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LAND USE LAND COVER ANALYSIS OF HAVERI DISTRICT : USING REMOTE SENSING

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Abstract:-Land-use and land-cover change, as one of the main driving forces of global environmental change, is central to the sustainable development debate. Land use and land-cover changes have impacts on a wide range of environmental and landscape attributes including the quality of water, land and air resources, ecosystem processes and function. This paper concentrates on spatial pattern of land use land cover in seven taluks of the Haveri district using satellite imagery of LISS IV 2014. The paper concludes that, in the total geographical area majority of the land is used for agriculture i.e. 74.93%. The area under forest is 9.88%, it is followed by built up area is 8.02%, waste land 3.6%, land used for other purposes is 3.31% and hardly 0.3% of the area is under water bodies in the district. If you compare the statistics of the earlier records it shows that, built up area, agriculture area is increasing whereas area under forest, water bodies, waste land and water bodies are decreasing.

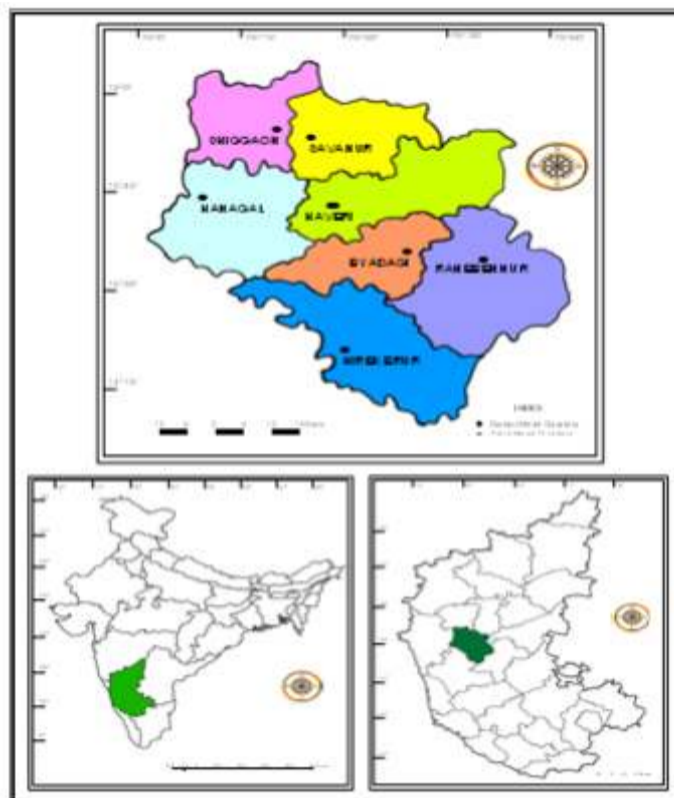
Keywords:Land use, land cover, Haveri district, Remote Sensing.

INTRODUCTION

The change in land cover occurs even in the absence of human activities through natural processes where as land use change is the manipulation of land cover by human being for multiple purposes- food, fuel wood, timber, fodder, leaf, litter, medicine, raw materials and recreation. So many socio-economic and environmental factors are involved for the change in land use and land cover. Land use and land cover change has been reviewed from different perspectives in order to identify the drivers of land use and land cover change, their process and consequences

LOCATION AND EXTENT

Haveri district is situated in the western sector of the Karnataka state. The district encompasses an area 485156 hectares lying between the latitudinal parallels of 14° 19' North and 15° 09' North and the longitudes of 75° 01' East to 75° 50' East. In its shape the district may be regarded as roughly resembling an inverted square shape as per Peter Hagget's method shape index. Its greatest length from north to south is about 111 kms and its greatest width from east to west is about 87 km. The district is bounded on the North by the districts of Dharwad and Gadag; on the south by the district of Chitradurga and Shimoga and the west by the district of North Kanara.



Analysis of Land–use land cover in Haveri District.

Forest:

Forest Lands have a tree-crown areal density (crown closure percentage) of 10 percent or more, are stocked with trees capable of producing timber or other wood products and exert an influence on the climate or water regime. Forest Land generally can be identified rather easily on high-altitude imagery, although the boundary between it and other categories of land may be difficult to delineate precisely. Lands from which trees have been removed to less than 10 percent crown closure but which have not been developed for other uses also are included. For example, lands on which there are rotation cycles of clear cutting and block planting are part of Forest Land. On such lands, when trees reach marketable size, which for pulpwood in the Southeastern United States may occur in 2 to 3 decades, there will be large areas that have little or no visible forest growth. The pattern can sometimes be identified by the presence of cutting operations in the midst of a large expanse of forest. Unless there is evidence of other use, such areas of little or no forest growth should be included in the Forest Land category. Forest land which is grazed extensively, as in the Southeastern States, would be included in this category because the dominant cover is forest and the dominant activities are forest related. Such activities could form the basis for Levels III or IV categorization. Lands that meet the requirements for Forest Land and also for an Urban or Built-up category should be placed in the latter category. The only exceptions in classifying Forest Land are those areas which would otherwise be classified as Wetland if not for the forest cover. Since the wet condition is of much interest to land managers and planning groups and is so important as an environmental surrogate and control, such lands are classified as Forested Wetland.

Auxiliary concepts associated with Forest Land, such as wilderness reservation, water conservation, or ownership classification, are not detectable using remote sensor data. Such concepts may be used for creating categories at the more detailed levels when supplemental information is available.

Above mention table and map is indicate the land use land cover in Haveri district, according to this table and map 47,454 hectares i.e 9.88% of the land in the total geographical area of the district is covered by forest region, The highest area under forest is noticed in Shiggaon taluk i.e 16.88% . It is followed by Ranabennur 11.47% Byadgi 11.10%, Hirekerur taluk 10.99% and Hanagal 10.93%. The less than 5% of its geographical area covered by forest is noticed in Haveri taluk i.e 4.81% whereas the least area undr forest is noticed in Savanur taluk i.e 1.59%. These Haveri and Savanur taluks are having black cotton soil so more area is devoted for agriculture.

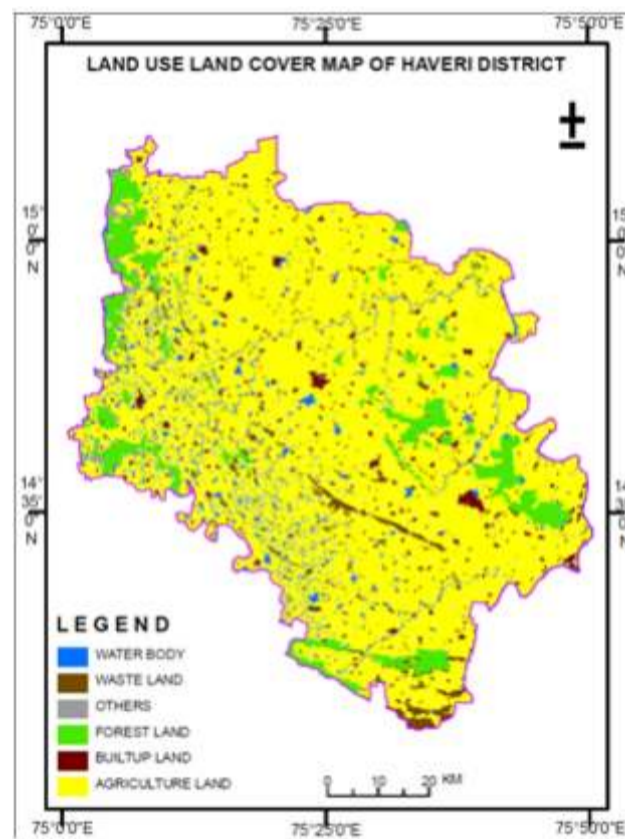
**Table No. 1 Haveri District
Taluka wise Land use land cover-2014 (Area in Hectares figures in the brackets are percentages)**

Sl.No	Name of the Taluka	Forest	Agricultural Land	Built up Land	Water bodies	Waste land	others	Total
1	Byadgi	4889(11.10)	33169(75.97)	2632(6.02)	152(0.34)	1647(3.77)	1167(2.67)	43656(100)
2	Hanagal	8474(10.93)	50868(65.61)	8364(10.79)	295(0.38)	5489(7.08)	4035(5.20)	77525(100)
3	Haveri	3849(4.81)	66651(83.35)	5843(7.30)	262(0.32)	680(0.85)	2672(3.34)	79957(100)
4	Hirekerur	8876(10.99)	58650(72.68)	7506(9.30)	272(0.33)	2663(3.30)	2727(3.37)	80694(100)
5	Ranebennur	10614(11.47)	66449(71.85)	7063(7.63)	210(0.22)	5280(5.70)	2859(3.09)	92475(100)
6	Savanur	801(1.59)	44858(89.41)	3170(6.31)	98(0.19)	437(0.87)	805(1.60)	50169(100)
7	Shiggaon	9951(16.88)	41572(70.55)	4214(7.15)	185(0.31)	1249(2.11)	1749(2.96)	58920(100)
	Total	47454(9.881)	362217(74.93)	38792(8.02)	1474(0.30)	17445(3.60)	16014(3.31)	483396(100)

Source: Data extracted from the Satellite Imagery

Agricultural Area:

Agricultural Land may be defined broadly as land used primarily for production of food and fiber. On high-altitude imagery, the chief indications of agricultural activity will be distinctive geometric field and road patterns on the landscape and the traces produced by livestock or mechanized equipment. However, pasture and other lands where such equipment is used infrequently may not show as well defined shapes as other areas. These distinctive geometric patterns are also characteristic of Urban or Built-up Lands because of street layout and



development by blocks. Distinguishing between Agricultural and Urban or Built-up Lands ordinarily should be possible on the basis of urban-activity indicators and the associated concentration of population. The number of

building complexes is smaller and the density of the road and highway network is much lower in Agricultural Land than in Urban or Built-up Land. Some urban land uses, such as parks and large cemeteries, however, may be mistaken for Agricultural Land, especially when they occur on the periphery of the urban areas.

The interface of Agricultural Land with other categories of land use may sometimes be a transition zone in which there is an intermixture of land uses at first and second levels of categorization. Where farming activities are limited by wetness, the exact boundary also may be difficult to locate, and Agricultural Land may grade into Wetland. When the production of agricultural crops is not hindered by wetland conditions, such cropland should be included in the Agricultural category. This latter stipulation also includes those cases in which agricultural crop production depends on wetland conditions, such as the flooding of rice fields or the development of cranberry bogs. When lands produce economic commodities as a function of their wild state such as wild rice, cattails, or certain forest products commonly associated with wetland, however, they should be included in the Wetland category. Similarly, when wetlands are drained for agricultural purposes, they should be included in the Agricultural Land category. When such drainage enterprises fall into disuse and if wetland vegetation is reestablished, the land reverts to the Wetland category.

In the Haveri district 362217 hectares or 74.93% of land is covered by agricultural activity in the total geographical area of the district, The highest 89.41% of agricultural land is noticed in Savanur taluk. In Majority of the taluks in the district more than 70% of the land is used for the agriculture. The black soil dominated taluks like Haveri 83.35%, and Byadgi 75.97% having relatively more area under agriculture. The lowest agriculture is noticed in Hanagal taluk i.e 65.61% this is due to the high concentration of forest area and waste land.

Built Up Land:

Urban or Built-up Land is comprised of areas of intensive use with much of the land covered by structures. Included in this category are cities, towns, villages, strip developments along highways, transportation, power, and communications facilities, and areas such as those occupied by mills, shopping centers, industrial and commercial complexes, and institutions that may, in some instances, be isolated from urban areas. As development progresses, land having less intensive or nonconforming use may be located in the midst of Urban or Built-up areas and will generally be included in this category. Agricultural land, forest, wetland, or water areas on the fringe of Urban or Built-up areas will not be included except where they are surrounded and dominated by urban development. The Urban or Builtup category takes precedence over others when the criteria for more than one category are met. For example, residential areas that have sufficient tree cover to meet Forest Land criteria will be placed in the Residential category.

In the study region Hangal taluk is having largest built up land i.e., 8364(10.79%) hectares, second highest built up land can be observed in the taluk of Hitekerur i.e., 7506(9.30%) hectares. Remaining taluks like Ranebennur is having 7063 hectare(7.63%), Haveri taluk 5843 hectare,(7.30%) Shiggaon is having 4214 hectare(7.15%), Savanur taluk is having 3170 hectare(6.31%) and Byadgi taluk is having very least built up land i.e., 2632 hectare(6.02%).

Water Bodies:

The delineation of water areas depends on the scale of data presentation and the scale and resolution characteristics of the remote sensor data used for interpretation of land use and land cover. (Water as defined by the Bureau of the Census includes all areas within the land mass of the United States that persistently are water covered, provided that, if linear, they are at least 1/8 mile (200 m) wide and, if extended, cover at least 40 acres (16 hectares).) For many purposes, agencies need information on the size and number of water bodies smaller than Bureau of the Census minimums. These frequently can be obtained from small-scale remote sensor data with considerable accuracy.

The total area under water bodies in the Haveri district is very low i.e 0.30% or 1474 hectare, in the total geographical area of the district. The highest water bodies are observed in the Hanagal taluk i.e. 295 hectare. Most of the taluks in the district the area under water bodies ranges between 0.34 to 0.31 percentages. The least area under water bodies is noticed in the two taluks of the district namely Ranebennur and Savanur taluks with 0.22% and 0.19% of its geographical area respectively.

Waste Land:

In the Haveri district 17445 hectares(3.60%) of land is comes under waste land class. The highest waste land noticed in Hanagal taluk i.e. 7.08% of total geographical area this was followed by Ranebennur taluk, Byadgi taluk Hirekerur taluk and shiggaon taluk with 5.70%, 3.77%, 3.37 % and 2.11% respectively. The least waste land is noticed in Savanur and Haveri taluks with 0.87% and 0.85% respectively.

Other:

It can be treated as miscellaneous because of the nature of occurrence, physical appearance and other characteristics. The district has 16014 hectares (3.31%) of land is comes under other land use class. The highest area under this class is noticed in Hanagal is taluk i.e. 5.20% of its total geographical area. The least is noticed in Savanur taluk with 1.60%.

CONCLUSION:

This paper concentrates on spatial pattern of land use land cover in seven taluks of the Haveri district using satellite imagery of LISS IV 2014. The paper concludes that, in the total geographical area majority of the land is used for agriculture i.e. 74.93%. The area under forest is 9.88%, it is followed by built up area is 8.02%, waste land 3.6%, land used for other purposes is 3.31% and hardly 0.3% of the area is under water bodies in the district. If you compare the statistics of the earlier records it shows that, built up area, agriculture area is increasing whereas area under forest, water bodies, waste land and water bodies are decreasing.

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