

**6.1 Introduction:**

Abandoned channels are recognised as depressions in the landscape and are located at the position of a formerly active channel (Willem H.J. Toonen et. al., 2012) These abandoned channels receive surface run-off water by rivers and consequently become very extensive water bodies during monsoon with heavy rainfall on one hand and partially dries up in the post-monsoon periods on the other hand. It is evident that abandoned channels have been recognized as one of the important life-support systems on Earth, in addition to the agricultural lands and forest lands. These abandoned channels support a wide variety of agricultural crops for the local people. These are also considered as habitat and breeding ground for fish and other aquatic species. Moreover, abandoned channels can provide habitat for wildlife and maintain biodiversity of aquatic habitat which have much economic value. At present, the common use of abandoned channels comprises fishing, cultivation, irrigation, jute retting, fodder collection, bathing, washing cloths and utensil, duck rearing and other household activities. The survival of these abandoned channels and their resources are not only important for economic development of the local people but also important for the preservation of biodiversity.

**6.2 General socio-economic discussion:**

People staying in and around the abandoned channel of the Sankosh River are directly or indirectly dependant on this abandoned channel. From field data it is observed that their socio-economic condition, especially economic development is influenced by these abandoned channels. People use water of abandoned channels for their irrigation and agricultural purposes. In this regard, Boro cultivation in dry season can be mentioned as a notable example. Fishing is considered another important practice of the people of fringe villages. Moreover, food and fodder collection is also abundantly noticed at the time of field investigation. So, it is mentioned that people inhabiting surroundings of the abandoned channels use these for their different purposes, as a result, land use and land cover of the study area is changing day by day.

### **6.2.1 Demographic characteristics:**

In general, demography is the study of the human population i.e. distribution, sex ratio, structure, ethnicity in a particular place in a particular period of time. Demographically, the study area is well populated.

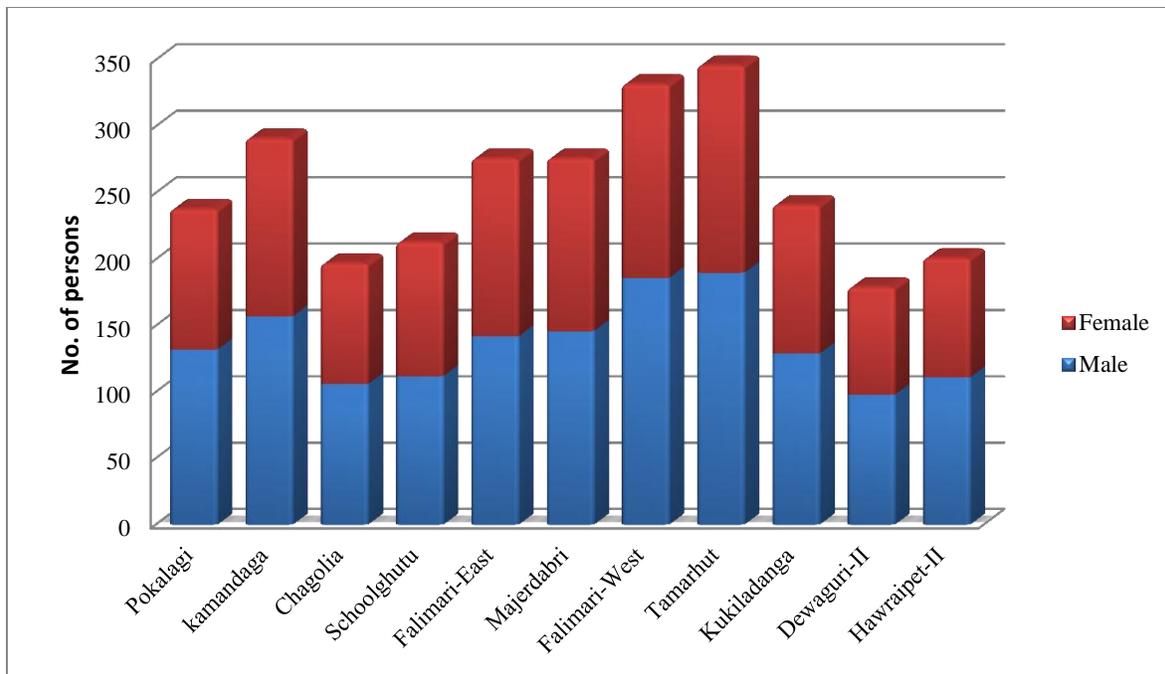
The distribution of population in different villages of study area of the Sankosh river basin is influenced by the Sankosh river and as well as by the presence of abandoned channels. Density of population is higher in the surroundings areas of the abandoned channels than other villages of the study area. It has occurred due to the scope for various occupational opportunities and at the same time the availability of fertile agricultural land in and around of abandoned channels especially in dry season when water level goes down. From the field data it is found that different societies or groups of people are engaged in different types of economic activities and field data reveals that more than 60% are people engaged in agricultural activities, where most of population belongs to the social group of Rajbanshi, Muslim, Namasudra etc.

On the other hand, Santhal and other tribal communities are mostly engaged in food and fodder collection in the study area and they are also engaged in fishing for their own consumption. So it is mentioned that population i.e. their distribution spatial or temporal change, ethnicity, occupational structure, societal bondage etc. all are attached with the presence of abandoned channels in the study area.

**Table No. 6.1: Population Characteristics in the Fringe Villages of Abundant Channels in the Study Area**

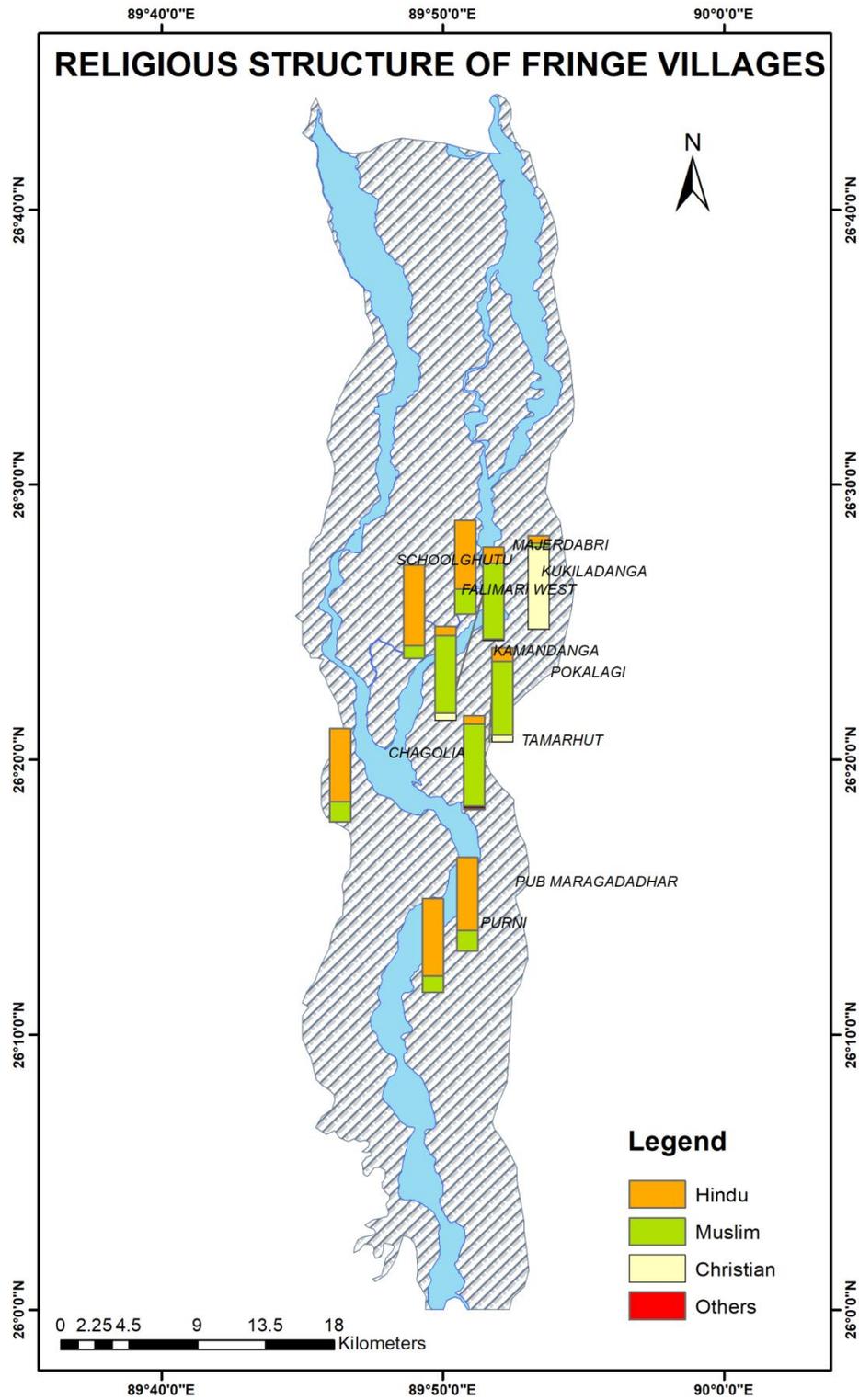
Sl No	Name of Village	Total Population	On the Basis of Sex		On the Basis of Religion				On the Basis of Caste			
			Male	Female	Hindu	Muslim	Christian	Others	Gen	SC	ST	OBC
1	Pokalagi	238	132	106	35	187	16	-	22	11	25	180
2	Kamandaga	291	157	134	28	241	22		18	17	29	227
3	Chagolia	197	106	91	154	43	-	-	117	37	12	31
4	Schoolghutu	213	112	101	17	9	187	-	6	6	192	9
5	Falimari-East	276	142	134	253	23			142	93	21	20
6	Majerdabri	276	146	130	202	74	-	-	124	72	15	65
7	Falimari-West	332	186	146	286	46	-	-	172	102	12	46
8	Tamarhut	346	190	156	30	303	6	7	22	12	15	297
9	Kukiladanga	241	129	112	42	195	4	-	25	21	13	182
10	Dewaguri-II	179	98	81	148	31	-	-	115	15	18	31
11	Hawraipet-II	201	111	90	157	44			95	28	34	44

Source: Primary Survey

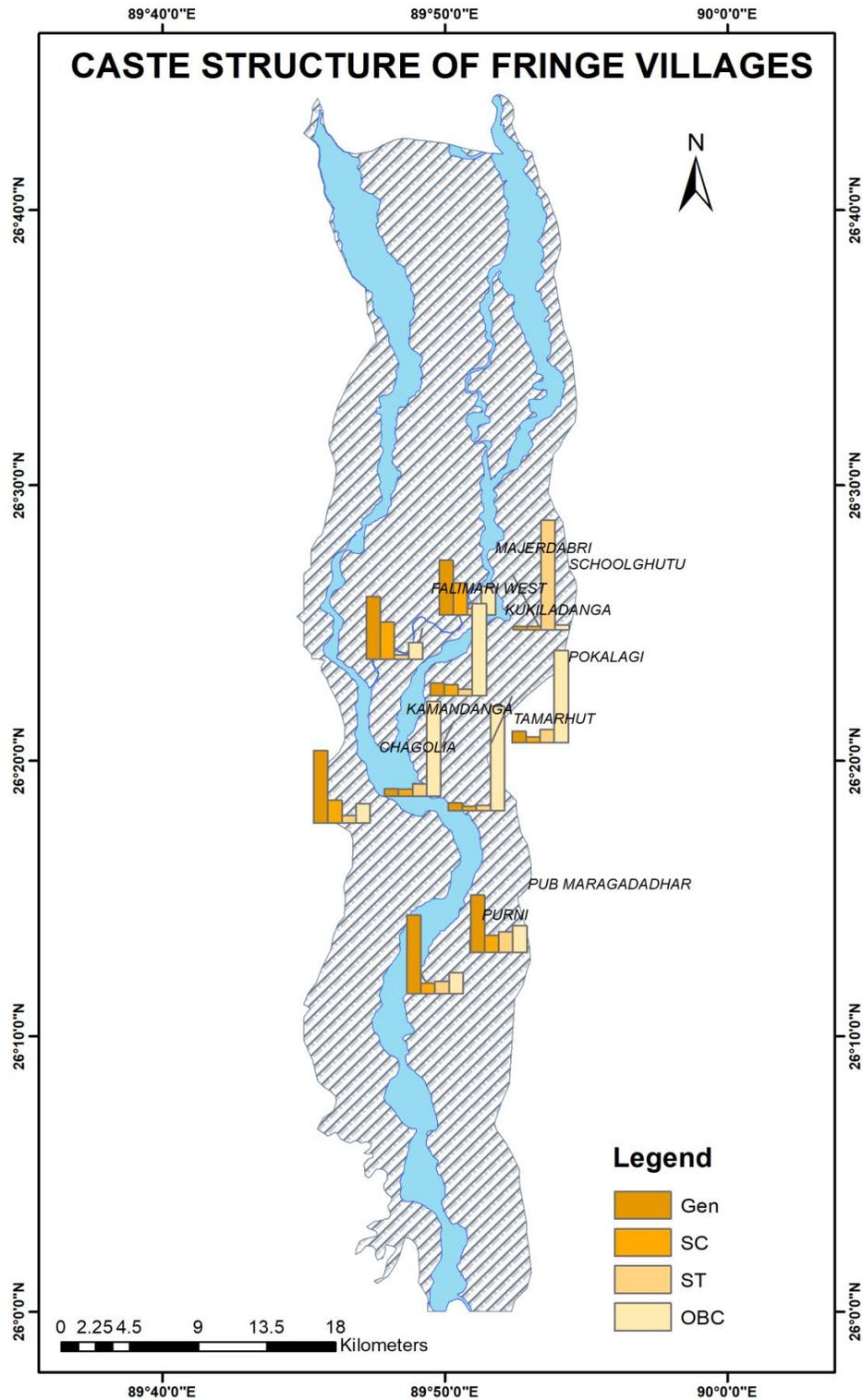


Source: Primary Survey

**Fig. 6.1: Sex Structure of Fringe Villages**



**Map 6.1: Religious Structure of Fringe Villages**



**Map 6.2: Caste Structure of Fringe Villages**

### 6.2.2 Levels of Education:

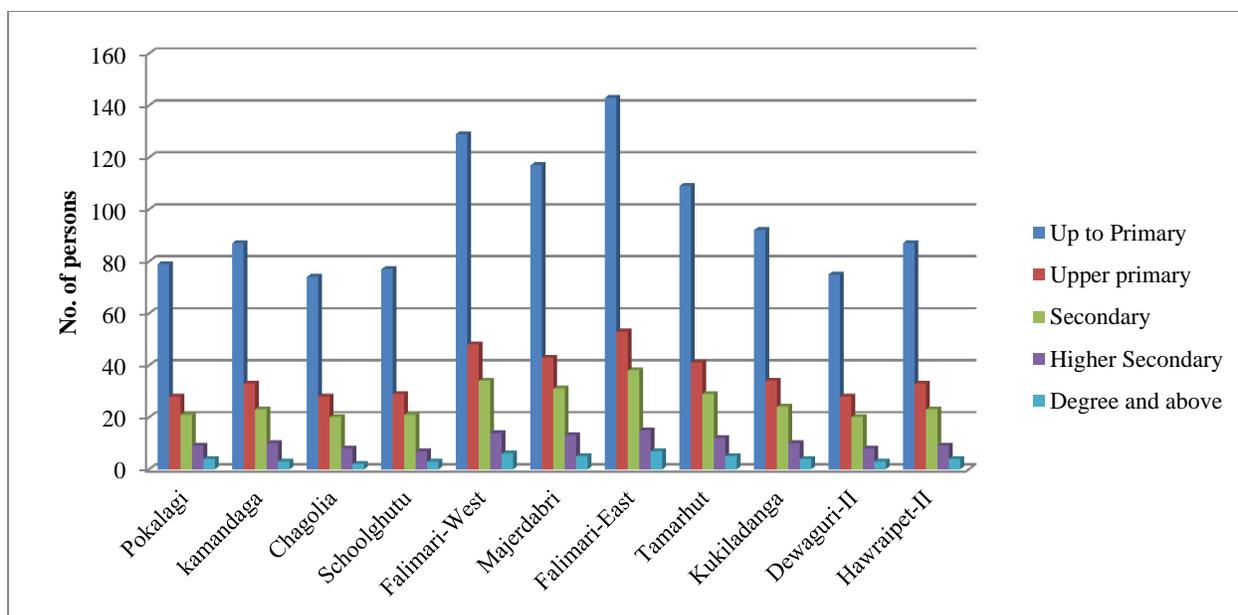
Education improves the quality of people lives and leads to broad social benefits to the society and for their own. It plays a very crucial role in their economic development and at the same time their social progress. It is also mentioned that education is improving income distribution of the people inhabiting the surroundings of the abandoned channels of the study area. From the field data, it is found that education level is poor in the surveyed villages. Most of the people of the surveyed villages belong to Primary level and the percentage is 56.18 followed by Upper Primary (20.94%), Secondary (14.82%), Higher Secondary (6%) and Degree and above (8.06%) etc.

The above-mentioned data of education proves that poor educational status made the areas economically backward on one hand and it increases the dependency on abandoned channels on the other hand.

**Table No. 6.2: Levels of Education in the Fringe Villages**

Sl No.	Name of Village	Numbers in Persons				
		Up to Primary	Upper Primary	Secondary	Higher Secondary	Degree and above
1	Pokalagi	79	28	21	09	04
2	kamandaga	87	33	23	10	03
3	Chagolia	74	28	20	08	02
4	Schoolghutu	77	29	21	07	03
5	Falimari-West	129	48	34	14	06
6	Majerdabri	117	43	31	13	05
7	Falimari-East	143	53	38	15	07
8	Tamarhut	109	41	29	12	05
9	Kukiladanga	92	34	24	10	04
10	Dewaguri- II	75	28	20	08	03
11	Hawraipet-II	87	33	23	09	04

Source: Primary Survey



Source: Primary Survey

**Figure 6.2: Levels of Education in the Fringe Villages**

### 6.2.3 Occupational structure:

The study of occupational structure of population occupies a significant role in the field of population studies, as well as the socio-economic conditions of the study area. It also determines the economic strength of the people inhabiting the surroundings of the studied abandoned channels. Moreover, the study of occupational structures is very important for researcher or planners who initiate plans and policies for social and economic development of any part of a region. In this regard, the study of the occupational structure of the surveyed villages helps to understand the overall socio-economic condition of the villagers and at the same time helps to formulate plans and policies for socio-economic development for future generation.

According to the Census of India (2011), workers have been classified into two broad categories i.e. main workers and marginal workers and these two also been classified into four sub-categories:

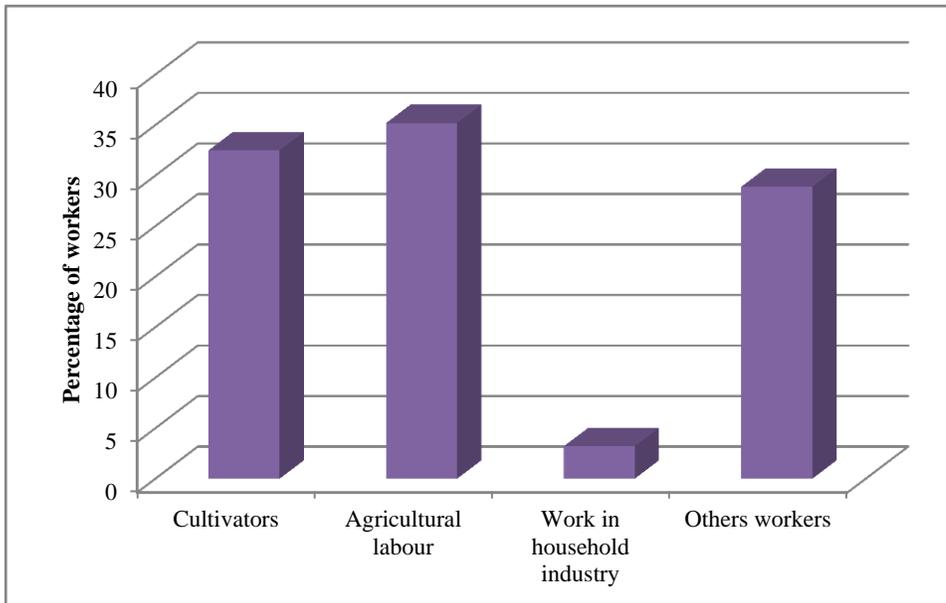
1. Cultivators
2. Agricultural labourers
3. Workers in household industries (HHI)

#### 4. Other workers.

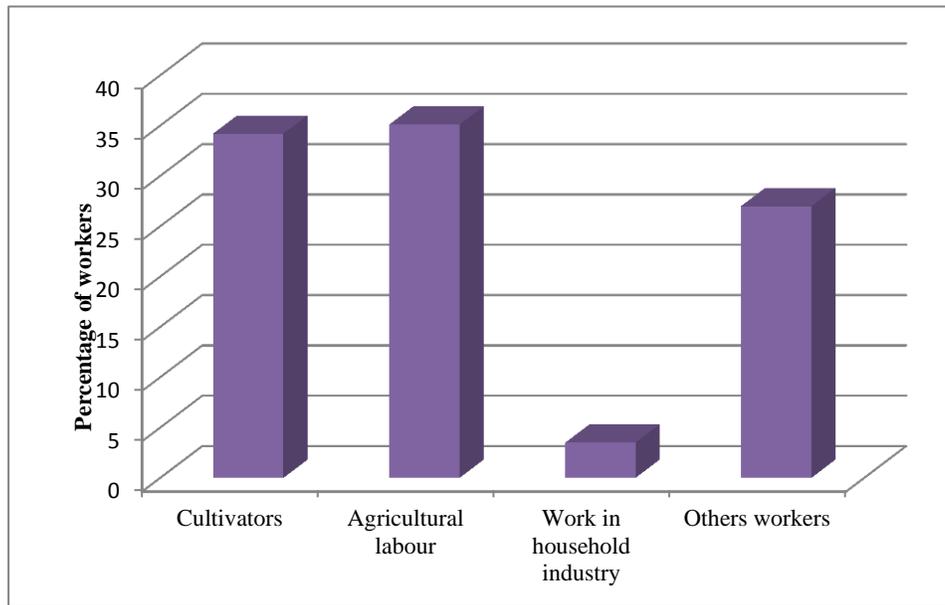
Based on the above industrial classifications of workers, mentioned in the census of India (2011), the research survey has been conducted in a number of villages during the field study in the study area. From the field data of the surveyed villages, it is found that the maximum population are mainly engaged in agriculture and allied activities. Cultivators (33.2%) and agricultural labourers (35.4%) both constitute 68.6% of the total work force in the study area and followed by household industries (3%) and other workers (29.4%) respectively. Here, it is mentioned that the work force in the study area is varied from the percentage of the work force of the national level. It is observed that the percentage of work force in cultivators and agricultural labourers is 33.2% and 35.4% respectively in the study area which is higher than the national level of 24.6% and 30% respectively. On the other hand, the percentage of workforce in household industry (3%) and other workers (29.2%) in the study area is lower than the workforce of national level of 3.8% and 41.6% respectively. Moreover, the occupational structure varies from place to place and from male to female population also. Here it is found that out of total male population, 66.2% of are engaged as cultivators and the corresponding figures for the female population is about 33.8%. On the other hand, out of total female population, 58.4% of are engaged as agricultural labourers and the corresponding figure for male population of about 41.6% is found in the study area. So, it is apparent that the occupational structure not only helps to formulate plans and policies for socio-economic development of the people but also emphasise on particular categories of population belonging to a particular caste and community.

**Table 6.3: Occupational Structure at Fringe Villages**

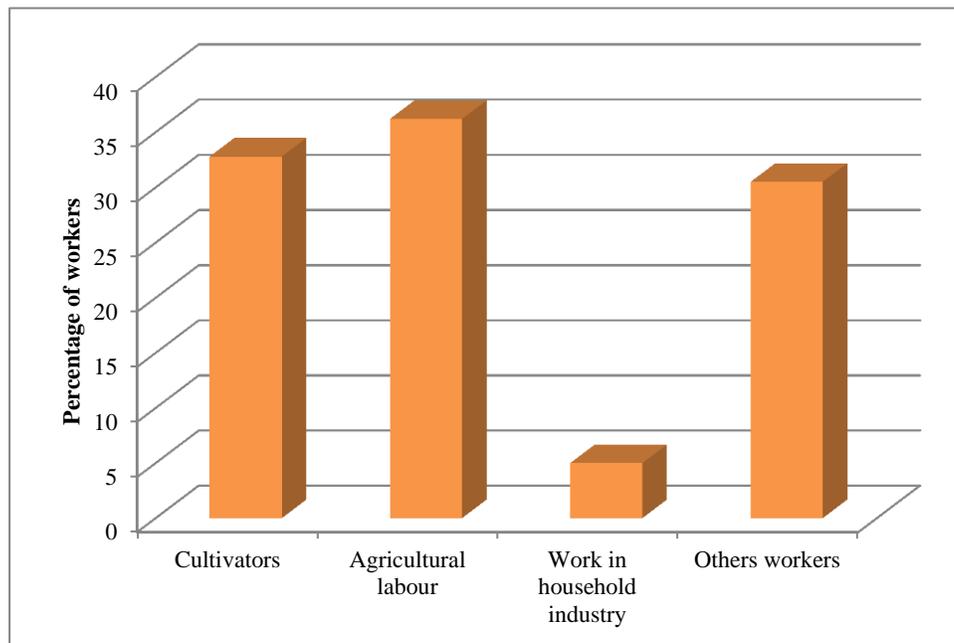
Sl. No	Name of the Village	Category of Workers			
		Cultivators	Agricultural labourers	HHI	Other workers
1	Pokalagi	78	84	07	69
2	Kamandaga	96	101	08	84
3	Chagolia	65	68	06	57
4	Schoolghutu	70	74	06	61
5	Falimari-West	96	91	09	77
6	Majerdabri	97	92	08	76
7	Falimari-East	116	109	10	96
8	Tamarhut	114	121	11	97
9	Kukiladanga	79	85	07	69
10	Dewaguri-II	59	62	05	52
11	Hawraipet-II	66	70	06	58
<b>Study area (%)</b>		<b>32.8</b>	<b>35.2</b>	<b>2.9</b>	<b>29.1</b>
<b>India (%)</b>		<b>24.6</b>	<b>30</b>	<b>3.8</b>	<b>41.6</b>



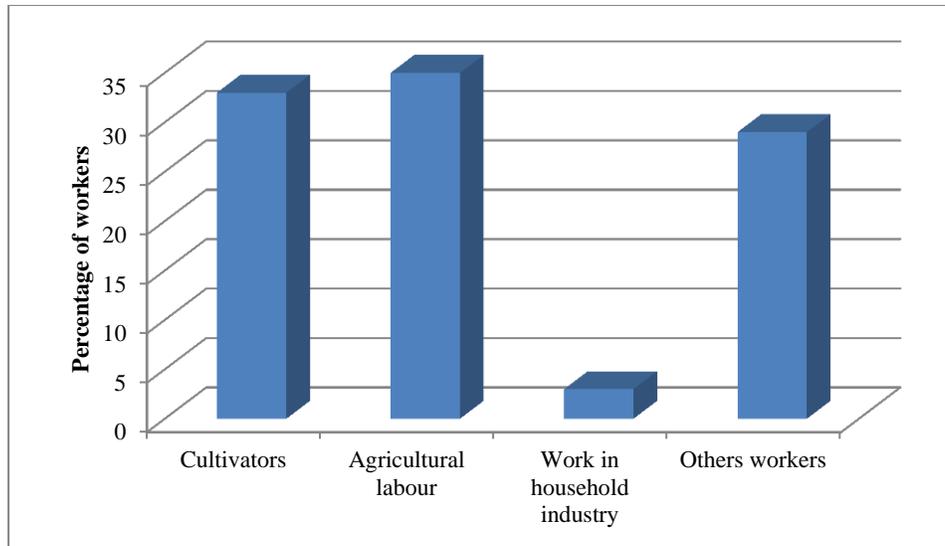
**Figure 6.3: Occupational Structure of Kamandanga Village**



**Figure 6.4: Occupational Structure at Chagolia Village**



**Figure 6.5: Occupational Structure at Schoolghutu Village**



**Figure 6.6: Occupational Structure at Pokalagi Village**

#### **6.2.4 Dependent Livelihood Options:**

Agriculture and allied occupations are the most common livelihood options for the rural people. Major livelihood activities for rural population include cultivation of food crops like paddy, wheat, maize etc. and cash crops like jute, tobacco and fish farming, cattle rearing, dairy farming, food processing, wood industries etc. But in the study area, only few livelihood options have been identified during the field survey through focus group discussions. These identified livelihood options are agriculture, agricultural labourers, fishing, food and fodder collection, livestock and others. Here it is found that there is a limitation of livelihood options for the development of local people in the study area. So, the identification and analysis of all livelihood options in the study area is very essential to generate and promote more livelihood options for the local people. On the basis of occupational habit of the local people and availability of natural resources in and around of abandoned channels in the study area, the livelihood options have been categorized into the following options:

- a) Agriculture
- b) Agricultural labourers
- c) Fishing
- d) Food and fodder collections

- e) Livestock and
- f) Others.

### ***6.3. Socio-Economic importance of abandoned channels***

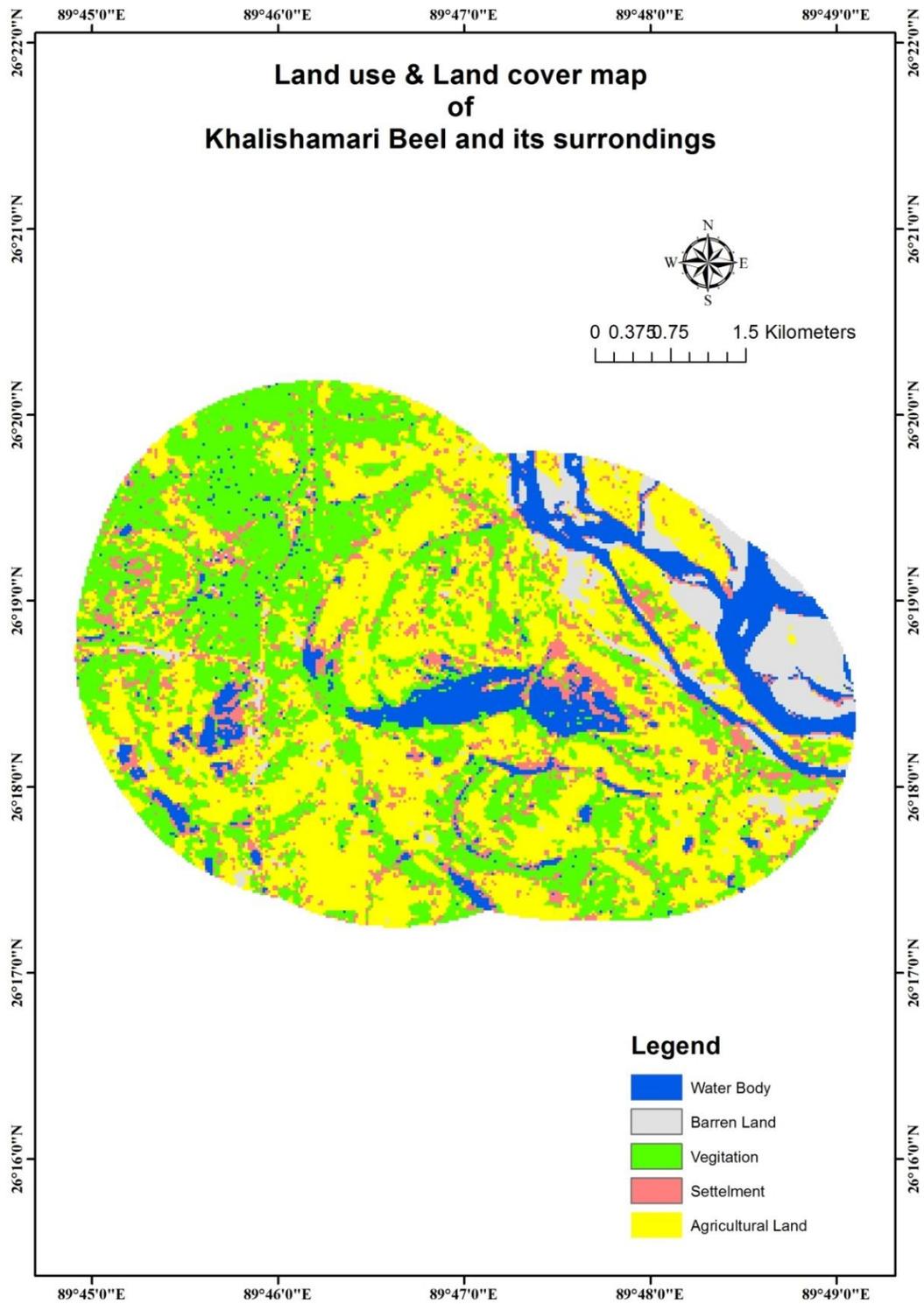
Over all socio-economic conditions of the selected abandoned channels has been analyzed by using primary data through questionnaire during the village survey. All the parameters regarding socio-economic conditions of the local people of the surveyed villages have also been carefully investigated by using various cartographic techniques and on GIS platform.

#### **6.3.1. Abandoned channel 1: Khalisamari beel**

Khalishamari beel is an important abandoned channel formed due to chute cut-off along the right Bank of River Sankosh which are associated with various importance upon which rural socio-economic conditions have depended. It has more and more been valued for natural resources and facility, and the essential biological significance provided to local populations. It is important for people living outside of the abandoned channels for various purposes. Various socio-economic importance as well as biological significance of this abandoned channel has been discussed below.

##### **6.3.1.1 Land use and Land cover:**

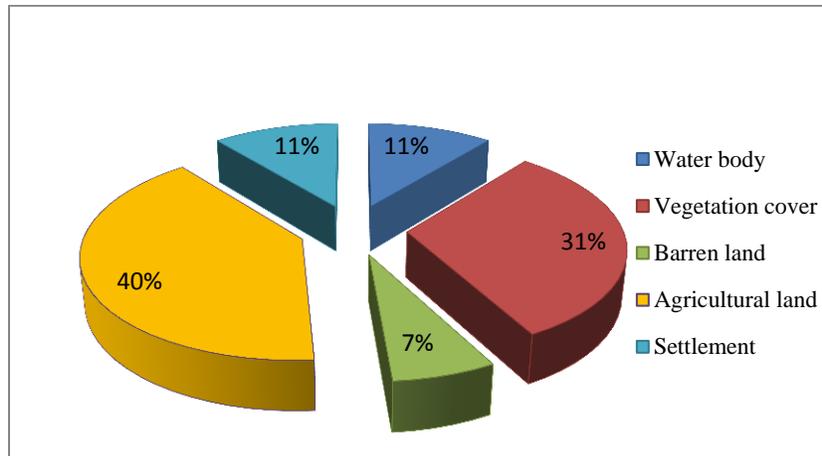
Based on 1km peripheral buffer area, land use and land cover map has been prepared. From this map, complex land use setup has been identified in the surroundings area of the Khalisamari beel. From the collected data from the land use and land cover map it is found that the agricultural land covers the 40% area, and Vegetation covers (31%) area. It is mentioned that both agriculture and forest have occupied more than 70% area of the total area and which have a great significant regarding socio-economic development. On the other hand, water body covers (11%) area, and followed by settlement (11%) and barren land (7%).



Source: LISS-III, BHUVAN (2019)

**Map 6.3: Land Use and Land Cover Map of Khalishamari Beel and its Surroundings, 2019**

From the above data, it is also mentioned that abandoned channels have a number of utility and uses for socio economic development but due to high rate of population growth day by day, the abandoned channel services have faced different kinds of problems and sometimes have steadily diminished. In this regard, it is also mentioned that fishing is considered an important service of this abandoned channel but nowadays fishing intensity, breeding ground and scope of fishery gradually has been going down.



**Figure 6.7: Distribution of Land Use and Land Cover at Surroundings of Khalishamari Beel, 2019**

### **6.3.1.2 Dependent livelihood:**

The livelihood pattern of the residents inhabiting the surroundings of the abandoned channel at Khalishamari beel is primarily based on the availability of occupations supported by the huge reserve of natural resources provided by the abandoned channel itself. This has resulted in bringing which economic gains to the local people. Moreover the immense population pressure and advances in modern technology is also having a marked detrimental effect on the natural environs of Khalishamari beel and is also diminishing the biodiversity of the natural wetland.

**Table 6.4: Pair wise Ranking for Livelihood Option at Khalisamari beel**

Livelihood Option	Agriculture	Agricultural labour	Fishing	Food and fodder collection	Livestock	others
Agriculture	*	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture
Agricultural Labour	Agriculture	*	Fishing	Agricultural Labour	Agricultural Labour	Agricultural Labour
Fishing	Agriculture	Fishing	*	Fishing	Fishing	Fishing
Food and Fodder Collection	Agriculture	Agricultural Labour	Fishing	*	Food and Fodder Collection	Food and Fodder Collection
Livestock	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	*	Livestock
Others	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	*

**Table 6.4a Ranking for Livelihood Option at Khalisamari beel**

Rank	Livelihood Option	Ranking Points
1	Agriculture	1
2	Agricultural labour	3
3	Fishing	2
4	Food and fodder collection	4
5	Livestock	5
6	Others	6

Source: Compiled by Researcher

### 6.3.1.2.1 Agrarian Status:

The main occupation of Khalishamari residents is agriculture that is dominated by cropping of boro paddy in the shallow water areas as well as in the drier sections of the abandoned channel.

The high nutrient value of the alluvial soils and the availability of sufficient water content ensure that the boro paddy cultivation is now a common practice in this area of the study area,

especially during the dry season when the cultivators can expect higher productions of paddy as their main source of livelihood.

The common practice by these farmers is to start boro paddy cultivation in the months of January to February every year, when the marginal areas of the abandoned channel is raised up since the flood waters reduce and the level of the water goes down. Taking advantage of this seasonal process, farmers having ownership of the land of the abandoned channels at Khalishamari beel convert the rivarine areas into agricultural land for boro paddy cultivation. It has been observed that these converted abandoned channels are very rarely allowed to regain the original status and continue to be used for agricultural purposes.

#### **6.3.1.2.2 Fishing:**

Abandoned channels are popularly known as beel or chhara by local people in the study area. These beel and chhara are recognised as habitat and breeding ground for fish. These are also the source of fish for the consumption of poor people in surrounding villages. At the same time, lease holders who have also occupied these beel and chhara for their business purpose. From the field data, it is also mentioned that a major group of people have been involved in an organized way for hunting of fish in the Khalisamari abandoned channel. There are various purposes of fish hunting in the study area. These are:

- a. Fishing for daily consumption of the local people.
- b. Fishing for the livelihood of the fishing community of the study area.
- c. Lease holders who occupy abandoned channels for fishing and for their business.

In the field, we surveyed 35 households at the villages surrounding of Khalishamari abandoned channel. Out of 35 households, 20% of the people directly involved in fish hunting for their livelihood, 12% for own consumption and 4% for their business. So, it is investigated that fish hunting plays an important role on economic development of the villagers inhabited in surrounding areas of the Khalishamari abandoned channel.

#### **6.3.1.2.3 Livestock:**

The field survey revealed that the rural economy of the residents of the surrounding areas of the abandoned channel at Khalishamari beel is greatly dependent on livestock rising. It not only acts

as a primary source of food/nonfood items but is also crucial in contributing to rural livelihoods by way of providing employment, generating a source of income as well as alleviating poverty for the local inhabitants of the study area.

During the field survey it was observed that the most important livestock are cattle, goats, pigs and duck with a predominance and preference for goat and pig cultivation by the locals. Therefore it can be asserted that livestock ranching plays a significant role in the livelihood pattern of the residents within this study area.

#### **6.3.1.2.4 Others:**

Fodder collection is an important activity in Khalisamari abandoned channel of the study area. People collect various waterborne vegetation and supplement fodder etc. from this abandoned channel for their livestock in the monsoon and non- monsoonal periods. Generally, in the dry season when grasses dry up, this abandoned channel becomes the only source of fodder. Moreover, people inhabiting the surroundings of the abandoned channel collect various edible plants like Kalmi, Hinch, Shusni etc. from this abandoned channel for their own consumption. Some other people collect various edible plants also for selling in the local market. Furthermore, Khalisamari abandoned channels also provides wide grazing land for cattle population in the winter and summer season when water level of abandoned channel remains low and which become an important occupation of the people inhabiting the surrounding of Khalisamari abandoned channels. Thereafter, fish farming or pisciculture is also considered as an important economic practice in the Khalisamari abandoned channel. It is also mentioned that due to high demand of fish in the market it makes a profitable business for the local people.

#### **6.3.1.3 Biological importance:**

Khalishamari abandoned channel has great significance in terms of ecological importance and biological diversity in the study area. The beel serves as an important reserve of natural resources as it is a natural habitat for both terrestrial and aquatic flora and fauna, greatly increases the biodiversity stock and contribution to its preservation. The Khalishamari beel plays a significant environmental function in maintaining the food chain and food web of this ecotone region.

During field investigation, the Khalishamari beel was also found to serve as a sanctuary for the migratory birds during the winter months. A significant number of medicinal plants are also found there. The region is also host to a large variety of mammals and reptiles including snakes, frogs, turtles, toads, tortoises, squirrels etc. Thus it has been seen that this abandoned channel has much biological significance for the preservation of biodiversity, ecology, ecosystem and the sustainable development of this area.



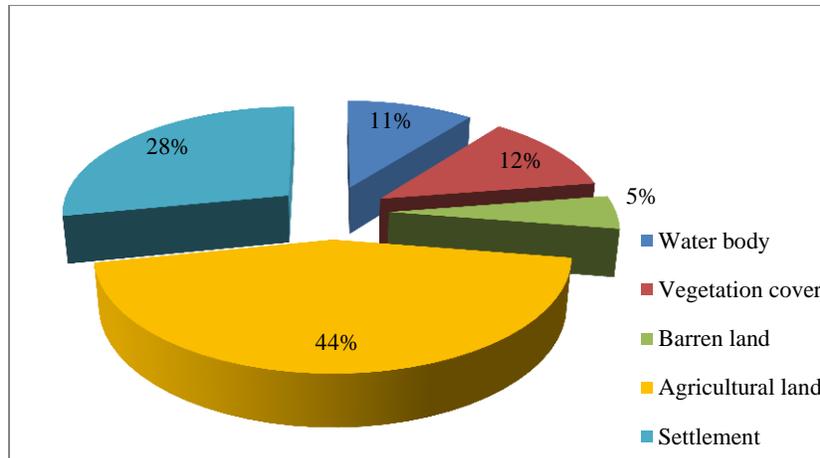
**Plate 6.1: Focus Group Discussion at Khalishamari Beel**

### **6.3.2. Abandoned channel 2: Kamandanga beel**

Kamandanga beel which plays a very important role economically as well as ecologically in the surroundings of the abandoned channel. It has formed along the East Bank of River Sankosh upon which rural socio-economic conditions have depended. A variety of socio-economic importance as well as ecological significance of this abandoned channel has been discussed below.

#### **6.3.2.1 Land use and Land cover:**

Land use and land cover within the 1km peripheral area of the (abandoned channel) Kamandanga beel reveals a complex land use setup. From the collected data during village survey it is found that the agricultural land covers the 44% of area followed by settlement (28%), vegetation cover (12%), water body (11%), and barren land (5%) out of the total area of this abandoned channel.

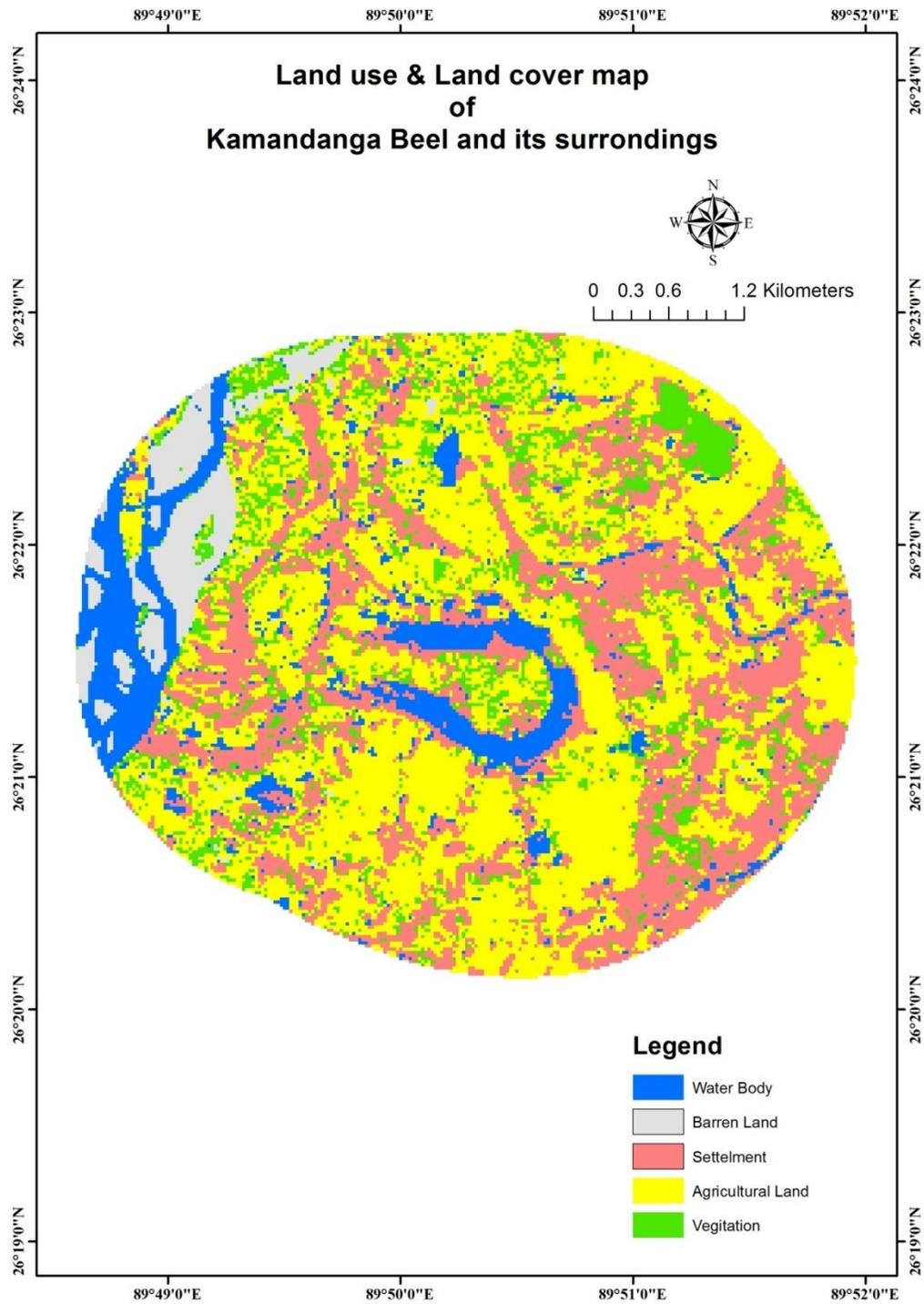


**Figure 6.8: Distribution of Land use and Land cover at Surroundings of Kamandanga Beel, 2019**

From the collected data, it has been clearly mentioned that abandoned channel has a number of utility and uses for socio economic development but with increase of population day by day most of the abandoned channel services have faced different kinds of problems and sometime have steadily diminished. In this regard, it is also mentioned that fishing is considered an important service of abandoned channel but nowadays fishing intensity, breeding ground and scope of fishery is gradually going down. Other uses of Kamandanga abandoned channels are rarely found there due to unavailability of different biotic and abiotic components, which provide the specific services.

#### **6.3.2.2 Dependent livelihood:**

On the basis of available occupational habit and allied economic activities of the local people of the study area, various livelihood options have been selected through focus group discussion during village survey. The main livelihood options of the local people are agriculture, agricultural labour, fishing, food and fodder collection, livestock and others. Here, it is also mentioned that this abandoned channel provides huge number of natural resources which have much economic value for the local people. But due to immense population pressure over the abandoned channel and the development of modern technology, some important natural resources are decreasing and disappearing day by day and environment of the surroundings areas of Kamandanga beel has been affected very badly.



Source: LISS-III, BHUVAN (2019)

**Map 6.4: Land use and Land cover Map of Kamandanga Beel and its Surroundings, 2019**

**Table 6.5: Pair wise Ranking for Livelihood Option at Kamandanga beel**

Livelihood Option	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	Others
Agriculture	*	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture
Agricultural Labour	Agriculture	*	Fishing	Agricultural Labour	Agricultural Labour	Agricultural Labour
Fishing	Agriculture	Fishing	*	Fishing	Fishing	Fishing
Food and Fodder Collection	Agriculture	Agricultural Labour	Fishing	*	Food and Fodder Collection	Food and Fodder Collection
Livestock	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	*	Livestock
Others	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	*

Source: Compiled by Researcher

**Table 6.5a: Ranking for Livelihood Option at Kamandanga beel**

Rank	Livelihood Option	Ranking Points
1	Agriculture	1
2	Agricultural Labour	3
3	Fishing	2
4	Food and Fodder Collection	4
5	Livestock	5
6	Others	6

Source: Compiled by Researcher

### 6.3.2.2.1 Agrarian Status:

Agriculture is the mainstay for the local people inhabited surroundings of the Kamandanga beel. In the study area, presently agricultural practices are changed due to technological innovations, demographic changes and inclusion of new high yielding varieties of different crops. In this regard, Boro paddy cultivation can be mentioned. It is now under the agricultural practice in the

shallow water areas mainly in the dry areas of Kamandanga abandoned channels in the study area. High nutrient value of soil and water content have made favorable conditions for Boro paddy cultivation in the study area. As a result, the Boro paddy cultivation in the surroundings areas of Kamandanga abandoned channel becomes a common agricultural practice especially in dry season and where cultivators accept a higher production of paddy for their livelihood. Generally, Boro paddy cultivation starts in the month of January –February every year when the water level goes down and marginal areas of abandoned channels are raised up as fertile land. In this situation, farmers having ownership of the land of Kamandanga abandoned channel convert it into agricultural land for Boro paddy cultivation in the study area. It is also observed that once the lands of abandoned channel are converted into agricultural land, it never regains the original status.

It was observed during field survey that nearly 40% of area of total area of Kamandanga abandoned channel is under the Boro paddy cultivation and about 59.29% people engaged directly with this agricultural practice and 5.71% people are also engaged as agricultural labourers and this practice increases day by day.

#### **6.3.2.2.2 Fishing:**

Abandoned channels are also known as beel or chhara by local people in the study area. These are recognised as habitats and breeding grounds for fish and are also the source of fish for the poor people in the surrounding villages. From the field data, it is found that there have been large groups of people involved in organised fishing in the Kamandanga abandoned channel. These are:

- d. Fishing for daily consumption of the local people.
- e. Fishing for the livelihood of the fishing community of the study area.
- f. Lease holders who occupy abandoned channels for fishing and for their business.

In the field survey, out of 53 households, 15.64% of the people are directly involved in fishing for their consumption. So, it is mentioned that fishing plays an important in the role economic development of the villagers inhabiting the surroundings of the Kamandanga abandoned channels.

#### **6.3.2.2.3 Livestock:**

Livestock plays an important role in rural economy of the local people and it also contribute to rural livelihoods, employment and poverty relief for the local people of the study area. Livestock provides food and non-food items for the rural people and also helps to earn money from the rural as well as neighboring urban market. In the study area most important livestock are cattle, goats, pigs, and duck, chicken. Some of these provide milk and meat as food and some other provide non-food materials like fibre, skin etc. which have much economic value. Cattle rearing are highest in the grazing lands of Kamandanga abandoned channel followed by poultry and goats.

On the other hand, goats and pigs cultivation are also abundantly practiced by the local people in the surroundings areas of the Kamandanga abandoned channel. So, finally it is investigated that the livestock provides food and non-food items to the people on one hand and it is also plays an important role in the development of economy for local the people in the study area on the other hand.

#### **6.3.2.2.4 Others:**

Fodder collection is another important activity in the Kamandanga abandoned channel of the study area. People collect various water-borne vegetation and supplement fodder etc for their livestock in the monsoon and non-monsoonal periods. Generally, in the dry season when grasses dry up, this abandoned channel becomes the only source of fodder. Apart from the fodder collection, the surrounding households collect various edible plants like Kalmi, Hinch, Shusni etc. from this abandoned channel for their own consumption. Some people collect various edible plants also for selling in the local market. Moreover, Kamandanga abandoned channel also provides wide grazing land for cattle population in the winter and summer seasons, when water level of the abandoned channel remains low and this becomes an important occupation of the people inhabiting the surrounding areas of Kamandanga abandoned channel. Thereafter, fish farming or pisciculture is also considered as an important practice in the Kamandanga abandoned channel.

### **6.3.2.3 Biological importance:**

Kamandanga abandoned channel has a great ecological importance to the environment. It provides habitat for wildlife and maintains biodiversity of aquatic habitat. It is also recognized as an important natural resource and significant biodiversity stock in the study area. Moreover, it is also significant for environmental functions and maintains the food chain and food web formations.

During the field observation it is found that Kamandanga beel is also considered as the home for migratory birds that pass the winter there. A significant number of medicinal plants are also found there. Moreover, in the study area, a number of varieties of mammals and reptiles including snakes, frogs, turtles, toads, tortoise, squirrel etc. inhabit in and around the surrounding areas of Kamandanga beel. So, it is investigated that this abandoned channel is biologically more significant for the preservation of biodiversity, ecology, ecosystem and sustainable development.



**Plate 6.2: Paddy cultivation at the Peripheral Areas of Kamandanga Beel**

### **6.3.3. Abandoned channel: Purba Charra**

One objective of this study was to determine whether gender, education and abandoned channels functions have multiple influences on the annual income of the local population. Purbachhara is an abandoned channel formed beside the east bank of River Sankosh and is associated with various occupations upon which the surrounding rural, social and economic status of the local residents have depended. An assessment of the socio-economic consequence as well as the biological importance of this abandoned channel has been discussed below.

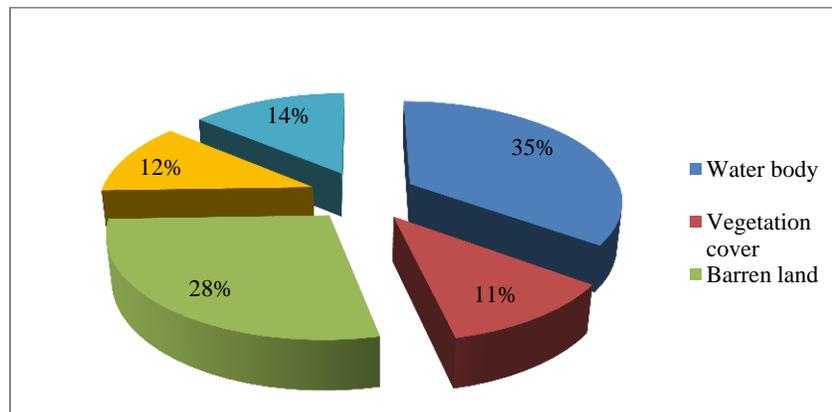
### 6.3.3.1 Land use and Land cover:

Land use and land cover within the 1km peripheral area of the (abandoned channel) Purba Chhara reveal a complex land use setup. From the collected data, it is found that the water body covers the 35% of the area, followed by settlement (14%), agricultural land (12%), vegetation cover (11%), and barren land (11%).

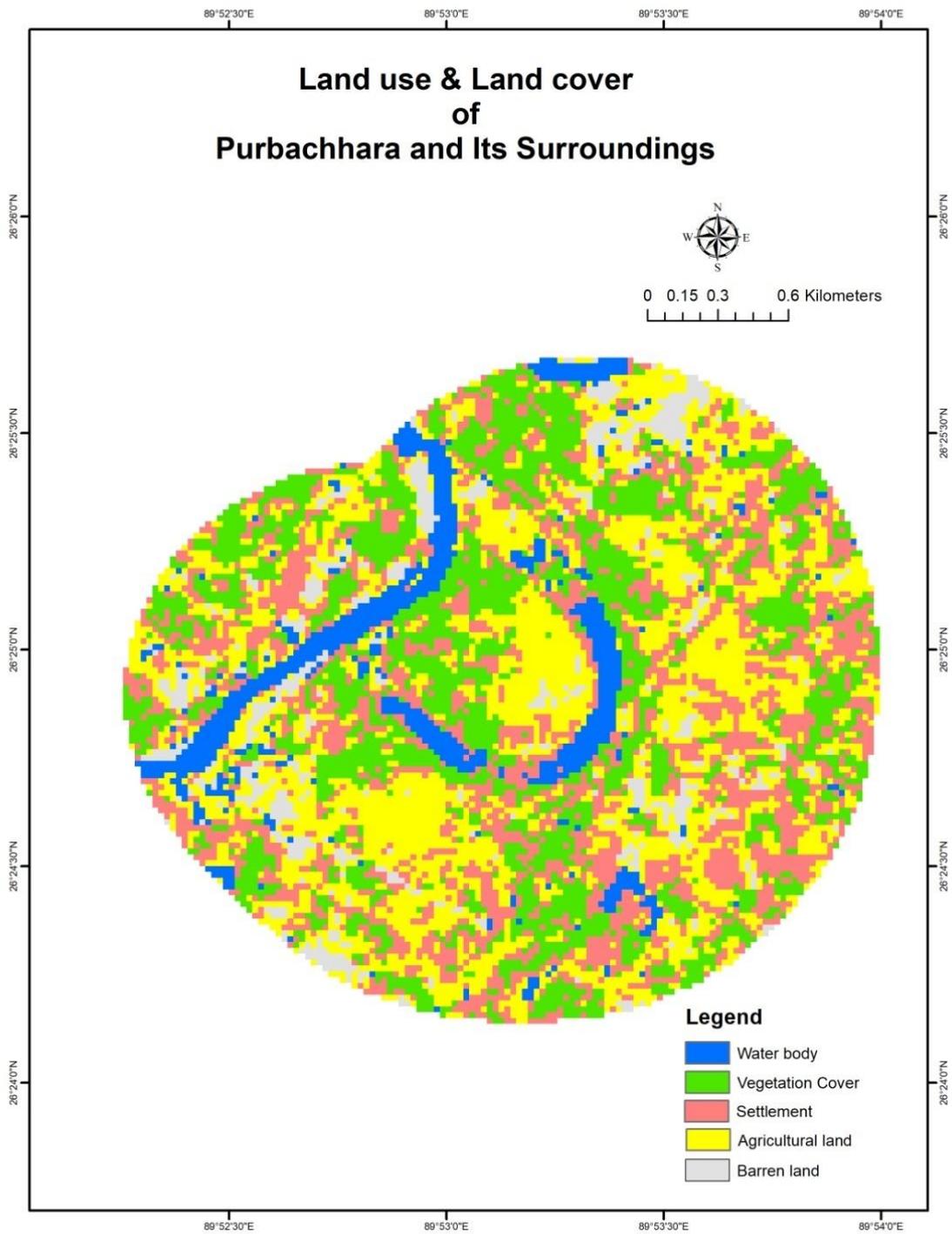
From the above data, it can be clearly seen that the abandoned channel has a number of utility and uses for socio-economic development but with increasing population day by day, most of the abandoned channel services have faced different kinds of problems and have steadily diminished over time. In this regard, it is also mentioned that fishing is considered an important service of abandoned channel but nowadays, fishing intensity, breeding grounds and scope of fishery is gradually decreasing.

### 6.3.3.2 Dependent livelihood:

The structure of the livelihood pattern based on abandoned channel varies from place to place in the study area. It is also mentioned that this abandoned channel provides a huge number of resources which have much economic value for the local people. But due to immense population pressure and the development of modern technology, environment of the surroundings areas of Purbachhara beel is affected very badly and has today degraded the natural wetland also.



**Figure 6.9: Distribution of Land use and Land cover at Surroundings of Purba Chhara, 2019**



Source: LISS-III, BHUVAN (2019)

**Map 6.5: Land use and Land cover map of Purbachhara and its Surroundings, 2019**

### 6.3.3.2.1 Agrarian Status:

At present, agriculture remains the primary occupation of the people living in the surrounding areas of the Purbachhara beel. These practices have been markedly overhauled by technological innovations, demographic changes and new high yielding varieties of different crops. In this case. As with earlier case study areas, the cultivation of Boro paddy predominates within the dry areas of Purbachhara abandoned channel in the study area.

**Table 6.6: Pair wise Ranking for Livelihood Option at Purba Charra**

Livelihood Option	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	Others
Agriculture	*	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture
Agricultural Labour	Agriculture	*	Fishing	Agricultural Labour	Agricultural Labour	Agricultural Labour
Fishing	Agriculture	Fishing	*	Fishing	Fishing	Fishing
Food and Fodder Collection	Agriculture	Agricultural Labour	Fishing	*	Livestock	Food and Fodder Collection
Livestock	Agriculture	Agricultural Labour	Fishing	Livestock	*	Livestock
Others	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	*

**Table 6.6a: Ranking for Livelihood Option at Purba Charra**

Rank	Livelihood Option	Ranking Points
1	Agriculture	1
2	Agricultural Labour	3
3	Fishing	2
4	Food and Fodder Collection	5
5	Livestock	4
6	Others	6

Source: Compiled by Researcher

#### **6.3.3.2.2 Fishing:**

The Purbachhara beel is recognized as an important habitat and breeding ground for fish and also as a source of fish for the poor people in the surrounding villages. From the field data, it is found that this beel falls within the Kokrajhar district of Assam. A large number of local people are involved in organized fishing in the Purbachhara abandoned channel.

#### **6.3.3.2.3 Livestock:**

Livestock plays an important role in rural economy and it also contributes to rural livelihoods, employment and poverty relief for the local people of the study area. In the study area, the common livestock are cattle, goats and chicken, which are sources for provision of milk, meat as well as food, while some other provide non-food materials like fibre, hide etc. It also plays a key role in the economy of the people of the study area.

#### **6.3.3.2.4 Others:**

Fodder collection is another important activity in Purbachhara abandoned channel of the study area.. Generally in the dry season when grasses dry up, this abandoned channel becomes the only source of fodder. Apart from the fodder collection, the surrounding households collect various edible plants like Kalmi, Hinch, Shusni etc. from this abandoned channel for their own consumption. Moreover Purba Chhara abandoned channel also provides grazing land for the cattle population. Fish farming or pisciculture is also considered as an important practice in the

Purba Chhara abandoned channel. It can also be mentioned that due to high demand of fish it serves a profitable means of livelihood for the local people.

### **6.3.3.3 Biological importance:**

Purbachhara abandoned channel has a significant ecological importance relating to the environment and to the locality, chiefly as a habitat for wildlife and by maintaining biodiversity of the area. Moreover, it is also significant in environmental functions and in all food chain and food web formations.

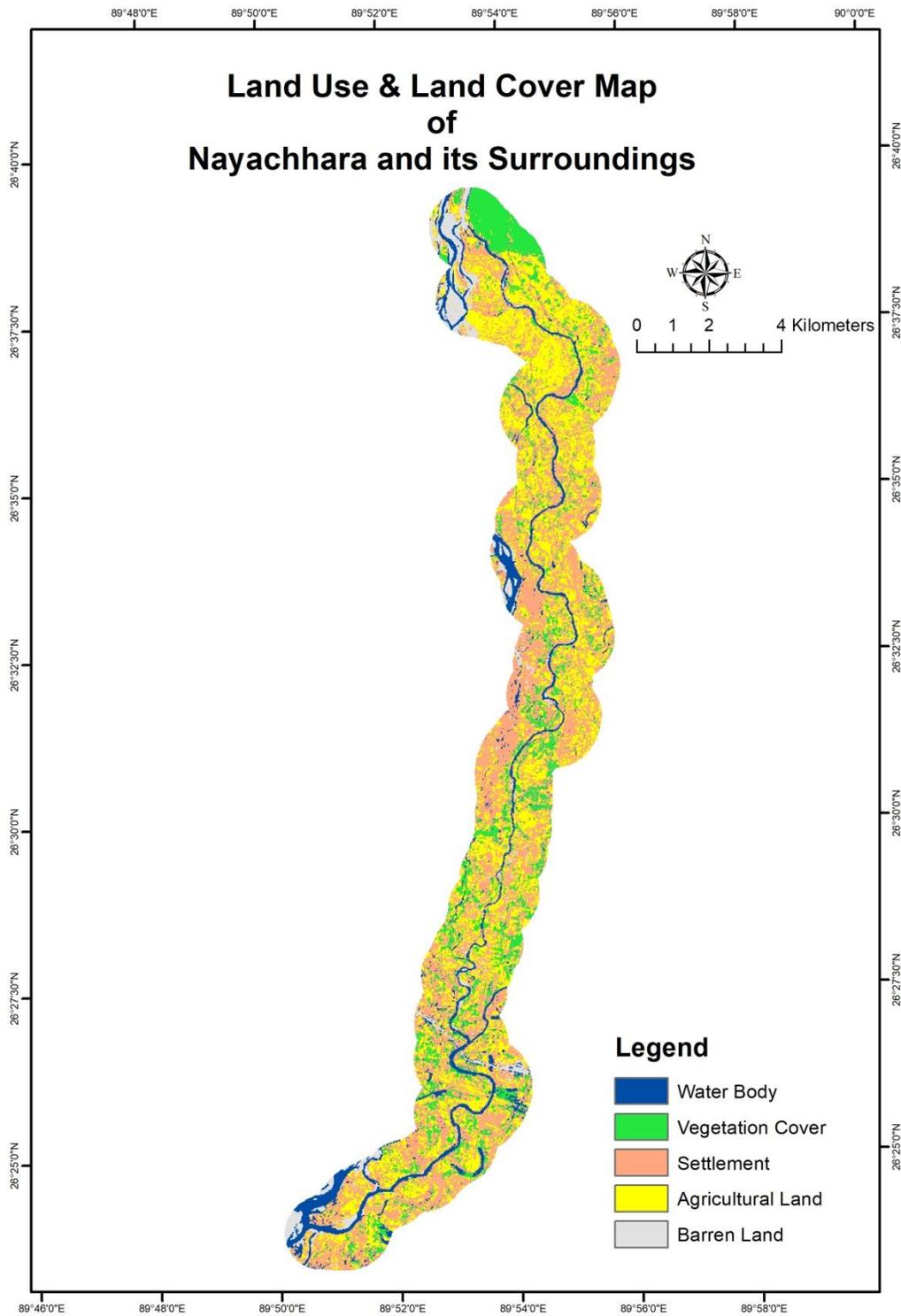
In the field investigation, it was observed that Purbachhara beel also serves as a home for migratory birds during the winter months. This abandoned channel hosts a significant variety of local flora and fauna, including some important medicinal plant species. Thus, it is evident that this abandoned channel is biologically more significant for the preservation of biodiversity and ecology of the region.

### **6.3.4. Abandoned channel 4: Naya Charra**

Abandoned channels benefit the surrounding environment, essentially by way of flood control, groundwater recharge, and pollution reduction (Bhattacharya et al. 2008). Naya chhara is an abandoned channel, along the east bank of River Sankosh in Assam and has a considerable impact on the local people's socio-economic environment.

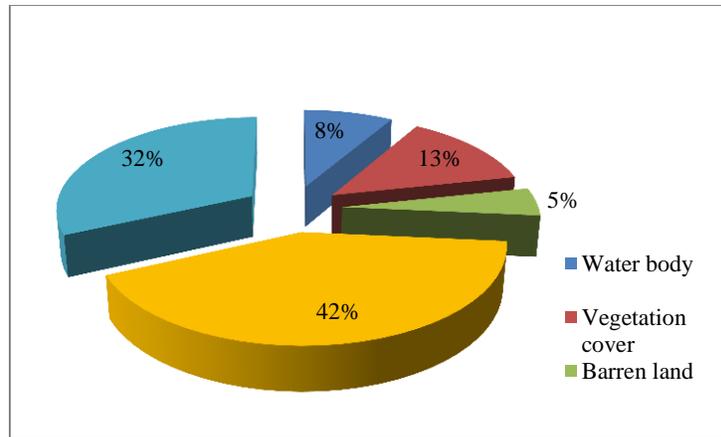
#### **6.3.4.1 Land use and Land cover:**

Land use and land cover within the 1 km peripheral area of the (abandoned channel) Nayachhara beel reveal a complex land use setup. From the collected data, it is found that the agricultural land covers the 42% area followed by settlement (32%), vegetation cover (13%), water body (8%), and barren land (5%). From the above data, it can be clearly mentioned that abandoned channel has a number of utility for socio economic development but with an increase of population day by day most of the abandoned channel services have faced different kinds of problems and sometimes, have steadily diminished. In this regard, it can also be mentioned that fishing is considered an important service of abandoned channels, but has gradually diminished.



Source: LISS-III, BHUVAN (2019)

**Map 6.6: Land use and Land cover map of Nayachhara and its Surroundings, 2019**



**Figure 6.10: Distribution of Land use and Land cover at surroundings of Naya Chhara, 2019**

#### **6.3.4.2 Dependent livelihood:**

The structure of the livelihood pattern based on abandoned channel varies from place to place in the study area. This abandoned channel provides a huge number of resources which have much economic value for the local people. But due to immense population pressure and the development of modern technology, the environment of the surroundings areas of Nayachhara beel has been affected very badly and has also diminished the natural wetland.

##### **6.3.4.2.1 Agrarian Status:**

Due to the high nutrient value of the soils and water content, the boro paddy cultivation in the Purba Chhara abandoned channel areas is now a common practice, especially in the dry season and where cultivators expect a higher production of paddy for their livelihood.

In the field survey, it was found that out of total area of Nayachhara abandoned channel, nearly 42% area was under cultivated land and near about 49.29% people engaged directly with this agricultural practice.

**Table 6.7: Pair wise Ranking for Livelihood Option at Naya Charra**

Livelihood Option	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	Others
Agriculture	*	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture
Agricultural Labour	Agriculture	*	Agricultural Labour	Agricultural Labour	Agricultural Labour	Agricultural Labour
Fishing	Agriculture	Agricultural Labour	*	Fishing	Fishing	Fishing
Food and Fodder Collection	Agriculture	Agricultural Labour	Fishing	*	Food and Fodder Collection	Food and Fodder Collection
Livestock	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	*	Livestock
Others	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	*

**Table 6.7a: Ranking for Livelihood Option at Naya Charra**

Rank	Livelihood Option	Ranking Points
1	Agriculture	1
2	Agricultural Labour	2
3	Fishing	3
4	Food and Fodder Collection	4
5	Livestock	5
6	Others	6

Source: Compiled by Researcher

#### 6.3.4.2.2 Fishing:

These abandoned channels are recognized as habitats and breeding grounds for fish. From the field data, it was found that these areas fall within the Kokrajhar district of Assam and is characterized by a group of people who are involved in organized fishing in the Nayachhara abandoned channel.

In the field survey, there were 130 households at the villages surrounding Nayachhara abandoned channel. Out of these 15.81% of the local people were directly involved in fishing for their livelihood, which supports the economic development of the villagers inhabiting the surrounding areas of the Nayachhara abandoned channel.

#### **6.3.4.2.3 Livestock:**

Livestock plays an important role in rural economy and it also contribute to rural livelihoods, employment and poverty relief for the local people of the study area. In this study area also, most important livestock were cattle, goats, pigs, and duck, chicken. Goat rearing took up the highest rank in grazing lands of Nayachhara i.e., 3.71%. Thus, the livestock provides food and non-food items to the people on one hand and it are also plays an important role in the economy of the people of the study area on the other hand.

#### **6.3.4.2.4 Others:**

Fodder collection is another important activity in Nayachhara abandoned channels of the study area. Generally, in the dry season when grasses dry up these abandoned channels become the only source of fodder. Some people collect various edible plants also for selling in the local market.

#### **6.3.4.3 Biological importance:**

Nayachhara abandoned channel has a great ecological importance to the environment and to the locality. It can provide habitat for wildlife and maintains biodiversity of aquatic habitat also. It is recognized as an important natural reserve and significant for the biodiversity stock and its preservation.

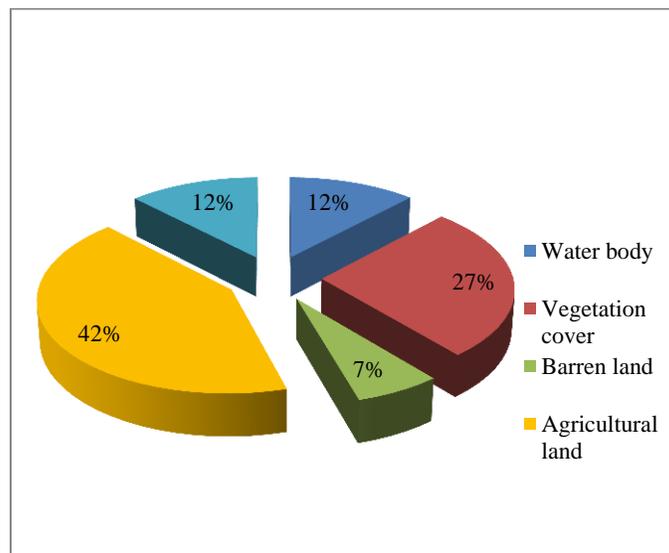
In the field investigation it was found that Nayachhara beel is also considered as the home for migratory birds that pass the winter there. A significant number of medicinal plants are also found there. So, it is said that this abandoned channel is biologically more significant for the preservation of biodiversity, ecology, ecosystem and sustainable development.

### 6.3.5. Abandoned channel 5: Tama Nadi

Tama Nadi is an abandoned channel formed along the west bank of River Sankosh. A multiple socio-economic importance as well as biological significance of this abandoned channel is examined below.

#### 6.3.5.1 Land use and Land cover:

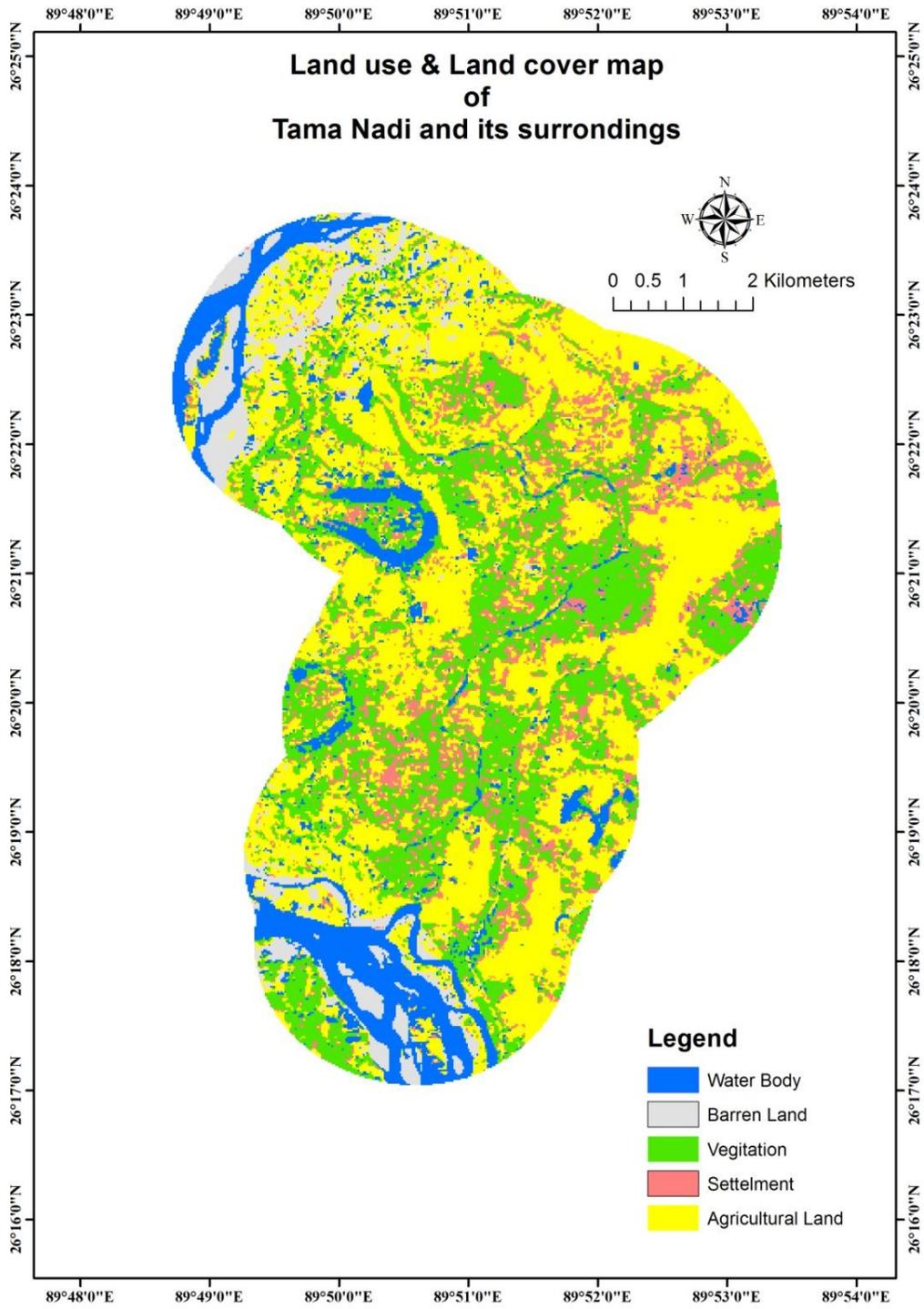
Land use and land cover within the 1km peripheral area of the abandoned channel Tama Nadi reveals a complex land use setup. From the collected data it is found that the agricultural land covers 42% of the area, followed by vegetation cover (27%), water body (11%), settlement (12%) and barren land (7%). From the above data, it can be clearly mentioned that abandoned channel has a number of utility and uses for socio economic development.



**Figure 6.11: Distribution of Land use and Land cover at Surroundings of Tama Nadi, 2019**

#### 6.3.5.2 Dependent livelihood:

The structure of the livelihood pattern based on abandoned channel varies from place to place in the study area. This abandoned channel provides a huge number of resources which have much economic value for the local people. But due to immense population pressure and the development of modern technology, the environment of the surroundings areas of Tama Nadi is getting degraded day by day.



Source: LISS-III, BHUVAN (2019)

**Map 6.7: Land use and Land cover Map of Tama Nadi and its Surroundings, 2019**

**Table 6.8: Pair wise Ranking for Livelihood Option at Tama Nadi**

Livelihood Option	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	Others
Agriculture	*	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture
Agricultural Labour	Agriculture	*	Fishing	Agricultural Labour	Agricultural Labour	Agricultural Labour
Fishing	Agriculture	Fishing	*	Fishing	Fishing	Fishing
Food And Fodder Collection	Agriculture	Agricultural Labour	Fishing	*	Livestock	Food and Fodder Collection
Livestock	Agriculture	Agricultural Labour	Fishing	Livestock	*	Livestock
Others	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	*

**Table 6.8a: Ranking for Livelihood Option at Tama Nadi**

Rank	Livelihood Option	Ranking Points
1	Agriculture	1
2	Agricultural Labour	3
3	Fishing	2
4	Food and Fodder Collection	5
5	Livestock	4
6	Others	6

Source: Compiled by Researcher

### 6.3.5.2.1 Agrarian Status:

At present, agricultural practices are dominated by the cultivation of boro paddy, owing to the high nutrient value of the soils and water content in the Tama Nadi abandoned channel area, especially in dry season. agricultural land for boro paddy cultivation. It is observed that once the lands of abandoned channel are converted into agricultural land, they never regain their original status.

In the field survey, it was found that out of the total area of Tama Nadi abandoned channel, nearly 42% area was under paddy cultivation, whereas 50.52% areas cultivated seasonal vegetables. Sometimes mono cropping with paddy cultivation was prevalent.

#### **6.3.5.2.2 Fishing:**

From the field data, it was found that nearly 21.68% people were directly involved in fishing. So, it can be mentioned that fishing plays an important role in the economic development of the villagers inhabiting the surroundings of the Tama Nadi abandoned channel.

#### **6.3.5.2.3 Livestock:**

Livestock provides food and non-food items for the rural people and also helps them to earn money from the market. In study area, the most important livestock are cattle, goats, pigs, duck, chicken. Among all the livestock dependent people, 7.22% engaged in cattle rearing as means of sustainable livelihood.

#### **6.3.5.2.4 Others:**

Fodder collection is another important activity in and around the areas of the Tama Nadi abandoned channel of the study area with 5.67% of the people engaged in this occupation. People collect and supplement fodder etc for their livestock in the monsoon and non-monsoonal periods. Generally, in the dry season when grasses dry up this abandoned channel become the only source of fodder. Moreover, the Tama Nadi abandoned channel also provides a wide grazing land for cattle population in the winter and summer seasons, when water level of abandoned channel remains low and this becomes an important occupation of the people inhabiting the surroundings of the Tama Nadi abandoned channel.

#### **6.3.5.3 Biological importance:**

Tama Nadi abandoned channel has a great ecological importance. It provided habitat for wildlife and maintains biodiversity of the aquatic habitat. Moreover, it is also significant in environmental functions and in all food chain and food web functions.

**Table 6.9: Biological Importance of Different Local Plants**

Scientific Name	Local Name	Uses
<i>Enydra fluctuans</i> Lour	Helench	Used as vegetable
<i>Ipomoea aquatic</i> Forssk	Kalmi sak	Used as vegetable
<i>Alocasia indica</i> (Lour.)Spach	Kachu	Used as vegetable
<i>Centella asiatica</i>	Thankuni	Used as vegetable
<i>Alternanthera philoxeroides</i> (Mart.)Griseb	Jaldhora	Used as vegetable

In the field investigation it is found that Tama Nadii abandoned channel also serves as the home for migratory birds that pass the winter there. A significant number of medicinal plants are also found there. Moreover, there are a number of varieties of mammals and reptiles in and around the surroundings area of Tama Nadii abandoned channel. So, it is said that this abandoned channel is biologically more significant for the preservation of biodiversity and sustainable development.



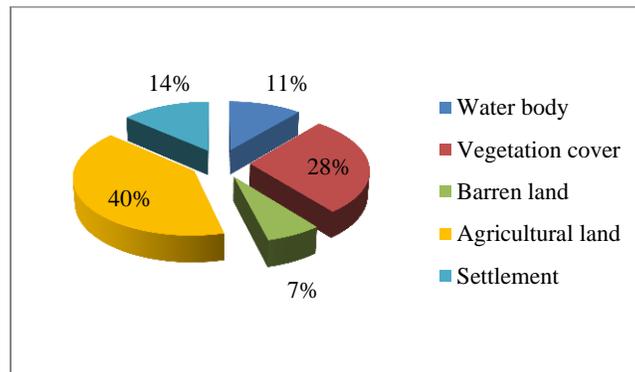
**Plate 6.3: Jute Wetting at Tama Nadi**

### 6.3.6. Abandoned channel 6: Avulsed Channel at Falimari

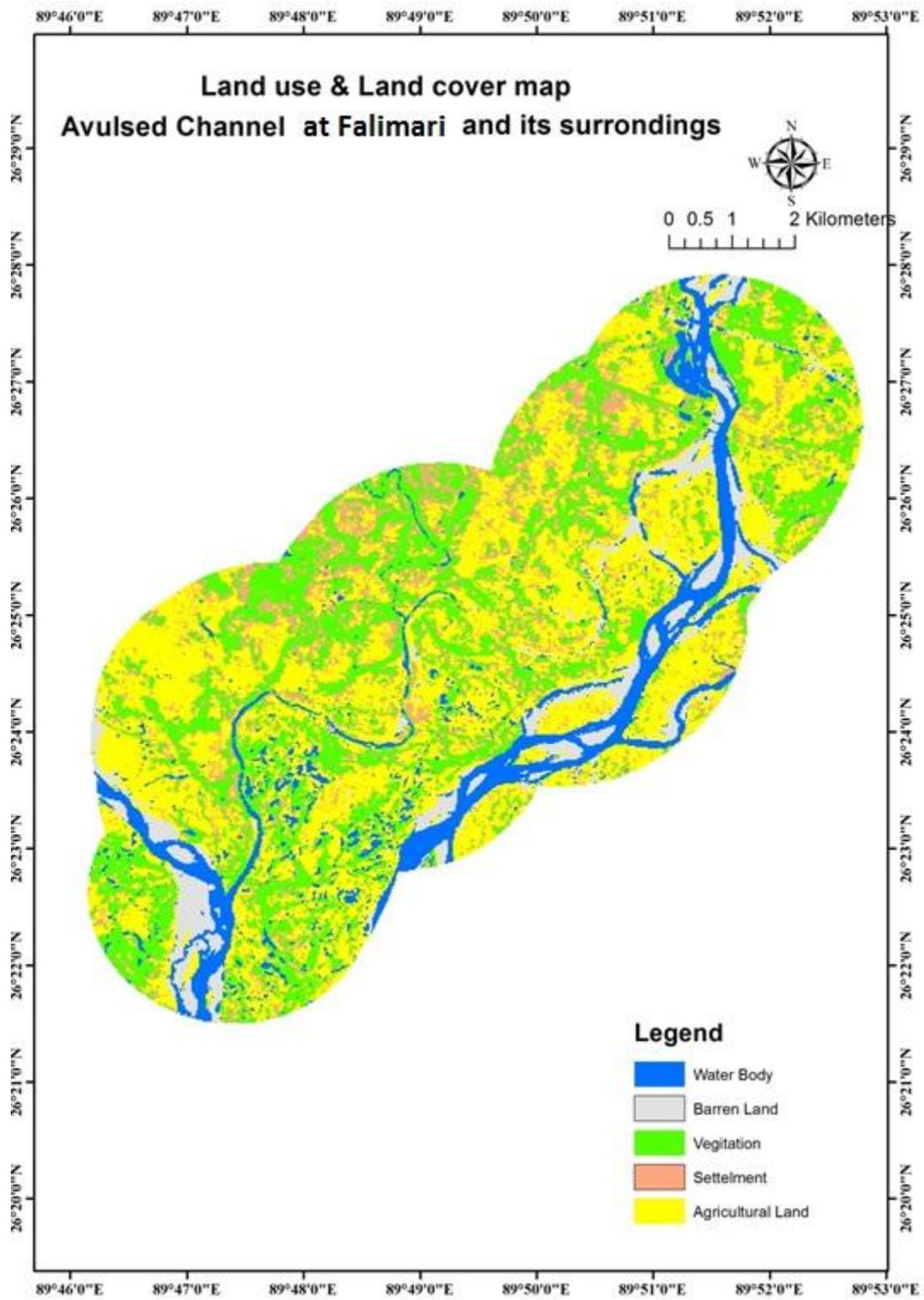
A fully avulsed abandoned channel is found in the middle course of the Sankosh River at Majerdabri, Falimari village of Cooch Behar district of West Bengal. This abandoned channel avulsed from the main channel of the Sankosh River due to overbank flow and channel infilling. The length of this abandoned channel is about 12.8km and width is about 200 m. Jorai Nadi also joins at the middle part of this channel and jointly flows about 16.2 km and thereafter, it meets with the River Raidak-II. Some areas of this upper portion of avulsed abandoned channel are filled by sediments and at the same time there is encroachment in the form of human settlements. No water flow is found in the dry season, whereas water flow is available only in rainy or flood seasons. At present, it serves as a fertile land for agriculture.

#### 6.3.6.1 Land use and Land cover:

Land use and land cover map has been prepared within the 1km peripheral area of the (abandoned channel). This avulsed channel reveals a complex land use setup. From the collected data it is found that the agricultural land covers the 40% of the area, followed by vegetation cover (28%), settlement (14%) water body (11%), and barren land (7%). From the above data, it can be clearly mentioned that the avulsed channel has a number of utility for socio economic development such as paddy cultivation but with accelerating increase of population day by day, most of the avulsed channel services have faced different kinds of problems and sometime have steadily diminished.



**Figure 6.12: Distribution of Land use and Land cover at Surroundings of Avulsed Abandoned Channel at Falimari, 2019**



Source: LISS-III, BHUVAN (2019)

**Map 6.8: Land use and Land cover map of Avulsed Abandoned Channel at Falimari and its Surroundings, 2019**

**6.3.6.2 Dependent livelihood:**

This avulsed channel provides a huge number of resources which have much economic value for the local people. However, due to immense population pressure and the development of modern technology, the environment of the surroundings areas of this avulsed abandoned channel has become very adversely affected and has also diminished the natural wetland.

**Table 6.10: Pair wise Ranking for Livelihood Option of the Avulsed abandoned Channel at Falimari**

Livelihood Option	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	Others
Agriculture	*	Agriculture	Agriculture	Agriculture	Agriculture	Agriculture
Agricultural Labour	Agriculture	*	Fishing	Agricultural Labour	Agricultural Labour	Agricultural Labour
Fishing	Agriculture	Fishing	*	Fishing	Fishing	Fishing
Food And Fodder Collection	Agriculture	Agricultural Labour	Fishing	*	Livestock	Food and Fodder Collection
Livestock	Agriculture	Agricultural Labour	Fishing	Livestock	*	Livestock
Others	Agriculture	Agricultural Labour	Fishing	Food and Fodder Collection	Livestock	*

**Table 6.10a: Ranking for Livelihood Option of the Avulsed abandoned Channel at Falimari**

Rank	Livelihood Option	Ranking Points
1	Agriculture	1
2	Agricultural Labourer	3
3	Fishing	2
4	Food and Fodder Collection	5
5	Livestock	4
6	Others	6

Source: Compiled by Researcher

#### **6.3.6.2.1 Agrarian Status:**

Owing to the high nutrient value of the soils and water content, the boro cultivation in the Avulsed abandoned channel areas is now a common practice especially in dry season and where cultivators expect a higher production of paddy for their livelihood. Generally, cultivation starts in the month of January –February every year when the water level goes down and marginal areas of abandoned channels are raised up. In this situation, farmers having ownership of the land of avulsed abandoned channel convert it into agricultural land for boro paddy cultivation. In the field survey, it was found that out of the total area of the avulsed abandoned channel, nearly 40% area is under paddy and vegetables cultivation and near about 57.38% people are engaged directly with this agricultural practice which is increasing day by day.

#### **6.3.6.2.2 Fishing:**

The avulsed channel is recognized as a habitat and breeding ground for fish and it also is the chief source of fish for the poor people in the surrounding villages. From the field data, it was found that there are a large number of people involved in organized fishing in the avulsed abandoned channel. These are:

- a. People who fish for their daily consumption.
- b. The fishing community who fish for their livelihood.
- c. Lease holders who occupy the abandoned channels for fishing as their main business.

In the field, the researcher surveyed more than 64 households at the villages surrounding the avulsed abandoned channel. Out of these, 15.63% of the people were directly involved in fishing for their livelihood.

#### **6.3.6.2.3 Livestock:**

Livestock also plays an important role in rural economy of the local people of the study area. Livestock provides food and non-food items for the rural people and also helps them to earn money from the market. In the study area, the most important livestock are cattle, goats, pigs, duck and chicken. Cattle rearing occupies 2.79% of the grazing lands of the avulsed abandoned channel. Goats and pig rearing are also common occupations of the residents of the avulsed abandoned channel. Thus, it is evident that the livestock provides food and non-food items to the

people on one hand and it is also plays an important role in the economy of the people of the study area on the other hand.

#### **6.3.6.2.4 Others:**

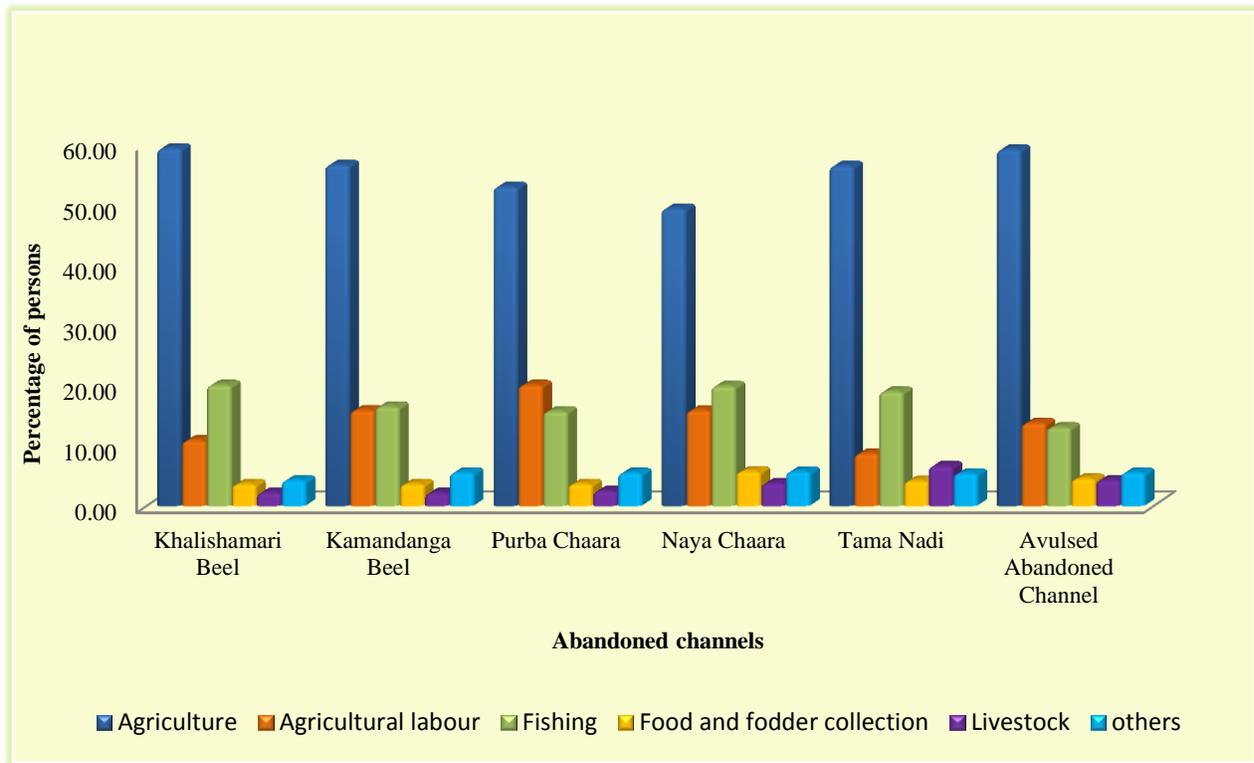
Fodder collection is another important activity in the avulsed abandoned channel of the study area. Moreover, the avulsed abandoned channel also provide grazing lands for cattle population in the winter and summer season. Pisciculture is also considered an important practice in the avulsed abandoned channel and due to high demand of fish it makes a profitable business for the local people.

#### **6.3.6.3 Biological importance:**

This avulsed abandoned channel has a significant ecological role in maintaining and preserving the biological diversity of the study area. It provides a habitat for wildlife and biodiversity of aquatic species that are recognized as important natural resources and significant for the biodiversity stock and its preservation. In the field investigation it was observed that the avulsed abandoned channel also serves as the home for migratory birds that pass the winter there. A variety of medicinal plants are also found there. The avulsed abandoned channels has great biological and ecological significance for the preservation of biodiversity in the region.

From the collected primary data during the village survey and from the above diagram it is observed that people inhabiting the surroundings of all the abandoned channels are mostly engaged in agricultural activity. About 59.29% of the population is engaged in agriculture at Khalishamari beel which considered as the highest among all the abandoned channels and which is followed by 59.10% at the avulsed abandoned channel. Corresponding figures were 56.54% at Kamandanga beel and 56.38% at the surroundings of Tamanadi. Fishing is considered the second highest livelihood option in most of the abandoned channels except Purba chaara and avulsed abandoned channel in the study area. Fishing activity is highest (20%) at Khalishamari beel which followed by Nayachaara (19.84%), Tama Nadi (18.93%) and the lowest is about 13.00% found at the avulsed abandoned channel. Out of the total population of the surveyed villages, about an average 14.14% of population chose their livelihood option as agricultural labour in the study area. Food and fodder collection, livestock and some other economic activities were also

found in the study area and their average percentage of engagement is about 4.18%, 3.53% and 5.27% respectively.



**Figure 6.13: Comparisons of Various Livelihoods among the Abandoned Channels**

#### 6.4 Discussion and Conclusion:

Socio-economically abandoned channels are very important for the people inhabiting the surroundings areas. These abandoned channels are considered as the source of various natural resources which are essential for their daily life. Local people collect food and fodder from these abandoned channels and they also engage in various occupations based on these abandoned channels such as fishing etc. It is observed that people used fertile land of abandoned channels for cultivation in the dry season and they also use the water of these channels for their irrigational purposes. Apart from the economic purpose, abandoned channels also play an important role in maintaining the biological balance of the study area. Moreover, these abandoned channels can also be recognized as containing very rich components of bio-diversity which have a great significance at local, regional and national levels.

In conclusion, it is apparent that abandoned channels constitute an important source of natural resources which yield high economic and livelihood values to the local people inhabiting the surroundings of the abandoned channels of the study area. Population is increasing day by day and at higher rates, but the natural resources of the abandoned channels are not increasing at the same rates. Moreover, poverty also greatly affects the natural environment and it is at a critical stage in the study area, since it influences the local people who willfully and consistently persist in the destruction of the resources of these abandoned channels. In this situation, prevention of further destruction of the abandoned channels will require the adaption of multiple-use land managements, based on the principles of sustainable management.

### **References:**

Toonen, W.H.J., Kleinhans, M.G. and Cohen, K.M. (2012) Sedimentary architecture of abandoned channel fills. *Earth Surface Processes and Landforms*, 37, 459–472.

District Census Handbook, Part XII- B, 2011.