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Land Use and Land Cover Analysis Using Satellite Image and GIS Techniques of Khandala Tehsil of Satara District

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ABSTRACT

Land use and land cover is very important consideration for proper planning and use of resources in the region to achieve ultimate goal of development. From the land use and land cover mapping developer can get the proper idea for the planning process of region. From that idea common man get the benefit of development. The GIS and remote sensing are efficient tools and techniques for mapping, analysis of change detection and analyzing the land use and land cover features. The use of satellite data with very fine resolution is very useful for the root level planning and management.
Keyword: *Land, Land over, map, Planning*

INTRODUCTION

The earth surface is covered with lot of things which called land cover and land use [1]. The natural and manmade features are fall in this land use and land cover. Land use and land cover is very important consideration for proper planning and use of resources in the region to achieve ultimate goal of development. From the land use and land cover mapping developer can get the proper idea for the planning process of region. From that idea common man get the benefit of development [2,3]. Land cover contributes to natural feature on the earth surface which created by nature and used by the man for the prosperous development. The feature created by the man which bridge, agricultural processes, and farming techniques, road, railway network, canal system for the irrigation, for utilization of natural resource to develop the humanity. The GIS and remote sensing are efficient tools and techniques for mapping, analysis of change detection and analyzing the land use and land cover features [4]. The use of satellite data with very fine resolution is very useful for the root level planning and management [5]. The land use and land cover mapping having importance for natural resource management, urban and village horizontal and vertical expansion, baseline mapping survey, land mapping survey for revenue department, resource extraction, mining activities, damage assessment by flood, drought, cyclone and earthquake, legal boundaries detection and mapping for tax assessment and property evaluation in the urban and rural areas [6]. The land use and land cover map is generated for the Khandala tahsil to develop the proper planning and management of natural and manmade resource. The use of technology for efficient planning and management is now requisite to development. To analysis land use and land cover of study area.

MATERIAL AND METHODS
DATABASE

The secondary data is collected from following sources, Landsat Satellite images, Earth Explorer (http://earthexplorer.usgs.gov) useful as source of database for mapping of land use and land cover. The remotely sensed data is having very high level accuracy and resolution to map the smallest feature from the earth surface. The temporal resolution or revisit period of the satellite is useful for change detection analysis. For this study the Landsat satellite data is used from the earth explorer of United Sates Geological Survey. The cloud free and haze free data is required for the proper mapping.

Table 1 Details of Landsat Image

Satellite	Sensor	Path	Row	Year
Landsat 8	ETM+	146 & 147	48	26 December 2018

Software Ananlysis

Land use and land cover feature map is derived from satellite image using supervised classification technique and using ERDAS Imagine 9.2 and ArcGIS 10.5 software.
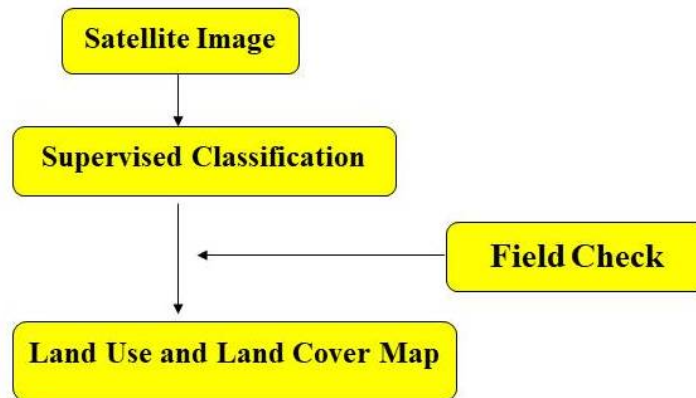
Fig. 1 Methodology

Land use and land cover features are identified and signature value is derived from the satellite image and different classes are prepared.

RESULTS AND DISCUSSION

There are five land use and land cover features are analyzed from the Khandala tahsil. Such as agriculture land, settlement, forest land, water body, barren land derived in the Khandala tahsil. The land use and land cover key parameter for the development of region. The planning process is dependent on the diversity of region and resources of the region. The Khandala tahsil is versatile in the resources.

Table 2: Land use and land Cover (2018)

| Class	Area in Ha
Agricultural Land	35893.75
Forest	6756.37
Barren Land	7285.59
Settlement	1646.86
Water body	789.34
Total	52372.00

Agricultural Land

The agriculture is main stay of the population in Khandala tahsil. Land use under agriculture is in different crops. Nearly 35893.75 hectors area is under the agriculture field. Rainfall and irrigation from the Veer dam is main source of irrigation to crops. Nearly 73 per cent area of Khandala tahsil is under different crops.

Water body

The main source of water on the earth surface is rainfall. The water falling from the rain accumulates at the depression and remaining water flow to sea. Water body is accumulation and flow of water on the earth surface in the form of river, lake, pond and reservoir. The water body feature is two types one is natural means created by nature and another is manmade which is developed by man to store the water for various purpose. In the Khandala tahsil part of dam is falling and percolation tank is distributed in the region. The river and stream are natural water body found in the region. "VEER" is the largest dam in

Khandalaon the Nira River flows from the northern border of the taluka. The area covered by water body is 789.34 hectors and one per cent of Khandala tahsil.
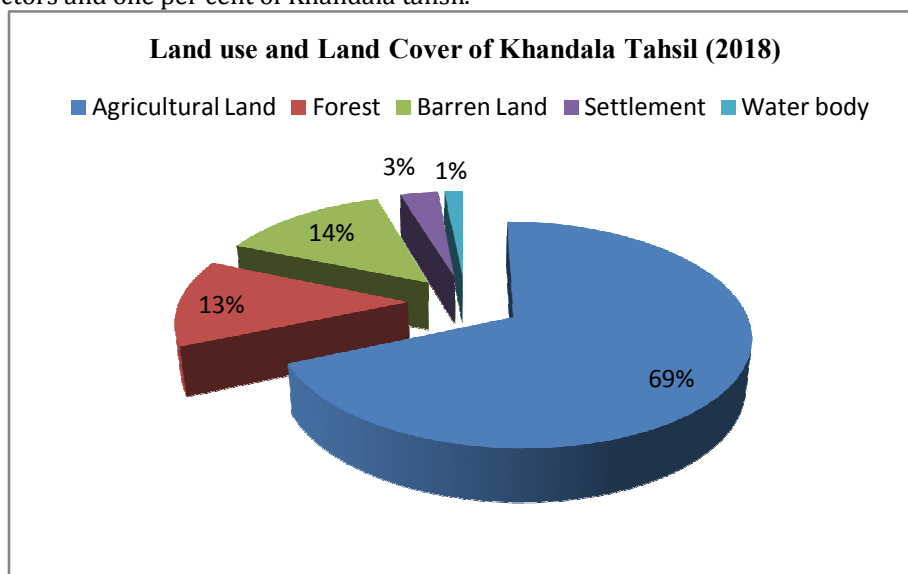
Fig. 2Land use and land Cover (2018)
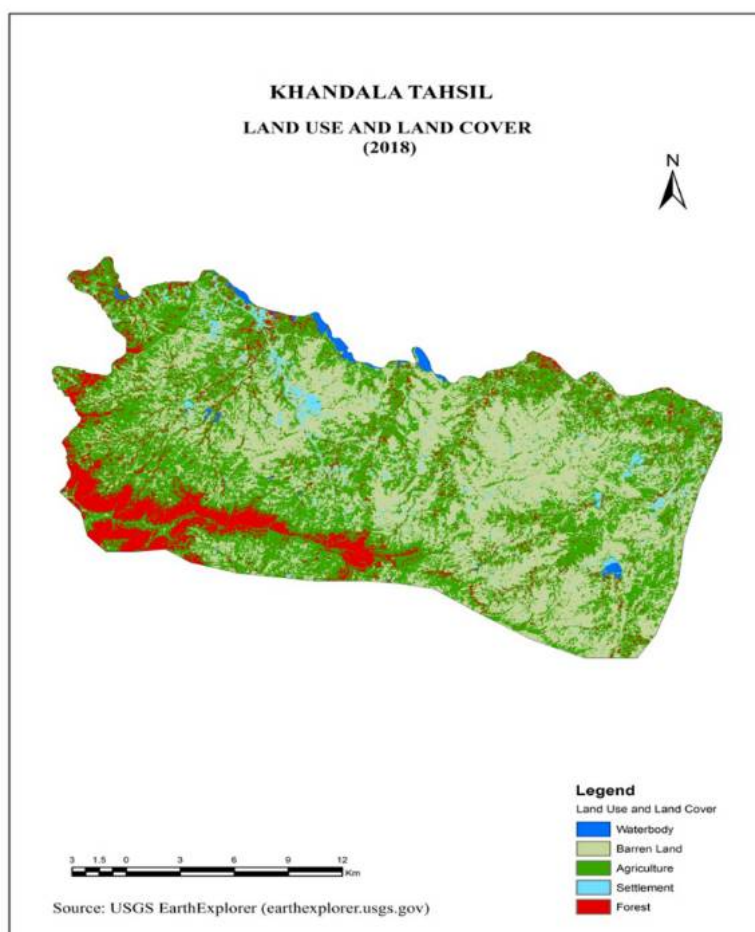
Fig. 3 Land use and land Cover (2018)

Forest

Forest is natural and manmade resource which is utilized for different purposes. There is 33 per cent area of the any region is under forest is need of safe and balanced environment. In the Khandala tahsil nearly 12.90 per cent area is under forest (6756.37 hectors). So it reflects need to plant more trees for balanced environment.

Settlement

For settlement purpose, man builds the houses and commercial building for the business. The settlement is manmade land use feature. The land is utilized for the construction of building. The constriction of canal, road, and railway for this purpose land also utilized. In the Khandala tahsil Lonand is census town and 66 villages are settled. The total population of Khandala Taluka is 137,418 out of which urban population is 18,723 while rural is 118,695 as per Census 2011. The area under settlement is 1646.86 hectors.

Barren Land

Land is not under the agriculture use, stony land, and high slope areal, hilly area cover the barren land. The area under barren land is 11985.59 hectors and 6 per cent to the total area of Khandala tahsil. This land is not applicable for the agricultural purpose.

CONCLUSION

The land use and land cover analysis is done for the planning and management of resources in the Khandala tahsil. The agricultural land, barren land, forest cover, settlement and water body classes are derived from the satellite image and using ArcGIS software. The remote sensing data and GIS technology is efficient tool for the analysis of land use and land cover.

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