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LAND USE AND LAND COVER IN CHANGE DETECTION OF SHIRUR TAHSIL, PUNE DISTRICT (MAHARASHTRA) USING GIS&REMOTE SENSINGTECHNIQUES.

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ABSTRACT

Land use and land cover is an important component in understanding the interactions of the human activities with the environment and thus it is necessary to monitor and simulate changes. In this paper an attempt has been made to study the changes in land use and land cover in Shirur tahsil over the span of 13 years (2001, and 2013). The study has been done through remote sensing approach using three time series data.The composition and distribution of land use Land cover classes of image include Waterbody, Forest, Agriculture, Open land, Fallow land, Settlement. The land use land cover map shows the spatial and temporal variation in the area. The finding reveals that there was drastic and rapid increases in the built up area and decreases in agriculture area. The analysis of spatial change indicates that the explanation of urban settlement is taking place of the of prime agriculture land in the area.

The analysis of spatial change indicates that the explanation of rural settlement is taking place of the of prime agriculture land in the area. The area under the Cropland
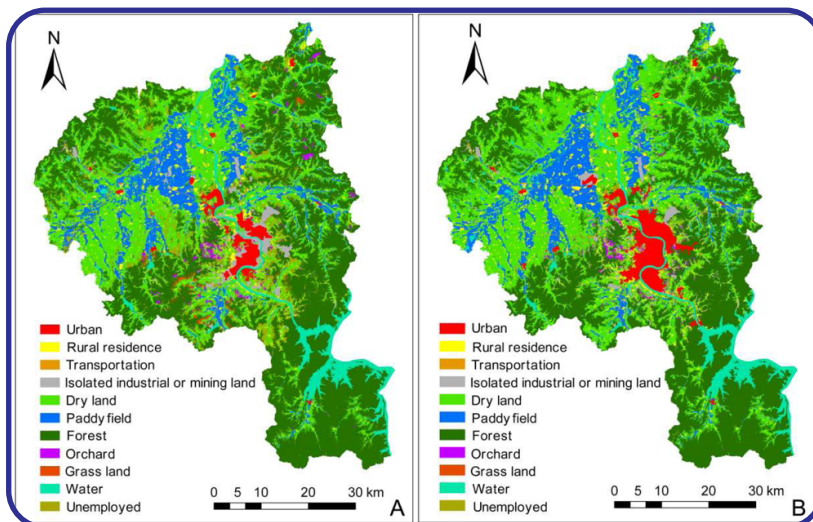
increases from in Nov. 2001 26.13% to , 35.54 % in Nov. 2013 due to increasing of irrigation facilities such Chas caman canal , Dimbe canal, Ghod canal and lift irrigation provided by Ghod river and Bhima river.Only Barren land have recorded negative. It is decreased from 54.7% to 26.05% in years 2001 and 2013. There will be possibilities barren land is converted in built area.

KEYWORDS :human activities , environment , human needs, either material, or artificial resources .

INTRODUCTION:

The concept by land use has been defined by Saver (1919) as the use to which the entire land is put. Vink (1975) has described land use as any kind of permanent or cyclic human intervention to satisfy the human needs, either material, or artificial resources which together are called the land.

According to Longley (2001), "land cover refer to the physical materials on the surface of a given parcel of land, while land use refer to the human activities that takes place on or make use of land e.g. residential, commercial, industrial etc."

Amare Sewnet Minale (2013) concluded that, the results of the study have shown that during the last 35 years forest, grass lands, wetlands and lake areas were converted to farm and settlement areas. There was rapid increase of population with growth rates of 4.9% and 3.5% (1984-1994 and 1994-2007), respectively per annum which caused more land cover changes.

Iqbal.M, Rashid S.M, concluded that, the study suggested that if the present trend continues it would lead to severe degradation of natural resources of the watershed. Therefore, proper land use planning for effective management strategies and policies for the rational land use is essential for a sustainable development of Dudhganga watershed. (1999).

Among concerns about global environmental change, some issues related to land-use land-cover (hereafter LULC) and its change (LULCC) over time are becoming increasingly recognized (Lambin et al., 2003; Pielke 2005).

INTRODUCTION OF STUDY AREA

The Shirur tahsil of Pune District is selected for the present research work. Shirur tahsil occupies eastern place in Pune district of Maharashtra State. It lies entirely in Ghodnadi and Bhima basin and extends between $18^{\circ}50$" N to $19^{\circ}02$" N latitude and $74^{\circ}01$" E to $74^{\circ}57$" E longitudes, The study area is covered in Survey of India Topographic Index Numbers 47J/1, 47J/2, 47J/5, 47J/6, 47J/10 and 47J/11on 1: 50,000.This tahsil is confined by Ahmednagar District to east and north-east, Ambegaon tahsil to north-west and Haveli tahsil to South. Its total Geographical area occupied 1552 sq.km.

Location Map of Study Area
(Shirur Taluka)
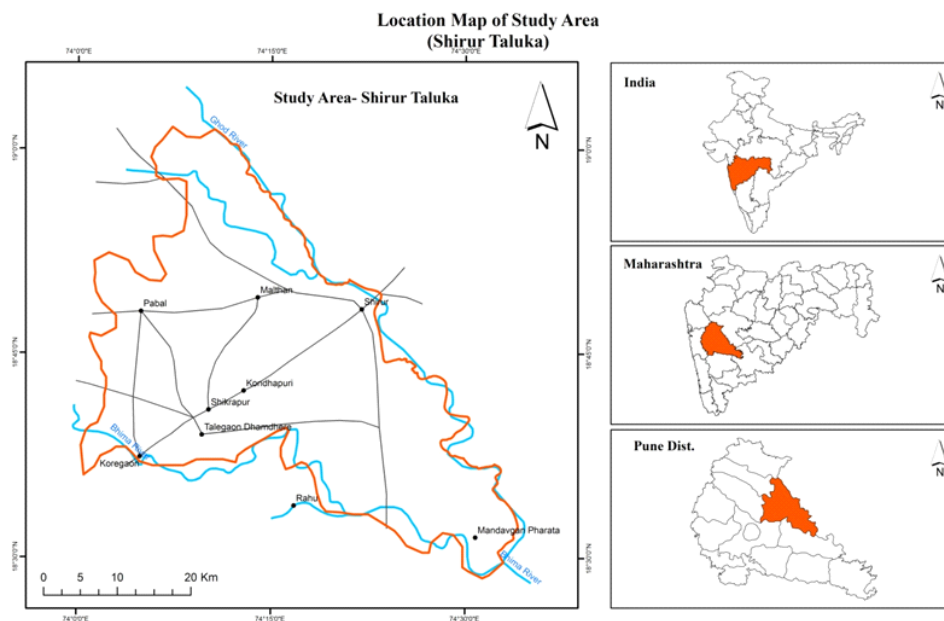
OBJECTIVE
+ To Understand Land use land Cover in different seasons of Study Area
+ To Study Land use land Cover   Change detection between Nov. 2001 and Nov.2013 years
+ To Prepared different Land Use Land Cover Maps

METHODOLOGY

This paper introduces a combined use of supervised image classification for detecting LC classes. The technique utilizes the spectral recognition of the supervised classification in the performance mode and the selection of sampling sites from a principal component analyzed image of the supervised classification in the training mode.

Date of acquisition	Type of satellite image	Spatial resolution (m)
19Nov.2001	Landsat-7 Enhanced Thematic Mapper plus (ETM+)	30
28 nov.2013	Landsat-7 Enhanced Thematic Mapper plus (ETM+)	30

For the purpose of study of land use/land cover ARC GIS 9.2 and ERDAS IMAGINE 9.1 are powerful tools for extracting the land use, land cover layers, from SOI toposheets and satellite imageries. This classification and methodology is performed based on the standard methodology. LaterChange Detection methodology was done for the images to find out the changes that have taken place in the study area using ERDAS IMAGINE 9.1. The feature classes were identified based on the visual interpretation of the satellite imagery coupled with filed checks. These datasets were digitized and analyzed to obtain land use/land cover statistics for the areas under each of these categories.
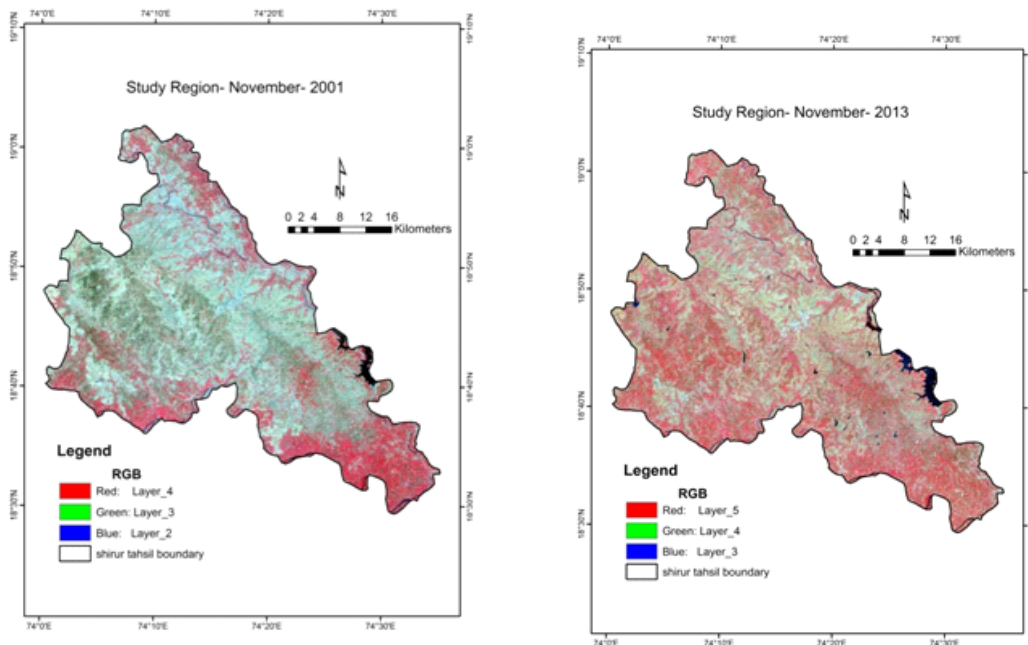

RESULT AND DISSECTIONS

The selection of an appropriate change detection algorithm is essential because it has a direct impact on the type of classification to be performed and whether important change information can be extracted from the image (Jensen, 2005).The purpose of this work was to develop a rapid method of

producing temporal land use and land cover maps for change detection analysis. The Shirur Tahsil was classified using GIS technique in to Six Landuse and Land cover classes .The composition and distribution of land useLand cover classes of image include Water body, Vegetation ,Cropland, Barren land, Fallow land, Settlement. The land use land cover map shows the spatial and temporal variation in the area. The finding reveals that there weredrastic and rapid increases in the built up area and agriculture area.
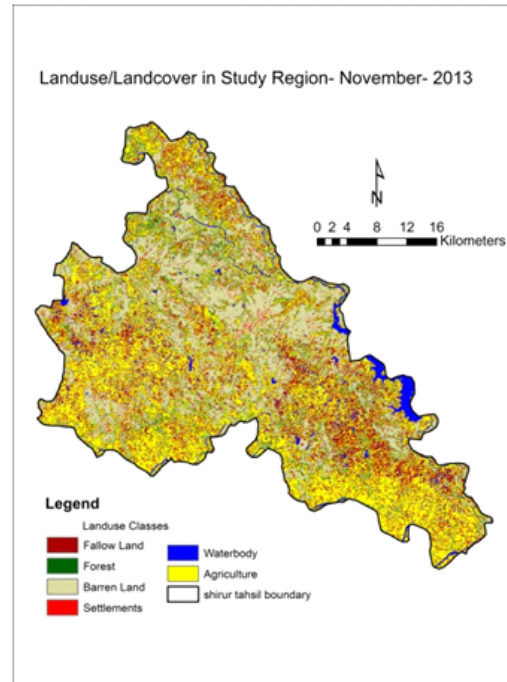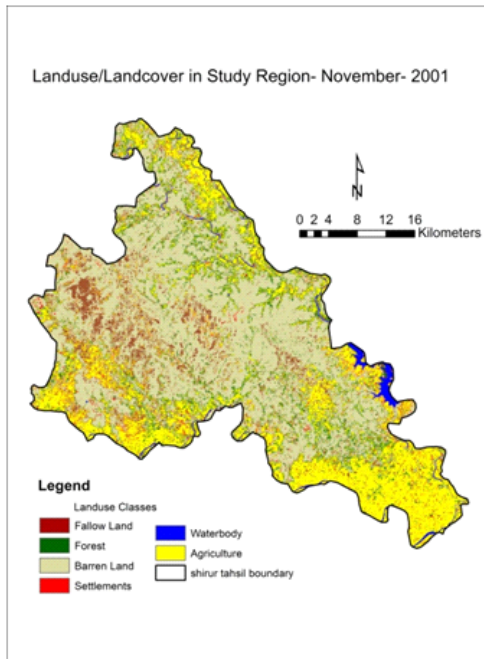
Satellite Images Nov.2001 Results

Nov.2001			
sr.no.	Landuse	Area(Sq.km)	Area (%)
1	Settlements	30.49	1.96
2	Vegetation	143.12	9.22
3	Waterbody	21.52	1.39
4	Fallow Land	101.02	6.51
5	BarrenLand	850.28	54.78
6	Cropland	405.63	26.13
	Total	1552.06	100.00
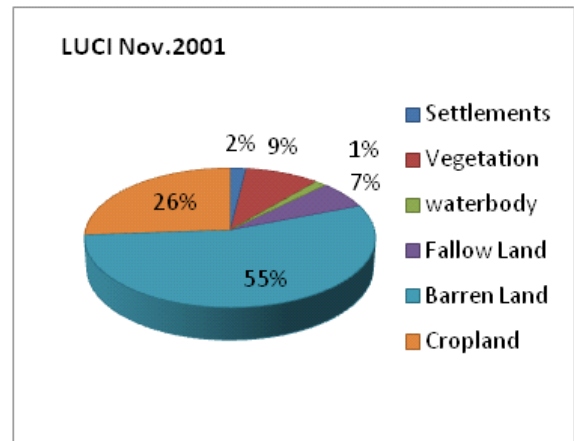
Satellite Images Nov.2013 Results

Nov.2013			
sr.no.	Landuse	Area(Sq.km)	Area (%)
1	Settlements	139.81	9.01
2	Vegetation	164.11	10.57
3	Waterbody	71.93	4.63
4	Fallow Land	220.33	14.20
5	BarrenLand	404.24	26.05
6	Cropland	551.52	35.54
	Total	1551.94	100.00
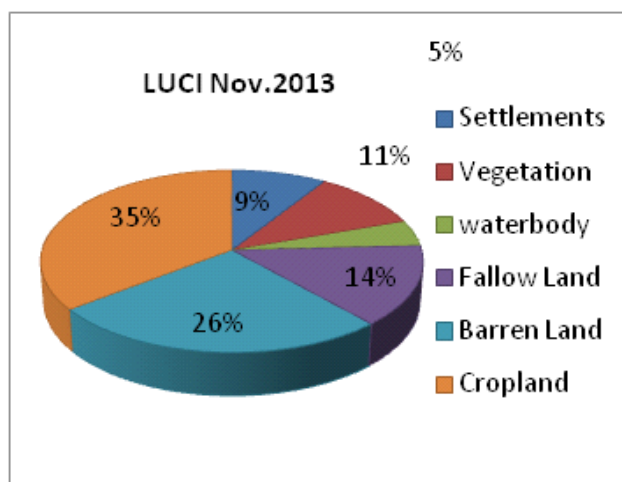
The analysis of spatial change indicates that the explanation of rural settlement is taking place of the of prime agriculture land in the area. The area under the Croplandincreases from in Nov. 2001 26.13% to, 35.54 % in Nov. 2013due to increasing of irrigation facilities such Chas caman canal , Dimbe canal, Ghod canal and lift irrigation provided by Ghod river and Bhima river.

The study area further indicates respectively that the built up area has increase from 1.96 %, to 9.01%. therefore agricultural and barren land low laying area are converted in built up area in the study area Shirur city , Industrial belt of Ranjangoan MIDC and along the State High way of Pune to Aurangabad No 50 etc.These cities rapidly increase population as well as built up area.

In the study area forest cover is very low. It is lower the average forest cover of India and Maharashtra the study included forest cover is 9.22% and 10.57% respectively in the years of 2001and 2013. The forest cover slowly increase in the span of 2001to 2013only 1.3 %.

In these decade water body and Fallow land also increases. Only Barren land have recorded negative. It is decreased from 54.7% to 26.05% in years 2001 and 2013. There will be possibilities barren land is converted in built area.

The most causes of land cover change in many literatures are population is increase. However, the relation-ship between population and land cover change is debate-able issue. Some such as argues that increase in population has positive effect on resource available.

Land use Land cover Change Detection Result Between 2001and 2013.

Sr. no.	Class	Change Detection in year wise
		Nov. 2001 to Nov.2013
1	Settlements	7.05
2	Vegetation	1.35
3	waterbody	3.24
4	Fallow Land	7.69
5	Barren Land	-28.73
6	Cropland	9.41

SUMMERY

The Shirur Tahsil was classified using GIS technique in to Six Land use and Land cover classes .The composition and distribution of land use Land cover classes of image include Water body, Vegetation ,Cropland, Barren land, Fallow land, Settlement. The land use land cover map shows the

spatial and temporal variation in the area. The finding reveals that two were drastic and rapid increases in the built up area and agriculture area. Further study will be useful of strategic plans and development of study area. Satellite Remote Sensing has proved to be a vital tool for continuous observation and quantification of environmental phenomena across varied spatial and temporal scales which are otherwise not possible to attempt through conventional mapping techniques.

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