LAND USE AND LAND COVER CHANGE- A CASE STUDY OF KARNATAKA: A GEOGRAPHICAL APPROACH

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Abstract
Land cover is the physical material at the surface of the earth. Land cover includes grass, asphalt, trees, bare ground, water bodies & settlements etc. Land cover is distinct from land use despite the two terms often being used interchangeably. Karnataka is located in the western part of the Deccan Plateau & the larger part of the state belongs to the Mysore plateau which is one of the three segments of larger Deccan Plateau. The state has both land as well as water frontier. The main objectives of the study are: To know the decadal variation in the land use & land cover change (2000-2001 to 2010-11). To know how demographic, economic and social factors play the vital role on changing Landuse pattern. To know how population plays an important role for changing Landuse cover in the study region. To know how the land use & land cover change impacts on environmental issues of the study region, and To know the role of Govt/politicians/Planners Scientists for changing land use & land cover scenario in the study region. Secondary data have been collected from the Directorate of Economic and statistics, Bangalore, Govt of Karnataka, Bangalore-I, for the year 2000-01 & 2010-11.Simple statistical methods are used to show the result variations like Pie-diagram, Bar graph, standard deviation etc. Table for both the study periods have been prepared with percentage conversion.

Keywords: Land use, Land cover.

Introduction

Land cover is the physical material at the surface of the earth. Land cover includes grass, asphalt, trees, bare ground, water bodies & settlements etc. Land cover is distinct from land use despite the two terms often being used interchangeably. Land use is a description of how people utilize the land and socio-economic activity. Urban & agricultural land uses are two of the most commonly known Landuse classes. Karnataka is one of the premier states of India in the field of agriculture. Landuse & land cover changes has become one of the essential components of agriculture. Land has been utilizing according to the requirements of man. The last decade has witnessed the scientific and technological developments which have brought tremendous change in Land use.

Expansion of urban centers has brought serious threats to the agricultural land around mega cities, urban centers, towns and hoblies in the state. Urban sprawling is one of the important facts of the losses of agriculture land. Agricultural land has been reduced 13% in the state and built area in the cities & towns have been increased to almost 18%. Out of the total geographical area of 190,49,836 ha, Net sown area constitutes-105,22,653 ha (55.25%), area under forest-30,71,833 ha (16.15), Land not available for cultivation-22,16,990 ha (11.65), other uncultivated land-16,12,768 ha (8.45), Fallow land-16,25,592 ha (8.50), area sown more than once is 25,39,510 ha (24.00%)

Profile of the study area

Karnataka is located in the western part of the Deccan Plateau & the larger part of the state belongs to the Mysore plateau which is one of the three segments of larger Deccan Plateau.

The state has both land as well as water frontier. It is surrounded by Maharashtra in the north, and Andhra Pradesh in the east, Tamil Nadu in the south & south East, Kerala in the south west & Goa in the North West and in the Western part is flanked by the Arabian Sea. The state extends from 11˚-31′ to 18˚-45' North latitudes and longitudinally the state extends from 74˚-12′ to 78˚-40′ East. From North to South 750 km. long and west to east the state is about 400 km. The total Geographical area of the state is about 1, 91,791 Sq. km (1, 90, 49,836 ha) which contributes 5.83% of total area of the country, and a population of 6, 11, 30,704, as per 2011 census. It contributes 5.05%, of the total population of the country. It is the 8th largest state in terms of area and 9th in terms of population in the country. The density of population per square km. is about 300.

Objectives

The main objectives of the study are: To know the decadal variation in the land use & land cover change (2000-2001 to 2010-11). To know how demographic, economic and social factors play the vital role on changing Landuse pattern. To know how population plays an important role for changing Landuse cover in the study region. To know how the land use & land cover change impacts on environmental issues of the study region, and To know the role of Govt/politicians/Planners Scientists for changing land use & land cover scenario in the study region.

Data and Methodology used

Secondary data have been collected from the Directorate of Economic and statistics, Bangalore, Govt of Karnataka, Bangalore-I, for the year 2000-01 & 2010-11.Simple statistical methods are used to show the result variations like Pie-diagram, Bar graph, standard deviation etc. Table for both the study periods have been prepared with percentage conversion.

Table 1. Land use & land cover change in Karnataka (in Hectares).

Land use Categories	**Study Period**		**Change in Percentage from 2000-2001 to 2010-11. + OR -**
	2000-2001	2010-2011	
Forest	30,63,009 (14.66)	30,71,833 (14.23)	No change
Land not available for Cultivation	20,97,705 (10.05)	22,16,990 (10.26)	+ 1, 19,285 (5.69%)
Other Uncultivated lands	17,16,024 (8.21)	16,12,768 (7.48)	- 1, 03,256 (6.40%)
Fallow lands	19,14,511 (9.16)	16,25,592 (7.53)	- 2, 88,919 (17.77%)
Net Area Sown	1,20,97,167 (57.92)	1,30,62,163 (60.50)	+ 9, 64,996 (8.00%)
Geographical Area	2, 08, 88,416 (100%)	2, 15, 89,346 (100%)	-----

Note: Area sown more than once has been included in the Geographical area of the state.

Land use and land cover change in Karnataka (2000-01 & 2010-11)

The study regions general Landuse has been categorized into 5 major categories namely, area under forest, Land not available for cultivation (including land put to non-agricultural uses and Barren & uncultivable land), other uncultivable land (including cultivable waste, permanent pasture & trees & groves), Fallow land (including other & current fallow), Net area sown (including area sown more than once). As per the land utilization statistics for 2010-11, out of the total Geographical area of the state (2, 15, 89,346 ha), the net sown area is 1, 30, 62,163 ha (60.50%) including are sown more than once. The Forest constitute 30, 71,833 ha (14.23), land not available for cultivation 22, 16,990 (10.26%), other uncultivated land 16, 12,768 (7.48%) and Fallow land 16, 25,592 ha (7.53%). Whereas, 2000-01 statistics shows the Net sown area was 1,20,97167 ha (57.92%), Forest 30,63,009ha (14.66%), Land not available for cultivation 20,97,705 ha (10.05%), Other uncultivated land 17,16,024 ha (8.21%) and Fallow land 19,14,511 ha (9.16%) of the total Geographical area of the state.

Discussion & Results

Forest

In assessing the characteristics of the vegetation type, a factor that cannot be neglected in the long occupation of man and the consequent change on the vegetal carpet through agriculture. The influence of temperature & rainfall on plant life has received a special attention in the classifications of climate proposed by Koppen & Thornthwaite.

Out of the Geographical area of the state, Forest constitutes 14.66% during 2000-01 & 14.23% during 2010-11. Area under Forest should have been at least 24% of the Geographical area of the state. The Govt. of Karnataka has planted 5 crore plants in the state during the study period. The main theme of this project is to maintain the ecological & environmental balance in the state. Forest plays a dominant role in maintaining ecological & environmental balance in the state; therefore, people from nearby states prefer to settle in Karnataka, because of its mild and favorable climatic condition.

Land not available for cultivation

This broad category comprises of a number of different types of land which are not available for cultivation under the existing circumstances. This type of use represents the land occupied by buildings, roads, railway lines, factories, industries, water bodies, playgrounds, gardens, grave lands and Settlements. These lands cover an area of 22, 16,990 ha (10.26%) during 2010-11 & 20, 97,705 ha (10.05%) during 2000-01, out of the total Geographical area of the state. These is a continuous increase of land under this category i.e. 1, 19,285 ha (5.69%) during the span of ten years. This exceptionally high population of non-agricultural land is due to rapid growth of population, which requires more land for residential, commercial establishments, educational & other institutions, industries, roads, gardens, playgrounds etc. in the state. The land under this category is increasing fast and is bound to increase in future too with the development of science and technology. Non-agricultural land is an index of the development of an area, when the area is developed in the construction of multi-stored buildings and development in transport facilities.

Other uncultivated land

Other uncultivable lands are definitely cultivable but are at present lying as waste on account of number of limitations. The limitations vary from one to another. They can be enumerated under the following heads. Encroachment by wild weeds, floods and erosion, poor drainage, scarcity of water and distance from settlement area etc.

In Karnataka other uncultivable lands are found in the areas where the land has been adversely affected by water logging floods, erosion and scarcity of water. Due to this negative factor, this category of land has become un-economic and un-productive. These lands can be provided to protect it from water logging. The river Krishna, Ghataprabha, Malaprabha Cauvery, & few tributaries of them bring often floods in the state and have turned considerable area into cultivable waste.
During 2010-11 the state had 16, 12,768 ha (7.48%) and 2000-01 17, 16,024 (8.21%) out of the Geographical area of the state. About 6.40% (to the geographical area) of land under this category have been reclaimed between 2000-01 and 2010-11. The statistical figures show that, there is a continuous decreasing trend in cultivable waste land in the state. About 1, 03,256 ha of land have been decreased in the state during the span of one decade. Due to the pressure of population Government is trying hard to reclaim land for agriculture and forest use in the State.

Fallow lands
The term fallow applies for the lands which are not under crops at the time of reporting though they were sown in the immediate past. The follow lands are generally divided into two major categories i.e., "Old follow lands" which comprises those lands that have been left uncultivated for more than five years, and
the "current fallow lands" which include lands that were not sown at the time of crop reporting, but, were sown one or two years before or left fallow either in one season or for one complete year to replenish the soil fertility. The definition of the term 'current fallow' greatly differs in many parts of the country. In Punjab, land is classified as 'Current fallow' if it has been left uncultivated for less than two years. In Maharashtra, land continues to be classified as 'Current fallow' if it is continued uncultivated for less than ten years. In Bihar 'Current fallow' is applied to all such lands which were not under crops at the time of reporting, but, which had been sown in the recent past. Thus, 'Current fallow' are a part and parcel of the arable land.
Karnataka state has a fallow land of 16, 25,592 ha (7.53%) during 2010-11, whereas, it was 19, 14,511 ha (9.16%) during 2000-01 its total Geographical area. The net decrease of fallow land is 2, 88,909 ha which constitute 17.77% over a period of ten years. This reclaimed land is almost used for cultivation purposes. Reclaiming fallow land is a good sign of prosperity in the development of agriculture in the state.

Net sown area
The net sown area is the land which is being actually tilled for rising of food, cash and fodder crops. The net sown area and the fallow land together constitute the extent of cropped land in a region. Out of the total geographical area 2, 08, 88,416 hects of the state, 1,20,97,67 hects. (57.92%) were under net sown during 2000-01, whereas, during 2010-11 the state had 1, 30, 62,163 ha (60.50%) were under net sown. About 9, 64,996 he. (18.00%) of land has been increased under net sown during a span of ten years in the state. This increase is due to the increase in population and its pressure on demand of food crops to feed the increasing population in the state. This increased land under net sown has been reclaimed from fallow land and other uncultivable lands. It is mainly because of the canal irrigational facility extended by Number river projects in the state. The river projects in the state provided irrigation to 25, 47,669 hects during 200-01 and 42, 78,849 hects, during 2010-11. Accordingly, the land under net sown has also been increased during the span of 10 years in the state.

Conclusion

The Karnataka state has good percentage of net sown area during the study period i.e. 2000-01 & 2010-11. During this period 9, 64,996 ha (8.00%) land has recovered and brought under net sown. Area under forest has been remained unchanged. Land not available for cultivation has also been increased in the tune of 5.69%. Other uncultivated land has been decreased during the study period i.e. 6.40% As far as, fallow land is concerned, and 17.77% of the fallow land has been decreased in the state. This is good sign of prosperity in agriculture & land use change. The reclaimed land under this category has been brought under various uses like, tree planting grazing, cultivation etc. now a days due to rapid growth in urbanization and industrialization, there is increasing pressure on land, water and environment, Urban sprawl may be found everywhere in major cities. There are many problems related with conversion of agricultural land in to urban use. Every city is expanding in all directions resulting in large-scale changes in urban land use.

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