CORRELATION AND TRANSFORMATION OF GENERAL LAND USE IN OSMANABAD DISTRICT

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Abstract:

Land use involves the management and modification of natural environment or wilderness into built environment such as field, pastures and settlements. Landuse is a function of four variables – land, water, air and man. More recent significant effects of land use include urban sprawl, soil erosion, salinity and desertification. Dueto influence of dynamic socio economic factors, the land use pattern also goes on getting modified, so much so, that, some time it is wholly replaced after a sufficiently long span of time. Land use study has key role in scientific study. The study of the land use not only provides base for understanding the complex structure of landscape of the region, but also helps for better planning therefore effort is made to study the transformation of land use. The present paper is based on secondary sources. To determine transformation of land use, the Karl Pearson's coefficient of correlation is used. On the basis of value of negative correlation the transformation of land use is determined and conclusions are drawn. The study reveals that the net sown area is converted into fallow land in wash and Lohara tehsil due to inadequate insufficient and unpredictable rainfall and lack of perennial irrigation facilities.

Key wards: Transformation, land-use, Correlation.

Introduction:

Transformation means the process of transforming (M.Webster's Collegiate Dictionary, 2004). The transformation of general land use means alternation in land use category due to cultural factors. Land is very significant and basic natural resources. Land use involves the management and modification of natural environment or wilderness into built environment such as field, pastures and settlements, it has been defined as " the arrangement, activities and inputs people undertake in a certain land cover type to produce, change or maintain it" (FAO, 1997, FAO/UNEP, 1999). Land use is a function of four variables – land, water, air and man. Each plays its own role in composing its life history. Land constitute its body, water runs through its veins life blood, air gives it Oxygen and man acts as

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dynamic actor to reflect its types, pattern and distribution (Singh R.P.,1992). Land use / land cover pattern of a region is an outcome of natural socioeconomic factors and their utilization by man in time and space. Land use and land management practices have major impact on natural resources including water, soil, nutrients, plants and animals. More recent significant effects of land use include urban sprawl, soil erosion, salinity and desertification. Land use and land cover change has become an important component in current strategies for managing natural resources and monitoring environmental changes (Hangaragi S.S., 2011). Land is becoming a scarce commodity due to immense agricultural and demographic pressure. Hence, information of land use and land cover and possibilities for optimal use is essential for the selection, planning and implementation of land uses schemes to meet the increasing demands for basic human needs and welfare (Mahlingam and Patil S. A., 2011). Land use / land cover study has key role in scientific study. Throughout the world, emphasis has been given on such study due to increasing demand for land as it's limited availability (Vaidya&Nannaware, 2013).

Systematic utilization of land is able to promote economic and cultural development. Without utilization of land, one cannot think of any progress. With a shift towards modernization and globalization, land use land cover has been changing remarkably all over world (Rath P. K. etc., 2009). Due to the growth of population, many changes in land-use have taken place. Forest and grassland are converted into agricultural, industrial, settlement, and transportation and mining land. Because of ever increasing population pressure on land, the land resources are depleting rapidly.

The study of transformation of land utilization is of immense value in tracing out the use of land in the past and its future trends. Through the study of transformation of land utilization, one can predict its future use and evolve land-use planning of a particular region. Therefore attempt is made here to study the transformation of land use in Osmanabad district.

Study Region:

The Osmanabad District [Area under Study] is part Maharashtra plateau. The district is bounded by 17°35' North to 18°40' North latitudes and 75°16' East to 76°40' East longitudes. The North South stretch of the district is 240 kilometers and East-west extension is 280 kilometers. Osmanabad district, comprises some hills of the Balaghat Mountain ranges. Bhum, Washi, Kalam, Osmanabad and TuljapurTehsils situated in the hilly areas of Balaghat and the remaining tehsils in the plateaus and plains. It is elongated towards southeast and south direction forming the water divide between the Godavari and Bhima valleys. The adjoining districts are Solapurto its Southwest, Ahmednagar to its Northwest, South by Bidar and Gulbarga district of Karnataka State. The district has a total area of 7512.40 square kilometers with 1657576 populations as per census of 2011.
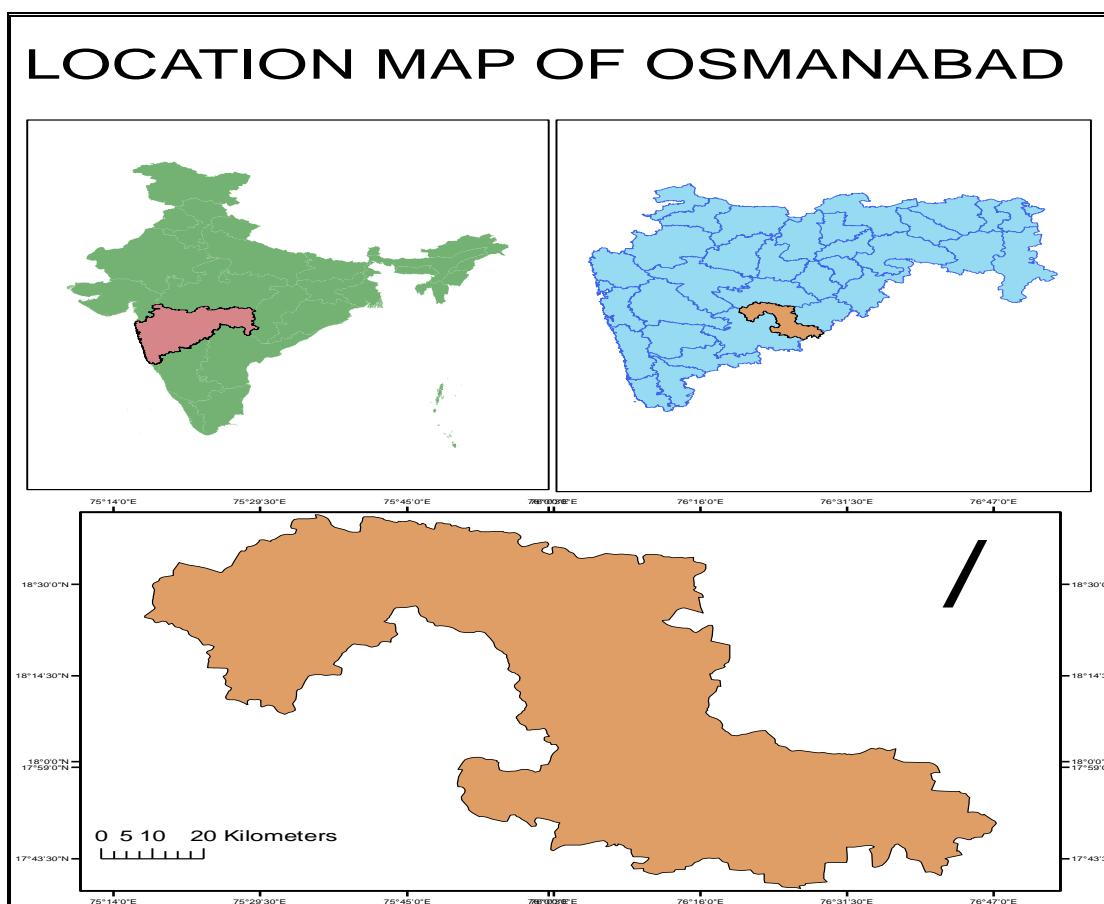

Figure No -1

Objectives:

The Main objective of the present paper is to determine and analyze transformation of general land use categories in Osmanabad District.

Data collection and methodology:

The present paper is based on secondary sources. The data regarding general land use are collected from Socio Economic Review and Districts Statistical Abstract of Osmanabad District for the period of 1999-2004 to 2009-2014. The data regarding population and location of study area is collected from District Census Hand book and Gazetteers of Osmanabad District.

Collected data are processed. To avoid fluctuation in area under different land use categories and to get reliable result quinquennial average is taken into consideration. Percentage of area under each category to total geographical area is calculated. To determine correlation and transformation of agricultural land use, the Karl Pearson's formula i. e.

$$r = \frac{\Sigma xy}{\sqrt{\Sigma x^2 \Sigma y^2}}$$

is used and the value of coefficient of correlation is calculated. Correlation between different landuse categories gives idea about mutual transfer of area between different landuse categories. The total geographical area has been divided in to five categories Viz. Area under forest, Area not available for cultivation, Other uncultivable land, Fallow land and Net area sown naturally a change in one followed by a change in another or all the reaming categories. The co-efficient of correlation of each of the category with rest of the categories have been calculated. On the basis of value of negative correlation the transformation of land use is determined and conclusions are drawn.

Result and Discussion:

A] Positive Correlation between Different Land-Use Categories:

1. Positive correlation of area under forest to other categories:

The district as a whole has high positive correlation between area under forest to net sown area which is amounted at + 0.8562 coefficient of correlation.

I. The high positive correlation between area under forest and area not available for cultivation is found in Kalam and Osmanabadtehsilswhich amounted at + 0.9534 and 0.8081 coefficient of correlation respectively.

II. The high positive correlation between area under forest and other uncultivable land is recorded only in Kalamtahsil which is amounted at + 0.8837.

III. The high positive correlation between area under forest with fallow land is found in Paranda,Tuljapur and Kalamtahsil which is amounted from +0.7850 to +0.9382 coefficient of correlation.

IV. The high positive correlation between area under forest to net sown area is recorded in Osmanabad (+0.8105) and Omerga (+0.8857) tehsils which is very better sign for human being and environment.

2. **Positive correlation of area not available for cultivation to other categories:**

I. The high positive correlation between area not available for cultivation to other uncultivable land is found in Kalamtahsil which amounted at + 0.7747 coefficient of correlation.

II. The high positive correlation between area not available for cultivation with fallow land is recorded in Kalamtahsil which amounted by + 0.8542 coefficient of correlation.

3. **Positive correlation of other uncultivable land to other categories:**

I. The high positive correlation of other uncultivable land with fallow land is found in Washi and Kalamtehsils which amounted by + 0.7731 and 0.9636 respectively.

B] Negative Correlation between Different Land-Use Categories and Transformation of land use:

1. Transformation of area under forest into rest of categories:

Considering the district as a whole, area under forest have high negative

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correlation with other uncultivable land and fallow land amounted by -0.77 and -0.91respectively during the period of investigation. However, tehshil level analysis varies, which is as following.

I. During the period of investigation, very high negative correlation between area under forest and area not available for cultivation is found in Tuljapur, Omerga and Lohara tehsils, which ranges from -0.68 to -0.84. In Loharatahsil area under forest is decreased indicates that it is converted into area not available for cultivation. Whereas in Tuljapur and Omergatehsils area under forest is increased due to afforestation, it indicates that area not available for cultivation is converted into forest area.

Table 1 A :Matrix of co-efficient of correlation between different categories of

General land-use of Osmanabad District.

Region	Categories	A	B	C	D	E
Osmanabad District	A	-	0.55125	-0.9181	-0.77818	0.85626
	B		-	0.20553	0.26622	-0.80404
	C			-	0.84361	-0.6529
	D				-	-0.75403
	E					-

Note : Where,

A = Area under forest, **B** = Area not available for cultivation,

C = Other uncultivable land, **D** = Fallow land, **E** = Net area sown

Source: *Compiled by Researcher on the basis of Socio Economic Review and Distric Statistical Abstract of Osmanabad District 1999-2004 to 2009-14.*

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Table 1B :Matrix of Co-efficient of Correlation between different categories of General Landuse at tehsil level.

Tehsil	Category	A	B	C	D	E
1.Paranda	A	-	0.59955	-0.664205	0.861492	-0.683073
	B		-	-0.437222	0.696977	-0.66319
	C			-	-0.765863	0.625182
	D				-	-0.944455
	E					-
2. Bhum	A	-	0.564153	0.172404	0.099595	-0.296758
	B		-	0.468898	-0.604518	0.327678
	C			-	-0.466714	0.324025
	D				-	-0.905963
	E					-
3.Washi	A	-	-0.40368	0.677975	0.202225	-0.348628
	B		-	0.206959	0.57895	-0.41886
	C			-	0.773145	-0.828775
	D				-	-0.945342
	E					-
4.Kalam	A	-	0.953448	0.883701	0.938289	-0.984431
	B		-	0.774763	0.854275	-0.943291
	C			-	0.963639	-0.916558
	D				-	-0.975203

	E					-
5. Osmanabad	A	-	0.808811	0.445644	-0.912401	0.810915
	B		-	-0.121389	-0.567189	0.407893
	C			-	-0.580344	0.658676
	D				-	-0.966172
	E					-
6.Tuljapur	A	-	-0.68348	-0.939423	0.785051	-0.19585
	B		-	0.442886	-0.850532	-0.218006
	C			-	-0.59363	0.328517
	D				-	-0.251783
	E					-
7. Lohara	A	-	-0.84817	-0.125355	-0.654365	0.48049
	B		-	-0.353491	0.260413	-0.162299
	C			-	0.602854	-0.66518
	D				-	-0.893467
	E					-
8. Omerga	A	-	-0.81297	-0.822857	-0.583512	0.885743
	B		-	0.668444	0.111914	-0.609652
	C			-	0.59513	-0.89607
	D				-	-0.837236
	E					-

II. During the period of investigation, high negative correlation between area under forest and other uncultivable land is found in Tuljapur and Omergatehsils(r = -0.82 to − 0.93). In both tehsils the area under forest is increased which indicates that the other uncultivable land is converted into forest area due to afforestation.

III. High negative correlation between area under forest and fallow land is found Osmanabad tehsil amounted by-0.91 which indicates that fallow land is transferred into forest area due to afforestation.

IV. High negative correlation between area under forest and net sown area is observed in Paranda and Kalamtehsils amounted by -0.68 to -0.98, area under forest is decreased and increase in net sown area indicates that area under forest is converted into net sown area.

2.Transformation of Area not available for cultivation in too three Categories:

I. During the period of under review, high negative correlation between area not available for cultivation and net sown area is found Kalamtahsil, which is amountedby -0.94. The area not available for cultivation is decreased which is converted into net sown area due to the man made siltation of alluvial soil on barren lands.

II.   High negative correlation between area not available for cultivation and fallow land is recorded in Tuljapurtahsil, which is amounted by -0.85 co-efficient of correlation. The fallow land is increased while area not available for cultivation is decreased which reveals that the the land put to non agricultural uses and barren land is converted into fallow land.

3. Transformation of other uncultivable land to other Categories:

I.   The table 1B reveals that other uncultivable land has high negative correlation with fallow land only in Parandatehshil, which is amounted by -0.76 co-efficient of correlation, which indicates that fallow land is converted into cultivable waste, permanent pasture and groves.

II.   High negative correlation between other uncultivable land and net area sown is found in Washi, Kalam and Omerga tehsils, which is amounted by -0.67 to 0.91 co-efficient of correlation. During the period of investigation the net sown area is decreased in Washi, which is transferred in other uncultivable land i.e. cultivable waste, permanent pasture and groves in this tehsil. In Kalam   and   Omergatehsils,   other

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uncultivable land is decreased which is converted into net sown area.

4. Transformation of Fallow Land into Net area sown:

The table 1B indicates that the district as whole has high negative correlation betweenfallow land and Net area sown during the period of investigation. The spatial analysis also reveals that, there is high negative correlation ranging from -0.83 to-0.97 between fallow land and net area sown is found in all tehsils of study region except Tuljapurtahsil. In Washi and Lohara fallow land is increased which indicates that much of the net sown area is converted into fallow land due to inadequate insufficient and un predictable rainfall and lack of perennial irrigation facilities. In Omerga, Osmanabad, Kalam and Parandatehsils fallow land is decreased which is converted into net sown area due to development of irrigation facilities.

Conclusions:

The forgoing analysis reveals that there is high positive correlation between area under forest to net sown area is recorded in Osmanabad and Omerga tehsils which is very better sign for human being and environment.

The high negative correlation in between fallow land and net area sown in Washi and Lohara tehsils and fallow land is increased while net sown area is decreased, which indicates that much of the net sown area is converted into fallow land due to inadequate insufficient and unpredictable rainfall and lack of perennial irrigation facilities.The conversion of most of area under forest into area not available for cultivation in Lohara, tahsilis result of cutting of forest and increase in area under settlement, roads, canals and tanks.The high negative correlation between area under forest and other uncultivable land in Tuljapur and Omerga tehsils indicates that the other uncultivable land is converted into forest area mainly due to afforestation. High negative correlation between area under forest and net sown area is observed in Kalam tahsil due to the cutting of forest and increase in area under net sown area. In Osmanabad tehsil the fallow land is converted into area under forest.

The high negative correlation between area not available for cultivation and net sown area is found Kalamtahsilindicates that area not available for cultivation is converted into net sown area, due to the man made siltation of soil on barren lands.

The other uncultivable land has high negative correlation with fallow land only in Parandatehshil which indicates that fallow land is converted into cultivable waste, permanent pasture and groves. High negative correlation between other uncultivable land and net area sown is found in Washi tehsil and decrease in net area sown indicates that net area sown is transferred in other uncultivable land i.e. cultivable waste, permanent pasture and groves in these tehsils.

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