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Analysis The Change Detection In Kolhapur City

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ABSTRACT

Land-use/land-cover change is an important field in global environmental change research. Inventory and monitoring of land-use/land-cover changes are indispensable aspects for further understanding of change mechanism and modeling the impact of change on the environment and associated ecosystems at different scales. Remote sensing is a valuable data source from which land-use/land-cover change information can be extracted efficiently. In the past two decades, there has been a growing trend in the development of change detection techniques using remote sensing data. A number of techniques for accomplishing change detection using satellite imagery have been formulated, applied, and evaluated, which can be broadly grouped into two general types (1) those based on spectral classification of the input data such as post-classification comparison and direct two-date classification and(2) those based on radiometric change between different acquisition dates, including (a) image algebra methods such as band differencing rationingand vegetation indices (b) regression analysis (c) principal component analysis and (d) change-vector analysis

Selection of an appropriate change-detection technique, in practice, often depends on the requirement of information, data availability and quality, time and cost constraints, and analysis skill and experience. Among those radiometric change-based approaches, change-vector analysis is a useful method for land-use/land-cover change detection because it not only can avoid the shortcomings of those type 1 approaches, such as cumulative error in image classification of an individual date, but also it can find changed pixels using more, even all, the bands and provide “from-to” type of change information. In the past few years, its advantages and potential have been demonstrated in some case studies of different phenomenological types of change is problematic when the number of bands involved is large. Urbanization is a dynamic process. Urbanization means shift of rural people to urban areas.

Aim

The main Aim is the study to land use land cover change from2008to 2018. It also aimed to find out the areas of rapid change, magnitude of change and assess the past and present condition of Land Cover to understand the dynamics and trend of change.

Objectives

The major objectives of the study area:

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I. To study existing land use / land cover of Kolhapur city for the period 2008 t0 2018 using remote sensing data.
II. To study Change detection land use in the study area.

STUDY AREA DETAILS

Kolhapur city was formed on 2-10-97 from the parts of Maharashtra and Kolhapur Districts. Kolhapur city is historic city of Maharashtra. It is district headquarters of Kolhapur. Kolhapur is one of the cities, which are worth to be visited in Maharashtra. Population of Kolhapur city was 419000. Kolhapur is famous for sugar lobby, jiggery, kushti, and language. Around the Kolhapur city the GandhinagrJotibaPanhala are famous places. In the Kolhapur having tow main rivers Krushna and Panchaganga. Cause of that rivers sugar ken production is more in this area. City was spared in north to south.

Geographical Location

This research was conducted in Kolhapur cityMaharashtra, India. Kolhapur city with geographical area of 560 square km is located between 16° 41' to 16° 55' north latitudeand east longitude of 74° 31' to 74° 20'. The Kolhapur city is located at an altitude of only 76 m above mean sea level.Net sown area of kolhapur District is about 391 square kilometers and gross sown area is about 486 square kilometers.Netirrigated area is about 133 square kilometers and gross irrigated area is about 145 square kilometers. Kolhapur shares boundaries with the gandhinar, panhala, jotiba….

Location Map of Study Area

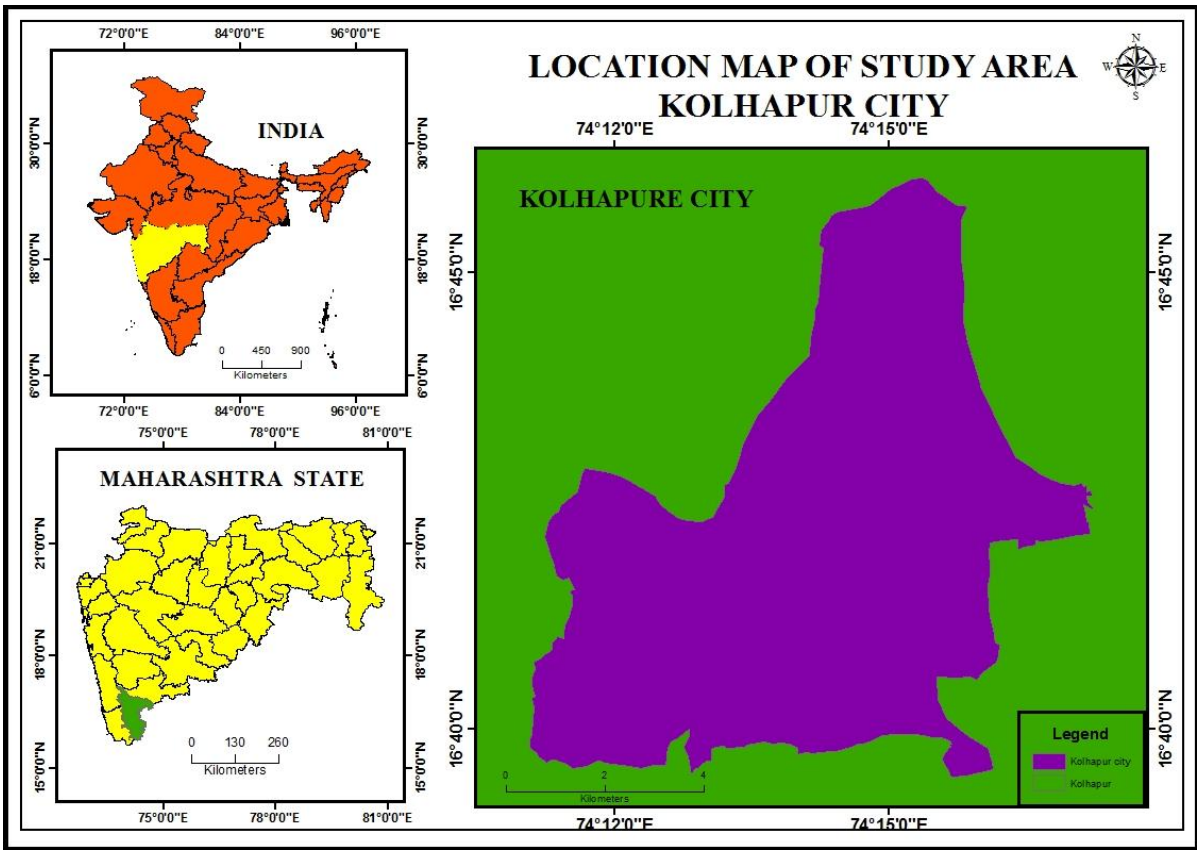

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Figure: 1 Location Map of study area

METHODOLOGY:

The secondary data Land sat TM, TM+ 5 satellite images of the years 2008, 2018 and Land sat 8 satellite images of the year 2018 will be taken for USGS for modeling Normalized Difference Vegetation Index (NDVI), Land use and Land cover (LULC) maps and False Color Combination (FCC).For creation of Normalized Difference Vegetation Index (NDVI), use "Raster Calculator" tool in QGIS (3.0.0 version). Formula NDVI = NIR - RED / NIR + RED for NDVI calculation and for Land use and Land cover use "Dzetsaka Classification" tool for the year 2008, 2018. The area of each category have been calculated and compared to study the temporal changes over a period of time.

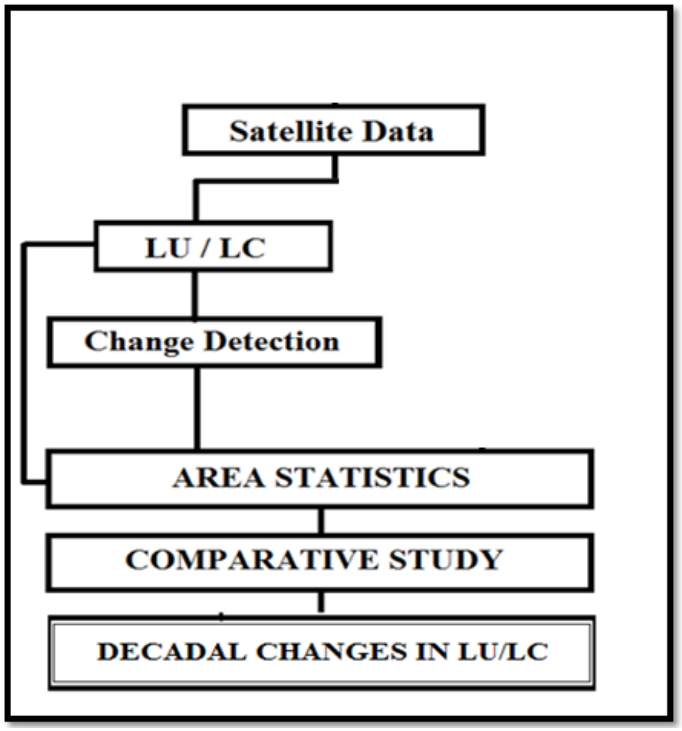

Figure: 2 Flow Chart of Methodology

Data acquisition

To analyze 10-year land cover change ThreeLandsat 4-5 TM data of January 2008, 2018 and Landsat 8 OLI & TIRS data of January 2018 was downloaded from the earth explorer site **www.earthexplorer.usgs.gov** Table 1 depicts the type of satellite data used.

Table No.3.1 Satellite data used for the study

SL.NO	Data	Source	Scale/Resolution
1	Land sat 4-5 TM (Thematic Mapping)	USGS Earth Explorer	30m

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2	Land Sat 8 (OLI/TIRS) Operational Land Imager/ Thermal Infrared Sensor	USGS Earth Explorer	30m

Land Use Land Cover

The Supervised Maximum Likelihood classification used in this study is the most commonmethod in remote sensing image data analysis (Richards, 1995). It identifies and locates land cover types that are known a priori through a combination of personal experience, interpretation of aerial photography, map analysis and fieldwork (Jensen, 2005). It uses the means and variances of the training data to estimate the probability that a pixel is a member of a class. The pixel is then placed in the class with the highest probability of membership (Oozes and Bauer, 2002).A classification scheme was developed for further analysis of the images, based on the characteristics of the area.

The Land sat 4-5 (TM) satellite images of the years 2000, 2010 and land sat 8 (OLI & TIRS) satellite images of the year 2018 will be taken from USGS/NRSC for modeling Land use and Land cover (LULC) maps. LULC maps showing the decade wise (2008, 2018) changes in vegetation, built-up area, water bodies and barren land in 1998, 2008 and 2018 of Patan District

Supervised ClassificationMethodology

i. Satellite imagery of the study area is downloaded from the website USGS (http://www.usgs.gov/) on the basis of desired path and row.
ii. The downloaded imageries are first layer stacked using QGIS.
iii. The boundary of study area has been clipped from the layer stacked image using subset tool.
iv. Now, the spectral signature has been assigned, which is composed of several AOI layers, like- agriculture, built-up, vegetation, water body and waste land.
v. Next, the LULC of the study area has been divided using the prepared spectral signature under supervised classification.

Finally, each area has been calculated using ArcGIS software and desired graphs have been prepared using Excel.

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Land Use / Land Cover: 2008

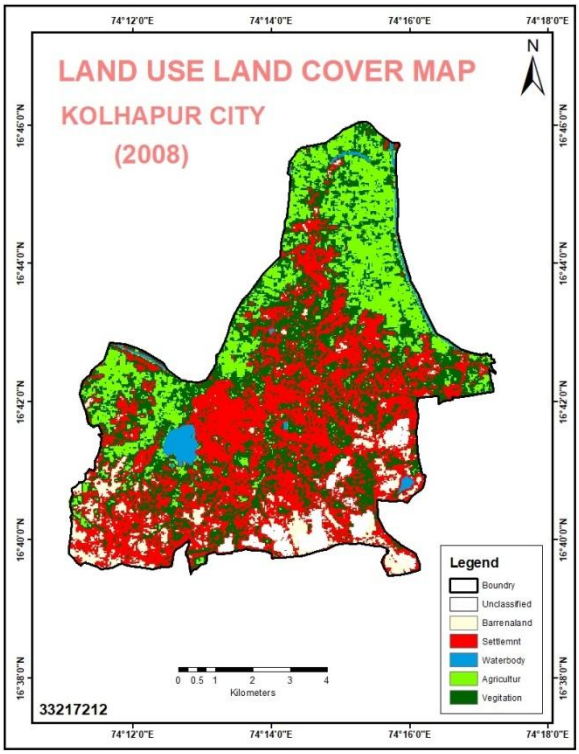
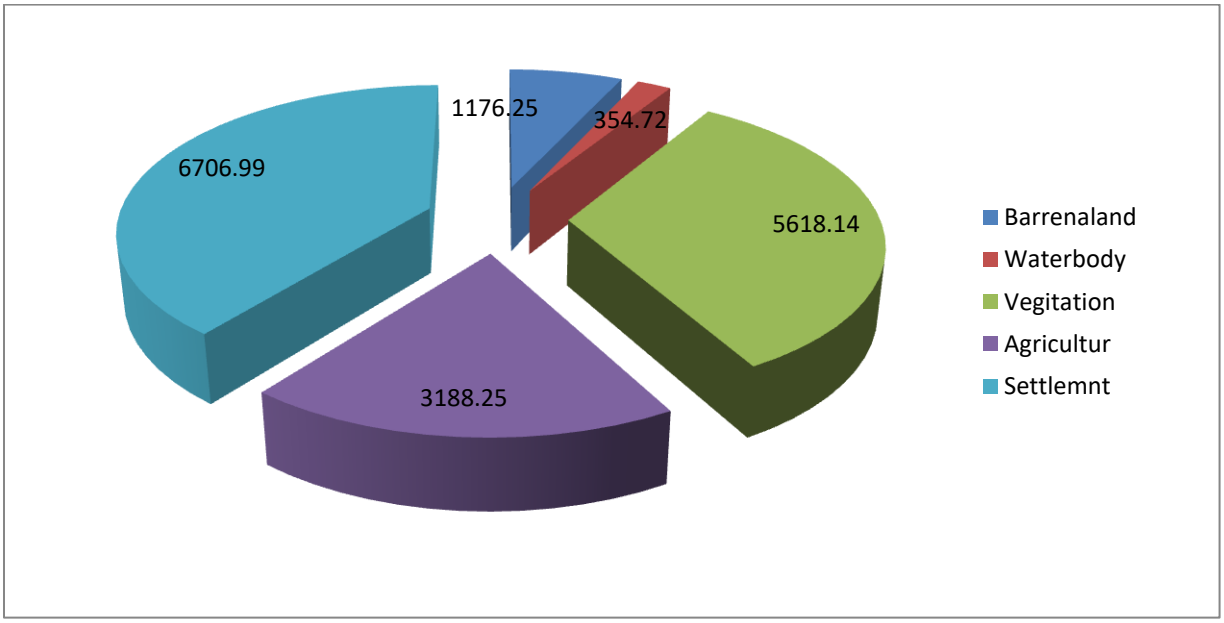


Table: Land Use and Land Cover : 2008

LULC (2008)	Area (In Acers)
Barren_land	1176.25
Water_body	354.72
Vegitation	5618.14
Agrriculture	3188.25
Settlement	6706.99



Pie chart : Land Use and Land Cover : 2008

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Land Use / Land Cover: 2018

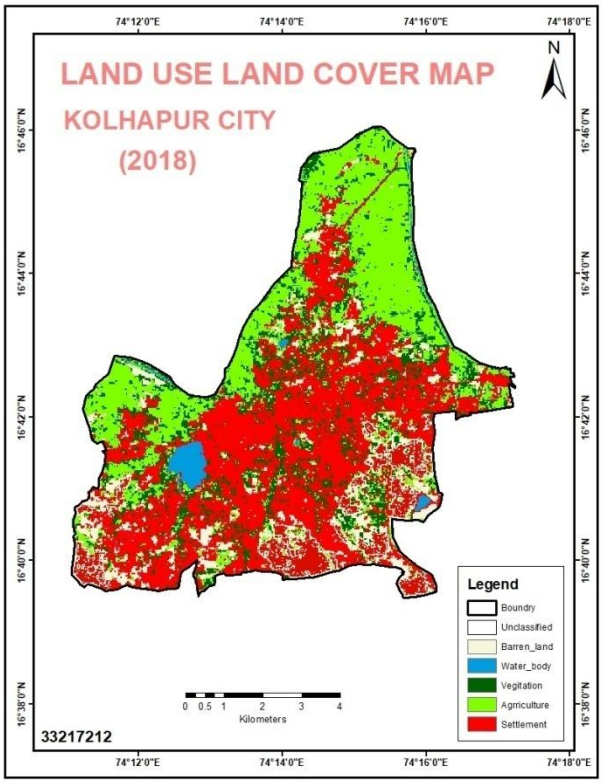
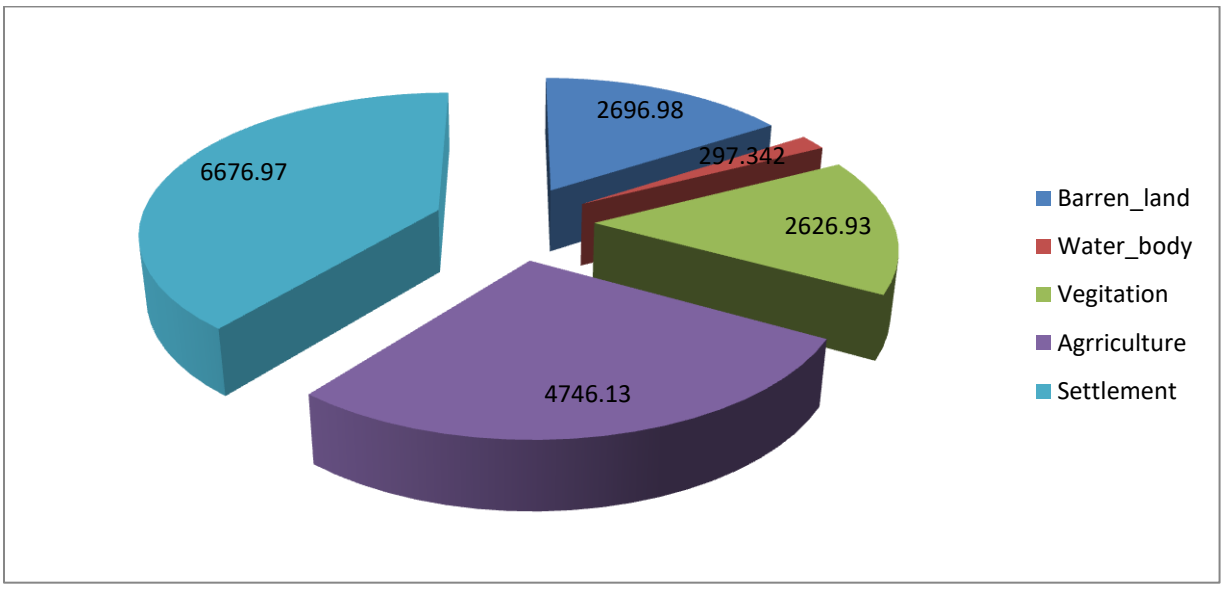


Table: Land Use and Land Cover : 2018

LULC (2018)	Area (In Acers)
Barren_land	2696.98
Water_body	297.342
Vegitation	2626.93
Agrriculture	4746.13
Settlement	6676.97



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Pie chart : Land Use and Land Cover : 2018

Change detection statistics

Its a statistical technique used to compile a detailed tabulation of changes between two classification images. The analysis identifies the classes into which those pixels changed in the final state image. This technique also provides an in-depth idea about pixel transformation and class change which provide an in-depth idea about the dynamics of converted landscapes. This study used ERDAS software platform to execute change detection statistics ERDASthe statistics of land cover change in a set of transition matrix. ERDASuses the available map information to automatically co- register the images

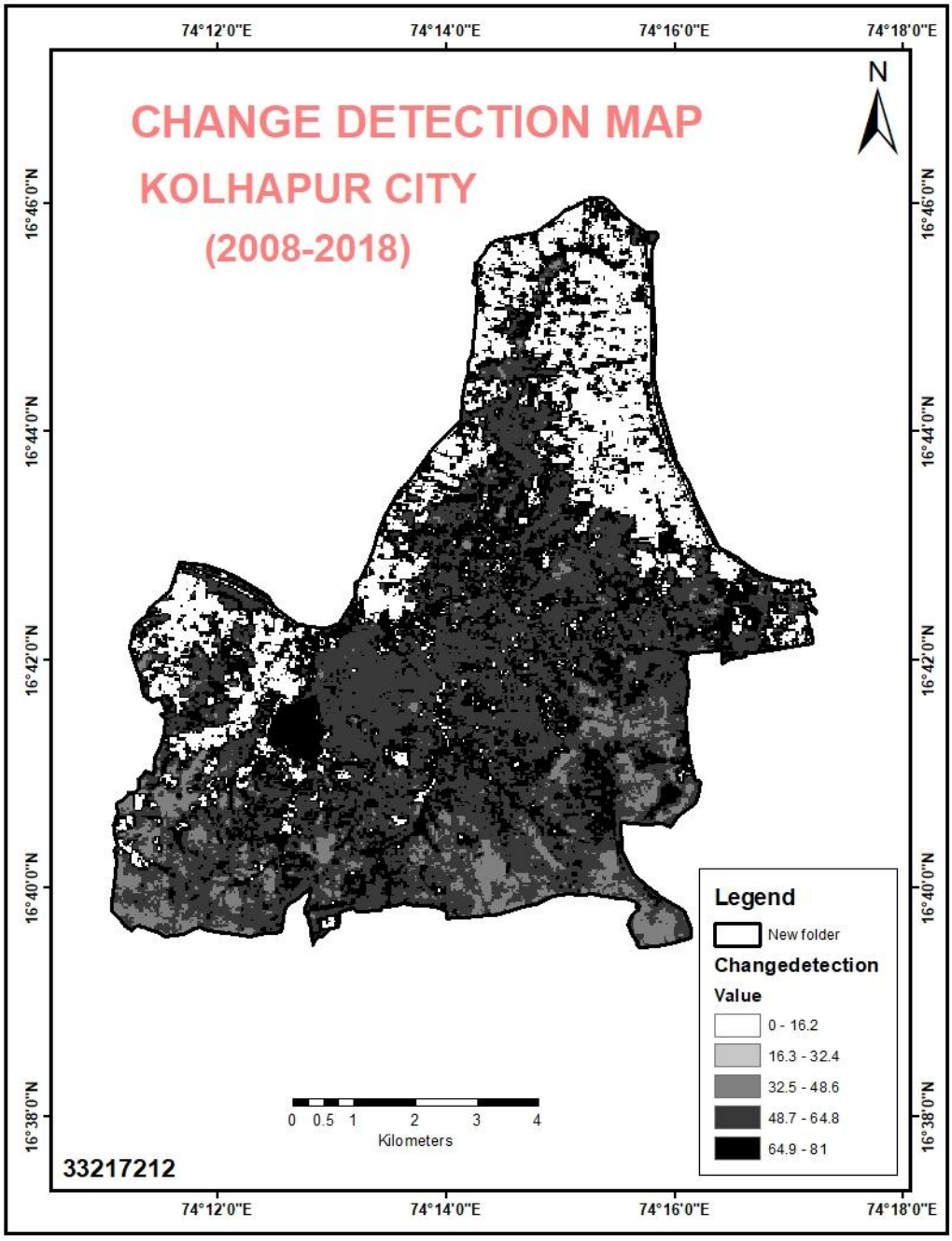

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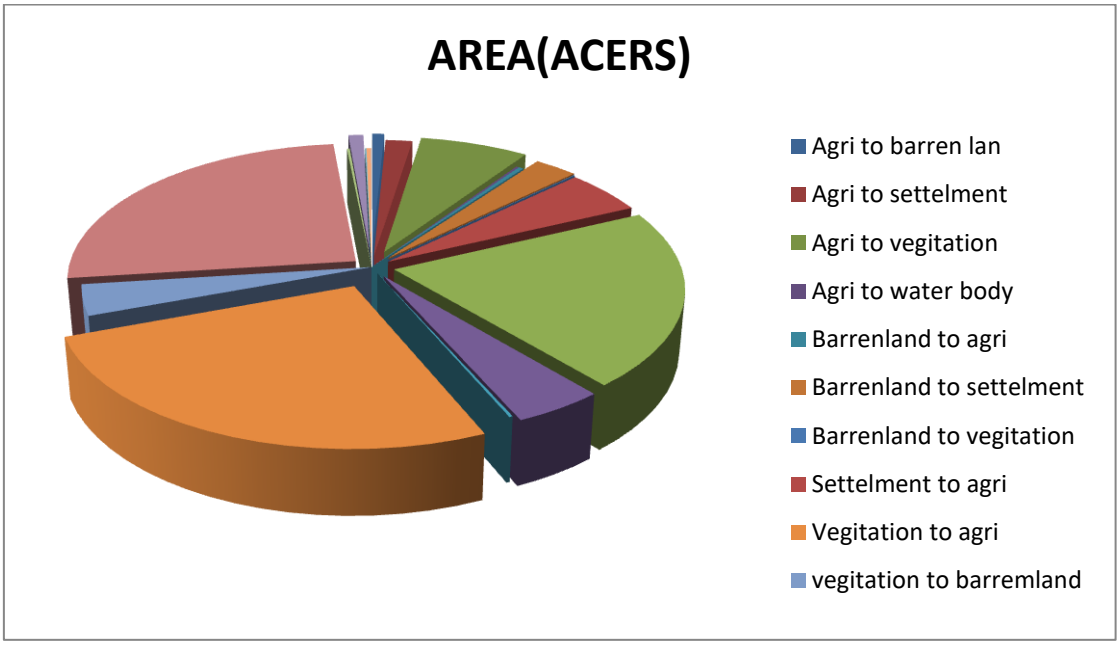
Figure 4.8 Land Use / Land Cover Changes:2008-2018

Table: Land Use and Land Cover Changes (2008 To 2018)

CLASS NAME	AREA(ACERS)
Agree to barren land	52.4852
Agree to settlement	117.869
Agree to vegetation	481.04
Agree to water body	12.4541
Barren land to agree	22.0171
Barren land to settlement	191.26
Barren land to vegetation	4.22551
Vegetation to agree	1778.05
vegetation to barren land	248.193
Vegetation to settlement	1747.8
Vegetation to water body	12.2317
Water body to agree	66.2737
Water body to barren land	5.78227
Water body to settlement	20.2379



Pie chart : Land Use and Land Cover change : 2008-2018

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CONCLUSION

Kolhapur city was formed on 2-10-97 from the parts of Maharashtra and Kolhapur Districts. Kolhapur city is historic city of Maharashtra. It is district headquarters of Kolhapur. Kolhapur is one of the cities, which are worth to be visited in Maharashtra. Population of Kolhapur city was 419000. In the Kolhapur city having two main rivers that's why there surgeon production is more in agricultural activities

The study area data downloaded on the USGS Earth Explore and it was using a data interpretation and analysis of study area. In this study area we are down the NDVI and LAND USE LAND COVER use the supervise classification and Change Detection. This will be giving final output to changes of year of 2008 to 2018 .

In the Kolhapur cityso many changes in the land use land cover between the years of 2000 to 2018. Settlement incises from 20080to 2018 its take a place from barren land ande vegetation area converted in to the settlement. Agricultural area also increases from 2008 to 2018 it take place from vegetation and barren land. In the water body we cantanalyasis that much changes from 2008 to 2018.

In that case we can say that upon a results the Kolhapur city was a urban area which was increases day by day.

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