Land Use Land Cover Change Detection Using Geomatic Techniques-a Study for Jalgaon District, Maharashtra, India.

Dr V. R. Saraf[1]. Vishal R. Shekade[1]. Rohini Y. Sonawane[1]. Shruti B. Sonawane[1], Harshada A. Patil[1*]. Charushila H. Nikam[1.]

([1]Dr V.R. Saraf, Assistant Professor, Department of Civil Engineering College of Technology and Engineering, GCOEJ, Jalgaon)
(Department of Civil Engineering college of Technology and Engineering , GCOEJ, Jalgaon)

ABSTRACT: *Land is one of the significant common assets. An urban areas development is estimated by populace as well as its spatial measurement. The development of country territories has brought about sharp land use and land spread changes. As of late, the criticalness of spatial information innovations, particularly the utilization of distantly detected and topographical data frameworks (GIS) has been generally utilized. The current examination explores the land use and land front of Jalgaon locale, Maharashtra utilizing Landsat satellite pictures for the year 2008 and 2017. Regulated characterization technique is utilized to order the various classes under the examination region and by utilizing QGIS programming, the shape document of study territory has made. This examination gives data about the most broad land spread class of the locale in October 2008 is 52.8%. The second most broad classification is desolate land, 23.9% forest spreads zone about 10.6% and metropolitan and different spreads zone unto 10.3% likewise water bodies spread region about 2.23%. In November 2017 the significant land utilized is horticulture land 50.8%, fruitless land 20.1%, woods cover 9.42%, water bodies 2.09%, and metropolitan and other 17.4%. The investigation helps in distinguishing land utilized land spread classes and the information can be utilized for future natural examinations.*

KEYWORDS: *Land Used, Land Cover, Remote Sensing, GIS, Supervised Classification,   Change Detection*

I.   INTRODUCTION

Land use characterizes the use of land differing from territory to region. In metropolitan zones land use majors lodging, ads or ventures. The sort of physical and normal highlights present on the outside of the earth is known as land spread, for example Water body, backwoods, developed zone, and so on. Land use change, including land transformation starting with one structure then onto the next alongside land spread alteration through land use the executives, has incredibly modified an enormous extent of the world's territory surface to fulfil humankind's prompt requests for characteristic assets. Presently a day's new innovations like satellite far off detecting and Topographical Data Frameworks (GIS) gives information to study and screen the elements of common assets for natural administration (Kumar et al.,2013). In the current examination we have utilized basically two kinds of information. These are geographical guide and far off detecting information. Provincial land use land spread order is as yet a test with medium or coarse spatial goal distantly detected information because of the huge number of blended pixels and ghostly disarrays among various land use land spread sorts. by and large, for rustic zones, higher goal pictures are more fitting as the land spread structure is unpredictable. Prior to the pre-preparing and grouping of satellite symbolism started; a broad field review was performed all through the investigation territory utilizing Worldwide Situating Framework (GPS) hardware (Srimani and Prasad 2013).

The chief goal of this undertaking was to think about the outcomes, subjectively and quantitatively of various land use and land spread change discovery draws near (Civco et al.,2002). Here the investigation territory is grouped in to five classifications, for example farming, woodland region, water spread territory, desolate land, metropolitan and different zones. The examination territory covers 11765 sq. km and a time of October 2008& October 2017 was taken for considering the land use and land spread changes.

1.1.   Change Detection

The process of identifying differences between natural resources and human beings through observation over a period of time is called Change detection. An accurate and timely observation of changes of Earth's surface features provides the foundation for better understanding of relationships and interactions between human and natural phenomena which leads to better management of our resources.

II.   METHODOLOGY

2.1 Study Area

The current examination zone is Jalgaon locale. Zone of study region is 11765.29 sq. Km, as appeared in fig 1 It is situated between longitudes 74°53'21"E to 76° 23'00"E and scopes 21°02'25"N to 14°16'30"N. The investigation zone has a subtropical atmosphere with a mean yearly temperature of 27°C. The yearly normal precipitation of the examination zone is about 755.6 mm. The mean day by day most extreme temperature in the locale is about 45°C in May. Yearly precipitation information of the year 2001 is 660.4 mm and 52 blustery days consistently, in 2008 yearly precipitation was 724.0 mm and stormy 44 days in the year and in 2017 yearly precipitation watched was 432.6mm and there were 40 stormy days.

Fig.1. Map of Jalgaon District

2.2 Remote Sensing Data

Advanced information for the current investigation of Jalgaon area Indian Distant Detecting (IRS-P6) Direct Imaging Self Filtering Sensor (LISS-III) pictures for October 2008 and October 2017 were secured from Bhuvan (Fig 2 and 3). The pictures were utilized for change in recognition of LU/LC for Jalgaon district and precipitation changes in the examination zone.
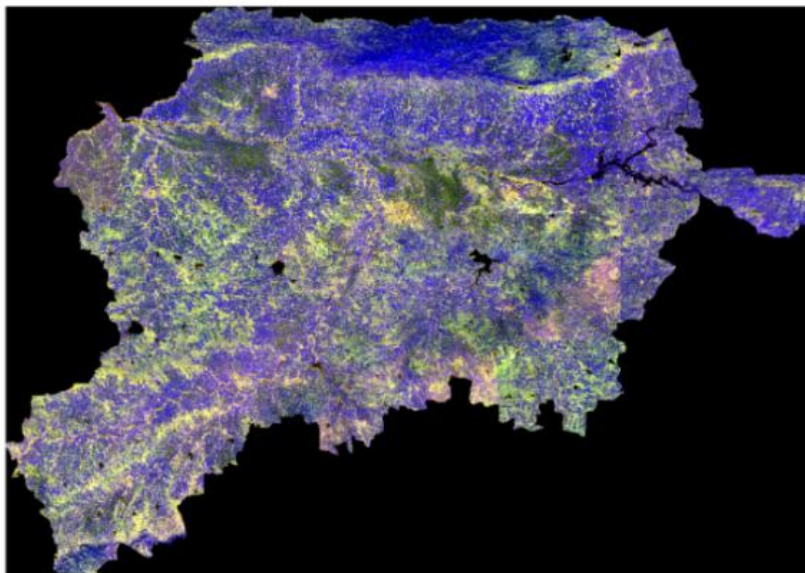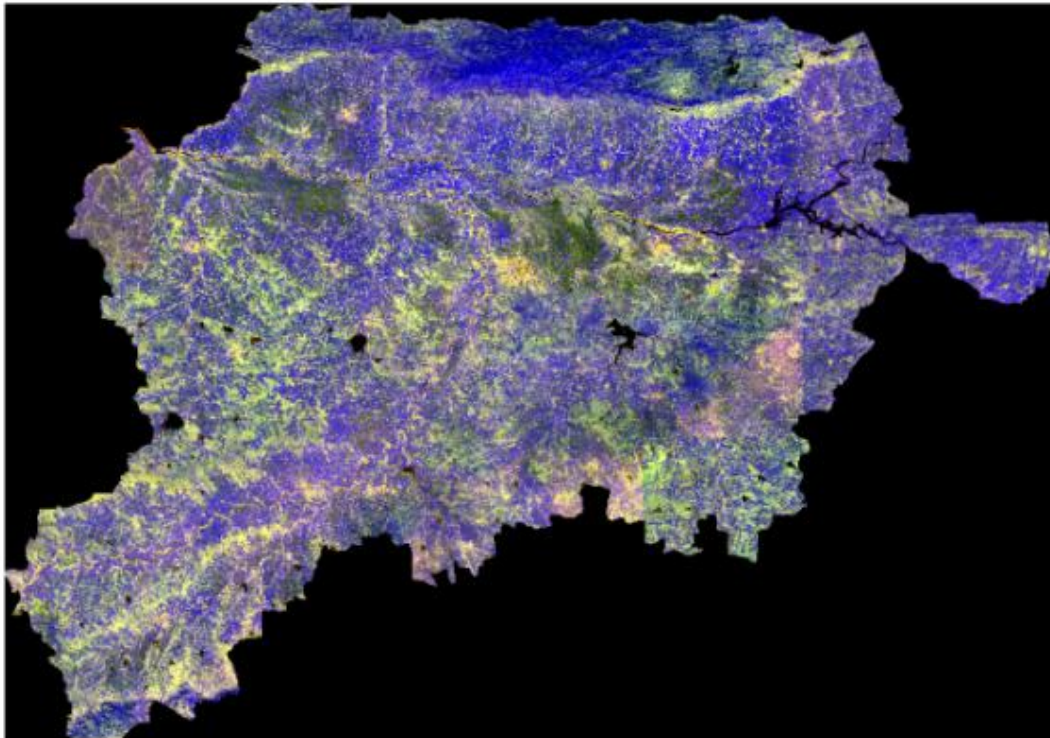

Fig. 2. LISS 3 Image of Jalgaon District 2008

Fig. 3. LISS 3 Image of Jalgaon District of October 2017

2.3   Collateral Data

Review of India (SOI) Toposheets at 1:50,000 scale was utilized for the readiness of the base guides and for far off detecting information understanding. This toposheet is acquired from google earthpro application and direct utilizing module devices from QGIS.

2.4   Method of Land Use Land Cover

The temporal satellite information IRS P-6 LISS-3 OF the Jalgaon locale region is related to two diverse decade October 2008 and October 2017. Thus, the picture needed to co-enlisted normalized and subset for contribution to the grouping and change discovery measure. Greatest probability classifier utilized in the administered grouping strategy in this specific investigation. Numerous literary works surveyed for the determination of the fitting and best arrangement strategy. Civco.et.al (2002), Yadav.et.al (2012), Srimani and Prasad (2013), Kumar.et.al (2013), Chaudhari and Kumar (2016) and veeraswamy.et.al (2017), this all examination papers are accessible identified with investigation of land use land spread which shows the detail of LULC. This paper gives how much measure of land is utilized for agribusiness, all out desolate land in the investigation territory, impact of urbanization on condition is examined. We utilized QGIS and Adventure programming for LULC change in recognition investigation in Jalgaon locale.

2.5   Flowchart of Methodology

The land use maps pertaining of two different periods were used for post classification comparison, which facilitated the estimation of changes in the land use category and dynamism with the changes as shown in figure 4.
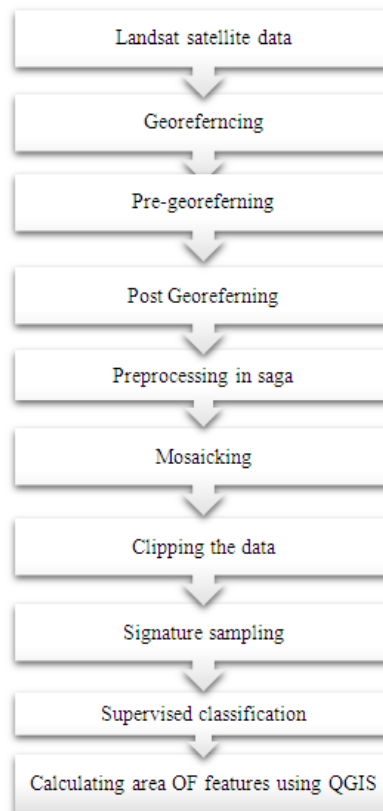
Fig 4: Methodology Flowchart

III. RESULTS AND DISCUSSION

Based on understanding of distant detecting symbolism, field overviews, and existing investigation zone conditions, here the examination territory is ordered into five categories, that is, farming, developed region, forest region, infertile zone, metropolitan and others. The examination region covers 11765 so km and LU/LC changes were assessed from October 2008 to October 2017 (Fig 5 and 6) gives the factual aftereffects of LU/LC changes. The LU/LC changes were of most elevated sum in horticulture developed territory, manor, other land, and thick forest from 2008 to 2017. Examination of LU/LC in 2008 and 2017 got from toposheet and satellite symbolism translation shows that the developed region, including human residence created for non-agrarian utilizations like structure, transport, and interchanges is generally widened from 5.91 km² (2008) to 18.34 km² (2017) in these 9 years, with a net expansion of 12.44km². This is because of metropolitan development and populace increment in this examination region during the investigation time frame.

- **Respective Figures of LULC Map of Year 2008 and 2017**
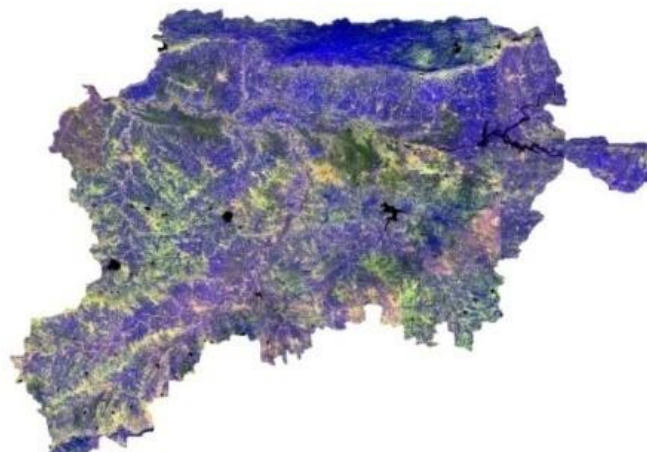
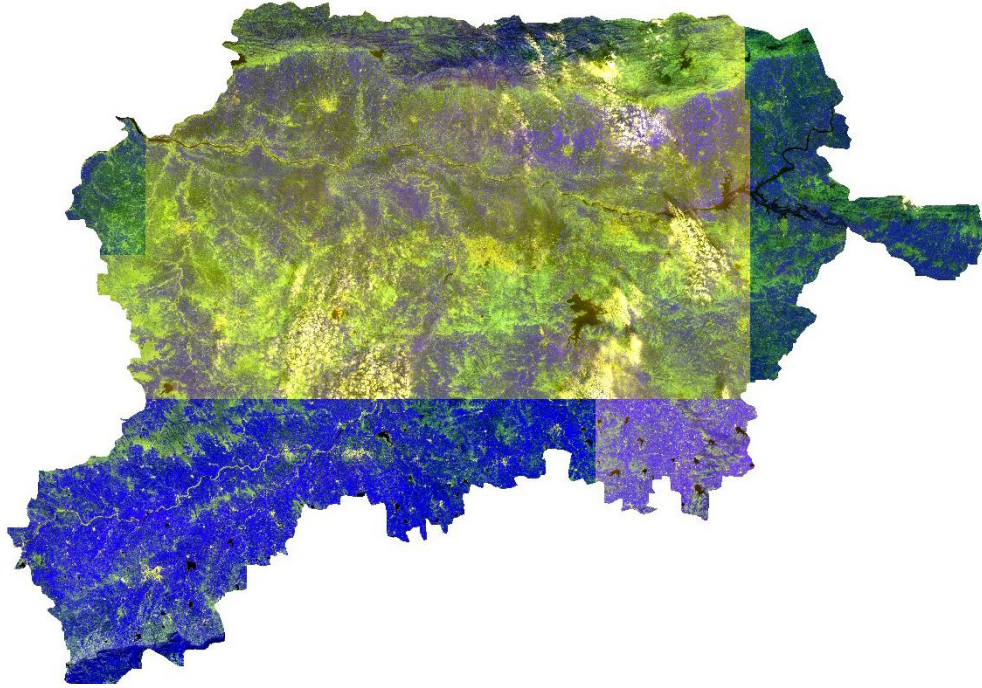**Fig. 5. LULC Map of October 2008**

Fig. 6. LULC Map of October 2017

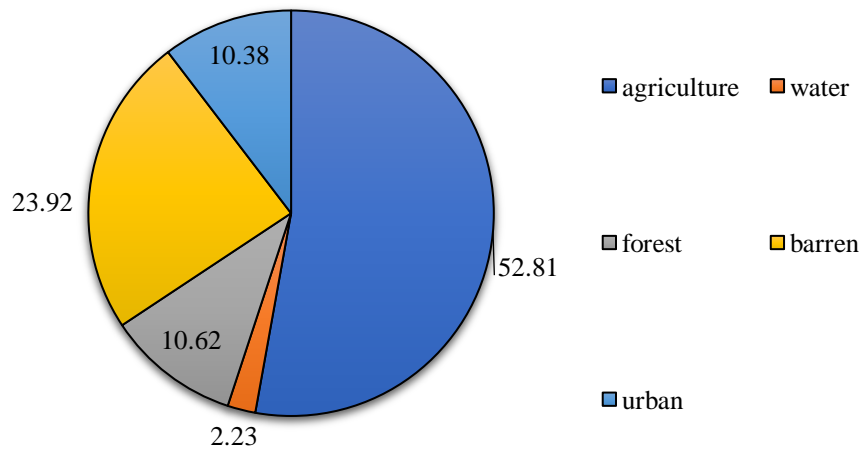- **The Total Percentage Area of These Two Respective Decades is Expressed in the Following Pie Chart**
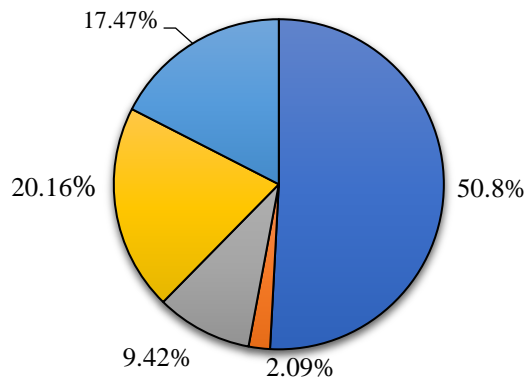

Fig. 7. Percentage Area of 2008

Fig. 8. Percentage Area of 2017

- **Table 1 Gives The Clarification About Amount and Percentage of Area Occupied for Different Purposes.**

Sr.no	Classes	Area (sq.km)		Change	% Area	
		2008	2017	(sq.km)	2008	2017
1	Agriculture Area	6213.25	5981.78	231.47	52.81	50.8
2	Water Bodies	263.14	246.14	17	2.23	2.09
3	Forest Area	1250.65	1108.34	142.31	10.62	9.42
4	Barren Area	2815.25	2371.89	443.36	23.92	20.16
5	Urban and Others	1222.27	2056.48	834.21	10.38	17.47
Total		11764.56	11764.63	00		

Table. 1. Amount and Percentage of Area Used

3.1 Agricultural Area

In the investigation region, farming area incorporates agrarian manor, cropland, decrepit, hydroponics and various yields, for example, rabi, kharif and Zaid, which covers a zone about 6213.25 km² (52.81%) for year of October 2008 and 5981.78 km² (50.8%) for the time of October 2017.

3.2 Water bodies

Water bodies seem dim on satellite symbolism because of absorption of approaching IR radiation. Surface water bodies, for example, tanks/repositories and waterway/stream/channels are recognized in the examination zone and their topographical dispersions are 263.14 km²(2.23%) for October 2008 and 246.14 km²(2.09%) for October 2017.

3.3 Forest Area

Forest land contributed the overwhelming area spread category in the examination territory, forest land was partitioned into various categories like Deciduous, Forest Manor, Clean Forest and Vegetated/Open Zone. These parts were secured a zone of about 1250.65 km²(10.62%) for year October 2008 and 1108.34 km² (9.42%) for October 2017.

3.4 Barren Area

It is limited to support life and in which less than one-third of the area has vegetation or other cover. This category includes such areas as Salt affected land, Scrub Land-Dense scrub, and Scrub Land-Open scrub. It is identified with light cyan tone and smooth to coarse texture on image. These were geographically extent an area about2815.25 km² (23.92%) for October 2008 and 2371.89 km²(20.16%) for the year of October 2017.

3.5 Urban and Others

The country zone is described by farming and associated sectors and non-business exercises with populace size under 5000 by and large need supporting offices. The greater part of the individuals is engaged with the essential movement of horticulture. These are portrayed by the expulsion of surface and sub-surface earth material by manual and motorized tasks. The topographical degrees of this metropolitan and different territories are about 1222.27 km²(10.38%) for October 2008 and 2056.48 km²(17.47%) for the year October 2017.

IV. CONCLUSION

Distant Detecting and GIS innovation has been discovered helpful for the spatial planning of the geological zone as for its property use and land spread examples. The factual examination of the investigation region utilizing information of distant detecting and GIS based displaying has given the entire image of the land use and land spread examples in the investigation zone. In general, after can be finished up as,

- The current investigation fundamentally centres around developed territory in Jalgaon area which uncovers its extension by more than 50% over the examination time frame.
- The results obviously show that LU/LC changes were very noticeable of the period 2008 and 2017. There is critical development of developed zone noticed.
- Barren land involves about 21.05 %, Forest spreads 8.44 % of the absolute geographic territory, Water body holds 2.75 % and developed zone is about 1.5 % of the all-out geographic region.
- This paper centres around LU/LC changes in a country and metropolitan region of Jalgaon area, Maharashtra, India utilizing distant detecting information and GIS innovation. This investigation demonstrates that how the incorporation of GIS and distant detecting advancements are compelling device for metropolitan arranging and the board. The measurement of LU/LC changes of Jalgaon territory is valuable for ecological administration gatherings, strategy creators and for public to all the more likely comprehend the encompassing.

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