Land use land cover change detection of Ramwadi ward in Nashik city

Sahebrao Uttam Deore

Associate professor in Geography MGV Arts Science and Commerce College Surgana Dist.Nashik (MS) India

Abstract

Remote sensing data GIS and GPS techniques are applied for acquiring data, mapping and assessing the proper planning and sustainable development. In this research Ramwadi ward have been select for detecting land use land cover changes. Changes in built up areas, barren land, water bodies, vegetation cover and agriculture land were explored. Information on land use land cover in the form of maps and statistical data is very important for utilization of land for spatial planning and sustainable development. In order to understand the growth and expansion rate of Ramwadi ward in Nashik city. Objectives of this study are to understand the land use land cover change detection. This change is important to understand the future planning.

KEYWORDS Land use land cover, Remote sensing, GIS.

Introduction

For this research the satellite images of 2001 and 2013 of Landsat ETM+ and OIR images processed under ERDAS 9.3+2011 are used; and for mapping Arc GIS 10 software is applied and thereby the land use land cover change from 2001 to 2013 has been detected. Change detection is the process of identifying differences in the state of an object or phenomenon by observing it at different times (Singh; 1989). Timely and accurate change detection of earth's surface features is extremely important for understanding relationship and interactions between human and natural phenomenon in order to promote better decision making. The land use of any area helps to demarcate the potential and difficulties of the urban areas. Ramwadi ward in Nashik city has been selected for study and analysis the change detection using the Remote sensing data and GIS techniques to understand the buildup area, water bodies, vegetation cover, barren land and agriculture.

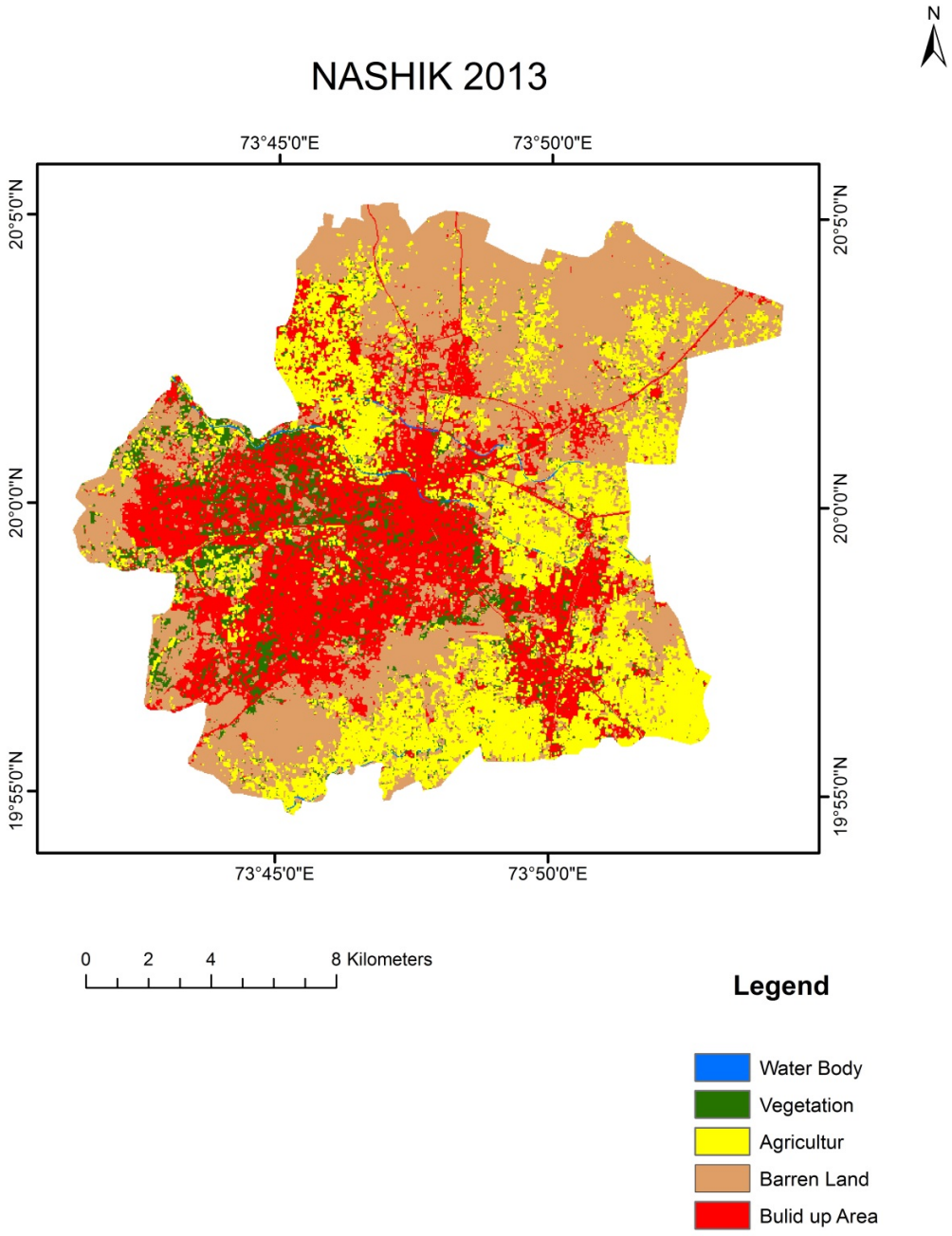
STUDY AREA

Nashik is located in Northern part of Maharashtra state. It is situated on the bank of Godavari River; the approximate coordinates of the city are 20^0 N and 73^0 E. The area of Nashik city is extended between 19^0 54' 56.7503"N to 20^0 04' 44.4821" N latitudes and 73^0 41' 01.73" E to 73^0 52' 02.02" E longitudes, which covers 259.1 sq. km. area, which is 2nd largest in Maharashtra after Mumbai. The city is situated at altitude of 565 meters above mean sea level (MSL) at a distance of 185 km.from Mumbai.

Change Detection Analysis

Ramwadi is located on the left bank of river Godavari. The total geographical area of this ward is 1.43 sq. km. The land use land cover parameters indicate that the built up area

which was 0.32 sq. km in 2001 increased up to 0.78 sq. km in 2013. Area under other parameters like barren land 0.08 sq. km, water bodies 0.52 sq. km and agricultural land 0.13 sq.km has decreased in 2001 and acquired as 0.05 sq. Km area each by barren land and water bodies, similarly 0.07 sq. Km area acquired by agriculture in 2013 Area under vegetation was 0.38 sq. km in 2001 which increased to 0.48 sq. km in 2013. As per the result obtained from the image map the built up area has increased from 0.32 to 0.78 sq.km.


N
NASHIK 2013
73°45'0"E
73°50'0"E
20°5'0"N
20°0'0"N
19°55'0"N
0 2 4 8 Kilometers
Legend
Water Body
Vegetation
Agricultur
Barren Land
Bulid up Area

Land use land cover statistics of Ramwadi Ward during 2001-2013.

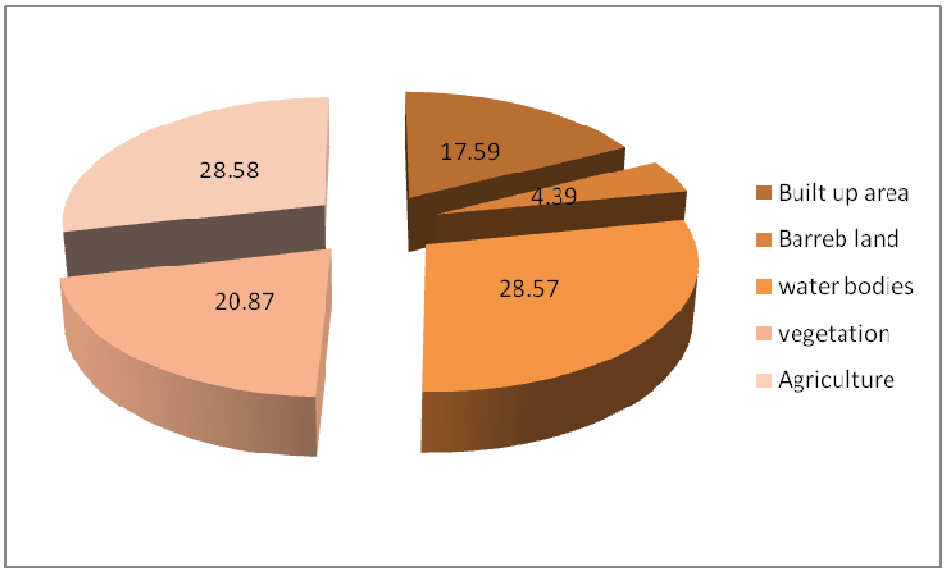
Sr.no	LU/LC parameters	2001		2013	
		Area in sq.km.	Area in %	Area in sq.km.	Area in %
1	Built up area	0.32	17.59	0.78	47.58
2	Barren land	0.08	4.39	0.05	3.49
3	Water bodies	0.52	28.57	0.05	3.49
4	Vegetation	0.38	20.87	0.48	33.56
5	Agriculture	0.13	28.58	0.07	11.88
	Total	1.43	100	1.43	100

Land use change detection of Ramwadi Ward

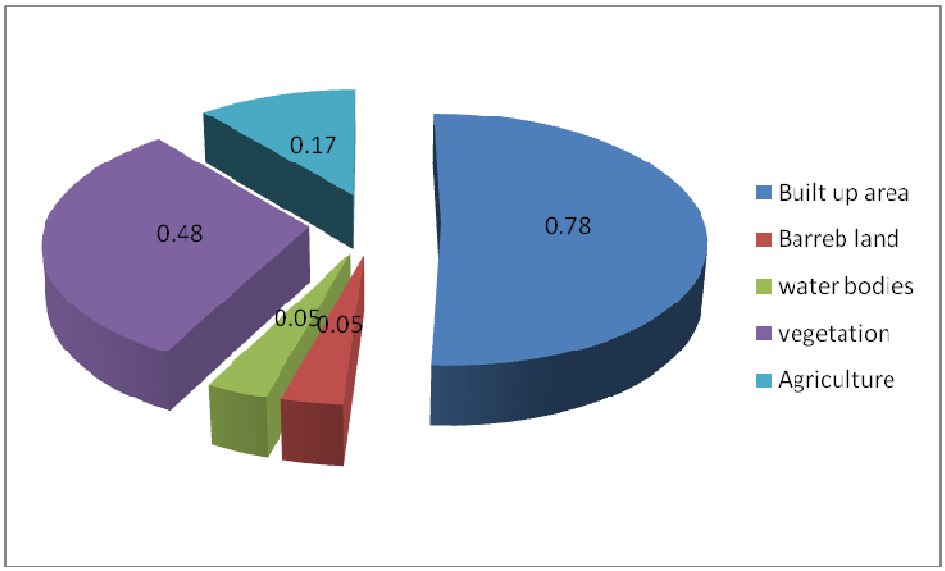
Sr.no.	LU/LC parameter	2001Area in %	2013 Area in %	Change in %
1	Built up area	17.59	47.58	29.99
2	Barren land	4.39	3.49	-0.90
3	Water bodies	28.57	3.49	-25.08
4	Vegetation	20.87	33.56	12.69
5	Agriculture	28.58	11.88	-16.70

Source-Based on Satellite images ETM+OIR - 2001-2013.

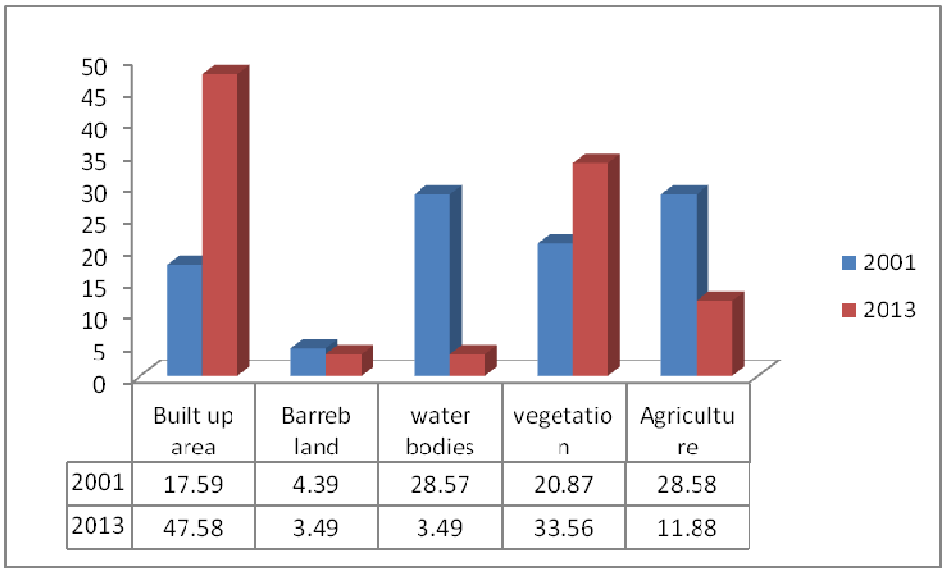
Land use land cover of Ramwadi ward- 2001



Land use land cover of Ramwadi ward- 2013

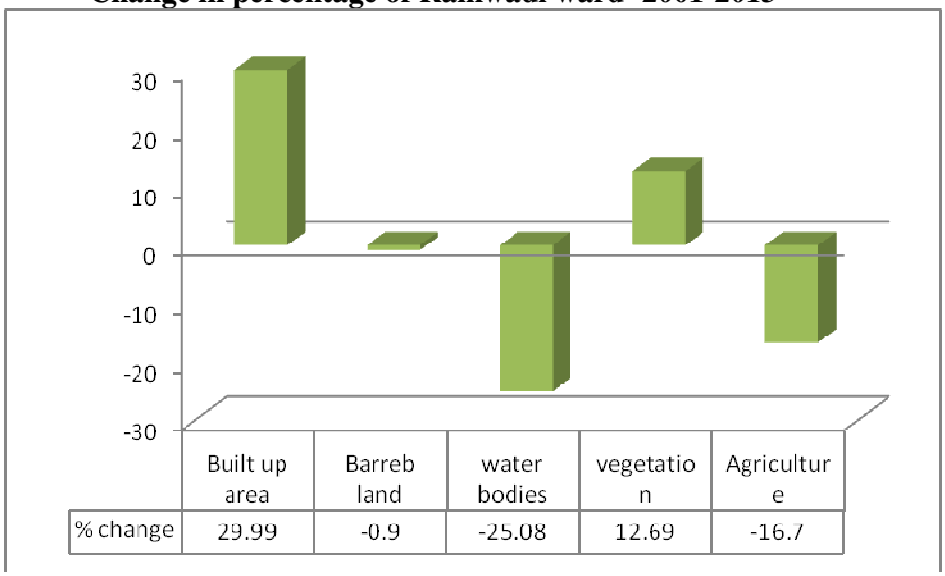


Land use land cover change of Ramwadi ward--2001-2013



	Built up area	Barreb land	water bodies	vegetation	Agriculture
2001	17.59	4.39	28.57	20.87	28.58
2013	47.58	3.49	3.49	33.56	11.88

Change in percentage of Ramwadi ward -2001-2013



	Built up area	Barreb land	water bodies	vegetation	Agriculture
% change	29.99	-0.9	-25.08	12.69	-16.7

The table illustrates the change detection of land use land cover of Ramwadi ward . It becomes clear that the percentage of change in built up area has been recorded highest i.e. 29.99 per cent. In this ward the area under vegetation cover has observed to increase by 12.69 per cent, which represents the efforts made for maintaining the environmental balance. As stated earlier the loss of barren land, water bodies and agriculture land is mainly due to conversion of that land into build up area used for various purposes like, residential, commercial and road networks.

Conclusion

The land use of any area helps to demarcate the potential and difficulties of the urban areas. The land use land cover parameters indicate that the built up area, water bodies, vegetation cover, barren land and agriculture have been detected. The percentage of change in built up area in study area has been recorded highest, according other parameters.

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