



# Analysis of Land Use and Land Cover Change in Haveri District, Karnataka

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**Abstract:-**The study of land use pattern is prime concern to geographers to know the relation between man and natural environment (Tripathi and Vishwakarma, 1988). Land is an important studies particularly relevant to agricultural geography. The term land use and cover are not synonymous and the literature draws attention to their differences so that they are used properly in studies of land use and land cover change. The Haveri district occupies a region of 4823 sq. km. along the 14°19' North and 15°09' North latitude as well as the 75°01' East and 75°50' East longitudes. To know the decadal variation in land use and land cover change. To know the land use & land cover change on environmental issues of the study region. These are main objectives of study. The technological advances in remote sensing products and digital image processing software are surely blessing to analyze land use studies. The present study concentrate on 2000-01 and 2020-21 land cover, Agricultural land barren land, buildup area, covered in this study.

**Key word:** Land use & Land cover, Satellite Image, Decadal Variation.

## INTRODUCTION

Land use involves the management and modification of natural environment or wilderness in to built environment such as settlement and semi-natural habitats, arable field, pastures and managed woods. It also has been defined as the total of arrangement, an activities, and inputs the people undertakes in certain land cover type and land cover in district from land use despite the two terms often being used interchangeable. Land use is a description of how people utilize the land and socio-economic activity. Urban and agricultural land uses are two of the most commonly known land use classes. Haveri district is one of the premier district of Karnataka, in the field of Agriculture land use and land cover change, have become one of the essential components of agriculture. Land has been utilizing according to the requirement of man, the last decade has witnessed the scientific and technological development which have brought tremendous change in land use.

## USGS Land Cover Classification

The United States Geological Survey (USGS) has been at the core of land cover and land use research and application since the late 1960's. It is the largest operational land cover agency in the world today. Land cover has historically been part of USGS's research heritage, and has been significantly influential in the science of mapping land cover and land use. Current mapping techniques of land cover would not be possible without milestone such as James Anderson's (1976) publication entitled "A Land Cover Classification System for Use with Remote Sensor Data", produced three hierarchical levels of classifying land cover and land use with level three being the most detailed, representing over 100 land use types. The basis of this classification has been explained in detail by Anderson by means of a policy paper in 1976. According to him, a land use and land cover classification system which can effectively employ orbital and high altitude remote sensor data should meet the following criteria (Anderson, 1971):

1. The minimum level of interpretation accuracy in the identification of land use and land cover categories from remote sensor data should be at least 85 percent.
2. The accuracy of interpretation for the several categories should be about equal.
3. Repeatable or repetitive result should be obtainable from one interpreter to another and from one time of sensing to another.
4. The classification system should be applicable over extensive areas.
5. The categorization should permit vegetation and other type of land cover to be used as surrogates for activity.
6. The classification system should be suitable for use with remote sensor data obtained at different times of the year.
7. Effective use of subcategories that can be obtained from ground survey or from the use of larger scale or enhanced remote sensor data should be possible.
8. Aggregation of categories must be possible.
9. Comparison with future land use data should be recognized when possible.
10. Multiple uses of land should be recognized when possible.

Some of these criteria should apply to land use and land cover classification in general, but some of the criteria apply primarily to land use and land cover data interpreted from remote sensor data.

### Classification of Land Use

**Forest Area:** This includes all land classified either as forest under any legal Enactment, or administered as forest, whether State-owned or private, and whether wooded or maintained as potential forest land. The area of crops raise in the forest and grazing lands or areas open for grazing within the forests remain included under the "forest area".

**Area under Non-agricultural Uses:** This includes all land occupied by buildings, roads and railways or under water, e.g. rivers and canals, and other land put to uses other than agriculture.

**Barren and Un-cultivable Land:** This includes all land covered by mountains, Deserts, etc. Land, which cannot be brought under cultivation except at an exorbitant cost is classified as uncultivable whether such land is in isolated blocks or within cultivated holdings.

**Permanent Pasture and other Grazing Land:** This includes all grazing land whether it is permanent pasture/meadows or not. Village common grazing land is included under this category.

**Land under Miscellaneous Tree Crops, etc.:** This includes all cultivable land, which is not included in 'Net area sown' but is put to some agricultural use. Land under casuarinas trees, thatching grasses, bamboo bushes and other groves for fuel, etc. which are not included under 'Orchards' are classified under this category.

**Cultivable Waste Land:** This includes land available for cultivation, whether taken up or not taken up for cultivation once, but not cultivated during the last five years or more in succession including the current year for some reason or the other. Such land may be either fallow or covered with shrubs and jungles, which are not put to any use. They may be accessible or inaccessible and may lie in isolated blocks or within cultivated holdings.

**Fallow Lands other than Current Fallows:** This includes all land, which was taken up for cultivation but is temporarily out of cultivation for a period of not less than one year and not more than five years.

**Current Fallows:** This represents cropped area, which is kept fallow during the current year.

**Net Area Sown:** This represents the total area sown with crops and orchards. Area has sown more than once in the same year is counted only once.

### STUDY AREA

The district of Haveri is located in the western part of Karnataka state. The district occupies a region of 4823 sq. km. along the 14°19' North and 15°09' North latitude as well as the 75°01' East and 75°50' East longitudes. As per Peter Hagget's method, the shape of the district is approximately square in shape. The maximum length is about 111 km from north to south and its greatest development is only about 87 km from east to west. The district is surrounded by the districts of Dharwad and Gadag to the north; the districts of Davanagere and Shimoga to the south; and the district of North Kanara to the west. The Varada River flows east to west, 128 km north of Haveri, and forms the border between north and south in the district. There are several subdivisions of taluks are Shiggaon, Hangal, Savanur, Haveri, Hirekeruru, Byadgi and Ranibennur.

## OBJECTIVES

To know the decadal variation in land use and land cover change

To know the land use & land cover change on environmental issues of the study region.

## DATA AND METHODOLOGY

Secondary data have been collected from the directorate of economic and statistics, M.S. building Bangalore. Simple statistical methods are used to show the results variation like pie diagram, bar graph standard deviation method etc. Table for both study periods have been prepared with percentage conversion.

## DISCUSSION

The land put to various uses in the district have been discussed at length. Land is one of the most important components of life support system which has over used and even observed since centuries.

### General land use:

In the year 2000-01 to 2020-21 the haveri district has a total geographical area 485156 sq km, out of which net sown area was 360680 sq km.74.34% forest 47454 sq km, (9.78%). Follows land 17367 (3.58%), cultivable land 3139 (0.65%), barren land 5793 sq.km (1.19%), trees and graves 1919 sq, km (0.40%).

**Table:-Land Use and Land Cover Change In Haveri District**

Types of land use	2000-01		2020-21		Volume Of Changes	Percentage Of Changes
	Area (Sq. Km)	% Of Area	Area (Sq. Km)	% Of Area		
Forest	47454	9.78	47454	9.78	00	<b>0</b>
Non-Agricultural uses	31395	6.47	33515	6.91	120	<b>0.44</b>
Barren	5793	1.19	5793	1.19	00	<b>0</b>
Cultivable Waste Land	3139	0.65	2989	0.62	-150	<b>-0.03</b>
Permanent Pasture	12526	2.58	12209	2.52	317	<b>-0.06</b>
Trees And Groves	1919	0.40	2290	0.47	371	<b>0.07</b>
Current Fallow Land	17367	3.58	4504	0.93	-12,863	<b>-2.65</b>
Other Fallow Land	4883	1.01	1854	0.38	-3029	<b>-0.63</b>
Net Sown Area	360680	74.34	374548	77.20	13,868	<b>2.86</b>
	485156	100	485156	100		

**Forest:** Haveri district has total geographical area 485156 sq km out of which 47454 sq km (9.78%) of land under forest . during 2000-01, and the same was 47454 sq km (9.78%) in the year 2020-21, there is no change in the forest area during study period.

**Non-Agricultural uses:** This broad category comprises of a number of different types of land which are not available for cultivation under the existing the land e.g. occupied by building, road, railways, and factories, water bodies. Play ground, gardens and other domestics purpose. Land put to uses other than agriculture, this land covers are of 31395 sq. km (6.47%), during 2000-01 and 33515 sq, km (6.91%) during 2020-21. This exceptionally high proportion of non-agricultural land is due to the rapid growth of population which require more land for residential purpose, commercial establishment, educational and other institution, industries, roads, railways etc. the land under this category is increasing fast and is bound to increase in future also with the development of science and technology.

**Barren:** This category of land includes all such land which is practically useless or unproductive and unfit for cultivation. Haveri district had 5793sq, km (1.19%), of land under this category during 2000-01; there is no change in during span of twenty years.

**Permanent pasture:** This category of land covers all grazing lands whether they are permanent pastures or not permanent land for grazing cattle, has been characteristic as pasture land. The pasture land all over the haveri

district had been reduce gradually and used for agriculture. Cattle grazing are still continued only in seasonal follow lands, their feed is supplemented by stocks of grains like .cardamom, cotton, Paddy etc. Haveri district had 12526 sq. km (2.58%) of land under this category during 2000-01 and the same has been 12209 sq. km (2.52%), in 2020-21. Little changes shown in this category during twenty years period -0.06 % area from this category converted into other purpose use.

**Land under miscellaneous Tree and groves:** It includes all cultivable land which is not included with net sown area shown, but it is put to some agricultural uses. The district had 19286 sq. km (3.98%) of land under this category during 2000-01, whereas in 2020-21, the land under this category is decreased to 6794 sq. km.

## CONCLUSION

Out of the total geographical area (2000-01), 74.34% land was under net sown, 9.78% under forest, 3.58 under follow land, 0.65% under cultivable waste, 1.19% under barren and un-cultivable land, 6.47% lands put to non-agricultural uses, 2.58% permanent pasture and other growing land, 1.01 land under miscellaneous trees and groves. Looking that the data of 2000-01. The net shown area has increased very significantly in the year 2022-21, lack of available water resource especially the underground water goes down which is to be tapped in order to make agriculture land more economical and widely acceptable. Both generation land uses should improve in quality and quantity maintain the entire related ecology. So that, it can help to stop soil erosion and there by imageries brings certain constraints in the minute and micro land use analysis of district.

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