Economic Analysis of Temporal Changes In Land Use Pattern of Western Maharashtra

Abstract

Land is a finite natural resource, the efficient management of which is vital for economic growth and development of the country. It is required for both agriculture and non-agricultural purposes. An analysis of structural changes in the land use pattern over a period of time provides the scope for planned and judicious management of land. In this connection, the present study on 'An Economic analysis of temporal changes in land use pattern in Western Maharashtra' was undertaken. For analysis the secondary sources and the necessary regional level time series data on area under land use categories were compiled from various issues of statistical abstract of Maharashtra and other publications of Government. The entire period of 1960-61 to 2019-20 was decomposed into three periods, viz; pre-liberalization, post-liberalization and overall period. A temporal change in land use pattern was estimated with the per cent change and compound growth rates. The temporal changes in land use dynamics of Western Maharashtra region revealed that, land put to non-agricultural uses, miscellaneous tree crops and groves, current fallow and fallows other than current fallow showed an increased trend while, area under forest, barren and uncultivable land, cultivable waste and net area sown registered a decline during Period-II. It is suggested that, during Period-II, the average proportion of forest land is 14.72 per cent, which is far less than the necessary percentage i.e., 33 per cent. Therefore, necessary steps may be taken by the state government in order to restore and maintain ecological balance. Land put to non-agricultural uses inclined throughout all the periods under study indicating an alarming situation. Majority of this conversion to land put to non-agricultural uses has taken place of agricultural land. Hence, the state government may prepare suitable policies controlling conversion of agricultural land, particularly.

Keywords: Land use pattern, temporal changes in land use category, Economic analysis

1. Introduction

The land is a fundamental component of agriculture and holds a significant place among the many resources needed for a present-day economy. (Ramasamy et al., 2005). The difficulty of increasing agricultural production around the globe is largely dependent on how

water and land resources are handled. Food insecurity is anticipated to become more prevalent because of population pressures, climate variability, and intense demand for water and land resources. The bigger difficulty now is feeding everyone on the earth enough food. (Anon., 2011).

Land being a non-renewable natural resource must be managed effectively for the nation's development and economic prosperity. Land use, often known as land utilization, is essentially and practically an action taken by the local populace to satisfy their needs. The utilization of the limited amount of land between the agricultural and non-agricultural sectors is typically governed by demand. The manner and intensity of a country's land use determine its economic growth rate. The land is essential for growing crops such as cereals, pulses, and other foods as well as surpluses that can be used to meet the demands of the population that has been increasing continuously. The establishment of a transportation network, communication, building of homes and public institutions, planning its exploitation for economic development, and judicious land use are prioritized for environmental reasons in the developing industrial sector. (Gairhe, 2011).

Land use is an extremely dynamic activity; land use dynamics of any region is influenced by the local physical environment and population strain on the land. The phrase "land use pattern" refers to the percent of an area that is used for different purposes, such as the area that is really farmed, forest land, fallow land, pasture land, area under settlements, and so forth. An area's land use trend is influenced by physical, ecological, and demographic demand on the land. Considering all these aspects, land use dynamics in Western Maharashtra was studies with an objective of analyzing the ecological implications of land use dynamics.

2. Methodology

For analysing the land use dynamics, Western Maharashtra region is selected, the study was undertaken using secondary sources and the necessary regional level data was compiled for the period from 1960-61 to 2019-20. The time series data was obtained for a period of (1960-61 to 2019-20) which was further divided into three separate sub-periods as Period-I (Pre LPG) from 1960-61 to 1990-91 and Period-II (Post LPG) from 1991-92 to 2019-20 and overall period 1960-61 to 2019-20.

2.1 Tabular analysis

For the meaningful interpretation of the data such as land use pattern and changes in land use pattern in Western Maharashtra region for Period-I, Period-II and overall period the tabular analysis was employed. Appropriate percentages and averages were worked out.

2.2 Compound growth rate analysis

Growth of any variable indicates its past performance. The analysis of growth is usually used in economic studies to find out the trend of a particular variable over a period of time. It clearly indicates the performance of the variable under consideration and hence it can be very well used for making interpretations and to evolve policy decisions. The growth in the area under different land use categories was estimated using the exponential growth function of the form:

$$Y_t = ab^t e^{ut}$$

Where,

Yt : Dependent variable (Area under forest, Barren & uncultivable lands, Land put to non-agricultural uses, Permanent pastures & other grazing lands, Cultivable wastes, Current fallow, Fallow other than current fallow and Net area sown);

a : Intercept;

b : Regression coefficient;

t : Years which takes values, 1, 2, …,n;

ut : Disturbance term for the year t.

The equation was transformed into log linear form for estimation purpose and was estimated using Ordinary Least Square (OLS) technique. The compound growth rate (g) in percentage was computed from the relationship,

g = (Antilog of log b-1)*100

The significance of the regression coefficient was tested using the student's 't' test.

3.Results and discussion

3.1 Temporal changes in land use pattern

During the research period, there have been significant changes in land use patterns, mostly because of ecological reasons and societal demands. Calculations were made to

determine how the pattern of land use changed between the Pre-liberalization and Post-liberalization periods, and the findings are shown in table below. For Western Maharashtra region as a whole, the area under forest decreased by -5.75 per cent per annum which is due to ever increasing population and its demands. The barren and uncultivable land declined by -3.83 per cent during Period II over Period-I as a result of more land undertaken for different purposes and suitable policies implemented by government. Similar results were found by Anup Adhikari and M K Sekhon. On the other hand, land put to non-agricultural uses jumped by 57.18 per cent per annum due to changing structure of the state economy, which is increasingly depending on the contribution from industrial and services sector and expansion of related infrastructure facilities. It is evident from table 1 that, cultivable waste declined by -5.08 per cent. Over the years there is no change in area under permanent pastures and other grazing lands while area under miscellaneous tree crops and groves surged by 50.28 per cent per annum likewise current fallow and fallow other than current fallow declined by 36.04 and 14.20 per cent during period II over period I. The decline in the net area sown took place by -4.22 per cent owing to the uses of cultivable land to other purposes such as urbanization, industrialization, etc., Almost similar trend of results was found by G. Anupama *et al.* (2020). Current fallow and fallow other than current fallow inclined by 36.04 and 14.20 per cent, respectively.

Table 1 Changes in different land use categories in Western Maharashtra region

(Area in ha)

Land use category	Western Maharashtra		
	Average of Period I (1960-1990) Pre-liberalization period	**Average of Period II (1991-2019) Post-liberalization period**	**% Change in period-II over period-I**
Forest	18217.81	17226.45	-5.75
Land put to non-agricultural uses	1543.70	3605.41	57.18
Barren and uncultivable land	8808.99	8483.96	-3.83
Cultivable wastes	2505.95	2384.73	-5.08
Permanent pastures and other grazing lands	4216.55	4216.74	0.00
Land under miscellaneous tree crops and groves	310.72	624.93	50.28
Current fallows	3067.02	4795.05	36.04
Fallow other than current fallow	3963.91	4620.2	14.20

Net area sown	73698.03	70716.85	-4.22

3.2 Compound growth rate of different land use categories in Western Maharashtra region

The annual compound growth rates for different land use categories at regional level were computed for Period-I (1960-61 to 1990-91), Period-II (1991-92 to 2019-20) and Overall Period (1960-61 to 2019-20) and the results are presented in Table 2. It is observed that, during Period-I (1960-61 to 1990-91), area under permanent pastures and other grazing lands, current fallow, fallow other than current fallow increased by 0.36, 0.67 and 0.46 per cent per annum, respectively while land put to non-agricultural uses, cultivable wastes, land under miscellaneous tree crops and groves increased significantly by 4.79, 0.75 and 4.87 per cent per annum, respectively. In contrast, net area sown decreased by -0.05 per cent per annum, forest and barren and uncultivable land decreased significantly by -0.12 and -0.34 per cent per annum.

Table2 Compound growth rates of different land use categories in Western Maharashtra

Land use category	**Compound growth rate**		
	Period I	**Period II**	**Overall**
Forest	-0.12***	0.05**	-0.15***
Land put to non-agricultural uses	4.79***	0.9***	-0.05
Barren and uncultivable land	-0.34***	2.32***	3.27***
Cultivable wastes	0.75*	-0.71***	-0.05
Permanent pastures and other grazing lands	0.36	0.82***	0.16
Land under miscellaneous tree crops and groves	4.87***	-0.31	2.64***
Current fallows	0.67	0.77**	1.54***
Fallow other than current fallow	0.46	-0.51**	0.4***
Net area sown	-0.05	-0.28***	-0.14***

Note: ***, ** and * Significant at 1%, 5% and 10% level, respectively

During Period-II (1991-92 to 2019-20), barren and uncultivable land, land put to non-agricultural uses, permanent pastures and other grazing lands, current fallow and area under forest increased significantly by 2.32, 0.9, 0.82, 0.77 and 0.05 per cent per annum, respectively while area under miscellaneous tree crops and groves declined by -0.31 per cent per annum and area under cultivable waste, fallow other than current fallow and net area sown reduced by -0.71, -0.51 and -0.28 per cent per annum, respectively.

The analysis of the land use pattern for the entire period indicated that, the barren and uncultivable land, miscellaneous tree crops and groves, current fallow, fallow other than current fallow increased significantly by 3.27, 2.64, 1.54 and 0.4 per cent per annum,

respectively and area under permanent pastures and other grazing land increased by 0.16 per cent per annum. On the other hand, forest land and net area sown declined significantly by -0.15 and -0.14 per cent per annum, respectively and land put to non-agricultural uses and cultivable waste both decreased non significantly by -0.05 per cent per annum.

4. Conclusions and Policy implication

Western Maharashtra's overall temporal shifts in land use pattern anticipated that, land put to non-agricultural uses, miscellaneous tree crops and groves, current fallow and fallow other than current fallow increased by 57.18, 50.28, 36.04 and 14.20 per cent, respectively while area under forest land, barren and uncultivable land, cultivable waste and net area sown experienced a decline of 5.75, 3.83, 5.08 and 4.22 per cent, respectively during Period-II over Period-I. Area under permanent pastures and other grazing lands remained the same in Period-II as it was in Period-I.

During Period-II, the average proportion of forest land is 14.72 per cent, which is far less than the necessary percentage. To preserve balance of nature and longevity, the proposed forest contribution to total geographical area is 33 per cent, which indicates that, necessary steps may be taken by the state government in order to restore and maintain ecological balance.

Land put to non-agricultural uses inclined throughout all the periods under study indicating an alarming situation. Majority of this conversion to land put to non-agricultural uses has taken place of agricultural land. Hence, the state government may prepare suitable policies controlling conversion of agricultural land, particularly.

5. References

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