

Land Use Land Cover Change Detection of Satara District (M.S). Using Geospatial Techniques

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Abstract

This study attempts to detect the land use land cover change in the Satara district between 2001 to 2020 using remote sensing technology, geographical information system to estimate the area of each class of land use in 2001, 2011 and 2020. Observations of land use trends and land cover change lead to finding the possible reasons behind these changes. The research findings showed 5.56 percent growth in settlement areas while agriculture areas were increasing 48.65 percent. 2001 to 2020. Recommendations were made for optimum benefit from the study in future land use planning and studies.

Keywords: land use, land cover, Geospatial Techniques.

Introduction

Land use refers to the natural ecosystem or human modifications to the desert, such as fields, pastures, and colonial settlements. The primary impact of land use on land use is temperate area deforestation. Urban sprawl, soil erosion, soil degradation, Stalinization, and desertification are recent notable impacts of land use. Land use is distinct from land use, despite the fact that the two words are frequently used synonymously. The two most widely acknowledged high-level classes of land use are urban and agricultural. Land use is a description of how humans use land and socioeconomic activities. Multiple and alternative uses of property may exist at one location, and each of these uses may have political implications. Environmental purity and quality of life are two factors that have an impact on human health, and changes in land use and land conservation have an impact on both. Some of the environmental, social, and economic issues linked to land use and changes in land cover include habitat, water and air quality, as well as changes in living standards. carried out an investigation to gauge and map the desertification of the Satara area. The study area's income greatly depends on the Satara district. It has recently experienced desertification, resulting in extremely severe biological, social, and economic losses, and it is environmentally unsafe. The Satara district has been chosen as the study area for these and other factors. This approach was created based on a number of earlier researches. This method allows for the detection of both actual and temporal changes in land use land cover between various dates.

Study Area

The study areas related to the subject Satara district north latitude 17°5 ' to 18° 11' and east line 73° 33' to 74° 54 '. East of Satara district is 144 km north-south 120 km. As per the district, the area of the district is 10, 400 sq. Km and it covers 34% of the area of Maharashtra by Satara district. There are 11 tahsils in the district and seven north of the Pune District, West Raigad, Ratnagiri, Sangli south to East Solapur District. (**Fig. 1**).

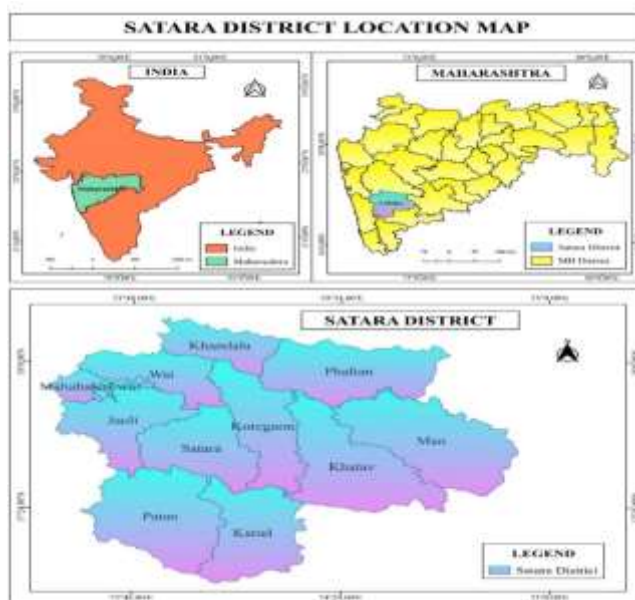
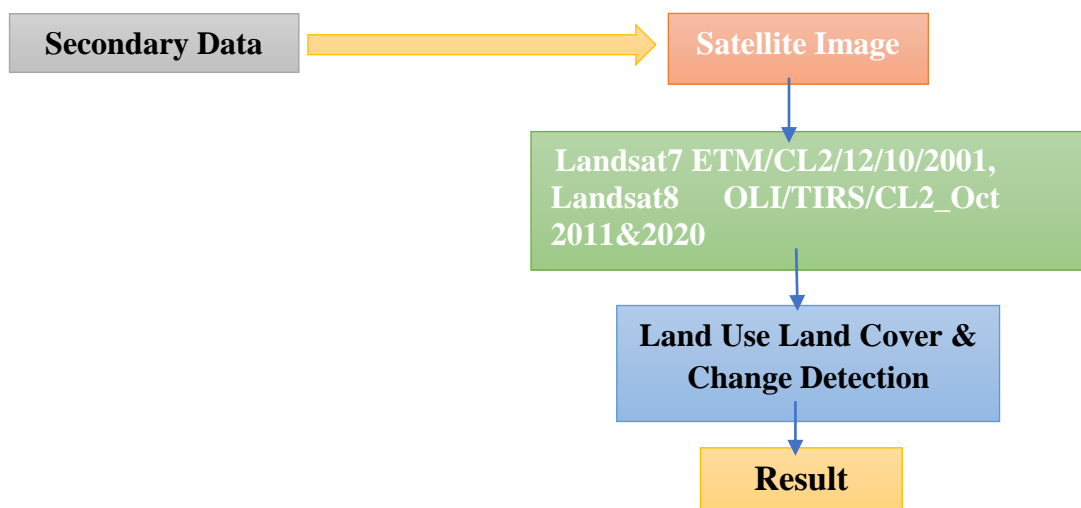


Fig.1

Objective

1. To study the land use land cover of the Satara district (M.S)

Methodology



To show the land use and land cover **2001, 2011 and 2020** map (fig. 2 and 3). The study region’s total geographical area is 10462 sq. km. download the Satellite image Landsat 7 ETM/CL2/12/10/2001., Landsat 8 OLI/TIRS/CL2 12/10/2011., Landsat 8 OLI/TIRS/CL2 12/10/2020. the map processing in ArcGIS 10.5 version, band composite, through image classification and super wise classification from 4,3,2 F.C.C. (Fales colure combination) and the image classification is waterbodies, Agriculture., Forest, Settlement and barren landmarked. The maximum likelihood classification to create the land use and land cover map. Used Raster to polygon tools used to the marge everyone classes.

General Land Use Pattern And Changes (2001 To 2020)

The land is a gift given by human nature. Therefore, the basic source of human community use is the use of land at specific times for specific developed and vacant lands and is an important component of space on which physical and social development depends. Land provides food, shelter, clothing, minerals and industrial raw materials. However, limited land is available on the surface of the earth. The method of land use varies from place to place due to location and geographical location.

Land used for dry purposes in the eastern and southern parts of the district. In the western part of the Satara district, forest, uneven topography, heavy rainfall and unhealthy climate result in relatively low land use. The study area under agricultural use has increased in the last two decades from 2001 and 2020.

Land Use Land Cover Image Classification (2001 To 2011)

In the study region the land cover classes generated were Agriculture, Water bodies Forest, Settlements and banner land. The classification gives the land use land cover image of the study region. The table 1 shows the used for the land covers.

Table 1. Satara District: Colour Assignment for Land Use Land Cover Classes

Sr. No.	LULC Class	Colours Assign to LU/LC Class
1.	Agriculture	Yellow
2.	Forest	Green
3.	Waterbody	Blue
4.	Settlement	Red
5.	Barren land	Broun

Table 1.2 Satara District: Land Use Land Cover 2001 To 2020 in Percentage

Sr. No.	LULC Class	2001		2011		2020		Change in % (2001 to 2011)	Change in % (2011 to 2020)
		Area in Sq. km.	Area in %	Area in Sq. km.	Area in %	Area in Sq. km.	Area in %		
1.	Agriculture	1845	17.64	3246	31.03	5090	48.65	13.39	17.62
2.	Forest	4033	38.55	980	9.37	2273	21.73	29.18	12.36
3.	Waterbody	308	2.94	139	1.33	257	2.46	1.61	1.13

4	Settlement	628	6.00	437	4.18	585	5.59	1.82	1.41
5.	Barren land	3648	34.87	5660	54.10	2257	21.57	19.23	32.53
Total		10462	100.00	10462	100.00	10462	100.00		

Source: Compiled by Researcher from Landsat 8 OLT/TIRS/C2L/ 12/10/2001.,12/10/2011 and 12/11/2020.

To show the land use and land cover **2001** map (fig. 2). The study region’s total geographical area is 10462 sq. km. Area in Percentage of Waterbodies (2.94 Percent), Agriculture (17.64)., Forest (38.55)., Settlement (6.0 Percent) and barren land (34.87 Percent).

To show the land use and land cover **2011** map (fig. 2). The Study region’s total geographical area is 10462 sq. km. Area in Percentage of Waterbodies (1.33 Percent), Agriculture (31.03 Percent)., Forest (9.37 Percent)., Settlement (4.18 Percent) and barren land (54.10 Percent).

To show the land use and land cover **2020** map (fig. 3). The Study region’s total geographical area is 10462 sq. km. Area in Percentage of Waterbodies (2.46 Percent), Agriculture (48.65 Percent)., Forest (21.73 Percent)., Settlement (5.59 Percent) and barren land (21.57 Percent).

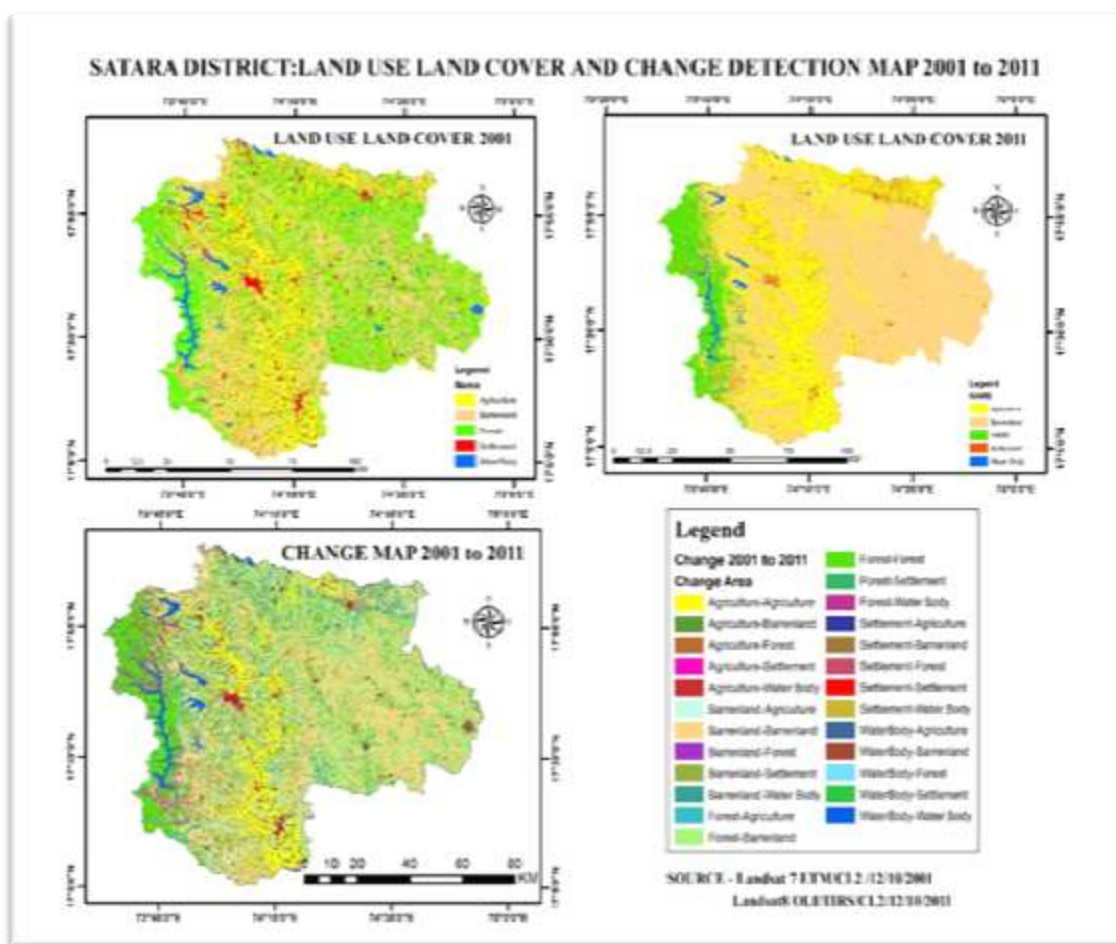


Fig. 2

Change Detection map 2001 to 2011

To show the change map 2001 to 2011 in these two images intersect tool to use to change the Waterbodies (1.61 Percent), Agriculture (13.39 Percent)., Forest (29.18 Percent)., Settlement (1.82 Percent) and barren land (19.23 Percent). In this period the study area change detection uneven topography, drought prone area, heavy rainfall and unhealthy climate result in relatively low land use. (Fig. 2).

Change Detection map 2011 to 2020

To show the change map 2011 to 2020 in these two images intersect tool to use to change the Waterbodies (1.13 Percent), Agriculture (17.62 Percent)., Forest (12.36 Percent)., Settlement (1.41 Percent) and barren land (32.53 Percent). Due to the study areas varied topography, drought-prone areas, excessive rainfall and unhealthy environment during this time, there was virtually little land use. (Fi g. 3).

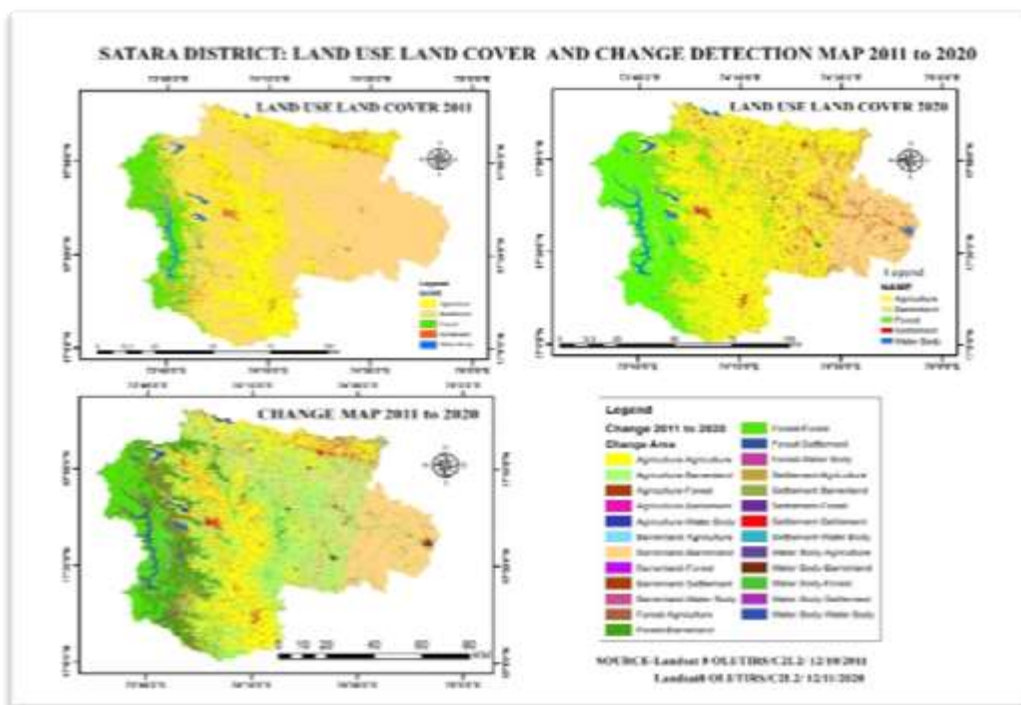


Fig. 3

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