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Land Use Classification of Amravati District Using Satellite Images

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ABSTRACT
The objective of this study is to classify land use and land cover status and to identify land use changes, especially in vegetation, forest degradation, building construction, and water bodies of Amravati district in the past 10 years using satellite images. A land use/cover classification system is based on the five classes. A supervised classification algorithm was used for change detection for land use classification.
For Land use change detection, satellite data will be collected from 2011 to 2021. Various data sources for satellite imagery can be used to download the images. We will be using different band combinations. The study is very much helpful in being useful in town planning, infrastructure development, landscaping, etc. Also, the project' is compared to others.
Keywords: Land Use Classification, Satellite Images, Classification, GIS Software.

I. INTRODUCTION

In this project, we detect the change in land use patterns in Amravati district, Maharashtra, India. We know that day by day our population is increasing and population increases mean our built-up area is increasing. As we have a fixed land, that's why we need to know about our land use and about the area of the class is increase or decrease. For feature planning, we classify it into five different classes i.e. water bodies, vegetation, agricultural land, bare land, and built-up area. Using the supervised classification, we have to take a sample of land, We have to collect all land samples after that we have to give the training of the software for the match that sample all area,like we take one sample of water body so we train it, it is water bodies so all are will automatically be selected and automatically give the name. we find 2011 and 2021 years of data on the satellite images, from that classification we compare that data.

II. METHODOLOGY

For classification,we are using supervised classification in QGIS software. From QGIS software we can collect the images from the SCP module of QGIS. We are comparing data and finding the lulc changes that happened in 2011 and 2021.

For comparing data we used five classes: Water Body, Vegetation, Agriculture, Built-up, and Bare Land.

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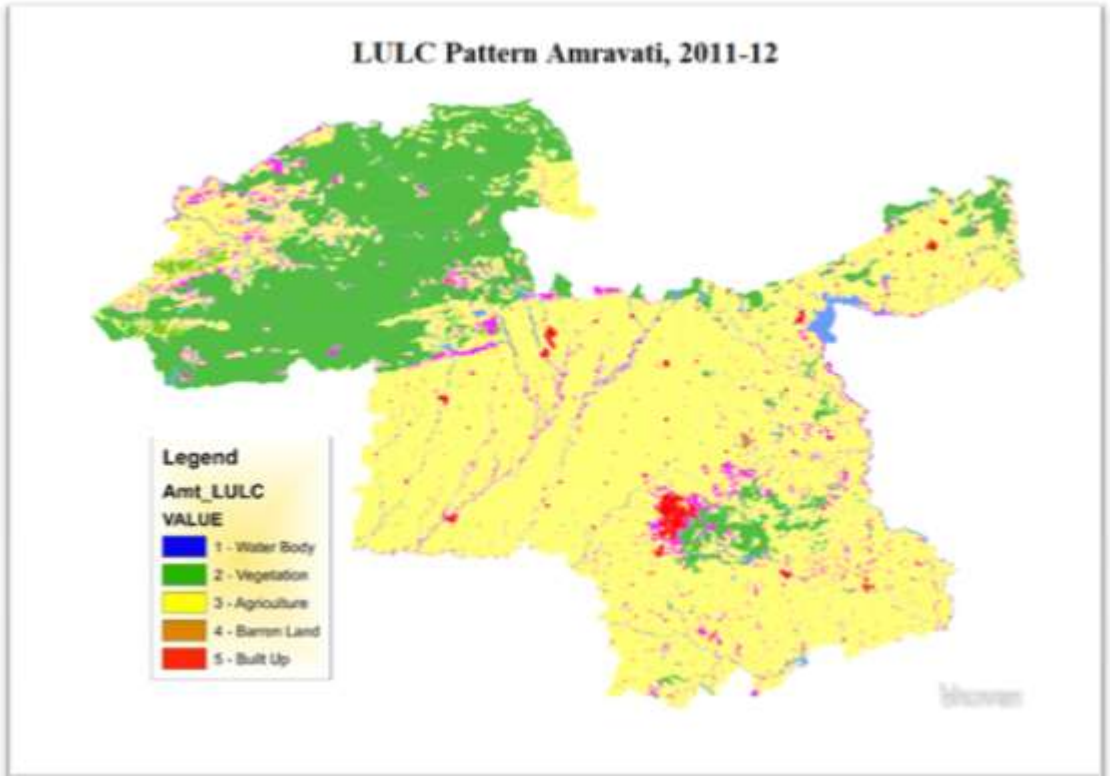

Figure 1. Classification flow chart

From figure 1 the flow chart, we can easily find out the step of classification and how we find the difference between the two years. How do we find the 10-year period?

Step 1: data was collected by Landsat 8 and Landsat 5.

Step 2: take a sample of the image.

Step 3: use a supervised classification method to classify that image into 5 different classes.

A different class is 1. Water bodies, 2. Vegetation land, 3. Agriculture land, 4. Barren land, 5. Buildup area.

Step 5: detect the difference between 10 years.

Step6: collect the result.

III. CLASSIFICATION MAPS AND ANALYSIS

Figure 2 and Figure 3 show land use land cover change between 2011 and 2021. It is found that there is a huge difference that is depicted in Table 1.

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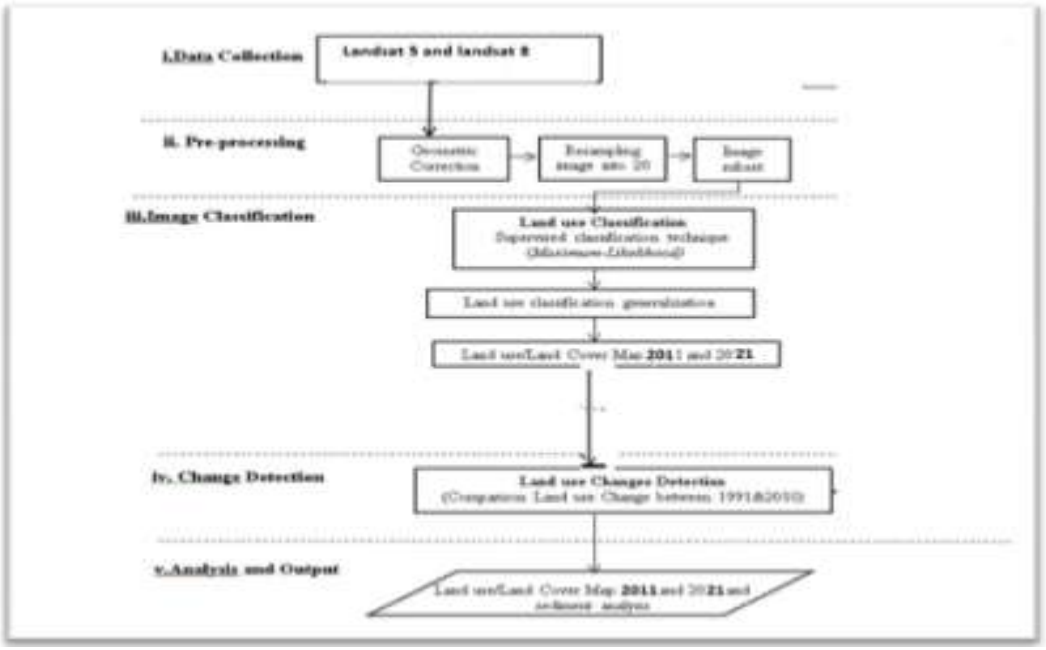

Figure2. LULC map 2011

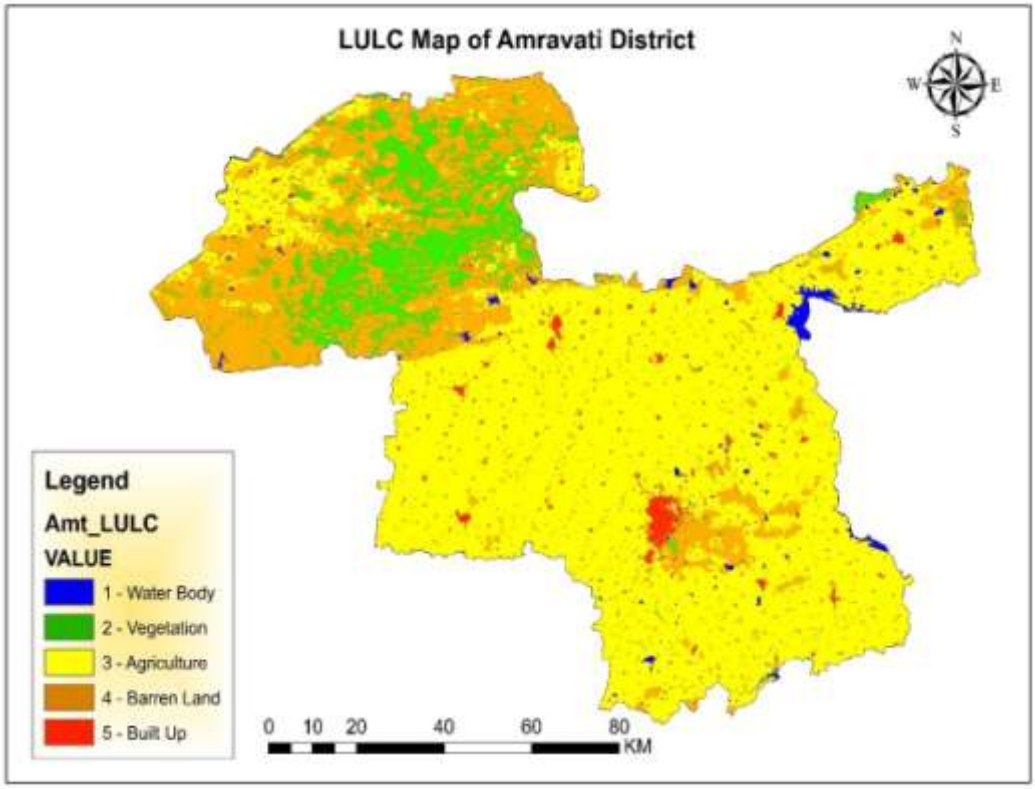

Figure 3. LULC map of 2021

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IV. RESULTS AND DISCUSSION

Table1. shows the difference over 10 years period. From the table, we can say that the water body is decreased by 47.7 %, vegetation land is decreased by 60 %, Agriculture land is decreased by 3 %, Barren land is increased by 169%, and Built up land is increased by 84.11 %. So, we can say that our natural resources are decreasing day by day hence we need to plan for LULC management.

Table 1: % Change in LULC Pattern for Amravati District

Sr. No.	Year	Class	% Area (Sq.Km)	Year	Class	% Area (Sq. Km)	% Change in LULC
1	2011-12	Water	270	2020-21	Water	141.82	-47.47
2		Vegetation	2548		Vegetation	1018.41	-60.03
3		Agriculture	8142		Agriculture	7880.16	-3.22
4		Barren Land	1060		Barren Land	2857.79	169.60
5		Built-Up	163		Built-Up	300.1	84.11

V. CONCLUSION

So we can say that our natural resources are decreasing day by day so need to plan LULC management. The objectives of this study were to detect land cover types and land cover changes Assessment of land degradation and future planning of smart cities.

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