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Spatio-Temporal Variation of Land Use Pattern in Morigaon District of Assam

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Abstract:

There has been a perceptible transformation in the land use pattern of Morigaon district of Assam during the last few years. The pattern of land use change is basically influenced by a set of physical as well as social factors which varies spatially and temporally.

The Morigaon district is a traditionally backward agrarian region constituted by four major social groups, viz. indigenous general group of people, including both Hindu and Muslim, indigenous scheduled tribes, including both Hindu and Christian, indigenous scheduled caste belonging to Hindu and immigrant Muslim. These social groups living in different physio-social areas behave differently in the process of land use pattern. Therefore, there is a socio-spatial relation of land use changes in the district.

In this paper an attempt has been made to analyze the temporal changes of general land use pattern and its socio-spatial relationship during 1990-'91 to 2002-2003. It is expected that the study will have not only academic value; it will also help the planners to adopt separate plans and programmers for different regions.

Keywords: Transformation, land use pattern, agrarian region, temporal changes, socio-spatial relationship

1. Introduction

The existing pattern of general land use in Morigaon district is an outcome of the continuous interplay of physical elements like topography, climate and soil as well as socio-economic conditions within the district, diverse ecological settings of the river valley, beels, hills and ridges and the different attitudes and traditional behaviours of different social groups resulting in a significant spatial variation in the pattern of land utilization. These factors are generally varying from place to place as well as from community to the others. Thus, there is a socio-spatial relation of land use in the district. On the other hand during the last three decades, the total population of the district has tremendously increased. According to the 1971 census, the total population of the district was 4,29,259 persons which increased to 7,76,256 persons in 2001. This rapid growth of population along with socioeconomic development has caused a remarkable change in the land use pattern of the district.

2. Methodology and Database

The analysis of the changes of general land use pattern in socio-spatial dimension is made on the basis of the secondary data collected from Economic Statistical office, Morigaon, Directorate of Economics and statistics, Assam, Department of Agriculture, different circle offices of Morigaon district and Census of India, 1991 and 2001.

Besides these, some geographical information about the people, living in isolated corners is obtained only by personal observation and interview with the local people. These have been done with the help of schedules, taking purposive stratified random sampling, selecting few villages dominated by different social groups of the district. These data collected so are processed statistically and analyzed and interpreted with the help of maps and diagrams.

3. Objectives

The main objectives of study are as follows:

- i. To find out the changes in general land use pattern of the district.
- ii. To examine the spatial variation in the pattern of land use within the district.
- iii. To study the spatio-temporal variation in land use pattern in the study area.
- iv. To find out the community wise regional variation of land use pattern in the district.

4. Changing Pattern of General Land Use Pattern

The total geographical area of the district is 1,42,552.87 ha which constitute 1.99 percent of the state's total area. The land use pattern of the district is mainly dominated by agricultural land use. From the table 1, it is seen that in 1999-2000, the net sown area of the district was 64.52 percent of the total geographical area of the district which slightly increased to 65.05 percent in 2002-2003. This

small increase was due to decrease of barren and uncultivable land, permanent pastures and grazing land and other fallow land. The total gross cropped area in 1999-2000 was 80.48 percent of total geographical area of the district, which increased to 84.43 percent and 84.89 percent in 2000-2001 and 2001-02 respectively. This is mainly because of the increase of area sown more than once during these two agricultural years. On the other hand, the area sown more than once decreased to 16.56 percent in 2002-03 leading to the reduction of the percentage of gross cropped area.

The total area under forest of the district is only 2.21 percent, which shows a static condition during 1999-2000 to 2002-03. Thus forest area of the district is very much less than that of the state average of 22 percent. The Government as well as NGOs should take steps for further expansion of reserved forest in order to increase the forest area in the district. The barren and uncultivable land of the district has been remaining almost same all the years except in 2002-03 which decreased to 3.17 percent.

On the other hand, the permanent pastures and grazing land slightly decreased from 8.62 percent in 1999-2000 to 7.29 percent in 2002-03 while in respect of miscellaneous tree crops and groves, there was little increased from 4.82 percent in 1999-2000 to 5.20 percent in 2002-03. The cultivable wastes land increased from 1.85 percent in 1999- 2000 to about 2.45 percent in 2002-03 while there was marked increased of the current fallow lands from 2.63 percent in 1999-2000 to 7.01 percent in 2002-03. The frequent flood of the entire north-western part of the district is main cause of it.

Land use categories	1999 – 2000	2000 – 2001	2001 – 2002	2002 – 2003	Volume of changes from 1999-2000 to 2002-03
Forest cover	3156.87 (2.21)	3156.87 (2.21)	3156.87 (2.21)	3156.87 (2.21)	0
Barren and Uncultivable land	7856.22 (5.51)	7734.35 (5.43)	7177.24 (5.04)	4524.09 (3.17)	-2.34
Land put to non agricultural uses	9601.95 (6.74)	7674.64 (5.38)	7364.34 (5.17)	8487.69 (5.96)	-0.78
Cultivable wastes	2634.69 (1.85)	4155.61 (2.92)	3834.83 (2.69)	3486.75 (2.45)	+0.6
Permanent pastures and grazing land	12286.29 (8.62)	11952.10 (8.39)	10519.19 (7.38)	10386.39 (7.29)	-1.33
Msc. Tree crops and goves	6864.82 (4.82)	7483.12 (5.25)	4774.58 (3.35)	7415.49 (5.20)	+0.38
Current fallow	3748.07 (2.63)	5960.95 (4.18)	8474.99 (5.95)	9995.14 (7.01)	+4.38
Other fallow land (permanent)	4413.15 (3.10)	4414.06 (3.10)	4405.86 (3.09)	2366.40 (1.66)	-1.44
Net sown area cropped	91970.87 (64.52)	90001.17 (63.14)	92824.97 (65.12)	92714.05 (65.05)	+0.53
Geographical area	142532.87 (100)	142532.87 (100)	142532.87 (100)	142532.87 (100)	0
Gross area	114716.83 (80.48)	120350.98 (84.43)	120998.28 (84.89)	116325.98 (81.61)	-1.13
Area Sown more than once	22745.96 (15.95)	30349.81 (21.29)	28173.31 (19.77)	23611.93 (16.56)	-0.61

Table 1: General Land Use in Morigaon District (Area in hectares)

Note: Figures in the brackets indicate percentage of the total area of the district.

Source: Economic and Statistical office, Morigaon.

From the above analysis, it is seen that existing pattern of land use is very much unscientific as a very low percentage of area are put to forest cover indicating ecological imbalance. On the other hand, the higher percentage of areas is occupied by net sown area which is also not rational. Instead of horizontal expansion of land for agriculture, emphasis should be given on increasing intensity of cropping through vertical expansion of land. Increase of yielding from the existing cultivable land is possible with the application of modern scientific techniques.

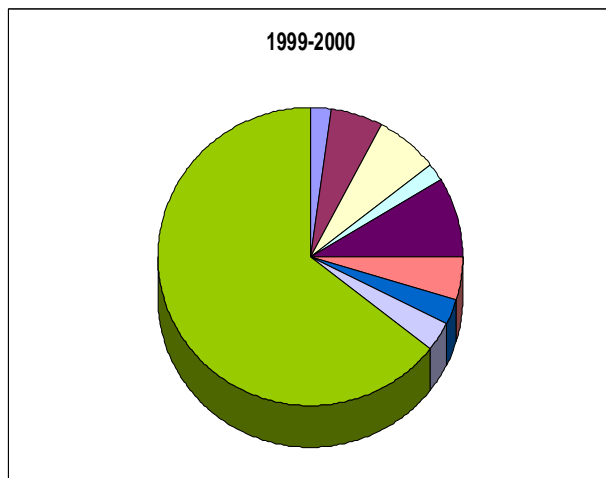


Figure 1: Morigaon General Land Use Pattern

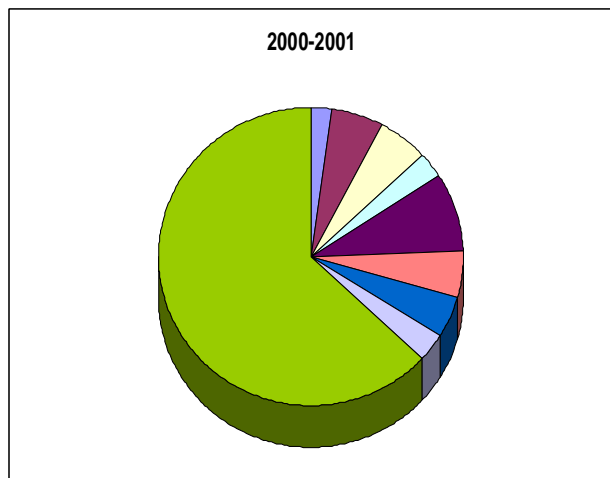


Figure 2: Morigaon General Land Use Pattern

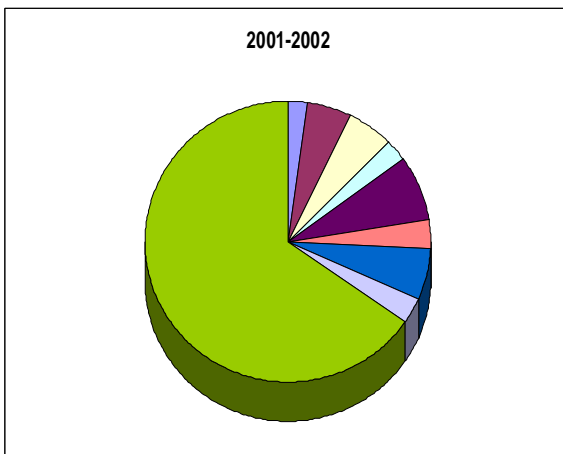


Figure 3: Morigaon General Land Use Pattern

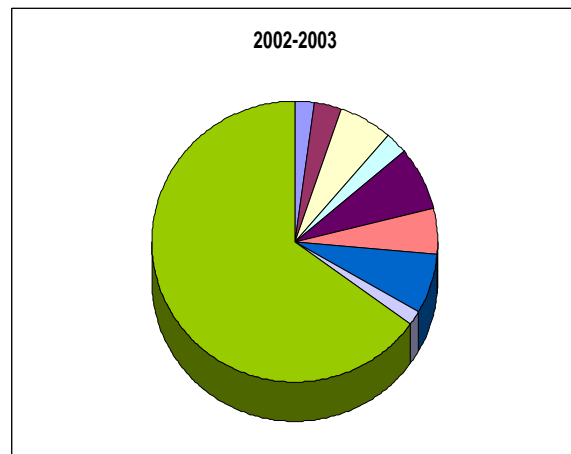


Figure 4: Morigaon General Land Use Pattern

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■ Forest	■ Barren and Uncultivable land
□ Land put to non agricultural uses	□ Cultivable wastes
■ Permanent pastures and grazing land	■ Misc. tree crops and goves
■ Current fallow	■ Other fallow (permanent)
■ Net sown area	

5. Mouzaswise Variation of Land Use

The land use patter varies from one mouza to another. The percentage of net sown area to the total land area varies greatly in different mouzas of the district depending mainly upon topography and soil as well as attitudes of the farmers of different communities.

Mouza	Forest	Barren and Uncultivated Land	Land put non agricultural uses	Permanent pastures and Grazing Land	Land under Misc. tree	Cultivable Wastes	Current fallow	Permanent fallow	Net Sown area	Total Cropped area (Gross)	Area Sown more than once	Geographical area
Dandua		5.43	3.24	2.43	3.16	2.36	0.24	0.35	82.79	95.25	12.46	100
Morigaon		3.65	6.13	2.79	4.00	1.25	0.48	0.46	81.24	84.95	13.71	100
Tetelia	6.93	2.98	8.23	9.87	1.86	0.18	0.95	0.10	68.90	76.94	8.03	100
Uttarkhola	15.32	2.43	5.87	8.39	2.54	0.28	1.41	0.32	63.44	72.01	8.58	100
Charaibahi		4.80	1.66	4.32	5.48	4.08	2.11	0.52	77.03	112.31	35.29	100
Mikirbheta		1.33	1.84	14.04	6.32	2.06	1.22	0.29	72.90	107.93	35.03	100
Silpukhuri		4.75	2.25	6.14	5.74	9.55	5.63	1.59	64.35	80.74	18.79	100
Laharighat		5.88	5.14	4.04	4.10	4.98	0.50	-	75.36	113.60	38.24	100
Moirabari		10.55	5.12	3.45	4.09	4.96	0.60	-	71.23	126.78	55.56	100
Bhuragaon		0.39	1.24	3.69	13.59	0.91	17.13	3.15	59.90	63.68	3.79	100
Bokani		1.57	1.06	8.13	4.85	2.18	4.95	8.95	68.31	71.51	3.19	100
Gova		3.64	11.59	10.11	7.82	2.21	11.81	0.71	52.11	57.00	4.89	100
Manaha	2.79	1.57	8.25	5.76	2.76	0.19	23.92	1.32	53.44	61.97	7.95	100
Mayang	2.11	0.24	10.42	17.86	12.39	1.02	8.33	0.73	46.90	49.95	3.06	100
Niz-Ghagua		2.20	8.61	9.99	4.02	3.50	19.29	5.38	47.01	48.52	1.51	100
Pokaria		2.32	11.58	5.45	0.69	0.53	11.49	0.79	66.98	78.09	11.12	100

Table 2: Mouza Wise Land Use Pattern of Morigaon District, 2002 – 2003. (Area in Percentages)

Source: Data collected from the Circle Offices of Morigaon District and calculated.

From the table 2, it is found that in the mouzas, the net sown area occupies higher percentage of areas of the district leaving very small areas to the other categories of land use. Extremely limited forest area is found in three mouzas and small percentages are found in two mouzas, whereas in other mouzas, it is totally absent. Whenever little forest area is still available, there also depletion of forest has been continuing at a very fast rate. This is mainly because of the reckless exploitation of forest. The illegal forest cutting leads to complete absence of forest in most of the mouzas.

From the table 2b it is seen that the barren and uncultivable land accounts for 10.55 percent in Moirabari followed by Laharighat (5.88 percent) and Dandua (5.43 percent). In Charaibahi, Silpukhuri, Morigaon, Gova, Tetelia, Uttarkhola, Niz-Ghagua, Bokani and Manaha, the proportion varies from 1 to below 5 percent and in all the remaining mouzas, it is less than 1 percent.

The proportion of land put to non-agricultural uses also varies from 1 to 12 percent in different mouzas comprises the highest proportion with 11.59 percent, followed by Pokaria mouzas (11.59 percent) and it is lowest in Bokani mouza (1.06 percent).

With 17.86 percent, Mayang ranks first in grazing lands followed by Mikirbheta, Gova, Niz-Ghagua, Tetelia, Uttarkhola, Bokani, Silpukhuri, Manaha and Pokaria. The proportion of these mouzas varies from 5.45 to 14.04 percent, whereas it is found to be less than 5 percent in the remaining mouzas.

At the mouza level, the proportion of land under miscellaneous tree crops and grove varies from 13.59 percent of the reporting area in Bhuragaon to only 0.69 percent in Pokaria. The second highest proportion constitutes 12.39 percent in Mayang followed by Gova (7.82 percent), Mikirbheta (6.32 percent) Silpukhuri (5.74) and Charaibahi (5.48 percent). Each of the remaining mouzas less than 5 percent.

The cultivable waste land occupies 9.57 percent in Silpukhuri followed by Laharighat (4.98 percent), Moirabari (4.96 percent), Charaibahi (4.08 percent) and Niz-Ghagua (3.50 percent). The proportion of this category varies from merely 0.18 percent to 2.36 percent in the remaining mouzas.

The mouzas like Manaha, Niz-Ghagua and Bhuragaon have a high proportion of land (about 17 percent) under current fallow whereas the percentages of current fallow are 11.81 percent in Gova, 11.49 percent in Pokaria, 8.33 percent in Mayang, 5.62 percent in Silpukhuri and 4.95 percent in Bokani. In the remaining mouzas, the proportion is very insignificant.

The proportion of the permanent fallow land to the total reporting area is 8.95 percent in the Bokani mouza followed by Niz-Ghagua (5.38 percent), Bhuragaon (3.15 percent), Silpukhuri (1.59 percent) and Manaha (1.32 percent). In Laharighat and Moirabari, this category of land is totally absent, whereas in the remaining mouzas, the percentages of this category of land are extremely insignificant (Table 2b).

6. Spatio-Temporal Variation in Land Use Pattern

The rapid population growth associated with socio-economic changes had caused a remarkable change in land use pattern of the district. From the table 3 (Part-I & II) it is seen that in all the mouzas of the district, the percentage of area under different categories of land use have been changed during the period 1990-91 to 2002-03 in respect of both space and time.

The percentage of forest area is very limited and it is found only in 5 mouzas (Tetelia, Uttarkhola, Manaha Mayang and Pokaria). In Tetelia mouza, the percentage of forest area decreased from 8.10 to 6.93 during 1990-92 to 2002-03. It also decreased in the remaining mouzas.

The percentage of area under barren and uncultivated land is increased in 6 mouzas (Charaibahi, Mikirbheta, Silpukhuri, Moirabari, Bhuragaon and Bokani) from 1990-91 to 2002-03. The percentage of increase is below 1 percent in the mouzas of Charaibahi, Mikirbheta, Silpukhuri and Bhuragaon. It decreased in the remaining 10 mouzas.

The percentage of area under land put to non agricultural uses has very significant variation in all the mouzas. It increased in 7 mouzas. In the Mayang mouza, it increased from 7.47 percent (1990-91) to 10.42 percent (2002-03), followed by Gova mouza with an increase from 9.21 percent (1990-91) to 11.59 percent (2002-03) and Niz-Ghagua mouza from 6.56 percent (1990-91) to 8.61 percent (2002-03). It slightly increased in the mouzas of Uttarkhola, Laharighat and Manaha. The amount of decrease of this category of land was highest in Bhuragaon mouza from 9.16 percent in 1990-91 to 1.24 percent in 2002-03. It was followed by Bokani, Silpukhuri, Mikirbheta, Morigaon, and Charaibahi. But it was very insignificant variation in Tetelia mouza.

The category of land under permanent pastures and grazing land has very insignificant temporal variation except in the mouzas of Bokani, Uttarkhola and Mikirbheta. In Bokani mouza the percentage of area under this category increased from 4.45 percent in 1990-91 to 8.13 percent in 2002-03.

Mouza	Total Geographical area (in ha.)	Forest			Barren and uncultivated land			Land put to non agricultural uses			Permanent pasture and grazing land		
		1990-91	2002-03	Diff.	1990-91	2002-03	Diff.	1990-91	2002-03	Diff.	1990-91	2002-03	Diff.
1.Dandua	6517.88				9.65	5.43	-4.22	5.43	3.24	-2.19	3.08	2.43	-0.65
2.Morigaon	7183.88				6.56	3.65	-2.99	10.27	6.13	-4.14	3.54	2.79	-0.75
3.Tetelia	9687.46	8.10	6.93	-1.17	4.33	2.98	-1.35	8.63	8.23	-0.40	8.38	9.87	+1.49
4.Uttarkhola	11907.48	18.03	15.32	-2.71	4.37	2.43	-1.94	4.91	5.87	+0.96	5.95	8.39	+2.44
5.Charaibahi	5168.08				3.85	4.80	+0.95	5.66	1.66	-4.00	3.66	4.32	+0.66
6.Mikirbheta	5370.94				1.06	1.33	+0.27	6.29	1.84	-4.45	11.88	14.04	+2.16
7.Silpukhuri	8026.51				3.80	4.75	+0.95	7.69	2.25	5.54	5.19	6.14	+0.95
8.Laharighat	13301.58				6.04	5.88	-0.16	4.58	5.14	+0.56	3.71	4.04	+0.33
9.Mairabari	8895.51				9.28	10.55	+1.27	8.87	5.12	-3.37	3.94	3.45	-0.49
10.Bhuragaon	10076.96				0.10	0.39	+0.29	9.16	1.24	-7.92	2.02	3.69	-1.67
11.Bokani	11141.49				0.40	1.57	+1.17	7.82	1.06	-6.76	4.45	8.13	+3.68
12.Gova	9176.31				4.16	3.64	-0.52	9.21	11.59	+2.38	11.13	10.11	-1.02
13.Manaha	8618.92	14.43	2.79	-11.64	1.69	1.57	-0.12	7.06	8.25	+1.19	5.98	5.76	-0.22
14.Mayang	9463.66	13.80	2.11	-11.69	0.26	0.24	-0.02	7.47	10.42	+2.95	18.54	17.86	-0.68
15.Niz-Ghagua	8463.03				2.52	2.20	-0.32	6.56	8.61	+2.05	11.04	9.99	-1.05
16.Pokaria	9533.18	12.24	2.32	-9.92	0.18	0.17	-0.01	10.04	11.58	+1.54	5.66	5.45	-0.21
District	142532.87	4.67	2.21	-2.46	3.55	3.17	-0.38	7.45	5.95	-1.50	6.68	7.29	-0.61

Table 3 (Part- I): Spatio-Temporal Variation of Landuse Pattern (1990-91 To 2002-03)(Area in percentage)

Source: Data collected from different offices of Morigaon District and calculated

Mouza	Misc. tree crops and groves			Cultivable waste			Current fallow			Permanent fallow			Net sown area		
	1990-91	2002-03	Diff.	1990-91	2002-03	Diff.	1990-91	2002-03	Diff.	1990-91	2002-03	Diff.	1990-91	2002-03	Diff.
1.	1.13	3.16	+2.03	5.66	2.36	-3.30	4.74	0.24	-4.50	4.53	0.35	-4.18	65.78	82.79	+17.01
2.	1.43	4.00	+2.57	2.91	1.25	-1.66	9.64	0.48	-9.16	5.97	0.46	-5.51	59.68	81.24	+21.56
3.	0.66	1.86	+1.20	0.44	0.18	-0.26	7.97	0.95	-7.02	1.24	0.10	-1.14	60.24	68.90	+8.66
4.	0.91	2.54	+1.63	0.68	0.28	-0.40	19.83	1.41	-18.42	4.09	0.32	-3.77	41.23	63.44	+22.21
5.	2.36	5.48	+3.12	1.58	4.08	+2.50	4.15	2.11	-2.04	2.07	0.52	-1.55	76.67	77.03	+0.36
6.	2.36	6.32	+3.96	1.11	2.06	+0.95	2.40	1.22	-1.18	1.14	0.29	-0.85	73.76	72.90	-0.86
7.	2.15	5.74	+3.59	3.70	9.55	+5.85	11.06	5.63	-5.43	6.33	1.59	-4.74	60.08	64.35	+4.27
8.	0.60	4.10	+3.50	1.55	4.98	+3.43	2.78	0.50	-2.28	1.37		-1.37	79.77	75.36	-4.41
9.	0.51	4.09	+3.58	1.19	4.96	+3.77	6.22	0.60	-5.62	0.45		-0.45	69.54	71.23	+1.69
10.	2.29	13.59	+11.30	1.70	0.91	-0.79	15.45	17.13	+1.68	10.62	3.15	-7.47	58.66	59.90	+1.24
11.	0.66	4.85	+4.19	4.04	2.18	-1.86	4.46	4.95	+0.49	30.20	8.95	-21.25	47.97	68.31	+20.34
12.	2.14	7.82	+5.68	3.43	2.21	-1.22	11.27	11.81	+0.54	1.00	0.71	-0.29	57.66	52.11	-5.55
13.	1.69	2.76	+1.07	0.28	0.19	-0.09	14.70	23.92	+9.22	1.74	1.32	-0.42	52.43	53.44	+1.01
14.	6.16	12.39	+6.23	1.50	1.02	-0.48	3.79	8.33	+4.54	0.96	0.73	-0.23	47.52	46.90	-0.62
15.	1.03	4.02	+2.99	5.46	3.50	-1.96	10.62	19.29	+8.67	7.55	5.38	-2.17	55.22	47.01	-8.81
16.	0.17	0.69	+0.52	0.78	0.53	-0.25	5.57	11.49	+5.92	1.05	0.79	-0.26	64.31	66.98	+2.67
Dist.	1.56	5.20	+3.64	2.17	2.45	+0.28	8.72	7.01	-1.71	5.43	1.66	-3.77	59.77	65.06	+5.29

Table 3 (Part- II): Spatio-Temporal Variation of Landuse Pattern (1990-91 to 2002-03) (Area in percentage)

Source: Data collected from different offices of Morigaon District and calculated

There was no spatio-temporal variation in other categories of land. The percentage of area under permanent fallow land decreased in all the mouzas of the district. The current fallow land highly decreased from 19.83 percent (1990-91) to 1.40 percent (2002-03) in Uttarkhola mouza. On the other hand the increase in the net sown area was more conspicuous in the mouzas of Uttarkhola from 41.23

percent (1990-91) to 63.44 percent (2002-03) and Morigaon from 59.68 percent (1990-91) to 81.24 percent (2002-03) in comparison to those in other mouzas. This significant amount of increase is the result of the consequent decrease in the fallow land in both the mouzas.

7. Conclusion

The forgoing analysis is concluded with following findings and suggestions.

- i. A large percentage of areas have been brought under net sown area. As the area under forest and cultivable waste are very small, there is no further scope for horizontal expansion of the cultivable land.
- ii. There is a spatial disparity at the mouza level and also spatial disparity at the community wise regional level in land use pattern resulting in the socio-spatial variation of land utilization of the district.
- iii. The existing pattern of land use is very much unscientific as a very low percentage of area is put to forest cover indicating ecological imbalance.

As the area under forest is very small, the government as well as NGO's should take steps for further expansion of reserved forest in order to increase the forest area of the district. The beels and waterlogged areas should also be developed as fishing grounds and for lifting water for irrigation. On the other hand higher percentage of areas is occupied by net sown area which is also not rational. Instead of horizontal expansion of land for agriculture, emphasis should be given on increasing intensity of cropping through vertical expansion of land.

As the nature of land use and agricultural practices in different regions inhabited by different communities with their different socio-cultural traits and socio-economic behaviours, separate planning strategies should be adopted for each community-space. In case of indigenous general community dominated area, extension of irrigation facilities and modern inputs should be provided so that productivity of crops can be increased by increasing the intensity of cropping and some of the educated unemployed youths may be attracted towards agriculture.

The people of immigrant Muslim community are generally laborious and hard workers. Therefore real agricultural development among them can be made possible by providing infrastructural and modern inputs facilities. In case of scheduled tribe peasants, extension of education and training facilities should be provided so that they can turn their interest from growing only food crops needed for their subsistence to adopt innovative measures for growing multiple crops. Like scheduled tribe peasants, in the case of scheduled caste community also, the extension of education and training facilities should be provided so that they can develop their traditional occupation as well as agricultural activities.

8. Acknowledgement

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9. References

- i. Das, M.M., 1981, 'Land use Pattern in Assam', *Geographical Review of India*, Vol. 43, No.3
- ii. Data, D.K. and Deka, D., 1995, 'Changing Pattern of Land use in Morigaon Town, Assam', *The North-Eastern Geographer*, Vol.26, No.1 & 2.
- iii. Sarma, T.C. and Coutinho, O. 1983, 'Growth of irrigation and its Impact on Crops Land use and Crop yield in Karnataka, 1960-61 to 1976-77', *Annals of the National Association of Geographers, India*, Vol.2, No.2.
- iv. Sharma, H.N. 1990, 'Integrated Land use Planning. An urgent Need of North-East India', *North-Eastern Geographer*, Vol.22 No.1 & 2.
- v. Siddiqi, M.F. 1973, 'A comparative Study of Land use Pattern in the Central Ganga Ghagra Doab, India', *Geographical Review of India*, Vol.35, No.4.
- vi. Taher, M., 1976, 'An Ecological Approach to Land-use Survey' in *workable Methodology of Land use Survey*, Das, M.M. (ed), Department of Geography, Gauhati University, Guwahati.