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PREPARATION OF CHANGE DETECTION MAPPING USING REMOTE SENSING AND GIS: A MODEL STUDY

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ABSTRACT

Change detection is the process of identifying differences in the state of a feature or phenomenon by observing it at different times. In remote sensing it is useful in land use/land cover change analysis such as monitoring deforestation or vegetation phenology. In the present study the data i.e. resources at imagery of period (2007 to 2017) has been collected near the limestone mine of Devapur village of Adilabad district. ARC GIS, ERDAS Software's were used interpretation of vegetation the preprocess multi spectral imagery and source sat and Finally, Spatial distribution and extent of land use land cover classes in study area (25km)and by using the above data we are giving the detail classification of study area

Key words: LU/LC, vegetation phenology, Change detection.

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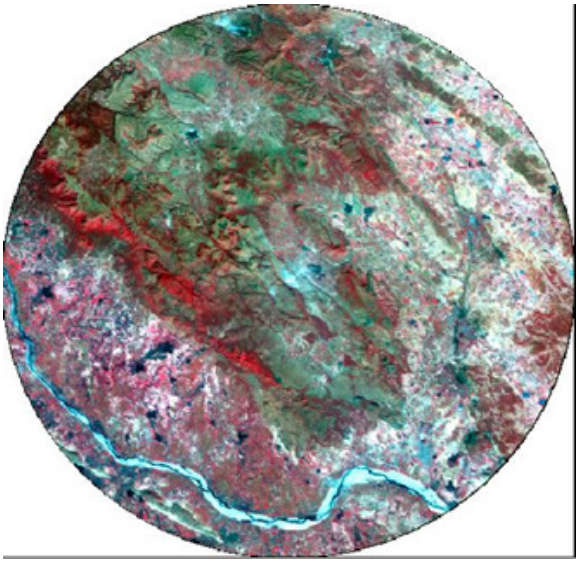
1. INTRODUCTION

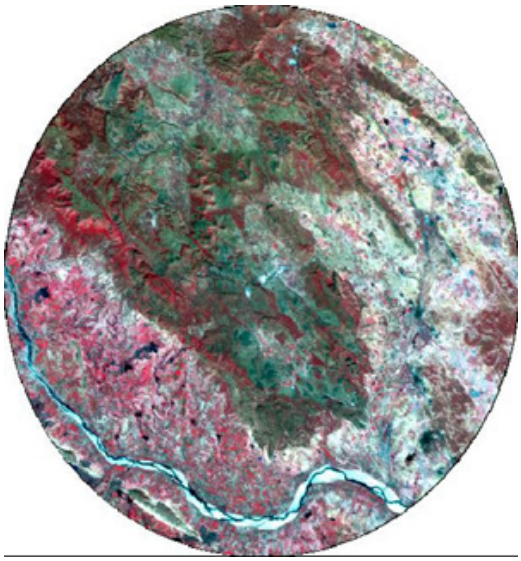
Planning for development of natural resources without endangering the environment is a crucial issue. The rate and kind of change in the use of land resources is essential for proper management planning and regularizing the use of such resources (Xiubin, 1996). Land use data is needed in the analysis of environmental process and problems, That must be understood if living conditions and standards are to be improved or maintained at current level. Land use refers to man's activities on land which are directly related to the land (Meyer, 1994). Land cover, on the other hand, describes the vegetation and natural features covering the land surface. Land use is in part determined by environmental factors such as soil characteristics, climate, topography, and vegetation (Jin, 2004). Large-scale approaches often utilize a watershed approach. The present study has been undertaken to identify and delineate the changes in the land use/land cover status in the area around this mine over a ten year period (2007 & 2017) in the context of preservation of environmental from pollution and degradation (Jansen,2002). Hence for the present study the prime objective is "*to prepare the LULC change detection map of Limestone mine area of Devapur village, Adilabad district*."

2. DESCRIPTION OF STUDY AREA

The study has been carried out in the area within 25 km radius from the limestone mine located south east of Devapur village in Kasipet mandal of Adilabad district of Andhra Pradesh State between 18º5O'-19º05'N latitude and 79°05'-79°35'E longitude . It is spread over an extent of 1923.33 sq. km in the Rali reserved forest, Devapur range, Mancherial division. Physiographically the study area is belonging to hilly region with an elevation of 140m near Bainurgutta to 560m near Kondapajli. River Godavari is the source of water supply for this area which is well confirmed by the dendritic drainage pattern identified by aerial view.



Satellite Image of 2007



Satellite Image of 2017

- Resource sat 2007 and 2017 image showing 25kms Radius around Devapur Limestone Mine Adilabad District, Andhra Pradesh

3. METHODOLOGY

3.1. Data used

The data is collected by using of software and Toposheets of resources sat images using of ARC GIS, ERDAS and using Toposheets

Two multispectral satellite images of medium resolution were used to prepare landuse and land cover (LULC) maps of Devapur village for the two time periods. Unsupervised classification technique, which identifies natural spectral grouping, was used to classify the images considering the landuse complexity of the study area. To prepare LULC maps and detect changes, the following three broad categories were considered: 1) Vegetation; 2) Built Up Areas and 3) Agricultural Land and Open Fields Accuracy assessments were performed on the two classified LULC maps to measure the degree of fidelity to ground reality. Finally, changes in LULC during the time periods of the study area were detected along with interclass changes.

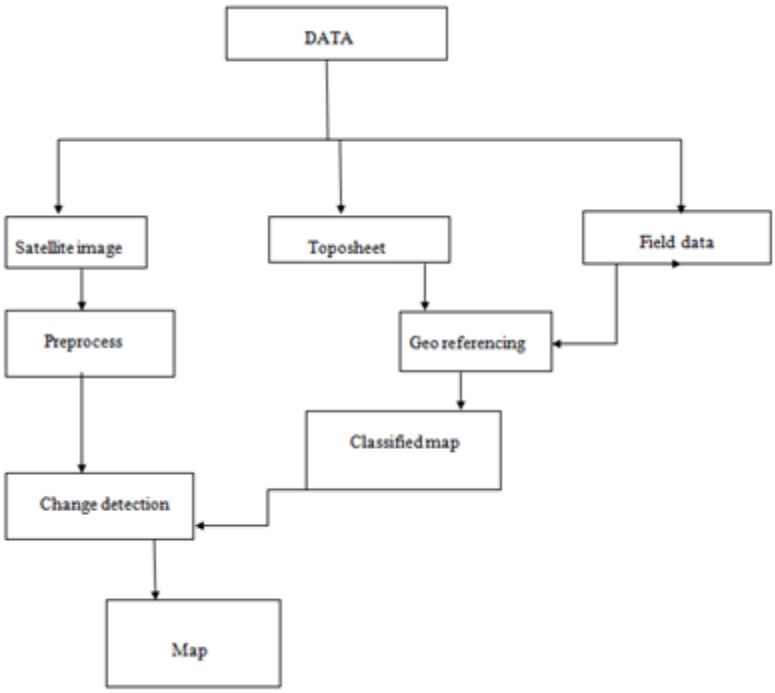


Figure 1

Two multispectral satellite images of medium resolution were used to prepare land use and land cover (LULC) maps of Devapur village for the two time periods. Unsupervised classification technique, which identifies natural spectral grouping, was used to classify the images considering the land use complexity of the study area. To prepare LULC maps and detect changes, the following three broad categories were considered: 1) Vegetation; 2) Built Up Areas and 3) Agricultural Land and Open Fields Accuracy assessments were performed on the two classified LULC maps to measure the degree of fidelity to ground reality. Finally, changes in LULC during the time periods of the study area were detected along with interclass changes.

LU/LC mapping in the study area was carried out by visual interpretation of two season's satellite data. The major components of LU/LC mapping methodology are:

- Rapid reconnaissance of the area
- Development of image interpretation key
- Image interpretation with concurrent integration of LU/LC classes interpreted from the different seasons
- Field validation
- Fair map drawing

4. RESULTS AND DISCUSSION

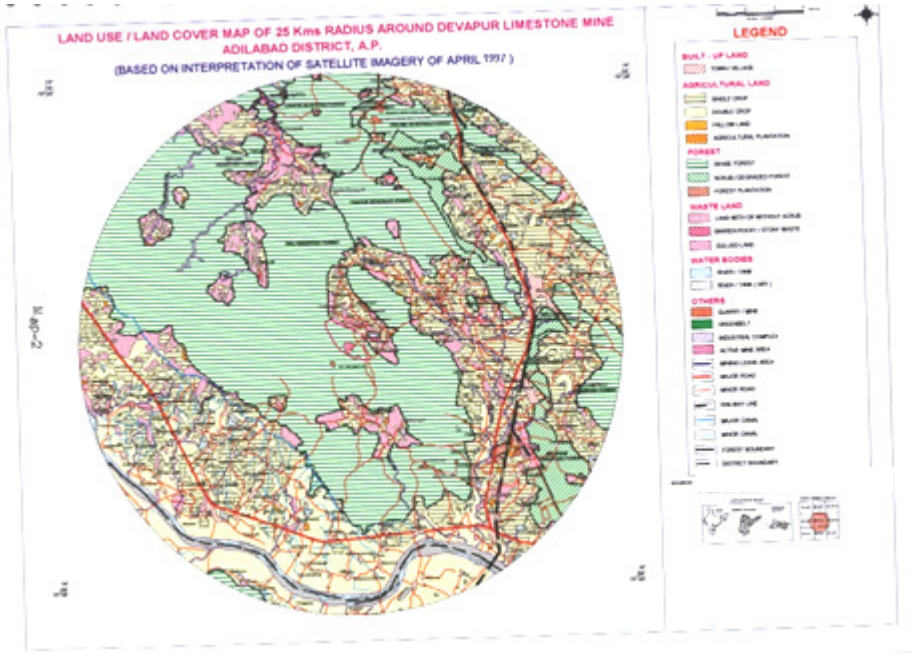


Figure 2 Interpretation of satellite image of 2007

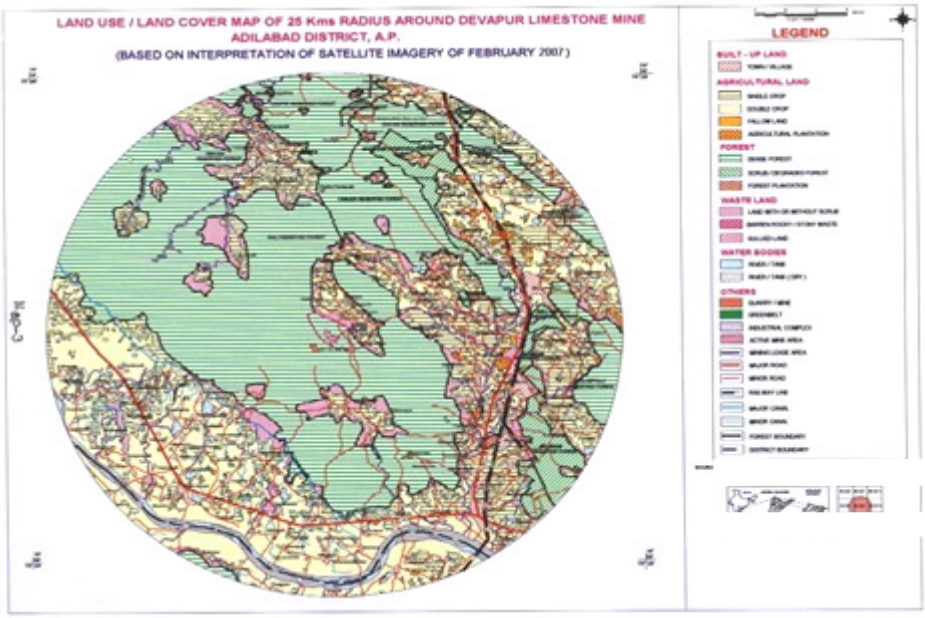


Figure 3 Interpretation of satellite image of 2017

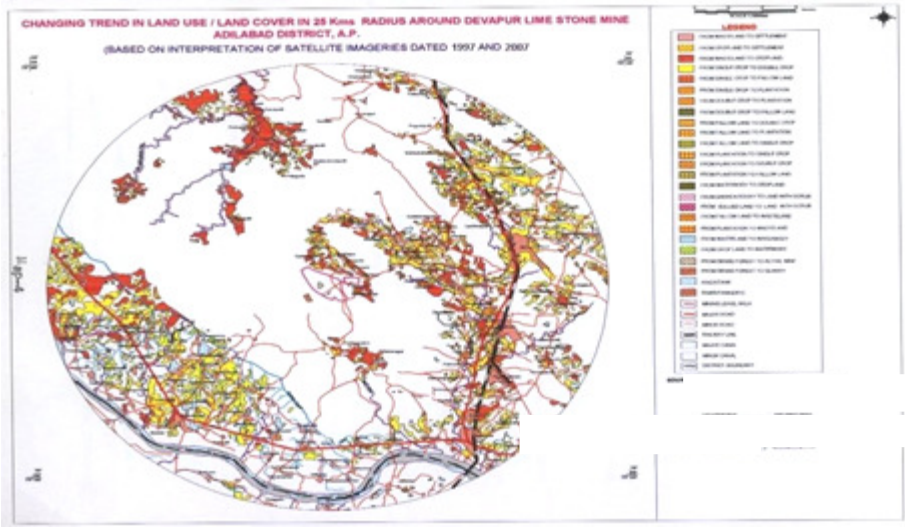


Figure 4 Interpretation of spatial distribution from 2007-2017

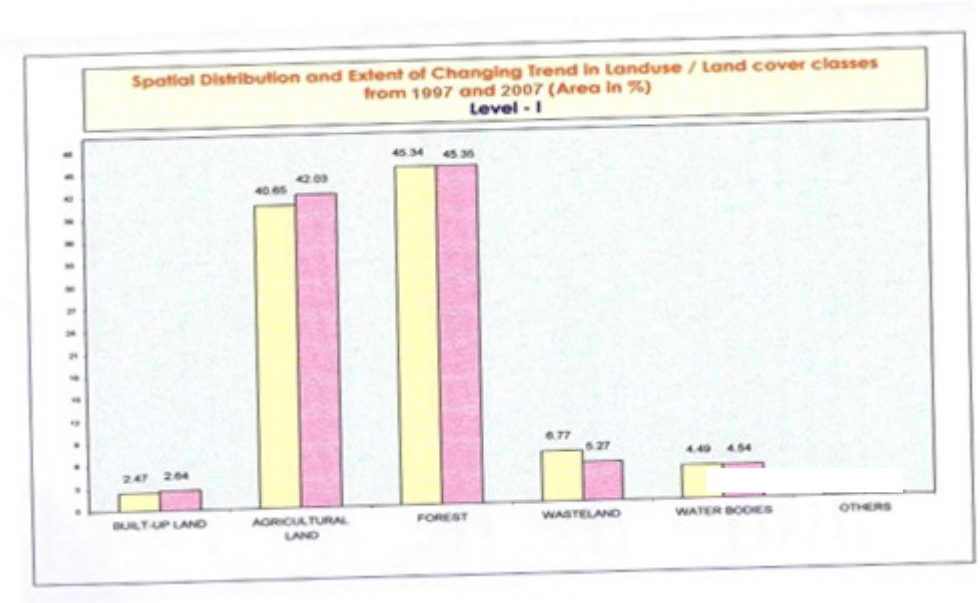
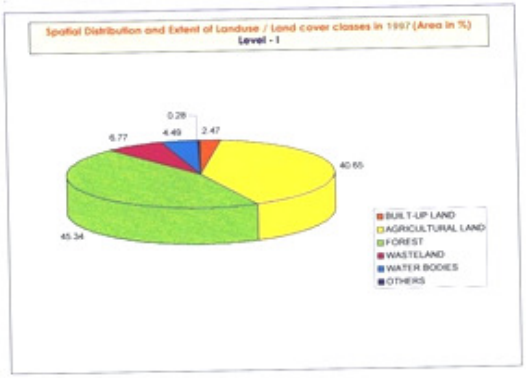


Figure 5 Spatial distribution and changing of land use and land cover from 2007-2017



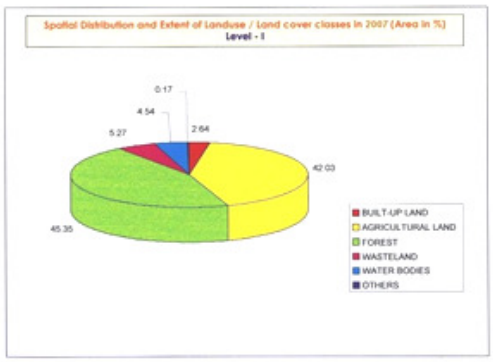


Fig 6 Pie graph representation of **Fig 7** Pie graph representation of spatial distribution in 2007 spatial distribution in 2017

Spatial distribution and extent of Level-2 Land use / Land cover classes in the study area - 2007 (25 km radius)

Table 1 Spatial distribution and extent of level-2 land use / land cover classes in the study area -2007 (25 km radius)

SI. No.	Land use / Land cover	Area	
		In hectares	Percentage %
1.	Built-up land Town/Village	4761	2.47
2.	Agricultural Land Single crop Double Crop Fallow land Agricultural Plantation	42588 34678 330 597	22.14 18.03 0.17 0.31
3.	Forest Dense Forest Scrub /Degraded Forest Forest Plantation	79950 7168 121	41.56 3.72 0.06
4.	Wasteland Land with or without scrub Gullied Land Barren Rocky and stony waste	12846 139 47	6.68 0.07 0.02
5.	Water bodies Tank/canal/River	8627	4.49
6.	Others Quarry/Mine Green belt Active Mine Industrial Complex	388 54 74 15	0.20 0.03 0.04 0.01
TOTAL		192383	100.00

As per the above study the following findings has been identified

- The population pressure has increased drastically as indicated by the increase in built-up area in 2007 to 2017 is 2%.
- In the study area agricultural land increased from 2007 to 2017 (1.38% increase)
- There has been negligible increase in the forest cover 2007 to in 2017 is (0.9%increases).
- In the study area there has been a decrease of wasteland to an extent of 2891 hectares over the ten year period from 2007 to 2017.
- There is absolutely no change in the river/stream courses, where as there is a significant increase in the number of tanks and canals.
- In the study area double crop land increased from 2007 to 2017 (6.75% increase)
- A green belt was developed around the orient cement plant in the vicinity of Devapur limestone mine by planting a suitable combination of trees which grow fast with good • leaf density. This belt is meant to act like a buffer to trap the airborne dust and also reduce the noise levels. From aesthetic point of view also, this will have a positive impact. The area covered by this green belt increased from 54 hectares in the year 2007 to 71 hectares in 2017.
- The area of active limestone mine at Devapur increased from 74 hectares in 2007 to 85 hectares in 2017.

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