

**LAND USE PATTERN AND LAND USE CHANGE OF RURAL URBAN FRINGE OF
SOLAPUR CITY**

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Abstract

Urbanization largely responsible for the rapid growth of urban fringe around the city. The term ‘fringe’ indicates a border zone between rural and urban area. The fringe is defined in relation to city and exists in the agricultural hinterland where land use is changing. Management and planning of urban fringe requires spatially accurate and timely information on land use and changing patterns. In this stage, GIS and Remote sensing are very useful in the formulation and implementation of the spatial and temporal changes, which are essential components of regional planning to ensure the sustainable development. The present research paper analyses the nature and pattern of land used and land cover of rural urban fringe of Solapur city during 1991 to 2011 by using Spatial data and classified land use/ land cover maps through geo-referencing.

Key Words: Urban Fringe, Land use , Land cover GIS and Remote Sensing.

Introduction

Urbanization results an increasing pressure on land, water and environment in the cities. Population growth, migration and infrastructure initiatives resulting the growth of cities on the one hand and development of modern means of transport and communication on the other, have been largely responsible for the rapid growth of urban fringe around the city. The term ‘fringe’ indicates a border zone between rural and urban area

The fringe is defined in relation to the city and exists in the agricultural hinterland where land use is changing. The rural urban fringe lies between the continuous built – up area of a city and the urban shadow and ecologically, it can be viewed as an area of invasion in which population density is increasing rapidly and land values are rising. The fringe consists of an inner fringe (urban fringe) which is characterized by land in an advanced state of transition from rural to urban land use. In this area new construction is taking place, which have been approved of planning permission granted by the authority. The second area in the fringe is the outer fringe (rural fringe) which is an area in which rural land use continues to dominate the landscape but

there is infiltration by those urban land uses which take up too much land to be easily located elsewhere, for example, airport cremations, sewage works, etc. The fringe is defined in relation to city and exists in the agricultural hinterland where land use is changing. GIS and Remote sensing are very useful in the formulation and implementation of the spatial and temporal changes, which are essential components of regional planning to ensure the sustainable development.

Objective

To assess land use pattern and land use change in rural urban fringe of Solapur city from the period 1991 to 2011.

Database

landuse of Solapur city fring used Spatial data. It is primarily defined as those which are directly or indirectly referenced to a location on the surface of the earth.

a) Satellite Image

Spatio temporal dynamics of land use/ land cover of rural urban fringe of Solapur city was generated from Landsat satellite imageries of two different time periods, i.e., Landsat Thematic Mapper Image (TM) with 30 meter resolution for the year 1991 and 2011 Landsat Enhanced Thematic Mapper (ETM) Images with 30 meter resolution.

b) Survey of India Toposheets

Following Survey of India topographic sheets on 1:50,000 scales were used to generate the base maps and landuse land cover map. 47O/9, 47O/10, 47O/13, 47O/14, 47O/15, 56C/1, 56C/2, 56C/3.

Methodology for Landuse Change of Solapur city

a) Geo-referencing

The SOI toposheets were geometrically registered through Everest Modified and projection WGS 1984 Complex UTM Zone 43N.prj projection system for subsequent analysis. Further, the satellite image of the study area was registered and rectified with reference to already geo-referenced 1:50,000 scale topographic maps of the same area.

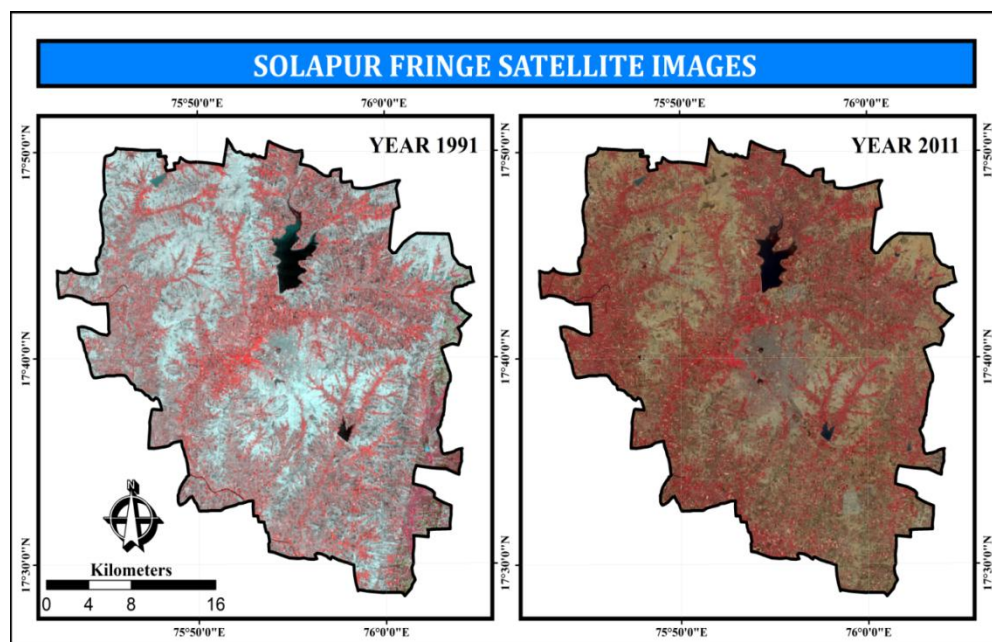


Fig 1.1

b) Classification

of Land use/ Land Cover Maps

Landsat satellite imageries of two different time periods, i.e., Landsat Thematic Mapper Image (TM) with 30 meter resolution for the year 1991 and 2011 Landsat enhanced Thematic Mapper Images with 30 meter resolution (WRS-2 Path 145 Row 48) (Fig 1.1) were downloaded from Global Land Cover Facility and earth explorer site.

The land use/ land cover classification maps of the study area were prepared for two different time periods of 1991 and 2011 through the method of digitization in ArcGIS 10.1 GIS software by using visual interpretation technique here made four classes for all images i.e.

Agriculture (Shown by Yellow shade), Built-up (Shown by Red Shading), Wasteland (Shown by Grey shade), and Water-body (Shown by Blue shade).

Study area

The Solapur city and its fringe area is located in between 17°28' 21" north and 17°42' 2" north latitudes to 75°42' 2" east to 76°4' 33" east longitude. It has an average elevation of 457 meters. In physiographic features Solapur and its fringe area extended in the south western part of Maharashtra state in India. It entirely spread in basin of river Bhima and Sinas catchment area of Deccan plateau. Solapur city and its fringe is connected by two National Highways first is Mumbai-Pune- Solapur-Hydrabad National highway No. 65 and Mumbai- Solapur- Bijapur – Chigradurga-Manglore national highway No. 52. Presently the city covers area of around 183.06 sq.km and fringe study area covers 861.65 sq.km with 75 villages.

Changing Land Use / Land Cover Pattern of Rural Urban Fringe of Solapur City 1991-2011.

The urbanization takes place either in concentric pattern around a well established city or linearly along the highways with expansion and land uses. Land use studies are very useful in urban planning and urban expansion because urban land is becoming scarce resource due to massive agricultural and demographic pressure. The information on land use/land cover and possibilities for their optimal use and transformation is essential for the selection, planning and implementation of land use schemes to meet the increasing demands for basic human needs and welfare. Various geographic and socio-economic factors largely determines that the land use pattern, distribution of land values, density of traffic, and the proportion of land used for different purposes in different parts of the city. So urban land cover / land use changes are necessarily for sustainable development of an area. This chapter demonstrated a descriptive analysis of the fringe wise land use change for the rural urban fringe of Solapur city. These changes have been studied during 1991 to 2011. The year 1991 has been consideration as the basic year for this study and the percentage and sq.km area of different category in land use change.

Table.1.1
Changing Land Use Pattern of Rural Urban Fringe of Solapur City 1991-2011

Sr. No.	Class Name	Rural -Urban Fringe of Solapur City					
		Area in Sq.km			Area in %		
		1991	2011	Change	1991	2011	Change
1	Agricultural Land	569.16	493.21	-75.95	67.95	58.88	-9.07
2	Builtup Land	15.11	42.07	26.96	1.8	5.02	3.22
3	Wasteland	235.17	284.87	49.7	28.07	34.01	5.94
4	Water Bodies	18.21	17.5	-0.71	2.17	2.09	-0.08

(Source: Computed by Researcher)

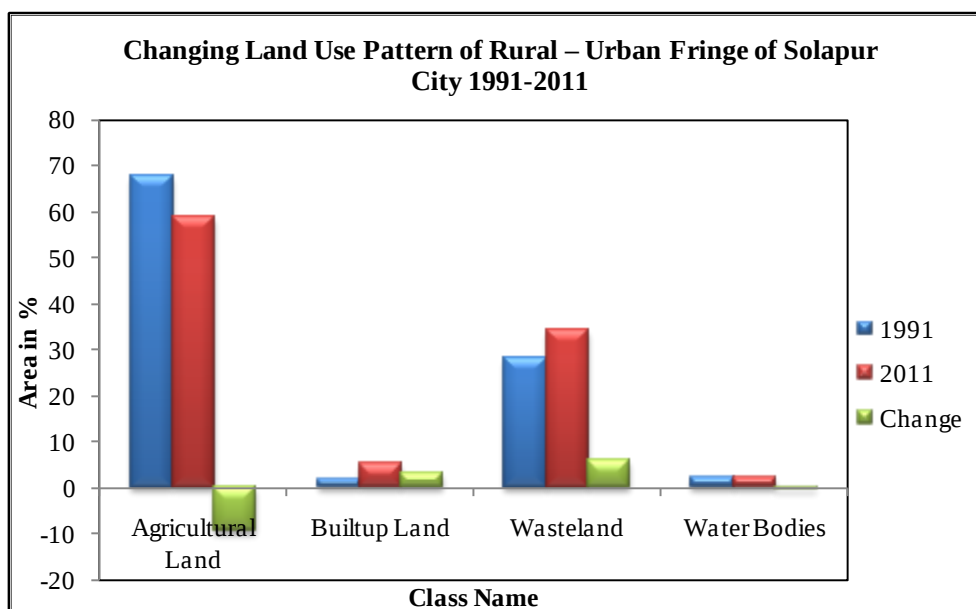


Fig. 1.2

a)

Agricultural

land

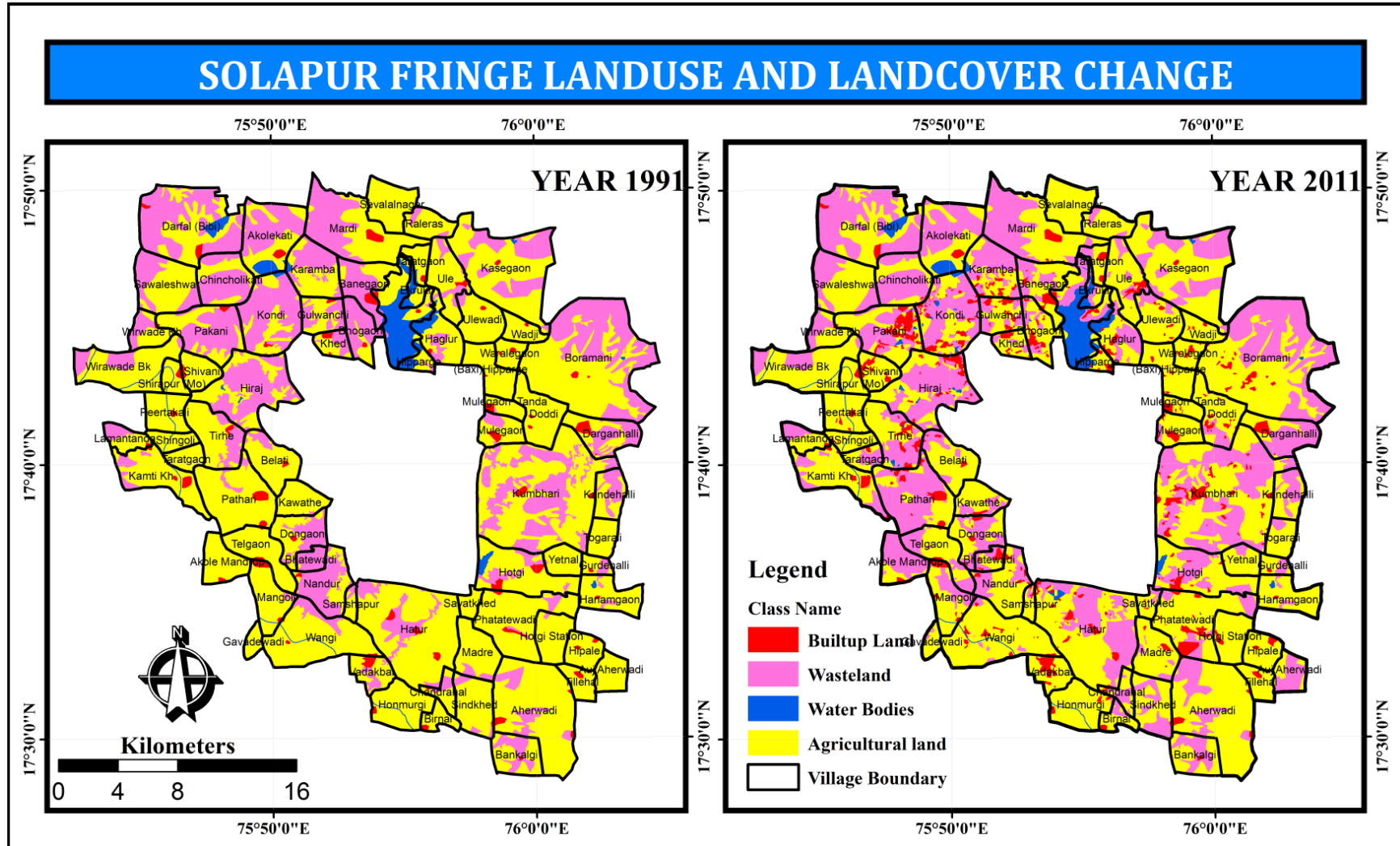
It may be seen from the Table. 1.1 and Map. 1.1 in the year 1991 rural urban fringe of Solapur city had 569.16 sq.km agricultural lands and have reduced up to 493.21 sq. km in 2011. This agricultural land converted in to built- up land and waste land. In the duration of this 20 years period the agricultural land reduced by 75.95 sq.km. In these years land developers were purchased agricultural land for the purpose of development and it became to waste land.

b) Built Up Land

There is tremendous change found in built up land area from 1991 to 2011, the built up area was 15.11 sq. km in 1991 and it increased to 42.07 sq. km in 2011. It is due to the expansion of rural settlement and as well as newly emerged industrial area near boundary of Solapur city.

c) Waste Land

An examination of Fig. 1.1 during the study period of 1991 to 2011 the area under waste land was increased to 49.07sq.km it was 235.17sq.km in 1991 and it extended up to 284.87sq.km in 2011. Waste land captures the fertile agricultural land at all over the rural urban fringe. Because of uncertainty of rainfall agricultural land converted in to the waste land. Waste land gained land from agricultural area because farmers keep their land to unattended for the further investment.



Map.1.1

d) Water Body:

The area under water body in 1991 was 18.21 sq. km and 17.5 sq. km in 2011 there was no any major changes occur in the area of water body.

Conclusion

The agricultural land use has decreased in 20 years span of 1991 to 2011. Productive agricultural field have been transformed in west and built up land due to the rising population pressure in city. Owners of the agriculture land often sale the land at higher prices to a housing society or the builders, who leave the land of unattained for many year instead of agriculture for getting high price in the future. Productive agriculture fields have been transformed in to built-up purpose which has resulted in large scale degradation land under agriculture where farmers find difficulty to continuous farming activity to supply agro product for population.

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