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# Spatio-Temporal Transformations in General Land Use in Latur and Nilanga Tahsil 1993-1996 to 2010-13

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**Abstract:** *It is very necessary to examine the general land use time to time for apply of some breaks, either at the administrative level for the beneficiaries of the farmers. The study of spatio-temporal changes in general land use will be useful for administrators and planners. Day by day population pressure is increased on land. Hence proper use of land is very important for sustainable development of any region. Every change in land use should be noticed for development planning and management. In this study Technical Committee on Co-ordination of Agricultural Statistics (T.C.C.A.S.) recommendations of standard classification of land class has been considered. Latur and Nilanga Tahsil of Marathwada region are chosen as study area. The regional variations in spatial pattern of land uses are examined from 1993-96 to 2010-2013. Categorywise more change has been observed in land put to non-agricultural use and net sown area. Negative change has observed in land put to non agricultural use, barren lands, permanent pastures and other grazing land, area under miscellaneous tree crops etc., cultural waste land, current fallows and other fallow land. Positive change has observed net sown and area under forest. It is good sign for study region development.*

**Keywords:** *Spatio-Temporal Transformations in General Land Use*

## I. INTRODUCTION

There are many geographical factors affects on the general land use of study region. Physiography, geology, climatic conditions, soil and vegetations are the main factors effects on general land use of study region. There are so many cultural factors which include, the duration of the occupancy of the area, population pressure, and socio-economic conditions, industrial frame work the use of modern technology used by the farmers. These factors determine the extent to which the land utilization of any region in the ultimate of the interaction between these two groups of variables. Those variables from manmade or cultural factors, which are very dynamic and show a variation through time. Due to human activities some of the physical factors such as soil, rainfall and forests are also the dependent variables which may go under a change. The demand for new uses of land may be stimulated by a technological change or by a change in size, compositions and requirements of a concerning community. Some changes are short lived while others represent a more constant demand (J.N. Jakson 1963). The study of land use is of pivotal importance in the point of view of planning and development of an area. "It is natural that different types of living which are represented by social values and certain industrial controls will create different patterns of land use within the limits imposed by different agro-physical controls" (Jasbir Singh, 1974)

## II. STUDY REGION

Study region is part of Latur district. Latur district is included ten tahsils. This study area consist current Latur tahsil and area of Nilanga tahsil before 23 June 1999. These are important tahsils of Latur district. Latur tahsil is divided into following five revenue circles. These are Kasarkheda, Latur, Gategaon, Tandulja and Murud. Nilanga tahsil is divided into following eight revenue circles. These are Nilanga, Shirur Anantpal, Hisamabad, Ambulga, Kssarshirshi, Kasar Balkunda, Madansuri and Aurad Shahajani. Latur tahsil is located in the north western part of Latur district. Nilanga tahsil is located in the southern part of latur district. Study area North side is bounded by Renapur and Chakur tahsil. East side is bounded by Udgir and Deoni tahsil. South and West side is bounded by Ausa tahsil and Osmanabad district. Study area lies between 17° 52' north to 18° 32' north latitudes and 76° 12' east to 76° 41' east longitudes. The total area of study is 2577.35 sq. km. The height of study region is in-between 510 to 700 meters from sea level. The main river is the Manjra flowing in the northern and eastern part of study area. Other important rivers are the Terna and Tawarja. Both rivers flow west to east direction through the study region. Study regions covered by deep black soil and medium black soil. The average normal rainfall of study region is 714 millimetres.

There is lot of variation in temporal and spatial distribution of rainfall in study area.

### III. OBJECTIVES

- A. To examine the general land use pattern of Latur and Nilaga Tahsil.
- B. To identify transform in general land use pattern from 1993-96 to 2010-13.

### IV. METHODOLOGY

In India as per the Technical Committee on Co-ordination of Agricultural Statistics (T.C.C.A.S.) recommendations of standard classification, the total geographical area of study area is divided into nine land use categories. The following are the main land use categories. 1) Area under forest 2) Areas under non agricultural uses 3) Barren lands 4) Permanent pastures and other grazing land 5) Area under miscellaneous tree crops etc 6) Cultural waste land 7) Current fallows 8) Other fallow land 9) Net sown area. Area under all land use categories has been collected circlewise from Socio- economic review and district statistical abstract of Latur district, District census & hand book, Gazetteer, Agricultural epitomes, season and crops reports published by the department of agriculture. Volume of Change is calculated using in following formula.

Volume of Change = (Last Year Land use Area in %) - (Base Year Land use Area in %)

### V. RESULTS AND CONCLUSION

#### A. Circle wise changes in general land use from 1993-1996 to 2010-13

There are differences in physical factors in different circles of study region. The general land use is shown by Map No. 1 and 2. Table No. 1 indicates that the general land use of different circles of this region from 1993-1996 to 2010-13.

- 1) *Transformations in Area under Forest:* The area under forest was 921 hectares in 1993-96 and it was 1702 hectares in 2010-13 in study region. The area under forest was increased by 0.30 % in study region. Positive changes were recorded in Latur (0.26%), Kasarkheda (0.30%), Tandulja (0.19), Nilanga (0.11), Ambulga (0.20), Kasarshirsi (0.57), Kasarbalkunda (0.14), Madansuri (0.10) circles and negative changes were recorded in Aurad shajani 1.72) Murud (0.13), Gategoan (0.48). The highest positive change has been observed in Kasarshirsi circle (0.57%) and the lowest positive change was recorded in Aurad shajani (1.72) circle during the period of 1993-96 to 2010-13.
- 2) *Transformations in Land Put to Non Agricultural Uses:* In this land use category negative transformations have been observed Latur (0.25%), Kasarkheda (0.52%), Murud (0.13%), Gategon (1.7%), Tandulja (1.55%), Nilanga (0.98%), Shirur Anatpal (0.63%), Hismabad (0.82%), Ambulga (3.15%), Kasarshirsi (1.29%), Kasarbalkunda (6.39%), Madansuri (3.57%) and Aurad shajani (1.77%) circles during the period of 1993-96 to 2010-13. The highest negative change was recorded in Kasarbalkunda (6.39%) circle. Very significant change is observed in this category in study area. The area under non agricultural uses was 4.95 % in 1993-96 and it was 2.95 % in 2010-13. Overall 2 % negative change has found in this category.
- 3) *Transformation in Barren and Uncultivable Land:* The overall 1.19 % negative change of this category is recorded during the period under study time. In this land use category negative transformations have been observed Latur (0.18%), Kasarkheda (0.73%), Murud (1.04%), Gategon (0.3%), Tandulja (1.0%), Nilanga (1.65 %), Shirur Anatpal (0.2%), Hismabad (1.32%), Ambulga (2.07%), Kasarshirsi (1.34%), Kasarbalkunda (4.36%), Madansuri (1.41%) and Aurad shajani (0.6 %) circles during the period of 1993-96 to 2010-13. The highest negative change in Barren and unculturable land was recorded in kasarkheda (4.36 %) circle and the lowest negative change was noticed in Latur (0.18%) circle during the period under study.
- 4) *Transformation in Cultivable Waste Land:* The negative change has been recorded in area under cultivable waste land during the period under study. The highest negative change in under cultivable waste land was recorded in Kasarbalkunda (3.3 %) circle and the lowest negative change was noticed in Shirur Anatpal (0.38%) circle during the period under study. The 1.16% negative change has been noticed in study region during the period 1993-96 to 2010-13. The negative change in cultivable waste land was observed in Latur (0.57%), Kasarkheda (0.89%), Murud (1.1%), Gategon (0.85%), Tandulja (1.41%), Nilanga (1.08 %), Shirur Anatpal (0.38%), Hismabad (2.19%), Ambulga (1.06%), Kasarshirsi (1.52%), Kasarbalkunda (3.3%), Madansuri (0.83%) and Aurad shajani (1.07 %) circles.
- 5) *Transformation in Permanent Pastures and other Grazing Land:* Negative changes have been observed in the area of this category. Nearly 1.12% was decreased in study area during the period 1993-96 to 2010-13. The highest negative change in area under permanent pastures and other grazing land was recorded in Kasarbalkunda (1.93%) circle and the lowest negative change area under permanent pastures and other grazing land was observed in Latur (0.23%) circle during the period under study. The negative change in permanent pastures and other grazing land was observed in Latur (0.23%), Kasarkheda (0.49%), Murud (0.38%), Gategon (0.69%), Tandulja (1.89%), Nilanga (1.37%), Shirur Anatpal (1.25%), Hismabad (1.42%), Ambulga (0.66%), Kasarshirsi (0.95%), Kasarbalkunda (1.93%), Madansuri (1.47%) and Aurad shajani (0.34 %) circles.



TABLE. 1  
Land Utilization of Different Circles of Study Region (1993-96 to 2010-13)

Name Of Circles	Year	Total Geographical Area(Area in Hectares)	Area Under Forest	Land Put To Non Agricultural Use	Barren & Uncultivable Land	Cultivable West Land	Permanent Pasture& Other Grazing Land	Land Under Miscellaneous Tree & Groves Not Included In Net Area Sown	Current Fallows	Other Fallows	Net Sown Area
Latur	1993-96	24587	21	612	230	315	84	97	54	56	23118
	%	100	0.09	2.49	0.94	1.28	0.34	0.39	0.22	0.23	94.03
	2010-13	24587	85	551	187	174	26	35	28	15	23486
	%	100	0.35	2.24	0.76	0.71	0.11	0.14	0.11	0.06	95.52
	Vol. of ch.	00	0.26	-0.25	-0.18	-0.57	-0.23	-0.25	-0.11	-0.17	1.49
Kasarkhed a	1993-96	15661	16	176	336	258	198	225	182	141	14129
	%	100	0.10	1.12	2.15	1.65	1.26	1.44	1.16	0.90	90.22
	2010-13	15661	63	94	222	134	120	160	67	33	14821
	%	100	0.40	0.60	1.42	0.86	0.77	0.68	0.43	0.21	94.64
	Vol. of ch.	00	0.30	-0.52	-0.73	-0.89	-0.49	-0.76	-0.73	-0.69	4.42
Murud	1993-96	23424	146	1228	374	652	332	256	208	181	20247
	%	100	0.62	5.24	1.60	2.78	1.42	1.09	0.89	0.77	86.44
	2010-13	23424	115	522	132	394	244	37	34	38	21908
	%	100	0.49	2.23	0.56	1.68	1.04	0.16	0.15	0.16	93.53
	Vol. of ch.	00	-0.13	-3.01	-1.04	-1.1	-0.38	-0.93	-0.74	-0.61	7.09
Gategoan	1993-96	18505	166	968	352	521	487	232	214	227	15338
	%	100	6.90	5.23	1.90	2.82	2.53	1.25	1.16	1.23	82.89
	2010-13	18505	77	654	297	365	359	184	198	125	16246
	%	100	0.42	3.53	1.60	1.57	1.94	0.99	1.07	0.68	87.79
	Vol. of ch.	00	-0.48	-1.7	-0.3	-0.85	-0.69	-0.26	-0.09	-0.55	4.90
Tandulja	1993-96	17588	14	824	298	352	432	267	274	259	14868
	%	100	0.08	4.68	1.69	2.00	2.46	1.52	1.56	1.47	84.53
	2010-13	17588	47	550	122	104	98	75	34	29	16529
	%	100	0.27	3.13	0.69	0.59	0.56	0.43	0.19	0.16	93.98
	Vol. of ch.	00	0.19	-1.55	-1.0	-1.41	-1.89	-1.9	-1.37	-1.31	9.45
Nilanga	1993-96	36708	21	2214	980	652	864	732	358	355	30532
	%	100	0.6	6.03	2.67	1.78	2.35	1.99	0.98	0.91	83.18
	2010-13	36708	260	1852	374	258	361	140	152	84	33227
	%	100	0.71	5.05	1.02	0.70	0.98	0.38	0.41	0.23	90.51
	Vol. of ch.	00	0.11	-0.98	-1.65	-1.08	-1.37	-1.61	-0.57	-0.68	7.44
Sairur anantpal	1993-96	21897	00	726	229	311	447	332	481	249	19122
	%	100	00	3.32	1.05	1.42	2.04	1.52	2.20	1.14	87.33
	2010-13	21897	00	588	187	228	174	168	114	125	20313
	%	100	00	2.69	0.85	1.04	0.79	0.77	0.52	0.57	92.77
	Vol. of ch.	00	00	-0.63	-0.2	-0.38	-1.25	-0.75	-1.68	-0.57	5.44
Hisamabad	1993-96	11645	00	517	292	317	277	184	135	97	9826
	%	100	00	4.44	2.51	2.72	2.38	1.58	1.16	0.83	84.38
	2010-13	11645	00	422	138	178	112	65	51	69	10610
	%	100	00	3.62	1.19	1.53	0.96	0.56	0.44	0.59	91.11

	Vol. of ch.	00	00	-0.82	-1.32	-2.19	-1.42	-1.02	-0.72	-0.24	6.73
Ambulga	1993-96	20262	00	1496	835	528	432	387	244	306	16034
	%	100	00	7.38	4.15	2.61	2.13	1.91	1.20	1.51	79.13
	2010-13	20262	40	857	421	334	298	235	64	57	17976
	%	100	0.20	4.23	2.08	1.55	1.47	1.16	0.32	0.28	88.72
Kasar Shirsi	Vol. of ch.	00	0.20	-3.15	-2.07	-1.06	-0.66	-0.75	-0.88	-1.23	9.59
	1993-96	14907	65	622	367	321	325	122	211	159	12715
	%	100	0.44	4.17	2.46	2.15	2.18	0.82	1.42	1.07	85.30
	2010-13	14907	151	355	167	94	184	98	77	49	13732
Kasar Balkunda	%	100	1.01	2.38	1.12	0.63	1.23	0.66	0.52	0.33	92.18
	Vol. of ch.	00	0.57	-1.29	-1.34	-1.52	-0.95	-0.16	-0.9	-0.74	6.88
	1993-96	21166	201	2078	1227	998	537	432	315	400	14978
	%	100	0.95	9.82	5.80	4.72	2.53	2.04	1.49	1.89	70.76
Madansuri	2010-13	21166	230	727	304	300	128	135	114	204	19024
	%	100	1.09	3.43	1.44	1.42	0.60	0.64	0.54	0.96	89.88
	Vol. of ch.	00	0.14	-6.39	-4.36	-3.3	-1.93	-1.4	-0.95	-0.93	19.12
	1993-96	15170	20	877	398	295	435	221	186	190	12548
Auradsha	%	100	0.13	5.78	2.62	1.94	2.87	1.46	1.23	1.25	82.72
	2010-13	15170	35	335	184	168	212	186	84	93	13873
	%	100	0.23	2.21	1.21	1.11	1.40	1.23	0.55	0.61	91.45
	Vol. of ch.	00	0.10	-3.57	-1.41	-0.83	-1.47	-0.23	-0.68	-0.64	8.13
Total Latur & Nilanga	1993-96	16214	271	418	242	258	124	128	230	198	14345
	%	100	1.67	2.58	1.49	1.59	0.76	0.79	1.42	1.22	88.47
	2010-13	16214	89	132	144	85	68	87	198	148	15263
	%	100	0.55	0.81	0.89	0.52	0.42	0.54	1.22	0.19	93.97
Total Latur & Nilanga	Vol. of ch.	00	-1.72	-1.77	-0.6	-1.07	-0.34	-0.25	-0.2	-0.31	5.5
	1993-96	257735	921	1275	5960	5778	4974	3764	3092	2818	217800
	%	100	0.36	4.95	2.31	2.24	1.93	1.46	1.20	1.09	84.51
	2010-13	257735	1702	76.09	2879	2796	2082	1552	1245	1069	237409
Total Latur & Nilanga	%	100	0.66	2.95	1.12	1.08	0.81	0.60	0.48	0.41	92.11
	Vol. of ch.	00	0.3	-2	-1.19	-1.16	-1.12	-0.86	-0.72	-0.68	7.2

Source: Crop and Season Reports, Tahsil Office, Latur and Nilanga. Some computed by the Author.

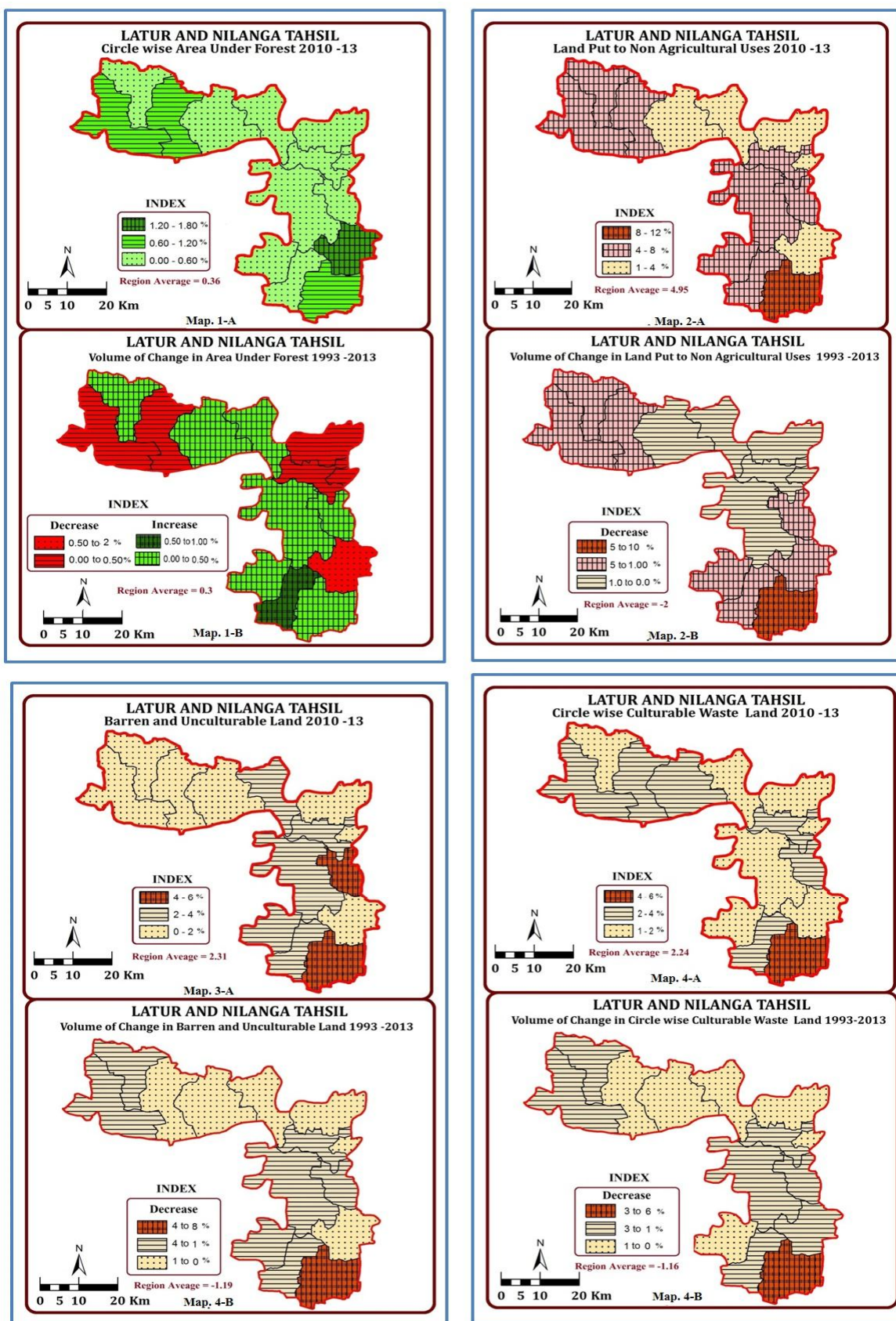
#### Transformation in Land under Miscellaneous Tree Crops and Groves Not Included in Net Sown Area

Area under this category negative change was observed in all the circles of study area during the period 1993-96 to 2010-13. The area under this category was decreased by 0.86 % during the period 1993-96 to 2010-13.

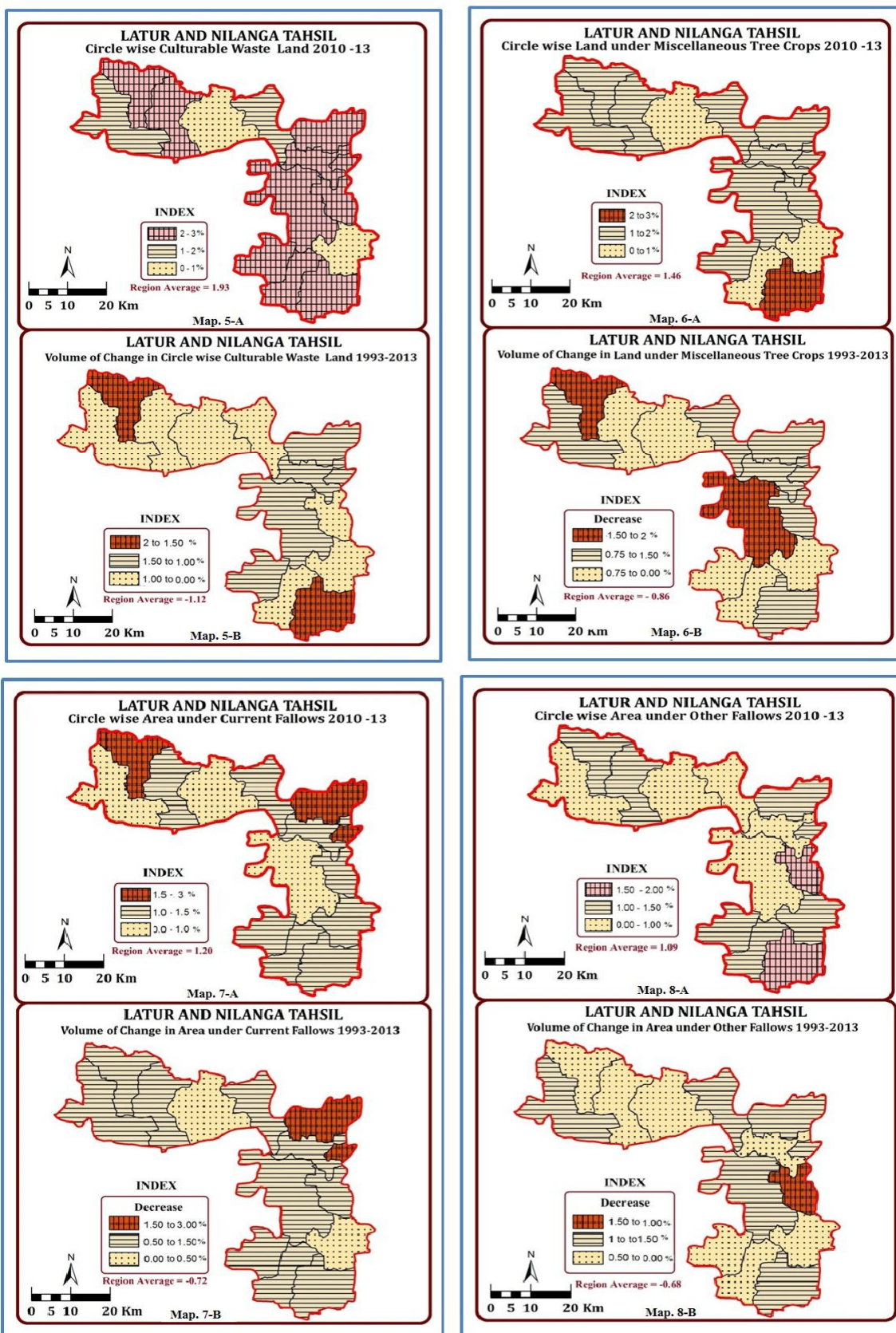
The highest negative change was recorded in Tandulja (1.9%) circle and the lowest negative change was observed in Latur and Madansuri (0.23%) circle during the period 1993-96 to 2010-13. The negative change in this category in Latur (0.23%), Kasarkheda (0.76%), Murud (0.93%), Gategon (0.26%), Tandulja (1.9%), Nilanga (1.61%), Shirur Anatpal (0.75%), Hismabad (1.02%), Ambulga (0.75%), Kasarshirsi (0.16%), Kasarbalkunda (1.4%), Madansuri (0.23%) and Aurad shajani (0.25%) circles.

- 6) *Transformations in Current Fallows:* Due to uneven monsoon rainfall, small size of holding, low per hectare yield of agriculture, the marginal land holding farmers put their land as a current fallow land. The average study area negative transformation of this category land is 0.72%. The highest negative change in current fallows are observed in Shirur Anatpal (1.68%) circle and the lowest negative transformations took place in Gategon (0.09%) circle during the period 1993-96 to 2010-13.

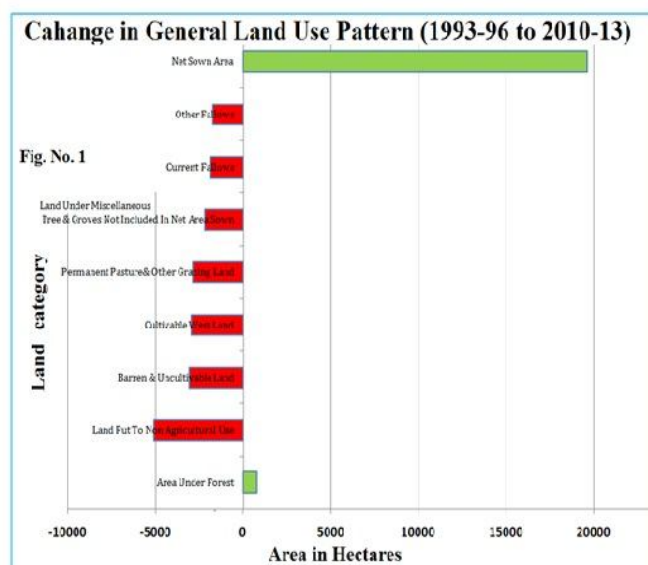
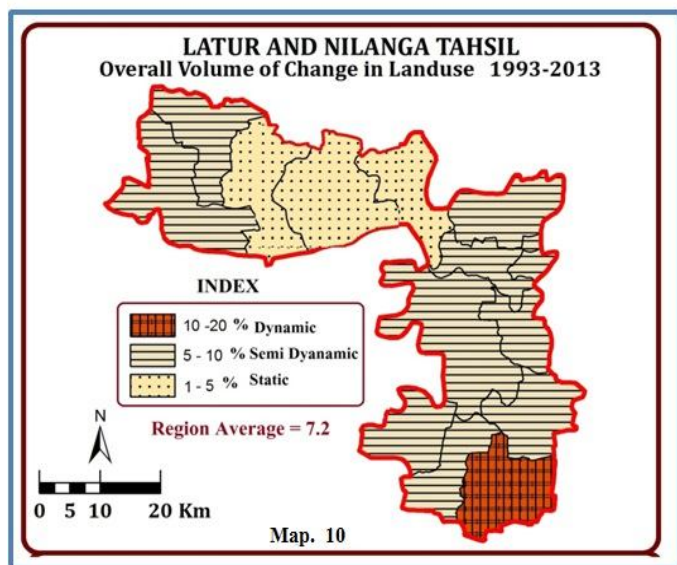
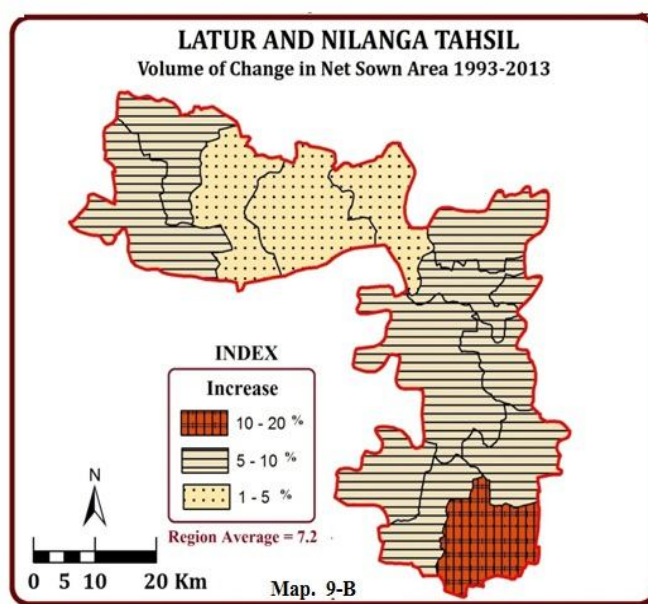
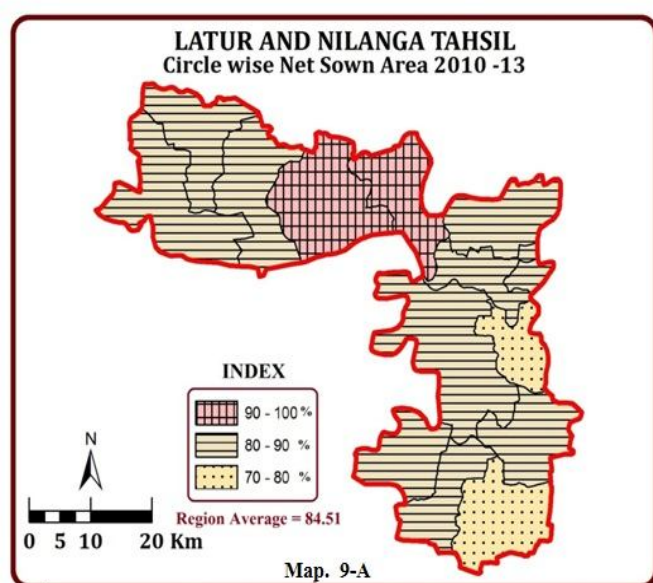
The negative change in this category in Latur (0.11%), Kasarkheda (0.73%), Murud (0.74%), Gategon (0.09%), Tandulja (1.37%), Nilanga (-0.57%), Shirur Anatpal (1.68%), Hismabad (0.72%), Ambulga (0.88%), Kasarshirsi (0.9%), Kasarbalkunda (0.95%), Madansuri (0.68%) and Aurad shajani (0.2%) circles. Due to population pressure increased in study area the area under current fallows has been decreased.







- 7) *Transformations in Other Fallows:* Nearly 0.68% area under other fallow land is also decreased in Latur and Nilanga tahsil. The highest negative change in area under other fallows has been recorded in Kasarbalkunda (0.93%) circle and the lowest negative change was observed in Latur (0.17%) circle during the period under study. The negative change in area under other fallows was recorded in Latur (0.17%), Kasarkheda (0.69%), Murud (0.61%), Gategon (0.55%), Tandulja (1.31%), Nilanga (0.68%), Shirur Anatpal (0.57%), Hismabad (0.24%), Ambulga (1.23%), Kasarshirsi (0.74%), Kasarbalkunda (0.93%), Madansuri (0.64%) and Aurad shajani (0.31%) circles.
- 8) *Transformations in Net Sown Area:* Due to utilization of fallow land the net sown area has been increased in study area. Only positive change was recorded in the area of net sown during the period under study. The positive change in net sown area was recorded by 7.2 % in study area during the period in 1993-96 to 2010-13. The positive change was observed in this category in Latur (1.49%), Kasarkheda (4.42%), Murud (7.9%), Gategon (4.90%), Tandulja (9.45%), Nilanga (7.44%), Shirur Anatpal (5.44%), Hismabad (6.73%), Ambulga (9.59%), Kasarshirsi (6.88%), Kasarbalkunda (19.12%), Madansuri (8.13%) and Aurad shajani (5.5%) circles. The highest positive change in net sown area was recorded in Kasarbalkunda (19.12%) circle and the lowest positive change was observed in Latur (1.49%) circles.





**B. Overall volume of change in General Land from 1993-1996 to 2010-13**

After the consideration of all the land use categories, it is necessary to measure the overall volume of change of nine general land use from 1993-1996 to 2010-13. In overall volume of change includes the land actually involved in the transform from one category to the other category. If the index of volume of change is greater, we can say that more dynamic conditions exist there. Table no. 2 indicates that an index of different circles of the study region. The index of volume of change was more than 19% were observed for Kasar Balkunda (19.26%) means the dynamic conditions of land use is observed in this circle. A semi-dynamic land use condition has been recorded in Tandulja (9.45%), Ambulga (9.59), Murud (7.09%), Nilanga (7.44%), Shirur Anatpal (5.44%), Hismabad (6.73), Kasarshirsi (6.88) and Aurad Shajani (5.5%) and madansuri (8.83) circles. The static conditions in land has been observed in Latur (1.79%), Kasarkheda (4.72%) and Gategaon (4.90%) circles. (Table No. 2 and Map No. 3)

Categorywise more change has observed in land put to non agricultural use and net sown area. Negative change has observed in land put to non agricultural use, barren lands, permanent pastures and other grazing land, area under miscellaneous tree crops etc. , cultural waste land, current fallows and other fallow land positive change has observed Net sown and area under forest. It is good sign for study area development.

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