Differential Impacts of Land Use Change on Livelihood Pattern of Tribal People of Binpur II Block, Jhargram District, West Bengal

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Abstract

The tribal lives are mostly associated with the nature who actually nurtures their livelihoods by natural resources. Their livelihood becomes harder when these natural resources are depleting through anthropogenic intrusions. This scenario has been observed in the maximum forest villages in Binpur II Block of Jhargram District of West Bengal. The impact of land use and land cover (LULC) change on every aspect of their livelihood has been thoroughly examined by LULC change detection and analysis of intensive perception survey among 275 Scheduled Tribe (ST) of 5 forest villages by using statistical software's. The result depicts that although the land use change is necessary for the betterment of the people, but it causes havoc depletion of forest resources. For this, the marginal ST people have to change their comfortable occupation and forced to migrate for searching jobs. A sustainable management strategy has been presented for better land use change policy.

Key words: Tribal, Nature, Anthropogenic, Impact, LULC, Occupation, Sustainable.

1. Introduction

Land use is mainly the anthropogenic modifications of earth surface for the fulfillment of human needs and aspiration. These modifications are rigorously affecting the ecological systems and functions (Steffen, et al., 2007). Land use change is such a fundamental driving force which can change the environment as well as anthropogenic activates. So, it is wise to maintain accuracy in the time of the impact of land use changes (Jonathan, et al.,2005; Mendoza, et al., 2011) because it calls for a wide range of modification of the environment (Arsanjani, 2012; Ellis, 2013). It also includes the changes in land cover that do not demand further anthropogenic use of the lands (Ellis, 2013). Moreover it seriously affects the change in climate economy, ecology and even socio-cultural stricter of this society (ABD El-Kawy, et al; 2011; Jansen, et al; 2008). The motto of sustainable development is also hampered severely due to the unscientific and illegal land use change. Most of the countries , particularly the developing countries are now going through the rapid land use change due to population growth and livelihood changes (Wu, et al., 2013).

Livelihood is the attempt to fulfill the requirements for living of an individual or group. There requirements may be have economic or physical or natural which are helpful to cope with unwanted circumstances or to respond for new chances (Hann, et al., (2003). It refers to the activities of any individual with the help of assets such as natural, cultural or economic to live with a hazard free living with accessibility of social institutions and relationships (Ellis, 2000). So, the livelihood facets can be understood in the following manner (fig.1)

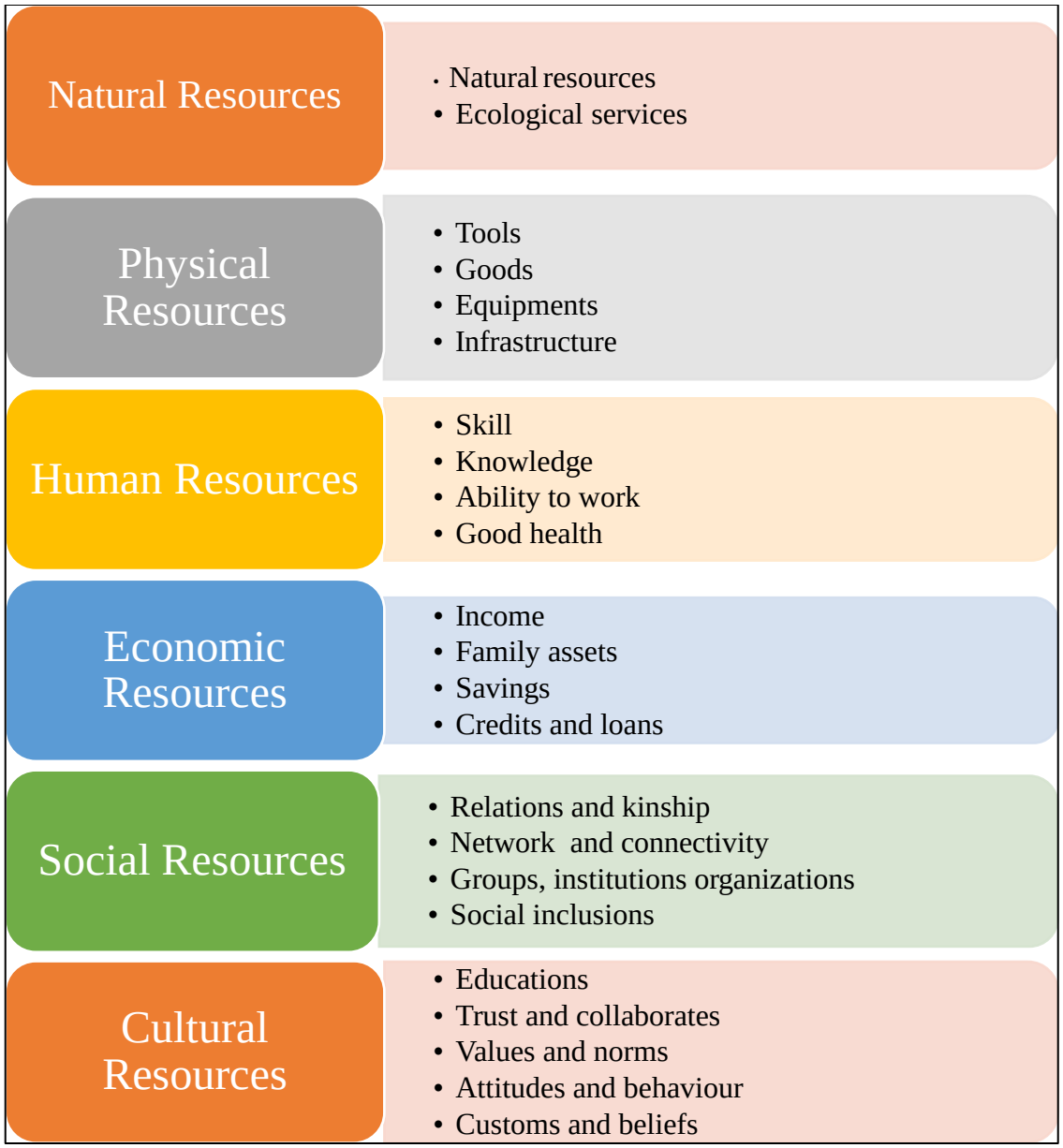

Fig. 1 Assets for livelihood

(Source: By authors)

People, the unique human resource are completely dependent on the land, the unique natural resource for their sustainable development (Dhas, 2008). The friendly co-ordination of both land and people is the key factor of sustenance of both humanity and ecology (Biswas, 1994).

The land based livelihoods (agriculture and allied) are purely dependent on environment. Land use is such an activity where both ecology and economy collides with each other (Dhas, 2008). This ecology- economy conflicts have been going on since the time immemorial. The solution of this conflict is to establish a harmony or balance between these two facts of the same coin.

Obviously, the livelihood is improving by efficient land use patterns (Antrop, 2005). Limited exposure of resources can make livelihood difficult and at this same time a little bit of alteration of land use can open vast opportunities to people for making more choices for livelihood. This land use is very crucial for the rural people who have limited access to natural resource. Therefore in the past are ongoing in the present and will continue in the future (Turner, et al., 1990 Turner &Shajaat, 1996).

Jhargram is a backward dominated district of west Bengal. Tribal communities generally like to live with nature. Their knowledge, customs, beliefs and adaptive capacities encourage them to live with nature without harming the natural ecosystems (Sternes, 1997). They have maintained a symbiotic relationship with their surrounding resources like land, water, and forest etc. forest is a major source of their livelihood just after the agriculture. This subsistence economy is now facing the land use change by outsider for the sake of land for settlement agriculture and other activities. Now their livelihood sustenance is under threat. Outsiders, administrations, planners etc, are bringing changes in land use, resource access, resource utilizations in tribal localities without any sustainable rehabilitation (Sivaprasad & Eswarappa, 2007). These tribal people are being cornered (put aside) due to encroachment of non tribal people. Encroachment of nontribal people is another major problem. They are forced to change their occupational structure (Scholte, et al., 2015). The livelihood of tribal people of this area revolves around their agriculture, livestock rearing, and collection of non-timber forest

products. They are economically poor and socially under privileged people. Many geography, botanist, anthropologists etc. have already studied the livelihood pattern of tribal people and their interaction with nature and natural resources (Cincotta et al., 1992; Gooch, 1992; Kuznar, 1994; Maikhuri et al., 1996; Anderson, 1952; Harlan, 1975; McCorkle, 1992; Rao & Saxena, 1996, Nautiyal, 1999 & Nautiyal et al., 2003). There people have to change their occupation from traditional to modern agriculture or non- agriculture.

2. Background

Change is in land use/land cover does not result always in positive sense. It also can make the livelihood difficult for the people. This is happening in these study areas of the present research. Jhargram district is one of the backward districts of West Bengal. It is a small and tribal dominated district. There are no such natural resources in terms of minerals. The main natural resource of broad leaves tropical deciduous forest mainly Sal *(Shorearobuta*). The main economic activities are gathering of forest productions, agriculture and recently tourism. Most of the people are living in rural areas with less than 10000/month family income. The situation is miserable in poor tribal villages where this income is reduced up to less than Rs 5000/ month. Tribal people are mostly engaged in marginal farming, agricultural laborer and forest product collection. Forest is their major source of livelihood earnings. The land use change in these areas has imposed a great threat in the lives of forest dwellers. Huge amount of deforestation in the name of development are making their lives miserable rather than upliftment. Due to deforestation and plantation of eco-enemy trees line eucalyptus, akashmoni etc, both the quality and quantity of non-timber forest products are gradually decreasing. This deforestation and land use change is not at all welcomed by the local rural tribal people of this district. They have to change their traditional occupation to modern one particularly, non-

agricultural jobs (Marchang, 2019; Sultan, 2016). The investigation of the changing occupation and non-traditional economic activities is another purpose of this study. How much extent this shifting of occupational structure is related to the land use change is another scope of this research? In this backdrop this research has been taken to search the perception of the local people about the impact of land use change of their areas. Is it beneficial for their livelihood or not?

Keeping all this in mind the main objective set for this study is to investigate the impact of land use change on the livelihood of rural backward indigenous people.

The specific objectives are:

1. To carry out an in-depth analysis of systematic spatial and temporal land use changes during 2006-2019.
2. To examine the driving factors behind the land use change.
3. To find out the income and occupational changes, and
4. To analyze the impact of land use change on the livelihood of the local tribes.

3. Materials and Methods

The village map has been taken from the District Census Handbook, Jhargram District, 2011. Google Earth image of 2006 and 2019 with administrative maps have been taken for land use land cover (LULC) classification. Secondary level of data (Census of India, 2011) were utilized as the basic information of local residents and also used for selection sample respondents. Primary level data were obtained from perception survey in the study area and put the data into SPSS software to get statistical analysis. Changes in land use and land cover

have been detected and estimated both spatially and temporally from classified image processed through Arc GIS 10.7 version. The total process is presented bellow (fig. 2)

3.1 Change detection process of Land use/ Land cover (LULC)

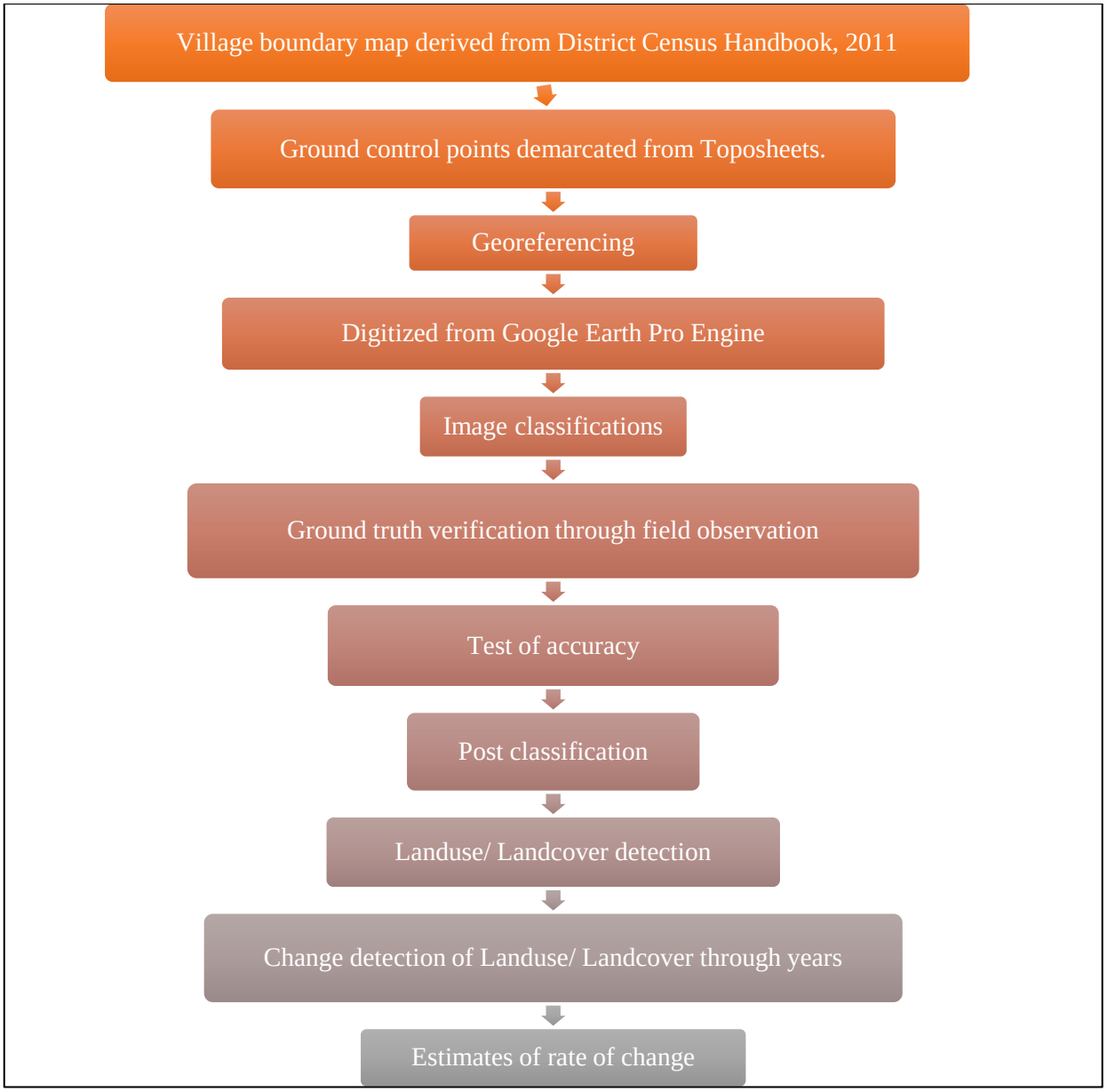

Fig. 2 Change detection of LULC process

(Source: By authors)

3.2 **Perception survey**

The intensive perception survey has been conducted among 275 villagers selected through stratified random sampling. Snowball process has been adopted for reaching to the stratified respondents. The major criteria for selecting the studied villages are i) Villages with forest cover ii) Scheduled tribe domination (more than 70%).

The main target group of this research is the only tribal people. About 20% ST people have been selected in each villages across occupational and income levels. At first key informants from each village was selected by the local Panchayat offices because these villages were not familiar to the researchers. They helped the researchers for selecting respondents as per category. Personal interviews were taken through structural questionnaire schedule in the month of March and April 2019 (pre monsoon season) July and August 2019 (monsoon season) and January 2020 (post monsoon season). Beside this, 5 interactive group discussion seasons (Naibaho, 2019; Aflah, 2017), one for each village have been taken with the villagers through open ended questionnaires. This sessions were taken for the cross verification of individuals perception. The major themes (fig. 3)

Themes of Household Survey

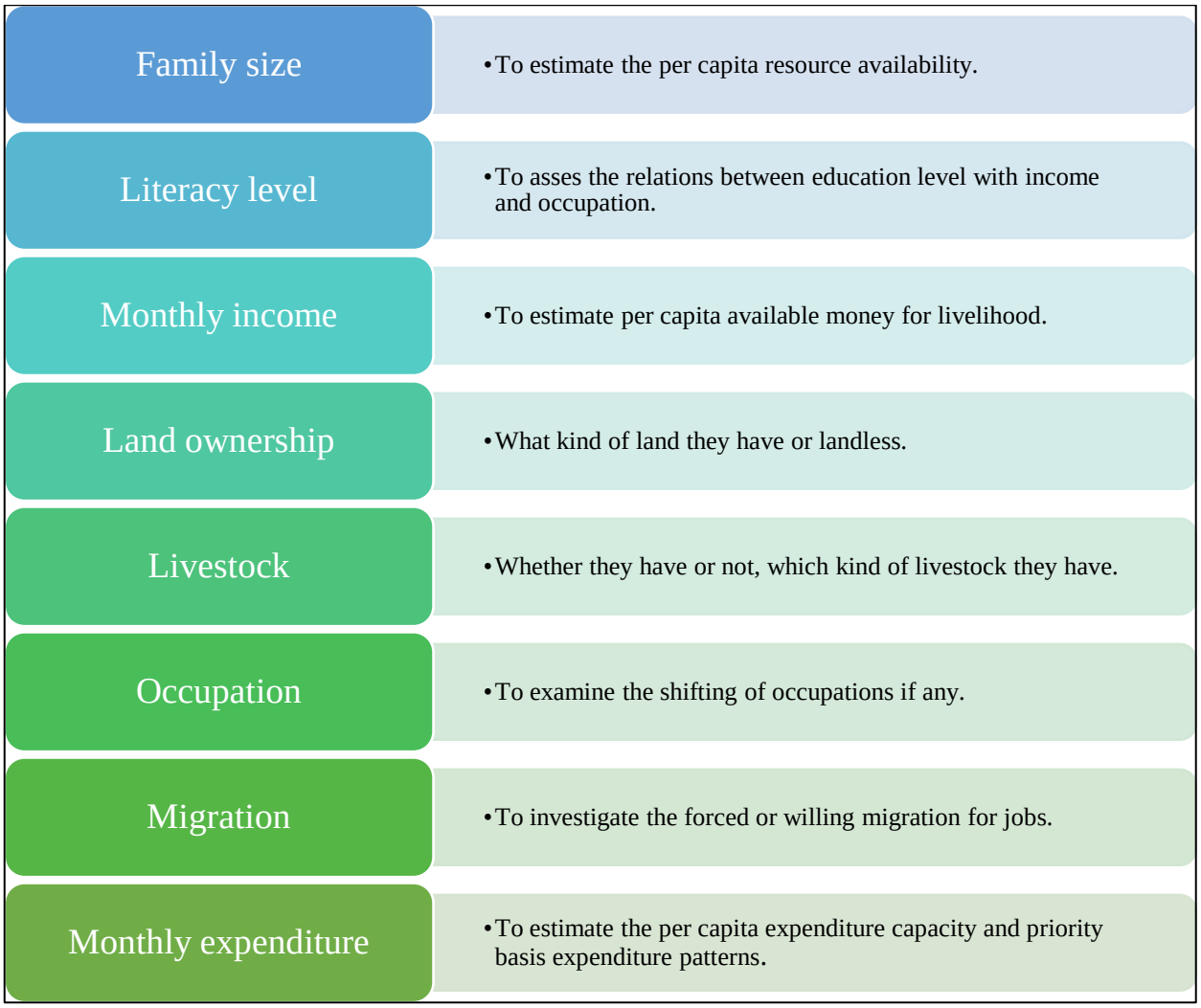

Fig. 3 Themes of household survey

(Source: By authors)

4. Study area

Jhargram is a district of low population density (370/ km^2, 2011), economically backward, socially under rated but rich with traditional culture, forest and natural beauties. It is the part of Chhotnagpur plateau with its general slops towards east. It is a rolling plateau with small

beautiful hillocks. Two life lines of this district are the river Kangsabati flowing in the northern part and the river Subarnarekha is flowing in the southern part. The soil is infertile red lateritic type. Climate is tropical monsoon type with hot summer and cold winter. Broad leaved deciduous trees mainly Sal (*Shorea robusta*) is the main characteristic feature of the forest. Forest is the only natural resources of this district.

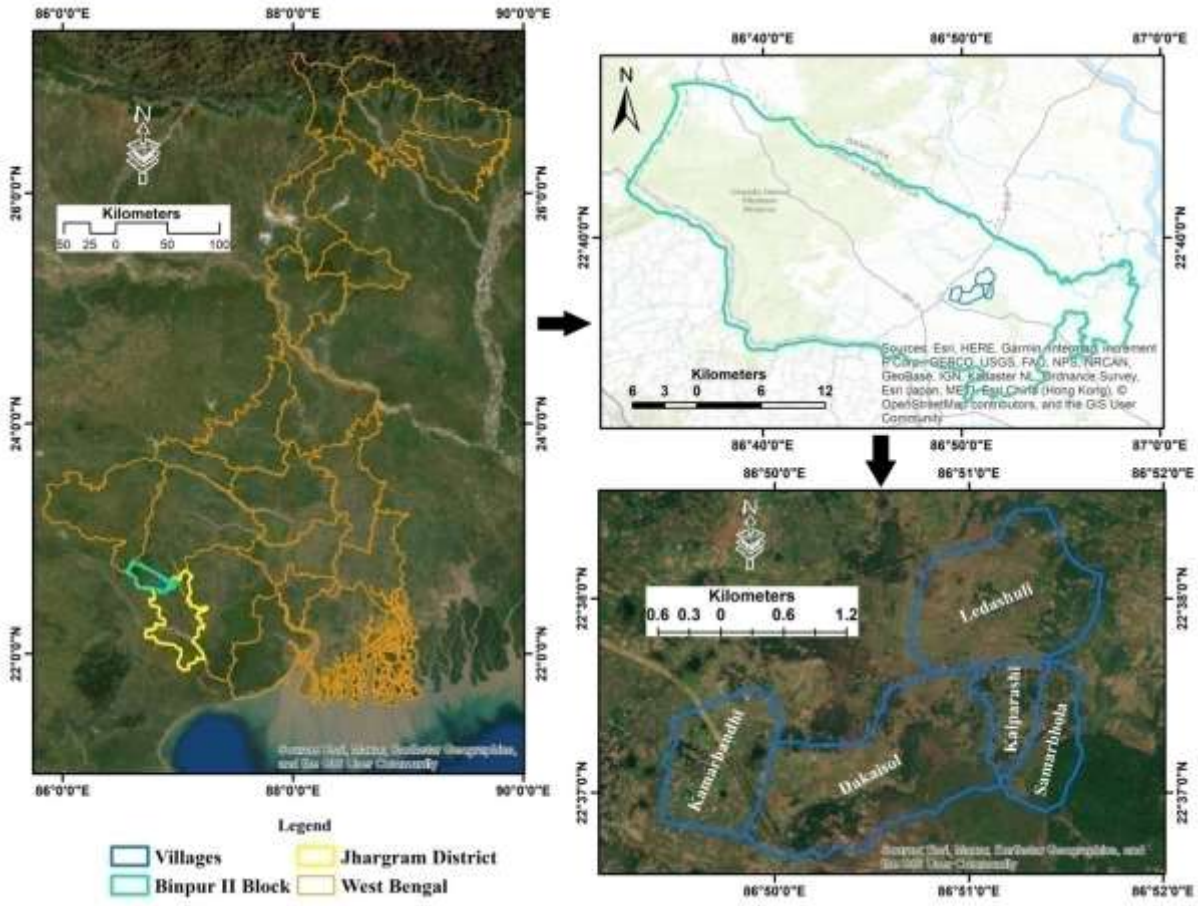

Fig. 4 Location of the study area

Table 1 General demographic scenario of he study areas

Categories	Kalparashi		Samarbhola		Dakaisol		Ledashuli		Kamarbandhi	
Village code	335724		335725		335722		335669		335721	
Area(sq km)	0.6515		0.5305		1.952		1.6711		0.8925	
Total population	249		135		456		312		434	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	127(51%)	122(49%)	74(55%)	61(45%)	228(50%)	228(50%)	154(49%)	158(51%)	208(48%)	226(52%)
Total SC population	Nil		Nil		Nil		Nil		9(2.07%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	3 (0.69%)	6 (1.38%)

Total ST population	249(100%)		134(99%)		333(74%)		253(81%)		401(92%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	127(51%)	122(49%)	73(54%)	61(45%)	167(37%)	166(37%)	123(39%)	130(42%)	194((45%)	207(47%)
Total Literate Population	125(50%)		43(32%)		266(58%)		220(71%)		318(73%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	77(31%)	48(19%)	28(21%)	15(11%)	15033%)	116(25%)	118(38%)	102(33%)	170(39%)	148(34%)
Total Main worker	3 (1.20%)		Nil		10 (2.19%)		60(19%)		106(24%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	2(0.8%)	1 (0.4%)	Nil	Nil	9 (1.97%)	1 (.22%)	49(16%)	11(3%)	78(18%)	28(6%)
Total Cultivator	Nil		Nil		Nil		42(13%)		45(10%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female

	Nil	Nil	Nil	Nil	Nil	Nil	39(12)	3(1%)	37(8%)	8(2%)
Total Agricultural labour	Nil		Nil		Nil		12(4%)		31(7%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Nil	Nil	Nil	Nil	Nil	Nil	6(2%)	6(2%)	19(4%)	12(3%)
Total Marginal worker	159(64%)		99(73%)		214(47%)		138(44)		87(20%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	73(29%)	86(35%)	53(39%)	46(34%)	119(26%)	95(%)	54(17%)	84(27%)	34(8%)	53(12%)
Total Non-Worker	87(35%)		36 (26.67%)		232(51%)		114(37%)		241(55%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	52(21%)	35(14%)	21	15	100(22%)	132(29%)	51(17%)	63(20%)	96(22%)	145(733%)

Total Respondents	50	27	67	51	80

(Source: Census of India, 2011)

Five villages, namely, Kalparashi, Samarbhola, Dakaisol, Ledashuli and Kamarbandhi are selected as intensive field survey (fig. 4). All these villages are the tribal villages situated at the proximity of forests. The detail population statistics is given in the table 1. Most surprising fact is that only 16% and 18% male are as main workers in Ledashuli and Kamarbandhi and other villages have less than 2%. Samarbhola has no main workers. More than 60% people are marginal workers and rests are non workers. Maximum people in these villages are primarily dependent on forest products and engaged as agricultural and non-agricultural laborers.

5. Result and Discussion

5.1 Impact of Land Use Change

Land use change actually is not the change for a specific purpose. It is also important that how this land is utilized. The efficiency of any land use planning is dependent on its purpose and mode of utilization (Liu& Deng, 2010). It is worthy to assess the impacts of various levels and magnitudes to any land use transformation (Schirmer et al., 2009) not only for the economic benefits but also for the maintenance of ecological services (Li, et al., 2007). The impact of land use change is not confined only on any particular area, rather it influences local to global arena also (Lambin & Geist, 2006).

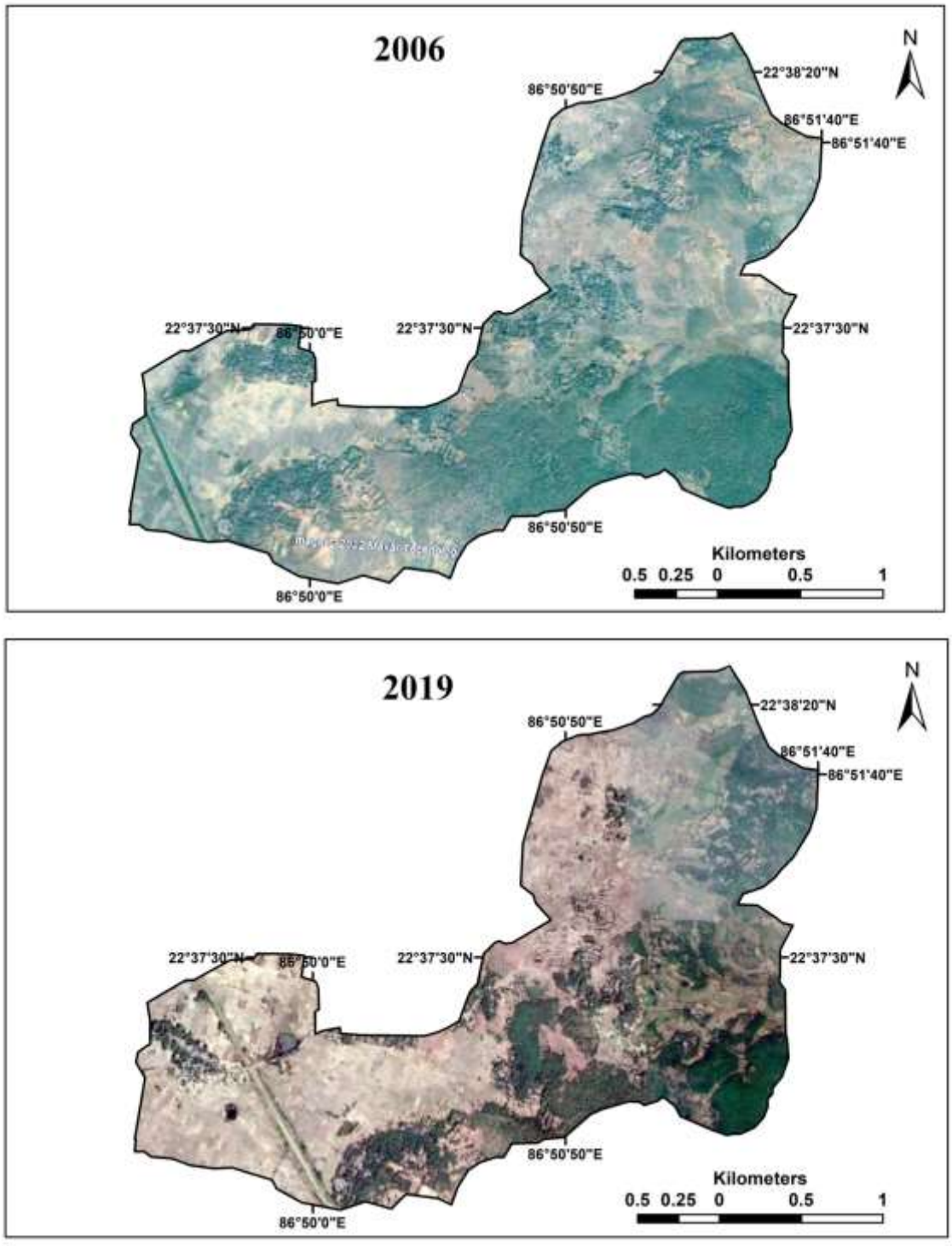

Fig. 5 Land use and land cover images of the study areas in 2006 and 2019

(Source: Google Earth Image)

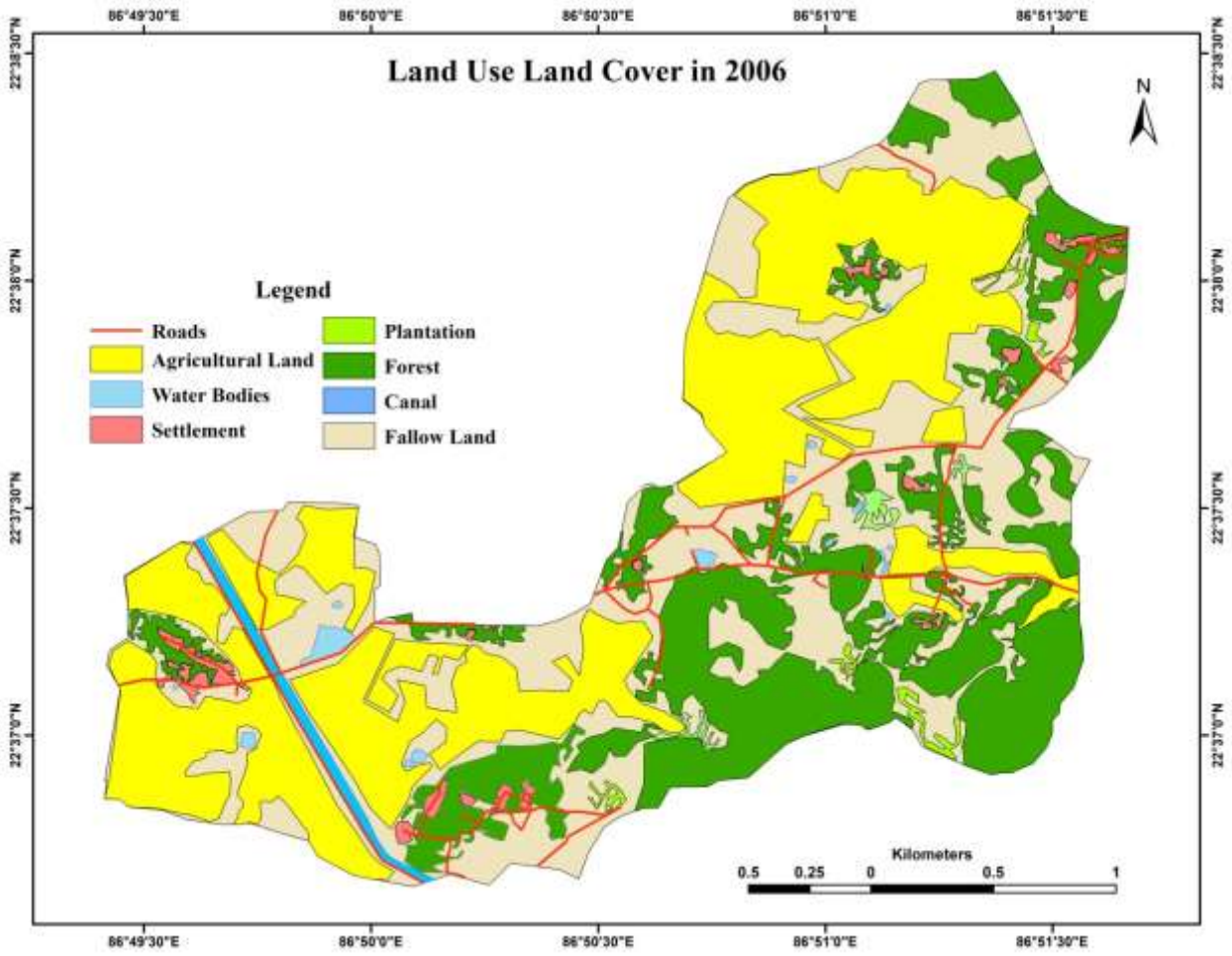

Fig. 6 Detected LULC classes of the study areas in 2006

(Source: Google Earth Image)

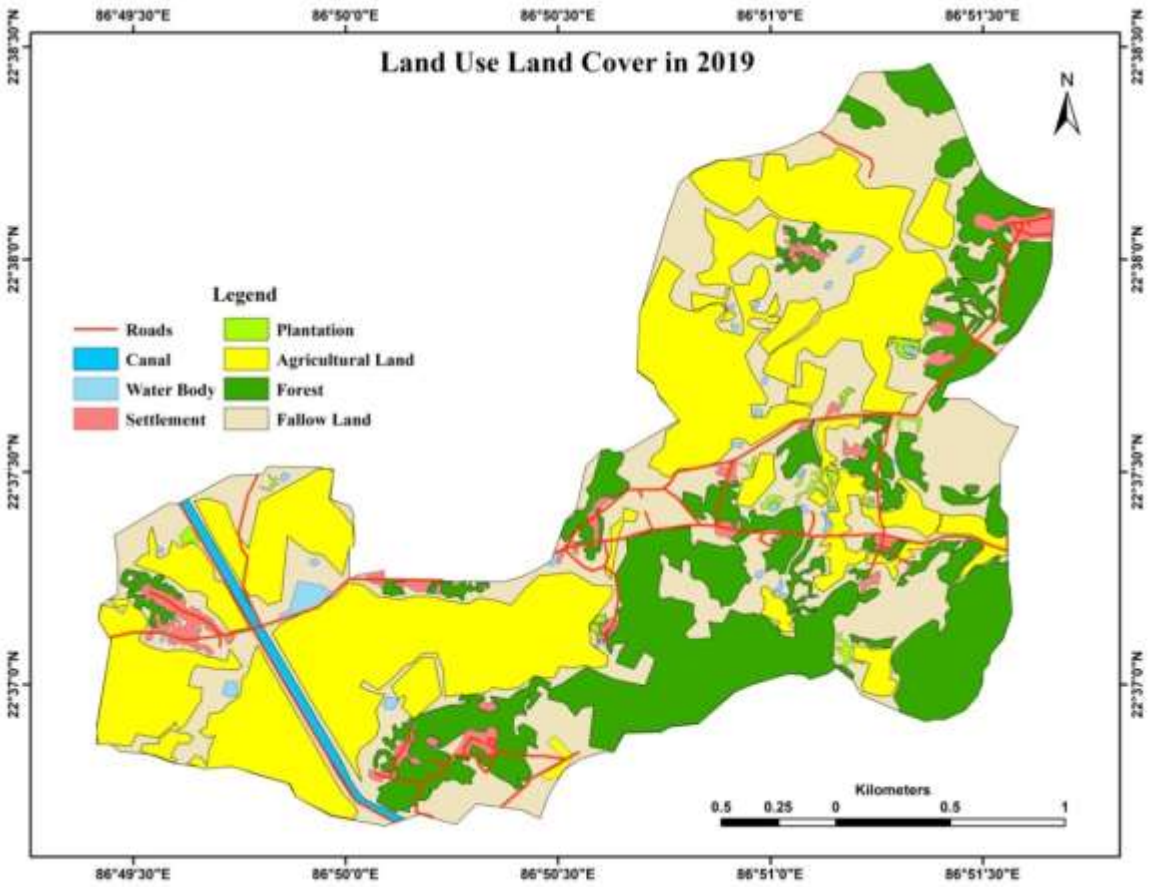

Fig. 7 Detected LULC classes of the study areas in 2019

(Source: Google Earth Image)

Table 2 Change detection of LULC classes during 2006-2019

Land use/land cover classes	Area under different land use/land cover classes (sq km)		Change in land use/land cover (%)
	2006	**2019**	
Cultivable land	36.1	37.8	+1.7

Forest	24.9	23.9	-1
Settlement	1.1	3.1	+2
Plantation	1	0.7	-0.3
Water Bodies	1.8	1.7	-0.1
Non-cultivable land	35.1	32.8	-2.3
Road	14.4093	14.4093	00

(Source: Google Earth Image)

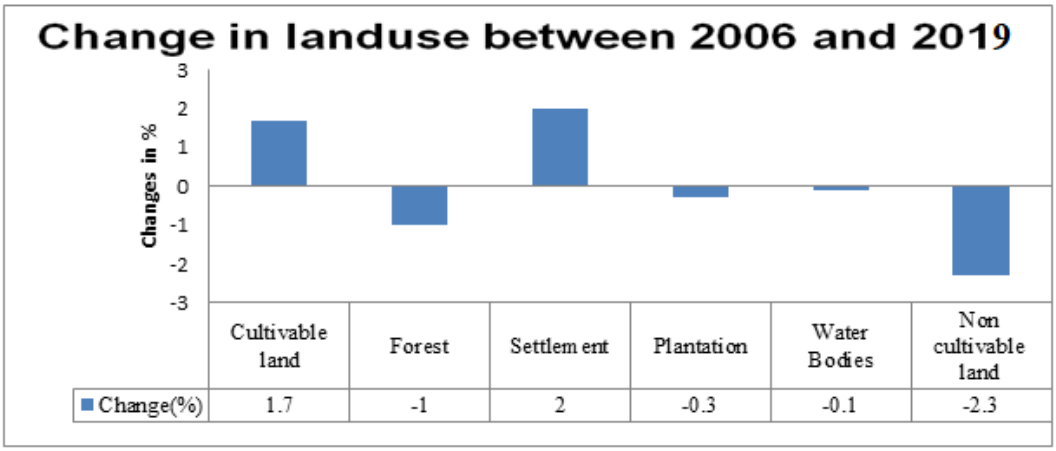

Fig. 8 Change detection of LULC classes during 2006-2019

(Source: Google Earth Image)

The above LULC change detection maps (fig.5, 6 & 7), table 2 and fig. 8 show few clear pictures. Firstly, LULC has been changed drastically particularly; settlement area has been increased 2%. Secondly, area under virgin forest has been decreased by 1% as well plantation by 0.3%. The remarkable fact is that the areal extent of forest has not so much decreased but the field visit shows the degradation and degeneration of forest quality. The dense forest of 2006 is now converted into scanty vegetation cover. The plantation areas are now converted into cultivable lands or settlements. Thirdly, huge amount of built up area has been developed by capturing the uncultivable lands, forest and plantation and fourthly, transport and other infrastructural developments are not shown so much from the maps.

5.2 Family Size

The term family size has been defined in various angles. It refers the number of children or the total no of members in a family of blood relations or no. of children on one parental family etc. (Treas, 1981; Blake, 1989 & Ryder, 1986). In this study the no of total members, both children and adult with blood relation resided in a family has been considered as family size.

Table 3 Family size

Family size	No. of respondents (%)
1	Nil
2	3
3	14
4	20

5	36
>5	27

(Source: Field survey)

The above table 3 shows that most of the respondents belong to the family size of maximum 5 which is quite comfortable. This is because of the tribal culture which encourages the small family. In this context this culture is far more advance than the so called enlightened general caste families. Family size is not so far responsible to their poverty. They are poor because, they have no such access to resources. These areas are economically backward and inaccessible for resource generation. They are mostly dependent on forest resources and purely subsistence type agriculture.

Land ownership: Land ownership depicts the picture of economic prosperity, and possibility of resource generation (Oraon, 2012).

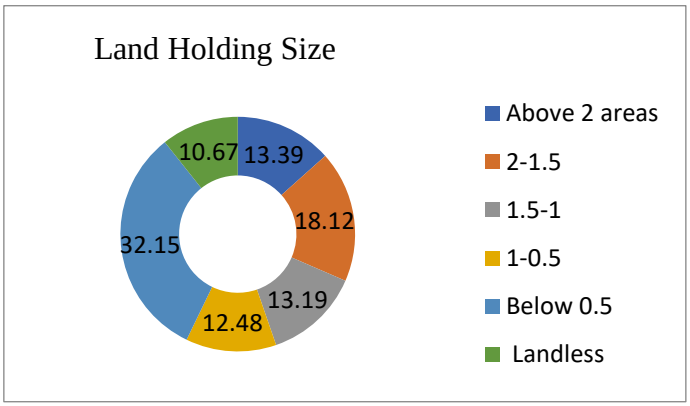

Fig. 9 Land holding capacity

(Source: Field survey)

The above diagram (fig.9) shows a poor picture regarding land holding size of the villages. Most of them belong to marginal class. Relatively well off families have more than 2 acres lands. Lands are not so fertile. The relatively fertile lands which are called ‘SOL’ in this area are capable for cultivation in two times in year. Especially Paddy or Kharif crop in monsoon season has been cultivated. The soil is also not very suitable for agriculture. So cultivation is not so supportive for their livelihoods.

5.3 Collection of Forest Products

Almost all tribal people collect the forest products (table 4). This traditional occupation is now hampered due to deforestation (Kalagnanam, 2012). The agricultural lands which were taken out from forests are not very much suitable for crop production. So, the people have faced problems in two ways, firstly, the forest products are deteriorating in both quality and quantity and secondly, the lands are not so productive. Therefore, their poverty is gradually spreading its claws.

Table 4 Collection of the forest products

Collected products	No. of respondents (%)
Fuelwood	100
Fodder	95
Leaf (green and dry)	98
Food	92

Root	82
Medicinal herb	34
Resin	73
Flower	56

(Source: Field survey)

5.4 Changes in Income Status

Many studies showed that the Scheduled Tribe people are normally backward in economy due to the dependency of traditional occupations (Bhagat, 2013). Most of the respondents of the villages are also belonging in the income level of > Rs 5000 (table 5). The important thing is that the income level is gradually increasing throughout the decade. This positive change indicates that the occupations which they adopt now are more income generating (fig. 10). The villagers actually are not capable to earn their livelihoods only from their traditional occupations so that they have to shift to other more income generating occupations.

Table 5 Income level

Income level (Rs/month/family)	No of Respondents (%)		
	13 years before	Now	Changes

<5000	55	38	-17
5000-10000	37	35	-2
10000-15000	4	15	11
15000-20000	3	9	6
>20000	1	3	2

(Source: Field survey)

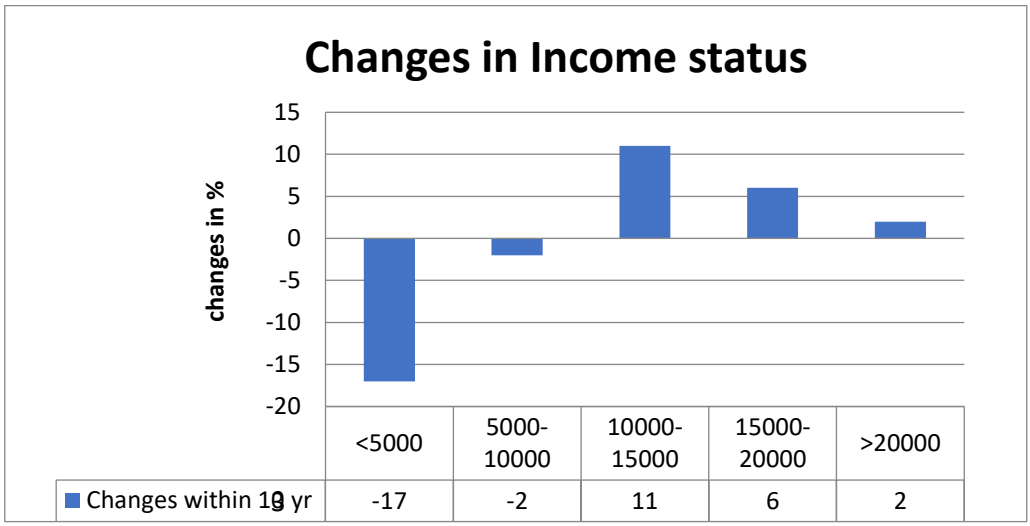

Fig. 10 Changes in income status

(Source: Field survey)

5.5 Changes in occupational status

Table 6 Changes in occupation structure

Sl No	Occupation structure	No of Respondents (%)		
		13yr before	Now	Changes
1	Traditional	35	23	-12
2	Agricultural	29	35	6
3	Agricultural labor	25	22	-3
4	Non agricultural labor	8	14	6
5	Business	2	4	2
6	Service	1	2	1

(Source: Field survey)

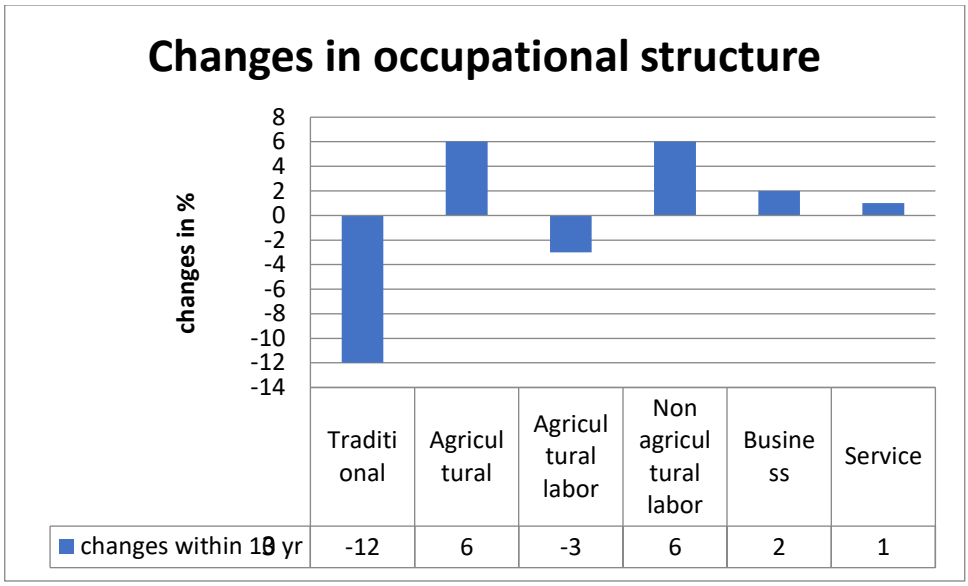

Fig. 11 Changes in occupational structure.

(Source: Field survey)

The occupational structure of the respondents shows that at present they have engaged in diverse occupations ranging from agriculture to salaried job. Considering their principal occupation i.e. an occupation from which a worker can earn the major share of his earnings, the respondents are divided into different occupational groups. It is evident from the table no

Table 7 Paired Samples Test

		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	Before occupation - Now occupation	-.316	1.052	.063	-4.985	274	.000

(Source: SPSS Software)

6 that only 35% in 13 years ago and 23% respondents at present are still continuing their parental traditional occupation while the rest have engaged in other type of activities. A large number of respondents work as laborer in agricultural sector, construction activities, hotel, shop and factories, brick kilns, household chores and so many other sectors. Here, more than 50% tribal prefer the agricultural sector, particularly to engage as agricultural labourers probably due to lower investment capacity (fig. 11).

From the paired sample test (Table 7), significant value of p is less than 0.05, that means the hypothesis of changes occupation before 13 years and after 13 years is accepted. Null hypothesis of no difference of occupation is rejected. Shifting of occupation among tribal people from their tradition to other occupation is statistically proven.

Perception of Possible Reasons behind the Occupational Shifting:

Table 8 Shifting of occupation

Shifting of occupation	Response of the respondents (%)	Major causes behind the occupational shifting	Remarks
Traditional to agriculture	18	1.Shrinkage of forest 2.Deterioration of quality of forest	Livelihood is not possible in sole dependency on forest and allied occupations
Traditional to agricultural labour	24	1.Shrinkage of forest 2. Unavailability of forest product 3.Sure income as agricultural labour	Quality and quantity of forest product are gradually decreasing
Traditional to non-agricultural labour	14	1.Shrinkage of forest resources 2. Sure income as migratory labour	Surety and flow income, as the demand prevails in surrounding urban areas,

Agriculture to business	09	1.Scope to earn more money	People who have some kind of money in hand choose business which has more income generation capacity
Agriculture to service	4	1.Getting job	Obviously better opportunity rather than agriculture.
Agriculture to agricultural labour	15	1. Less profit in agriculture 2. Decreasing family income	Agriculture is not so profitable for them because of infertile soils. Not so capital for agriculture. Land holdings are small
Agriculture to non-agricultural labour	16	1.better income scope particularly as migratory labour 2. less profit in agriculture	This tendency is common for all villages

(Source: By authors)

Due to the unavailability of local resources, the tribes have to shift from their traditional occupations such as collection of forest products, handicrafts, animal rearing etc. to other occupations such as cultivation, agricultural laborers, non-agricultural laborers, business, and

service etc for their livelihood earnings (Table 7). They now want to get a sure income from these occupations for which they can plan their means of livelihoods. Therefore, land use can be done in such way which will be more beneficial to these local indigenous people (Hanumantha& Grover, 1979).

Satisfaction Level of Respondents Regarding Occupational Satisfaction

Table 9 Satisfaction level

Name of the Villages	Satisfaction level of respondents					
	Yes		No		Don't Know	
	13 years before	Now	13 years before	Now	13 years before	Now
Kalparashi	80	65	18	32	2	3
Samarbhola	62	62	28	31	10	7
Dakaisol	45	59	51	38	4	3
Ledashuli	53	58	41	37	6	5
Kamarbandhi	72	43	21	54	7	3
Mean	62.4	57.4	31.8	38.4	5.8	4.2

(Source: Field survey)

The spatial pattern shows in the following table no 9 few remarkable viewpoints. More than half of the total ST populations are satisfied for this occupational shifting through the decades. They particularly the younger generation welcomes the change they are not satisfied income. Another cause may be the deforestations. Due to the degradation of quality of forest they do not get enough non-timber forest products which can support their livelihood. Near about 35% people particularly elders retain their beliefs on NTFs for their livelihood. Among the five villages Kamarbandhi depicts a different picture. About 54% people are not satisfied at present for this occupational shifting. Probably they become satisfied to their own traditional occupations or do not have such job options or do not want to work as labour.

Table 10 Paired Samples Test

	Paired Differences			t	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean		
Samarbhola Satisfaction before 13 years - Samarbhola Satisfaction after 13 years	.074	.267	.051	1.442	.161
Dakaisol Satisfaction before 13 years -	.134	.776	.095	1.416	.161

Dakaisol Satisfaction after 13 years					
Kalparashi Satisfaction before 13 years - Kalparashi Satisfaction after 13 years	-.140	.351	.050	-2.824	.007
Ledashuli Satisfaction before 13 years - Ledashuli Satisfaction after 13 years	.078	.337	.047	1.661	.103
Kamabandhi Satisfaction before 13 years - Kamarbandhi Satisfaction after 13 years	-.262	.522	.058	-4.502	.000

(Source: SPSS Software)

From the paired compared test (Table 10) in between 5 selected villages, the result has been shown maximum changes of satisfaction on occupation transformation regarding satisfaction comparison between 13 years before and after in Kamarbandhi and Kalparashi villages. These two villages are basically tribal dominated that are 92% and 100% respectively (Table 1), the

changes of occupation from tradition to the other sectors are also high, so their satisfaction levels before and after 13 years are significant. In other hand, the satisfaction levels of the villagers of Samarbhola, Dakaisol and Ledashuli are the same as 13 years before and after. The following map represents the spatial variation of ‘p value’ which denotes the changing status of satisfaction level before and after 13 years of five selected tribal villages in Binpur II block.

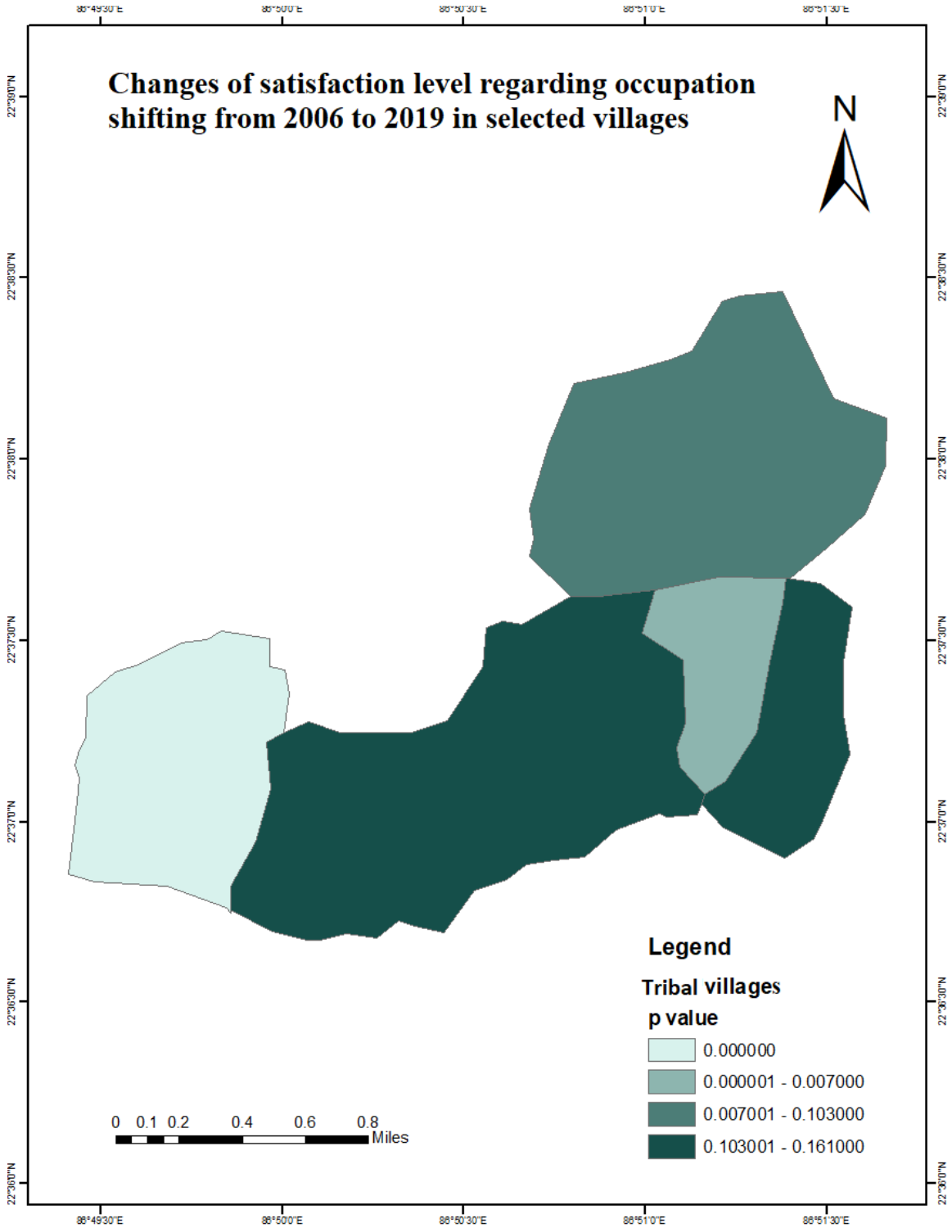

Fig. 12 Spatial distribution of satisfaction level about shifting of occupation.

(Source: ArcGIS 10.8)

5.6 Impact of Land Use Change

Land use alteration particularly from forest and open space to build- up area reduce both quality and productivity of land and forests. It also reduces the local environmental resources which are the basics of survival of local residents (Mzuza, et al., 2019). The encroachment of outsiders as well as the development authorities is helpful in terms of economy in one hand and on the other these are responsible for the destruction of social unity, traditional tribal set up, socio-economic segregation and identity of communities (Table 8).

Forests are not only the means of earning but also the places of cultural rituals of the tribal people. Mostly all rituals of them are forest based. They also depend on forest for the treatment of their illness. Forests in these study areas are prosperous with medicinal flora and fauna.

Table 11 Impact of land use change

Variables	Impacts
Economic	1. Traditional to agricultural and agricultural to non agricultural conflicts in occupation intensities. 2. Huge shifting of labourers from agricultural to non agricultural creates shortage of agricultural labours and it leads to collapse in local agricultural economy. 3. Change in occupation leads to the total destruction of indigenous traditional economy (Lynch & Carpenter, 2003). 4. Free livestock rearing in the forest becomes impossible due to forest degradation.

	5. Limited availability of forest resources may raise the food scarcity among tribal.
Social	1. Change in economy brings the changes in their own traditions, food habits, dress etc. 2. Sacred groves of tribal people are actually located in original forests. These are used for various cultural ceremonies. 3. Various traditions festivals are organised in the forests. The depletion of forest can destroy their cultural lives. 4. Conflicts arise between ST and not ST people particularly at Dakaisol and Ledashuli villages.
Environmental	1. Deforestation of surface and sub-surface water quality. 2. Limited availability of both plants and animals which are essential for their livelihood(Aye & Htay, 2019) 3. These indigenous people believe in traditional medicines. These medicines are prepared from these herbs of forests. So, due to deforestation these practices may be threatened.(Mondal et al., 2022) 4. Degradations and deforestations ruins the habitats. 5. This land use change welcomes soil erosion, salinization etc.

(Source: By authors)

6. Policy Recommendations

The culture of indigenous people is different from mainstream culture. They are more close to their natural surroundings. They love their forest based traditions. So, deforestation means some kind of dislocation from nature to them. Agriculture is also not so supportive. So, the people whose main occupation is agriculture they also collect the forest products when they have time in their hand. Therefore, forest has great impact on them. The local people usually blame the administration for deforestation. Deforestation is also necessary for developmental works. But it should be done such a manner that the livelihood of local people will not be considered the opinion of local people. Both decision makers and local people should aware about the impact of land use change. A pathway is recommended in the following for the sustainable management planning for the betterment of livelihood of local indigenous people of these areas (fig. 12).

Fig. 12 Recommended pathways for planning of sustainable management of land use and livelihood

(Source: By authors)

7. Conclusion

This study found the differential impacts of land use change which ultimately threatened the traditional livelihood of the indigenous people of this region. Forests provide various direct and indirect livelihood securities to these poor people. No doubt, deforestation is necessary for agricultural and non-agricultural activities and development planning but, it should be kept in mind to the decision makers that the people of this backward region have no such occupational options to cope with this type of land use change. If the livelihood sources are changed then the differential coping strategies will also be needed. Planning and development processes should provide such coping strategies which will be the survival strategies to these poor and marginalized people.

Land use change must happen to make the people's survival easier. Every land use change should also consider the value of local ecological system and the needs of local people. The decision of local people must be included in any type of land use change decision. But this essential part has always been forgotten by the decision makers because these decisions are controlled by the political biasness. Local indigenous people of these study areas are largely dependent on forest products. The huge amount of deforestation makes their livelihood more difficult. They generally do not want to opt another occupation. This study shows that they are forced to take the options like labourer in agricultural or non agricultural sectors. As they are very poor so, they cannot capable to take any better occupation like business and the scope of government job is very limited. Even they have to migrate to surrounding region for searching jobs. The key observation of this study in that due to differentiation and other land use change the local economy has been changed.

Although many young age people support this change and in favour of salaried jobs but this type of job option are limited in these areas. For future development, it is important to systematically evaluate previous patterns and dynamics of land use. Land use change based on time series analysis will provide insight into sustainable resource utilization and conservation.Therefore, the government should implement such land use policies and guidelines which can support the local livelihoods without any deforestation. For sustainable development of local rural economy and culture, land use policies should thoroughly investigate the impacts otherwise all the efforts of government will go in vain.

Acknowledgement

The authors express their heartfelt gratitude to the respondents particularly to the tribal villagers for their kind cooperation, help and sparing their time. We are thankful to the students of Post Graduate, Environmental special, Department of Geography, Midnapore College (Autonomous) for their spontaneous participation in the field work.

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