TRANSFORMATION OF GENERAL LAND USE IN SOLAPUR 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. Due to 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 drown. The study reveals that the net sown area is converted into fallow land due to inadequate insufficient and unpredictable rainfall and lack of perennial irrigation facilities.

Key wards: Transformation, land-use, Correlation.

Introduction:

Land is a 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 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. Landuse 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 Solapur district

. **Study Region:**

The Solapur District [Area under Study] lies entirely in the Bhima basin of Krishna river system. The district is bounded by 17^0 10' North to 18^0 32' North latitudes and 74^0 42' East to 76^0 15' East longitudes. The North South stretch of the district is 150 kilometers and East-west extension is 200 kilometers. The Solapur district is fairly well defined to its West as well as to its East by the inward looking scarps of Phaltan range and Osmanabad Plateau respectively. The adjoining districts are Sangli to its Southwest, Satara to its West, Pune to its Northwest, Ahmednagar to its North and Osmanabad to its East and Bijapur district in Karnataka to the South. The district has a total area of 14878 square kilometers with 4317756 population as per census of 2001.
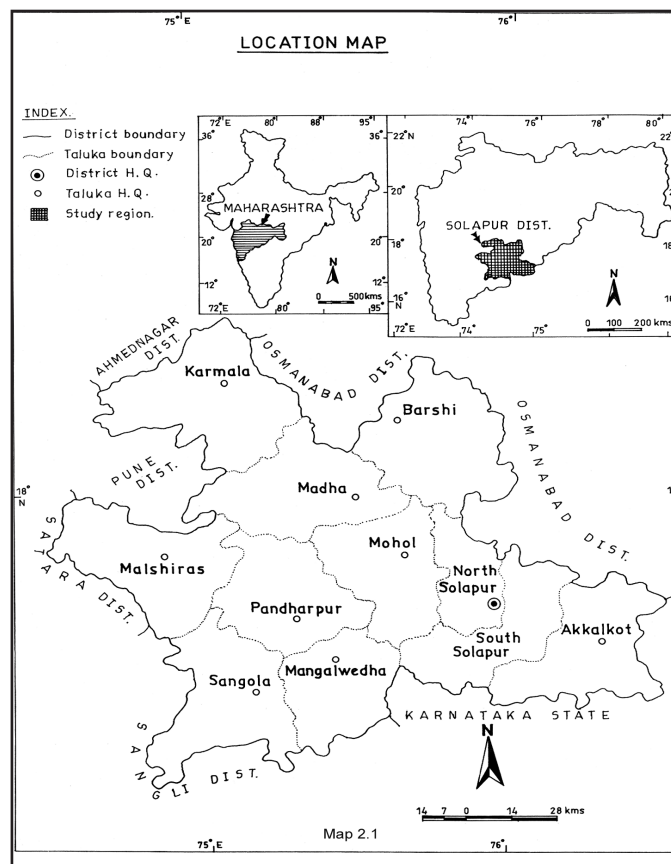

Figure No -1

Objectives:
The Main objective of the present paper is to determine and analyze general land use transformation in Solpur 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 Solapur District for the period of 1975-76 to 1999-2000. The data regarding population and location of study area is collected from District Census Hand book and Gazetteers of Solapur 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 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.

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

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

I. During the period of investigation, very high negative correlation between area under forest and area not available for cultivation is found in Mohol tehsil, which is amounted by -0.92, due to cutting of forest and increase in area under settlement, roads, canals and tanks. (table 1B)

II. During the period of investigation, high negative correlation between area under forest and other uncultivable land is found in North Solapur, Pandharpur and Sangola (r = -0.75 to –0.99). In North Solapur and Pandharpur tehsils the area under forest is increased which indicates that the other uncultivable land is converted into forest area due to a forestation. But in case of Sangola tehsil the area under forest is decreased which converted into other uncultivable land.

III. High negative correlation between area under forest and fallow land is found Sangola and Akkalkot tehsils amounted by-0.81 and -0.72, which indicates that area under forest is transferred into fallow land due to degradation of forest.

Table 1 A : Matrix of co-efficient of correlation between different categories of General land-use of Solapur District

Region	Categories	A	B	C	D	E
Solapur	A	-	0.73	0.67	-0.25	0.10
District	B		-	0.13	0.46	-0.58
	C			-	0.74	0.65
	D				-	-0.68
	E					-

Note : Where,   **A** = Area under forest, **B** = Area not available for cultivation, **C** = Other uncultivable land, **D** = Fallow land, **E** = Net area sown

Table 1B : Matrix of co-efficient of correlation between different categories of General land-use at tehsil level

Tehsil	Category	A	B	C	D	E
1. Noth Solapur	A	-	0.93	-0.99	0.36	-0.26
	B		-	-0.91	0.19	-0.10
	C			-	-0.30	0.19
	D				-	-0.99
	E					-
2. Barshi	A	-	0.98	0.99	-6.66	0.73
	B		-	-0.98	0.59	-0.43
	C			-	-0.65	0.71
	D				-	-0.81
	E					-
3. Akkalkot	A	-	0.98	0.99	-0.72	0.38
	B		-	0.99	-0.71	0.35
	C			-	-0.72	0.38
	D				-	-0.91
	E					-
4. South Solapur	A	-	0	0	0	0
	B		-	-0.99	0.86	-0.55
	C			-	-0.33	0.52
	D				-	-0.99
	E					-
5. Mohol	A	-	-0.92	0.98	-0.16	0.25
	B		-	-0.98	0.33	-0.45
	C			-	-0.33	0.36
	D				-	-0.98
	E					-
6. Mangalvedha	A	-	0	-0.26	-0.11	-0.15
	B		-	0	-0.96	-0.64
	C			-	0.03	0.04
	D				-	-0.95
	E					-
7.Pandharpur	A	-	0.37	-0.87	0.30	-0.48
	B		-	0.76	0.05	-0.11
	C			-	-0.21	0.36
	D				-	-0.98
	E					-
8.Sangola	A	-	-0.33	-0.75	-0.81	0.71
	B		-	0.87	0.13	-0.71
	C			-	0.51	-0.87
	D				-	-0.77
	E					-
9. Malshiras	A	-	0.99	0.22	0.12	-0.80
	B		-	0.21	0.13	-0.80
	C			-	0.45	0.002
	D				-	-0.95
	E					-
10. Karmala	A	-	0.26	0.99	-0.90	0.85
	B		-	0.21	-0.50	0.52
	C			-	0.88	0.83
	D				-	-0.99
	E					-
11. Madha	A	-	-0.16	0.82	0.66	-0.71
	B		-	0.33	-0.20	0.06
	C			-	0.38	-0.50
	D				-	-0.98

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Source: Compiled by Researcher on the basis of Socio Economic Review and Distric Statistical Abstract of Solapur District 1975-76 to 1999-00

2.   Transformation of Area not available for cultivation into other Categories:
Considering the district as a whole, area not available for cultivation has moderate negative correlation with Net sown area, during the period of investigation. However, tehshil level analysis varies, which is as follows.

I During the period of under review, High negative correlation between area not available for cultivation and other uncultivable land is found in South Solapur, Mohol, Barshi and North Solapur, which is amounted by -0.99, -0.98, -0.98 and -0.91, indicates that area not available for cultivation is converted into other uncultivated land i.e. settlements, roads, canals, tanks, with the population growth.

II.   High negative between area not available for cultivation and and fallow land is recorded in Mangalvedha and Akkalkot, which is amounted by -0.96 and -0.71 co-efficent of correlation respectively, which reveals that the the land put to non agricultural uses and barren land is converted into fallow land.

III.   Area not available for cultivation has high negative correlation with net sown area Sangola and Malshiras tehsils, the co-efficient of correlation in this regard amounted to be   -0.71 and -0.80 during the period of investigation. In Sangola tehsil the area net sown area khas decreased considerably, which in converted into area not available cultivation, while in case of Malshiras tehsil net sown area increased by 11 per cent indicates that the barren land and area put to non agricultural use converted into net son area due to high development of surface irrigation facilities.

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 Akkalkot tehshil, which is amounted by -0.72 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 Sangola tehsil, which is amounted by -0.87 co-efficient of correlation. During the period of investigation the net sown area decreased, which is transferred in other uncultivable land i.e. cultivable waste, permanent pasture and groves in this tehsil.

4. Transformation of Net area sown into fallow land:
The table 1B indicates that the district as whole has high negative correlation between Net area sown and fallow land during the period of investigation. The spatial analysis also reveals that, there is high negative correlation ranging from -0.77 to-0.99 between fallow land and net area sown is found in all tehsils of study region 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.

Conclusions:
        The forgoing analysis reveals that there is high negative correlation ranging from -0.77 to-0.99 between fallow land and net area sown in all tehsils of study region, 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 Mohol tehshil is 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 North Solapur and Pandharpur tehsils indicates that the other uncultivable land is converted into forest area mainly due to a forestation. In Sangola tehsil the area under forest is converted into other uncultivable land.

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The High negative correlation between area not available for cultivation and other uncultivable land in South Solapur, Mohol, Barshi and North Solapur indicates that area not available for cultivation is converted into other uncultivated land i.e. settlements, roads, canals, tanks, with the population growth. Areas not available for cultivation have high negative correlation with net son area Sangola and Malshiras tehsils. In Sangola tehsil the area net sown area converted into area not available cultivation, while in case of Malshiras tehsil the barren land and area put to non agricultural uses converted into net son area mainly due to high development of surface irrigation facilities. In Sangola tehsil transformation of net area sown into other uncultivable land i.e. cultivable waste, permanent pasture and groves is result of insufficient rainfall and lower development of irrigation facilities.

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