuel for cooking and lightening but also satisfy deep rooted sentiments with forest environment. It is stated that in Gujarat, forest possessed a central position in the village economy through a provision of a variety of minor forest products (NTFPs) and other goods and services for local use like fuel fodder, wood, materials for agricultural implements and bulbs and wild tubers as vegetables, etc. (Kant et al., 1993). The forests products are numerous and available seasonally, their pattern and collection of the use differs with

economic and socio-cultural condition of each household (Malhotra et al., 1991). Here villagers are isolated with their own economy and culture as well as small forest society due to their remote location and untouched with others world. Ravi et al., (2006) reported that NTFPs acts a key role in the economy and life of the tribal community residing in and around the protected areas of Kote region. The income derived from NTFPs was the single largest source but it was not sufficient to meet even their subsistence requirement of food. So different kinds of forest products are prime lifeline and collection of forest products is one of the ways of life. Regularly villagers go inside the forest and collect forest product according to their demand and local sell. The chief collected items are cane, cane fruits, dry branches and leaves, purundi fruits, pan leaves, naglata, lycopodium stick, totola pods and seeds, golden and sponge mushrooms, odal fruit, fern bud, mahogany floral axis, lali fruit, simul floss and floral axis, broom stick, thatch etc. There are many medical herbs in this region which are also used by inhabitants to remove fever, stomach problem, jadish, asthma, skin disease, bone fracture join etc.

The table 5.9 shows the villagers dependency on forest produce where out of 878 household, 818 (93.17 %) depends on forest produce for livelihood needs and only 60 household (6.83 %) depends on other sources. The dependency on forest produce is more among villagers of interior area and such villagers are Gangutia, Adma, Raimatang, Bhutri Forest basti, Chunabati and Bhutia basti, Santrabari where 100 % dependency were observed during field survey.



Plate 5.3 Wooden house with tin-shed at Bhutri forest village.

Table 5.9 Dependency on forest produce (village-wise).

Sl. No.	Forest village	Yes	No	Total sampled households
1	Lehra	18 (81.82)	4 (18.18)	22 (100 %)
2	Suni	25 (89.29)	3 (10.71)	28 (100 %)
3	Garo Basti	66 (91.67)	6 (8.33)	72 (100 %)
4	Gadhadhar	53 (84.13)	10 (15.87)	63 (100 %)
5	Poro (N)	61 (100)	-	61(100 %)
6	Nimati and Dabri	56 (82.35)	12 (17.65)	68 (100 %)
7	Gangutia H.A	55 (100)	-	55 (100 %)
8	Adma H.A	55 (100)	-	55 (100 %)
9	Raimatang H.A	55 (100)	-	55 (100 %)
10	Bhutri forest basti H.A	45 (100)	-	45 (100 %)
11	Gudamdabri	54 (85.71)	9 (14.29)	63 (100 %)
12	Chunabati H.A	54 (100)	-	54 (100 %)
13	Bhutiabasti	30 (100)	-	30 (100 %)
14	Sankosh	58 (96.67)	2 (3.33)	60 (100 %)
15	Lapraguri	43 (91.49)	4 (8.51)	47 (100 %)
16	Santrabari H.A	61 (93.85)	4 (6.15)	65 (100 %)
17	Balapara	29 (82.86)	6 (17.14)	35 (100 %)
Total		818 (93.17 %)	60 (6.83 %)	878 (100 %)

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017)

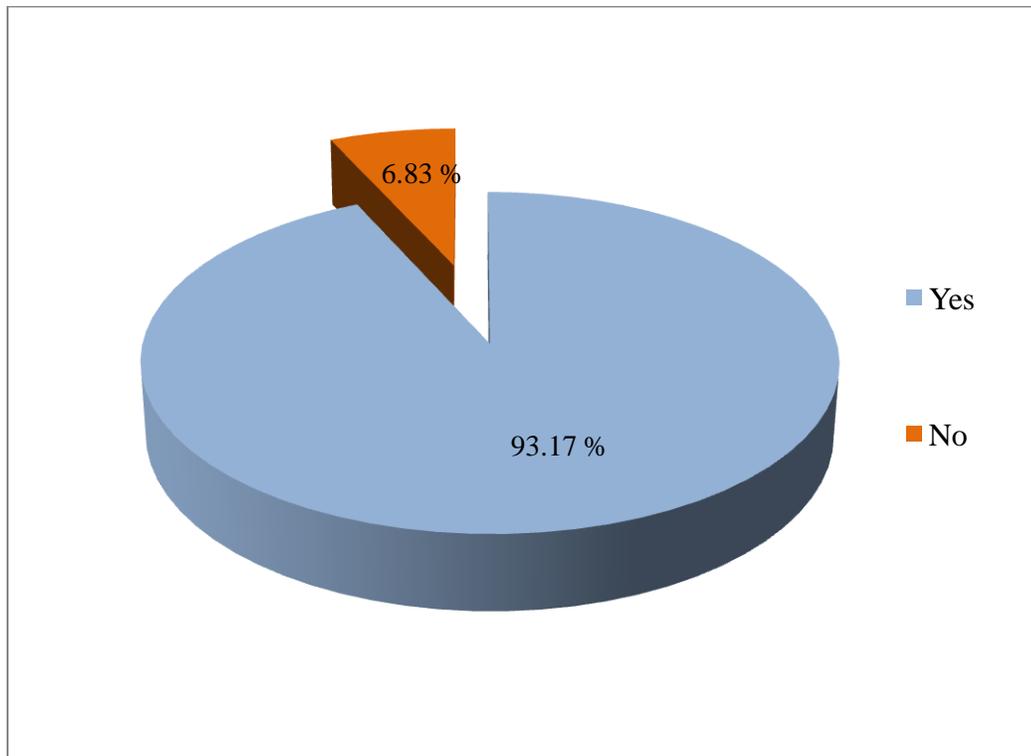


Figure 5.6 Villagers dependency on forest produces.

5.1.11 Conflict with wildlife

The forests of Alipurduar District are an extremely rich bio-diversity zone but today facing challenging moment due to regular man-animal conflict. Human interferes such as changes in land use pattern, Jhum cultivation, tea garden extension, conversion of forest cover area into agricultural and habitat lands etc. has become a primary issue for loss natural corridors of animals and are the main causes for man-animal conflict in this study area. Besides tea gardens serves as ideal dens for breeding leopard; illicit liquor, brewing attracts wild animals mainly elephants in nearby tea gardens, forest villages as well as revenue villages and caused conflicts. The conflicts of humans with tiger, elephant, leopard, wild boar, monkeys, gaur, and rhino have become a regular feature (Das, 2013). In this respect the table 5.10 shows the conflict of men and wildlife based on the sampled household of villagers. Out of the 878 households 759 (86.45 %) households gave positive option and 119 (13.55 %) household gave negative approach regarding of wild animal conflict. Except hill top villagers such as Adma, Chunabati, Raimatang other villagers gave their 100 % positive option on men animal conflict.

Table 5.10 Villagers' response on Man-Wildlife conflict (village-wise).

Sl. No.	Forest village	Yes	No	Total sampled households
1	Lehra	22 (100)	-	22 (100 %)
2	Suni	28 (100)	-	28 (100 %)
3	Garobasti	72 (100)	-	72 (100 %)
4	Gadhadhar	63 (100)	-	63 (100 %)
5	Poron	61 (100)	-	61 (100 %)
6	Nimati and Dabri	68 (100)	-	68 (100 %)
7	Gangutia H.A	55 (100)	-	55 (100 %)
8	Adma H.A	12 (21.82)	43 (78.18)	55 (100 %)
9	Raimatang H.A	23 (41.82)	32 (58.18)	55 (100 %)
10	Bhutri forest basti H.A	45 (100)	-	45 (100 %)
11	Gudamdabri	63 (100)	-	63 (100 %)
12	Chunabati H.A	10 (18.52)	44 (81.48)	54 (100 %)
13	Bhutiabasti	30 (100)	-	30 (100 %)
14	Sankosh	60 (100)	-	60 (100 %)
15	Lapraguri	47 (100)	-	47 (100 %)
16	Santrabari H.A	65 (100)	-	65 (100 %)
17	Balapara	35 (100)	-	35 (100 %)
Total		759 (86.45 %)	119 (13.55 %)	878 (100 %)

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017)

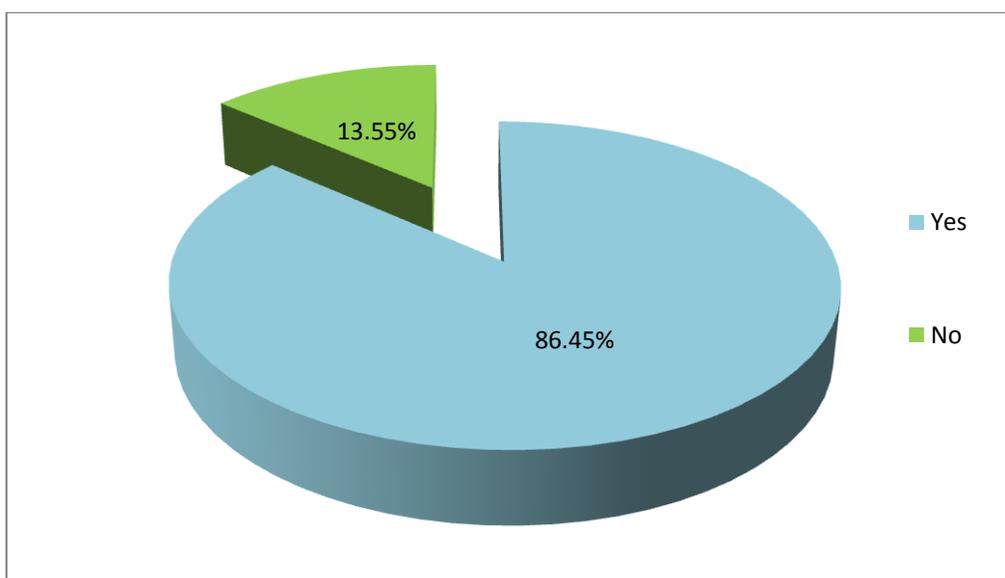


Figure 5.7 Villagers' response on conflict of men-animal attack.

The table 5.11 shows the cattle lifting figure of different ranges in BTR of this District. It is mentioned that most affected area of ranges are N. Rydak, Jainti, Buxaduar, Kumargram, S. Raidak, Hailtongaunj, Hatipota and Pana where maximum number of cattle lifted by wildlife.

Table 5.11 Cattle lifting in Buxa Tiger Reserve by tiger and leopard.

Year	BTR (West) Division							BTR (East) Division							Total
	PANA	HMTG	NMT	EDPO	WDPO	ERVK	WRVK	JNT	BDR	NRD	SRD	BH	KGM	HPA	
2004	-	-	-	-	-	-	-	8	11	23	-		5	-	47
2005	3	-	1	-	-	1	-	24	9	26	6		11	-	81
2006	6	-	3	1	-	1	-	8	12	24	5		8	-	68
2007	10	-	1	-	-	1	4	7	10	27	2	2	13	-	77
2008	4	-	-	1	-	1	-	10	8	26	2	-	8	-	60
2009	2	1	2	-	-	1	4	-	-	-	-	1	1	2	14
2010	3	2	3	-	-	1	1	-	-	2	-		2	5	19
2011	-	2	-	2	2	1	-	-	-	4	-		1	-	12
2012	-	3	-	-	5	-	-	27	-	-	4		3	-	42
2013	1	2	-	-	-	1	1	-	2	-	1	1	1	1	11
Total	29	10	10	4	7	8	10	84	52	132	20	4	53	8	431

Source: Tiger conservation plan, 2016-17 to 2026-27, DFD, East & West BTR

Forest Office, Alipurduar

Human death and injuries are reported in BTR mainly from tea gardens and fringe villages. Forest villages were also affected. Human death and injuries are caused due to elephants and leopards attack. The following table 5.12 shows the range wise human death and injuries figures in BTR of this area by elephants and leopards.

Table 5.12 Human death and Injury by elephant and leopard/ tiger in BTR (2005-13).

Year	BTR, West Division		BTR, East Division		Total	
	Person killed	Person injured	Person killed	Person injured	Person killed	Person injured
2005-06	4	10	13	8	17	18
2006-07	4	6	5	4	9	10
2007-08	2	7	5	9	7	16
2008-09	4	15	8	10	12	25
2009-10	6	0	4	8	10	8
2010-11	3	8	2	5	5	13
2011-12	4	16	3	17	7	23
2012-13	6	23	10	11	16	34
Total	33	85	50	72	83	157

Source: Tiger conservation plan, 2016-17 to 2026-27, DFD, East & West BTR

Forest Office, Alipurduar

Elephant, wild boar, bison and monkey damages agricultural crops in peripheral and forest villages. Maximum damage to the crop takes place from August-September to December - January. They damage mainly paddy, maize, wheat, mallots etc. The table 5.13 will give an idea about the magnitude of crop and hut damage in Buxa Tiger Reserve of this District. Elephants are involved in house/ hut damage in forests villages, peripheral villages and tea garden labour lines.

Table 5.13 Crop and hut damages by wildlife in Buxa Tiger Reserve.

Year	BTR, West Division				BTR, East Division				Total Compensation paid in BTR (Rs.)
	Crop damage		Hut damage		Crop damage		Hut damage		
	No. of cases	Compensation paid (Rs.)	No. of cases	Compensation paid (Rs.)	No. of cases	Compensation paid (Rs.)	No. of cases	Compensation paid (Rs.)	
2005-06	675	270000.00	86	97200.00	967	363173.00	93	54600.00	784973
2006-07	708	318600.00	82	80400.00	897	390500.00	102	51350.00	840850
2007-08	723	289200.00	102	110800.00	1283	389200.00	490	157400.00	946600
2008-09	958	475350.00	108	122000.00	849	418400.00	107	52000.00	1067750.00
2009-10	800	395750.00	140	147850.00	1448	71520.00	90	106400.00	721520.00
2010-11	1303	775200.00	167	221000.00	768	425700.00	148	240500.00	1662400.00
2011-12	521	303500.00	219	308999.00	805	329300.00	113	186500.00	1128299.00
2012-13	1617	1109750.00	699	962750.00	2125	1074710.00	421	707270.00	3854480.00
Total	7305	3937350	1603	2050999.00	9142	3462503	421	1556020.00	11006872.00

Source: Tiger conservation plan, 2016-17 to 2026-27, DFD, East & West BTR

Forest Office, Alipurduar

5.2 Economic condition

5.2.1 Labour force participation

The villagers of the sample households have been classified into main workers, marginal workers and non-workers. Table 5.14 (Appendix D) presents the labour force participation of the household of 17 sampled villages. It has been observed from the table that out of 4071 persons, main workers form only 35.57 percent, marginal workers 43.78 percent and non-workers constitute for 20.65 percent of the total villagers. In Suni Village, villagers have large number of main workers, followed by the Garo Basti, Gadhahar, Bhutri forest basti, Balapara, Gudamdabri, Santrabari, Poro, and Adma and so on. The above table also explains the sex wise labour force participation among households where it has been shown that male and female main workers consists 18.72 % and 18.45 % respectively. Besides maximum male main worker found in Suni village and female main worker in Garo basti which is 25.28 % and 29.12 % respectively. In case of marginal workers, male workers are more than the female, but in some villages female workers are more in number than male i.e. in Santrabari, Lapraguri.

5.2.2 Occupational structure of working family members

An attempt has been made here to give an idea of the economic condition of the forest communities. A detail discussion has been prepared based on both primary and secondary occupation. The table 5.15 (Appendix D) describes the primary and secondary occupation of forest living communities. From the data it has been noticed that out of total 4071 persons of the total households, 98.27 % are engaged in primary activities, 0.59 % is in manufacturing, and service occupied only 1.14 %. So it noticed that, villagers are depending on primary activity for livelihood where manufacturing and service is too less importance. The above table also explains the sex wise occupational status where it has been shown that 49.41 % male and 48.86 % female is engaged in primary activity. Besides maximum engagement of primary activity is found in Gadhahar village which is 99.65 % and minimum engagement is found in Lehra village which is 92.95 %.

5.2.3 Income pattern

Income is one of the important indicators for socio-economic study. Keeping in view on labour force participation, about land use and occupational structure, an emphasis has been given on income of the forest villagers living in different locations of the study area. For the purpose of

analyzing the data, monthly income of the families are tabulated under different income group ranges as shown in the table 5.16, that is Rs. Below 5000, 5001-10000, 10001-25000, 25001-50000, 50001-75000, 75001-100000, and Rs. above 100000.

Table 5.16 Income pattern of sampled households.

Sl. No.	Forest village	Income (Rs.) of sampled households							
		Total surveyed house hold	< 5000	5001-10000	10001-25000	25001-50000	50001-75000	75001-100000	>100000
1	Lehra	22	2 (9.09)	18 (81.82)	-	-	2 (9.09)	-	-
2	Suni	28	4 (14.29)	23 (82.14)	-	-	1 (3.57)	-	-
3	Garo Basti	72	7 (9.72)	51 (70.83)	10 (13.89)	2 (2.78)	-	2 (2.78)	-
4	Gadhadhar	63	5 (7.94)	47 (74.60)	10 (15.87)	-	1 (1.59)	-	-
5	Poru (N)	61	4 (6.56)	51 (83.60)	4 (6.56)	-	2 (3.28)	-	-
6	Nimati and Dabri	68	-	54 (79.41)	14 (20.59)	-	-	-	-
7	Gangutia H.A	55	6 (10.91)	25 (45.46)	19 (34.55)	2 (3.63)	2 (3.63)	1 (1.82)	-
8	Adma H.A	55	1 (1.82)	43 (78.18)	10 (18.18)	-	1 (1.82)	-	-
9	Raimatang H.A	55	3 (5.45)	33 (60.00)	15 (27.28)	-	1 (1.82)	3 (5.45)	-
10	Bhutri forest basti H.A	45	-	20 (44.44)	19 (42.22)	3 (6.68)	2 (4.44)	1 (2.22)	-
11	Gudamdabri	63	7 (11.11)	43 (68.25)	12 (19.05)	-	1 (1.59)	-	-
12	Chunabati H.A	54	6 (11.11)	38 (70.37)	8 (14.82)	-	1 (1.85)	1 (1.85)	-
13	Bhutiabasti	30	-	21 (69.99)	6 (20.00)	-	1 (3.34)	2 (6.67)	-
14	Sankosh	60	-	31 (51.66)	19 (31.67)	4 (6.67)	4 (6.67)	2 (3.33)	-
15	Lapraguri	47	5 (10.63)	33 (70.22)	6 (12.77)	-	2 (4.26)	1 (2.12)	-
16	Santrabari H.A	65	-	35 (53.86)	21 (32.31)	4 (6.15)	4 (6.15)	1 (1.53)	-
17	Balapara	35	8 (22.86)	21 (59.99)	6 (17.15)	-	-	-	-
Total		878	58	587	179	15	25	14	-
		100 %	6.61 %	66.86 %	20.39 %	1.71 %	2.84 %	1.59 %	

% is given in brackets, H.A=High Altitude,

(Prepared by the researcher based on field survey, 2017)

From the table 5.16 it apparent that out of total families, above half of the total families (66.86 %) earn between Rs. 5001-10000. Another 20.39 % families have income between Rs.10001-25000. There are only 6.61 %, 2.84 %, 1.71 %, and 1.59 % families whose monthly

income ranges below Rs. 5000, Rs. 25001-50000, Rs. 50001-75000 and Rs. 75001-100000 group range respectively.

It is seen from the table 5.17 that majority of the households (93.51 %) depend on primary activities i.e. on cultivation, NTFPs collection, agriculture labour, horticulture and their income fall in between below Rs.5000.00-50000.00, where 66.61 % households have income from Rs. 5001.00-10000.00, 20.73 % have income from Rs.10001.00-25000.00, 6.61 % are in income from below Rs.5000.00-10000.00 and 1.71 % are belongs to the group of Rs.25001.00-50000.00. About 4.44 % household are earning from service sector where 2.85 % households have income from Rs.50001.00-75001.00, and 1.59 % have income from Rs. 75001.00-100000.00. Only 2.05 % are engaged in manufacturing sector where household income ranges from Rs.10001.00-25000.00.

Table 5.17 Income with reference to occupation.

Sl. No.	Occupational Status (Village-wise)	Income (Rs.) of sampled households							Total households
		<5000	5001-10000	10001-25000	25001-50000	50001-75000	75001-100000	>100000	
1	Lehra Village	-	-	-	-	-	-	-	22
	Primary	2 (9.09)	15 (68.18)	-	-	-	-	-	
	Manufacturing	-	-	3 (13.64)	-	-	-	-	
	Service	-	-	-	-	2 (9.09)	-	-	
2	Suni Village	-	-	-	-	-	-	-	28
	Primary	4 (14.29)	23 (82.14)	-	-	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	1 (3.57)	-	-	
3	Garo Basti Village	-	-	-	-	-	-	-	72
	Primary	7 (9.72)	51 (70.83)	10 (13.89)	2 (2.78)	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	-	2 (2.78)	-	
4	Gadhadhar Village	-	-	-	-	-	-	-	63
	Primary	5 (7.94)	47 (74.60)	10 (15.87)	-	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	1 (1.59)	-	-	
5	Poro Village (N)	-	-	-	-	-	-	-	61
	Primary	4 (6.56)	51 (83.60)	-	-	-	-	-	
	Manufacturing	-	-	4(6.56)	-	-	-	-	
	Service	-	-	-	-	2 (3.28)	-	-	
6	Nimati and	-	-	-	-	-	-	-	68

	Dabri Village								
	Primary	-	54 (79.41)	11 (16.18)	-	-	-	-	
	Manufacturing	-	-	3 (4.41)	-	-	-	-	
	Service	-	-	-	-	-	-	-	
7	Gangutia Village H.A	-	-	-	-	-	-	-	55
	Primary	6 (10.91)	25 (45.46)	19 (34.55)	2 (3.63)	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	2 (3.63)	1 (1.82)	-	
8	Adma Village H.A	-	-	-	-	-	-	-	55
	Primary	1 (1.82)	43 (78.18)	10 (18.18)	-	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	1 (1.82)	-	-	
9	Raimatang Village H.A	-	-	-	-	-	-	-	55
	Primary	3 (5.45)	33 (60.00)	15 (27.28)	-	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	1 (1.82)	3 (5.45)	-	
10	Bhutri forest basti Village H.A	-	-	-	-	-	-	-	45
	Primary	-	20 (44.44)	19 (42.22)	3 (6.68)	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	2 (4.44)	1 (2.22)	-	
11	Gudamdabri Village	-	-	-	-	-	-	-	63
	Primary	7 (11.11)	43 (68.25)	12 (19.05)	-	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	1 (1.59)	-	-	
12	Chunabati Village H.A	-	-	-	-	-	-	-	54
	Primary	6 (11.11)	38 (70.37)	8 (14.82)	-	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	1 (1.85)	1 (1.85)	-	
13	Bhutiabasti Village H.A	-	-	-	-	-	-	-	30
	Primary	-	21 (69.99)	6 (20.00)	-	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	1 (3.34)	2 (6.67)	-	
14	Sankosh Village	-	-	-	-	-	-	-	60
	Primary	-	31 (51.66)	19 (31.67)	4 (6.67)	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	4 (6.67)	2 (3.33)	-	

15	Lapraguri Village	-	-	-	-	-	-	-	47
	Primary	5 (10.63)	33 (70.22)	2 (4.26)	-	-	-	-	
	Manufacturing	-	-	4 (8.51)	-	-	-	-	
	Service	-	-	-	-	2 (4.26)	1 (2.12)	-	
16	Santrabari Village H.A	-	-	-	-	-	-	-	65
	Primary	-	35 (53.86)	21 (32.31)	4 (6.15)	-	-	-	
	Manufacturing	-	-	-	-	-	-	-	
	Service	-	-	-	-	4 (6.15)	1 (1.53)	-	
17	Balapara Village	-	-	-	-	-	-	-	35
	Primary	8 (22.86)	21 (59.99)	2 (5.72)	-	-	-	-	
	Manufacturing	-	-	4 (11.43)	-	-	-	-	
	Service	-	-	-	-	-	-	-	
Overall result of Villagers									
	Primary	58 (7.37)	584 (74.21)	164 (18.68)	15 (1.71)	-	-	-	821 (93.51)
	Manufacturing	-	-	18 (2.05)	-	-	-	-	18 (2.05)
	Service	-	-	-	-	25 (3.18)	14 (1.78)	-	39 (4.44)
Grand Total		58	584	182	15	25	14	-	878
		6.61 %	66.51 %	20.73 %	1.71 %	2.85 %	1.59 %		100

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017)

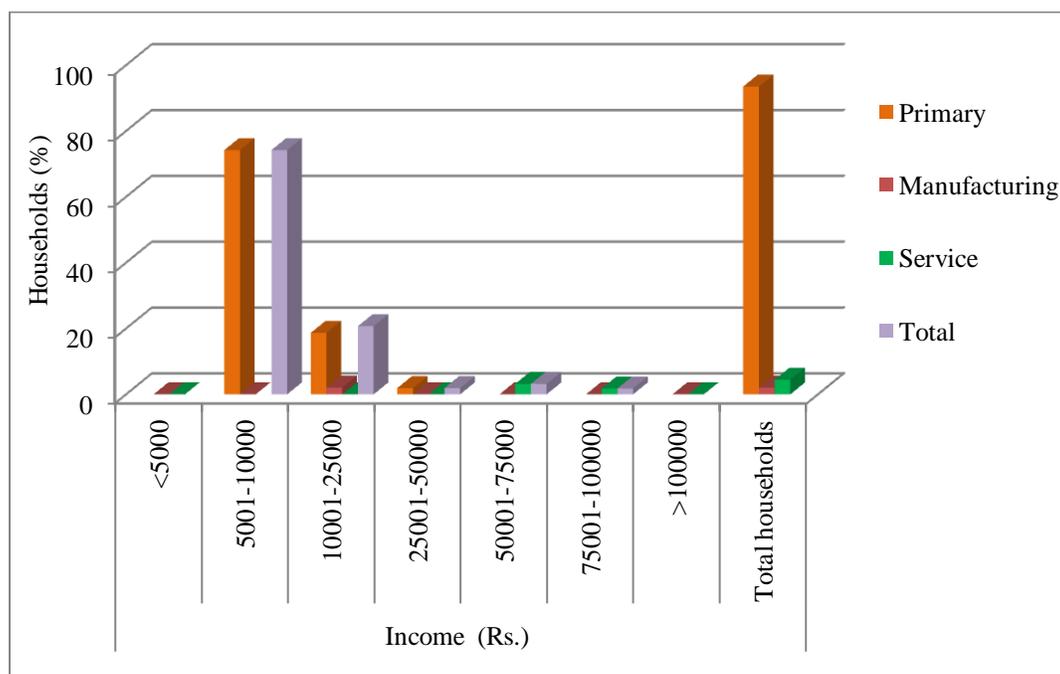


Figure 5.8 Relation between income and occupation

5.2.4 Land holding capacity

The size of agricultural holding capacity depends on the climate and geographical conditions, partly upon the social institutions and laws, partly upon the techniques and methods of cultivation (Mamoria, 1995). The capacity of land holding of sampled households was stratified into marginal (<1.5 acre), small (1.51-2.00 acre), medium (2.01-2.50 acre) and high (> 2.51 acre) and accordingly the studies were conducted and the results were analyzed, and is presented in table 5.18. It is clear that most of the sample households were found to be in medium category land holding capacity which accounted for 433 (49.32 %) to the total sample households. The small category of land holding household were found to be quite less than median category, that is about 314 (35.76 %) and the high and marginal land category were found to be less that is about 110 (12.53 %) and 21 (2.39 %). It is mentioned that the land owned by the households (forest villagers) were within the reserve forests wherein they were permitted to do agricultural operations to fulfill their livelihood needs as land agreement holder with Forest Department. Recently the Govt. of West Bengal took initiative to give their land right by issuing land patta of individual household especially for Schedule Tribe villagers (plate 5.4).

Table 5.18 Land holding capacity.

Sl. No.	Forest village	Number of households with land holding (acre)				
		Marginal (<1.50)	Small (1.51-2.00)	Medium (2.01-2.50)	High (> 2.51)	Total households
1	Lehra	-	-	18	04	22
2	Suni	-	-	26	02	28
3	Garo Basti	-	-	61	11	72
4	Gadhadhar	-	-	45	18	63
5	Poro (N)	-	-	48	13	61
6	Nimati and Dabri	-	-	56	12	68
7	Gangutia H.A	03	52	-	-	55
8	Adma H.A	05	50	-	-	55
9	Raimatang H.A	04	51	-	-	55
10	Bhutri forest basti H.A	02	43	-	-	45
11	Gudamdabri	-	03	45	15	63
12	Chunabati H.A	03	51	-	-	54
13	Bhutiabasti	-	-	23	07	30
14	Sankosh	-	03	46	11	60
15	Lapraguri	-	-	34	13	47
16	Santrabari H.A	04	61	-	-	65
17	Balapara	-	-	31	04	35
Total		21	314	433	110	878
%		2.39	35.76	49.32	12.53	100.00

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017).

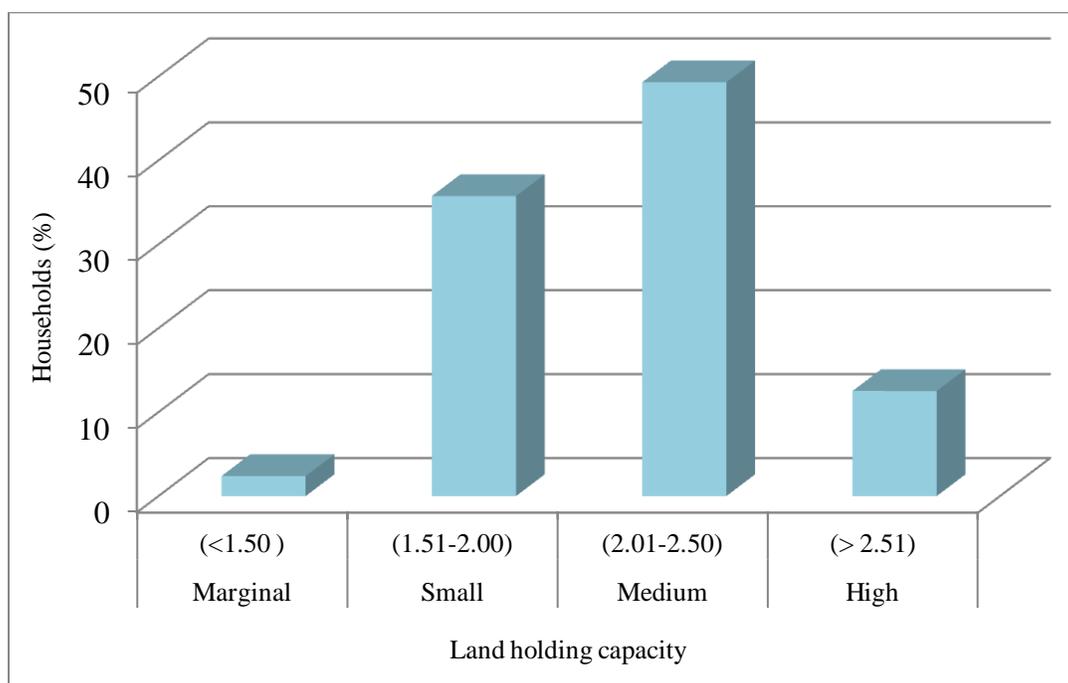


Figure 5.9 Land holding capacity of households.

It is also noticed from the table 5.19 that 461 (52.51 %) number of household don't have own proper document for the land and it is provided lease basis for agreement holder. The households who have proper document (land patta) have been accounted only for 417 (47.49 %) number of total household.

Table 5.19 Land holding status.

Sl. No.	Forest village	Land holding status (Households-wise)			Uses of land (Households-wise)		Total sampled households
		Yes		No	For		
		Lease from Forest Dept.	Patta given from West Bengal Govt.		Agriculture	Agriculture and homestead	
1	Lehra	-	22 (100)	-	-	22	22 (100 %)
2	Suni	-	28 (100)	-	-	28	28 (100 %)
3	Garobasti	42 (58.33)	30 (41.67)	-	-	72	72 (100 %)
4	Gadhadhar	-	63 (100)	-	-	63	63 (100 %)
5	Poron	-	61 (100)	-	-	61	61 (100 %)
6	Nimatidabri	-	68 (100)	-	-	68	68 (100 %)
7	Gangutia H.A	55 (100)	-	-	-	55	55 (100 %)
8	Adma H.A	55 (21.82)	-	-	-	55	55 (100 %)
9	Raimatang H.A	55 (41.82)	-	-	-	55	55 (100 %)
10	Bhutri F. basti H.A	45 (100)	-	-	-	45	45 (100 %)
11	Gudamdabri	-	63 (100)	-	-	63	63 (100 %)
12	Chunabati H.A	54 (100)	-	-	-	54	54 (100 %)

13	Bhutiabasti	30 (100)	-	-	-	30	30 (100 %)
14	Sankosh	60 (100)	-	-	-	60	60 (100 %)
15	Lapraguri	-	47 (100)	-	-	47	47 (100 %)
16	Santrabari H.A	65 (100)	-	-	-	65	65 (100 %)
17	Balapara	-	35 (100)	-	-	35	35 (100 %)
Total		461 (52.51 %)	417 (47.49 %)	-	-	878 (100 %)	878 (100 %)

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017).

GOVERNMENT OF WEST BENGAL


सत्यमेव जयते

TITLE FOR FOREST LAND UNDER OCCUPATION

[Rule 8 (h)]

Certificate No. 10272 Date 01 / 04 / 2015

- Name (s) of Holder (s) of Forest Rights (including spouse) : Goshal Asur.
: Suro Asur.
- Name of the Father / Mother : Pt. Mathu Asur.
- Name of Dependants : Rinu, Golap, Anjali, Sushma.
- Address : Gudam Dabri Forest Village
- Village / Gram Sabha : Satali - KI
- Gram Panchayet : Satali.
- Block : Kalchini.
- Sub-Division : Alipurduar
- District : Alipurduar.
- Whether Schedule Tribes or Other Traditional Forest Dwellers : Sch. Tribe (Asur)
- Area : Homestead = 0.29
Agric. = 3.38 aca.
Total = 3.67
- Description of Boundaries by prominent Land Marks including Khasra / Compartment No. : Agric. N - Gandur.
Homestead: N - Jharid Asur.
S - Fagu Munda.
E - Kacha Road.
W - Santa Nagaria.
S - Jitni.
E - Fagu
W - River.

This Title is heritable, but not alienable or transferable under sub-section (4) of Section 4 of the Act.

Divisional Forest Officer
Backward Classes Welfare
P.O. Cum D.W.O.
Backward Classes Welfare
P.O. Cum D.W.O.
B.C.W.
P.O. & Dibe Alipurduar.

Plate 5.4 Document of land patta of Gudamdabri village.

5.2.5 The livestock situation and asset

The forest villagers' livelihood security was closely associated with the agriculture and allied activities such as livestock farming, collection of fodders, collection of dry leaves, processing and sale of NTFPs etc. among these, the livestock rearing and its assets are very important to support the economic impact. The animal population classified as adult cow, goats, pig and calves, their details were analysed and the results are given in table 5.20 below. Among various categories of livestock animals, the population of adult cow (both dry and milch) belongs to the top position which are found 44.78 % (36.39 and 8.39) followed by pig, goat and calves where they have 27.88 %, 17.62 % and 9.72 % respectively. It is depicted from the study that the cow and pig are most valuable animals and villagers were getting financial assistance by selling livestock within a regular interval of the year.

Table 5.20 Livestock population (village-wise).

Sl. No.	Forest village	Adult Cow		Goat	Pig	Calves	Total
		Dry	Milch				
1	Lehra	15 (36.59)	6 (14.63)	13 (31.71)	-	7 (17.07)	41(100)
2	Suni	19 (32.20)	8 (13.56)	23 (38.98)	-	9 (15.25)	59(100)
3	Garo Basti	38 (30.89)	12 (9.76)	25 (20.33)	33 (26.83)	15 (12.20)	123
4	Gadhahar	55 (34.81)	16 (10.17)	37 (23.42)	31 (19.62)	19 (12.02)	158(100)
5	Poro (N)	46 (30.87)	14 (9.39)	32 (21.48)	41 (27.52)	16 (10.74)	149(100)
6	Nimati and Dabri	75 (43.86)	18 (10.53)	34 (19.88)	24 (14.04)	20 (11.69)	171(100)
7	Gangutia H.A	16 (24.24)	04 (6.06)	11 (16.67)	31 (46.97)	4 (6.06)	66 (100)
8	Adma H.A	21 (24.42)	05 (5.81)	17 (19.77)	37 (43.02)	6(6.98)	86(100)
9	Raimatang H.A	25 (27.78)	08 (8.89)	14 (15.56)	34 (37.78)	9 (9.99)	90(100)
10	Bhutri forest basti H.A	35 (41.18)	06 (7.06)	11 (12.94)	26 (30.59)	7(8.24)	85(100)
11	Gudamdabri	51 (39.53)	12 (9.30)	16 (12.40)	36 (27.91)	14 (10.85)	129(100)
12	Chunabati H.A	14(23.33)	2(3.33)	6(10)	34 (56.67)	4(6.67)	60(100)
13	Bhutiabasti	25 (43.86)	-	9 (15.79)	23 (40.35)	-	57(100)
14	Sankosh	71 (47.65)	10 (6.71)	23 (15.44)	33 (22.15)	12 (8.05)	149(100)
15	Lapraguri	31 (41.33)	07 (9.33)	6(7.99)	23 (30.67)	8 (10.67)	75(100)
16	Santrabari H.A	42	5(5.32)	7(7.45)	35	5(5.32)	94(100)

		(44.68)			(37.23)		
17	Balapara	24 (36.92)	6(9.23)	8 (12.31)	21 (32.31)	6(9.23)	65(100)
Total		603 (36.39 %)	139 (8.39%)	292 (17.62%)	462 (27.88%)	161 (9.72%)	1657 (100%)

H.A=High Altitude, (Prepared by the researcher based on field survey, 2017)

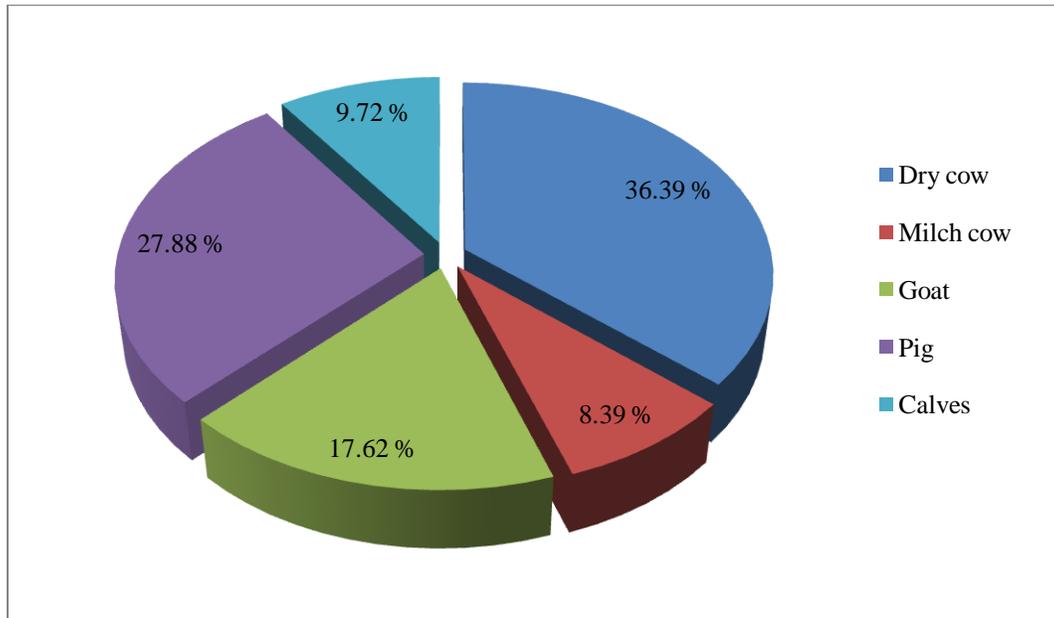


Figure 5.10 Livestock population of households.

5.2.6 Agricultural pattern

In high land forest villages, mainly Adma, Chunabat, Santrabari, Gangutia, Bhutia basti, Raimatang and Bhutri village, step and shifting cultivation is being practiced (plate 5.5 and 5.6). The step is a technique of growing crops on sides of hill slope or by planting on terraces built into the slope though it is labour-intensive, the method has been deployed effectively to increase arable land in variable terrains and to decrease soil erosion and water loss (Bhattacharya et al., 2015). The shifting cultivation is an age-old agricultural practice among the tribes. It means the cultivation of a plot of land for temporary period and then leaves it fallow. It consists of clearing the forest slopes, burning the fallen trees and bushes, and broadcasting the seed in the ash covered soil (Hasnain, 2005). It is also reported that 32 % of the states' geographical area (5316 sq.km) is under shifting cultivation (Tripathi, 2005). In these forest villages, the common cultivable edible plants are rice, maize, potato, raisakh, green chili, tomato, squash, leaf mustard, banana, pomelo, areca nut, large cardamom etc. In this connection it is reported that vegetable

production was comparatively more environment friendly than food grains production on hill farms of Nepal (Pant & Pandey, 1999). Areca nut is the main cash crop of this area and an important economic source of horticulture farming. The households of forest villages used organic farming and cow-dung as manure. Although some pesticide and fertilizer is added to the fields as there is presence of pest attack in the agricultural areas.



Plate 5.5 Clearing of forest for Jhum cultivation at Chunabati village



Plate 5.6 Step and Jhum cultivation for livelihood at Adma village.

Most of the houses in hill forest villages have cultivable lands adjacent to the houses and horticulture farming is done there. Since agricultural production is one and only prime economic sources of the villages hence they used to sell the foods, mainly vegetables in the local markets i.e. in Kalchini, Madarihath, Hamiltongaunj, Rajabhatkhawa markets.



Plate 5.7 Intensive subsistence cultivation in Garo basti village.

The intensive subsistence farming is being practiced by the (plate 5.7) villages of low lying area and mainly they are Lera, Suni, Gadhathar, Poro (N), Gudhamdabri, Garo basti, Lapraguri, Nimti and Dabri, Sankosh, and Balapara village. The intensive subsistence agriculture is a method of growing food crops on even terraces of inside and nearby forests and the method has been employed effectively to fulfill self-requirements of the people of the area. The size of land holdings is small, use of maximum manual labour and traditional simple farm implements etc. are observed in this farming. The common cultivable edible plants are paddy, white, maize, potato, green chili, tomato, mustard, banana, areca nut, large cardamom, brinjal, laddish finger etc. Now villagers' used pesticide and fertilizer to get more agricultural production. The excess food and vegetable used to sell in the local markets periodically i.e. in Kalchini, Nimti bazar, Hamiltongaunj, Kumargaunj markets.

5.3 Conclusion

In conclusion, it can be said that, physical site and other natural environment directly and indirectly controlled livelihood entity of villagers. The forest households has been lived and adopted automatically to survive in this forest environment. Besides other important aspects of social customs and traits related to local ecology has been depicted here. It is noticed that there are some differences of agriculture, social customs and other anthropogenic activities between high altitude and low lying reside villagers; core area and fringe area forest villagers. The land use pattern, food habit, fuel used, house type, water storage facilities, type of NTFPs collection of household of high altitude area is differ from low-lying household. In the other side, difference also observed in land holding capacity, income pattern, occupational structure, livestock rearing and agriculture practices. In high land forest villages, mainly Adma, Chunabat, Santrabari, Gangutia, Bhutia basti, Raimatang and Bhutri village, step and shifting cultivation has been followed due to undulating and rugged surface feature. On the other hand the intensive subsistence farming is being followed by the villages of low lying area villagers i.e. in Lera, Suni, Gadhahar, Poro (N), Gudhamdabri, Garo basti, Lapraguri, Nimti and Dabri, Sankosh, and Balapara village due to huge even land, fertile soil and available water facilities. The pipe line and spring water is the only source of water for high altitude villagers' but in low-lying villagers' are used well and tube well to fulfil demand of water. Finally it is depicted that although villagers adapted to their surrounding environment but income, education, housing, culture etc of high altitude households are comparatively fall behind than low lying households, and it is due to lack of job opportunity, education institution, agricultural land, accessibility of the high altitude villagers.

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