

Landuse & Land Cover Changes of Drought Prone Anantapur District Using Geo-Spatial Technology

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Abstract: Land use/land cover is an important tool for the various planning authorities with responsibilities for the management of territory at a regional level (Marcal *et al.*, 2005). Using Land use/land cover tool allows for the identification of the major processes of change and, by inference, the characterization of land use dynamics. The knowledge of land use/land cover map is very important to understand the drought prone environment, utilization, conservation and management. Land use relates to the human activity or economic function associated with a specific piece of land (Lillesand *et al.*, 2004). Land cover relates to the composition and characteristics of land surface elements (Cihlar, 2000). The term land cover originally referred to the kind and state of vegetation, but it has broadened in subsequent usage to include human structures such as buildings or pavement and other aspects of the natural environment. The knowledge of land use/land cover changes is very important in understanding natural resources, their utilization, conservation and management uses. Land use is a product of interactions between a society's cultural background, and its physical needs on the one hand, and the natural potential of land on their (Achard, 2002). In this context, an attempt is made here to study the landuse & Land cover change detection in the drought prone Anantapur District for the years 2005, 2012 and 2015. The same is mapped and classified using RS & GIS Technology.

Keywords: Landuse, Land cover

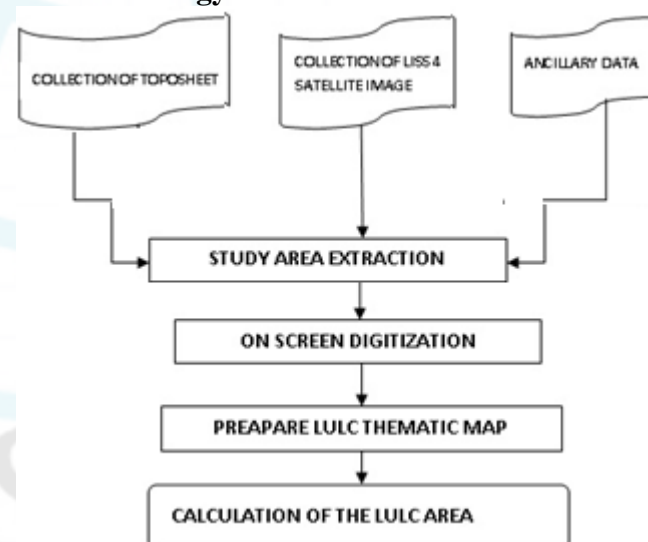
1. Introduction

Land use/land cover is an important tool for the various planning authorities with responsibilities for the management of territory at a regional level (Marcal *et al.*, 2005). Using Land use/land cover tool allows for the identification of the major processes of change and, by inference, the characterization of land use dynamics. Same time, the knowledge of land use/land cover map is very important to understand the drought prone environment, utilization, conservation and management. Land use relates to the human activity or economic function associated with a specific piece of land (Lillesand *et al.*, 2004). Land cover relates to the composition and characteristics of land surface elements (Cihlar, 2000). The term land cover originally referred to the kind and state of vegetation, but it has broadened in subsequent usage to include human structures such as buildings or pavement and other aspects of the natural environment. The knowledge of land use/land cover changes is very important in understanding natural resources, their utilization, conservation and management uses. Land use is a product of interactions between a society's cultural background, and its physical needs on the one hand, and the natural potential of land on their (Achard, 2002). So that in our study area to detect the land use & Land cover change detection we have prepare 2005, 2012 and 2015 land use and Land cover map and those related analysis.

2. Aim & Objectives

- 1) To find the LULC pattern of the Study Area.
- 2) Find out the land use & Land cover change detection with reference Years of 2005 to 2012 and 2015
- 3) Mainly to find out the urban and rural LULC pattern changes in Anantapur District.

3. Methodology



Flow Chart- 1: Methodology for LULC Changes

Data use

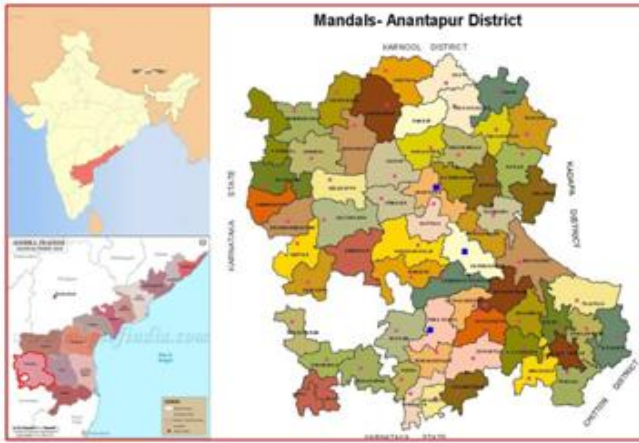
For this study I have use survey of India Topo-sheet and LISS IV satellite image in the year of 2013.

Software use

ARC GIS 10.2.2, ERDAS 9.3, MS Word, MS Excel.

Study Area

Anantapur District lies Andhra Pradesh State between 14° 42' 0" north latitude and 77° 36' 0" east longitude was selected as study area. It is located in the middle of the peninsular region and is confined to the southwestern part of Andhra Pradesh, India. It is bounded by Kurnool District, Kadapa District, Chittoor District and east part of the district is surrounded by Karnataka State. The total geographical area of the study area is **19130.00** Sq. Km.

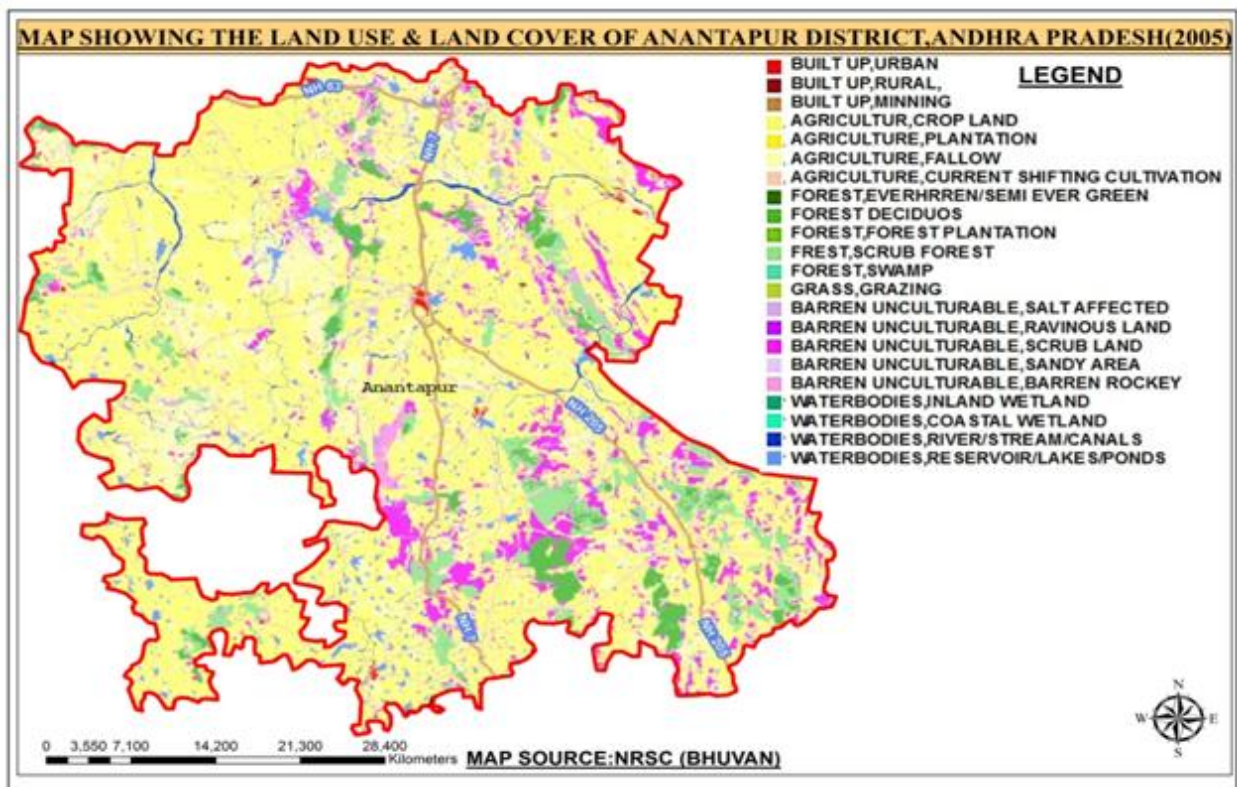


Map 1: Location Map of Anantapur District

According to 2011 census total population is 4,083,315 on which urban population is 28.09%, with 368.33 a literacy rate of 64.28% and sex ratio of total population is 978.

4. Result & Discussion

Land Use & Land Cover Map of 2005

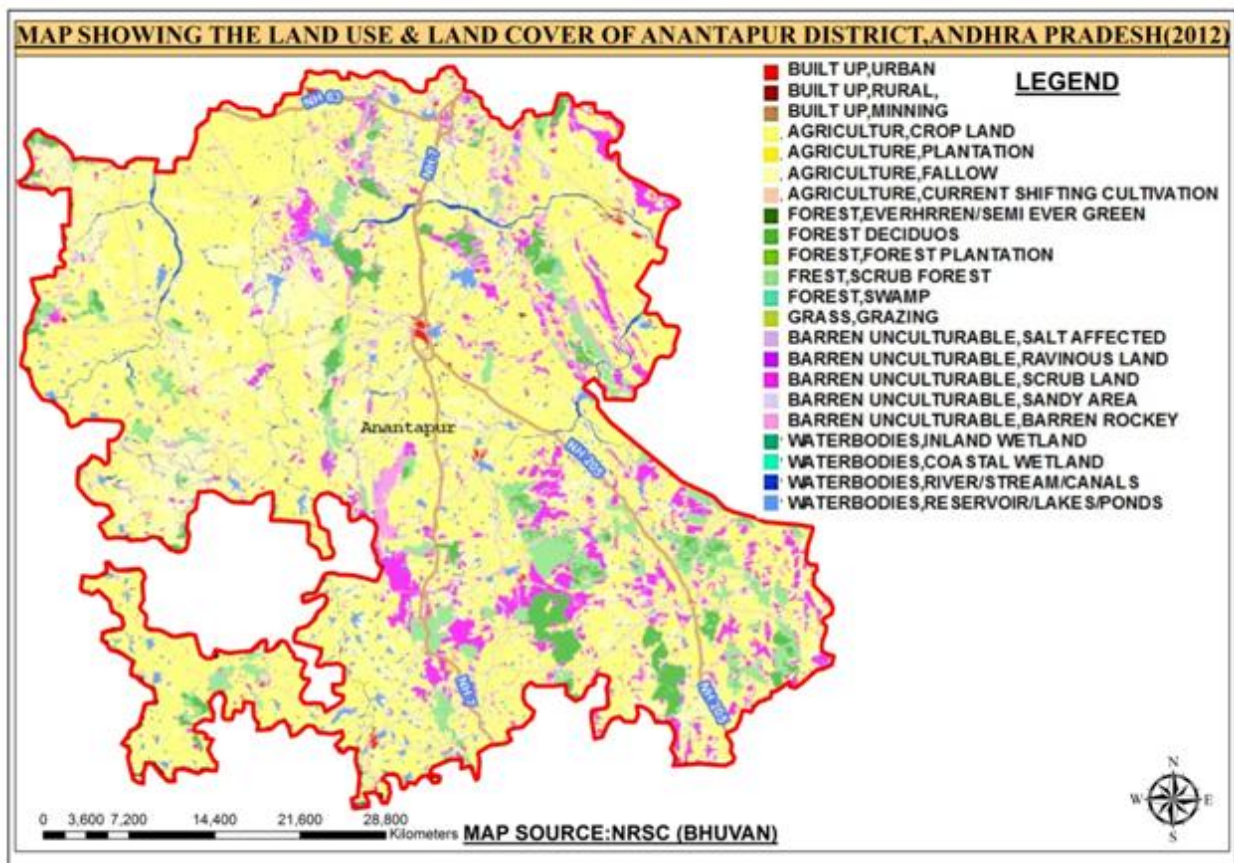
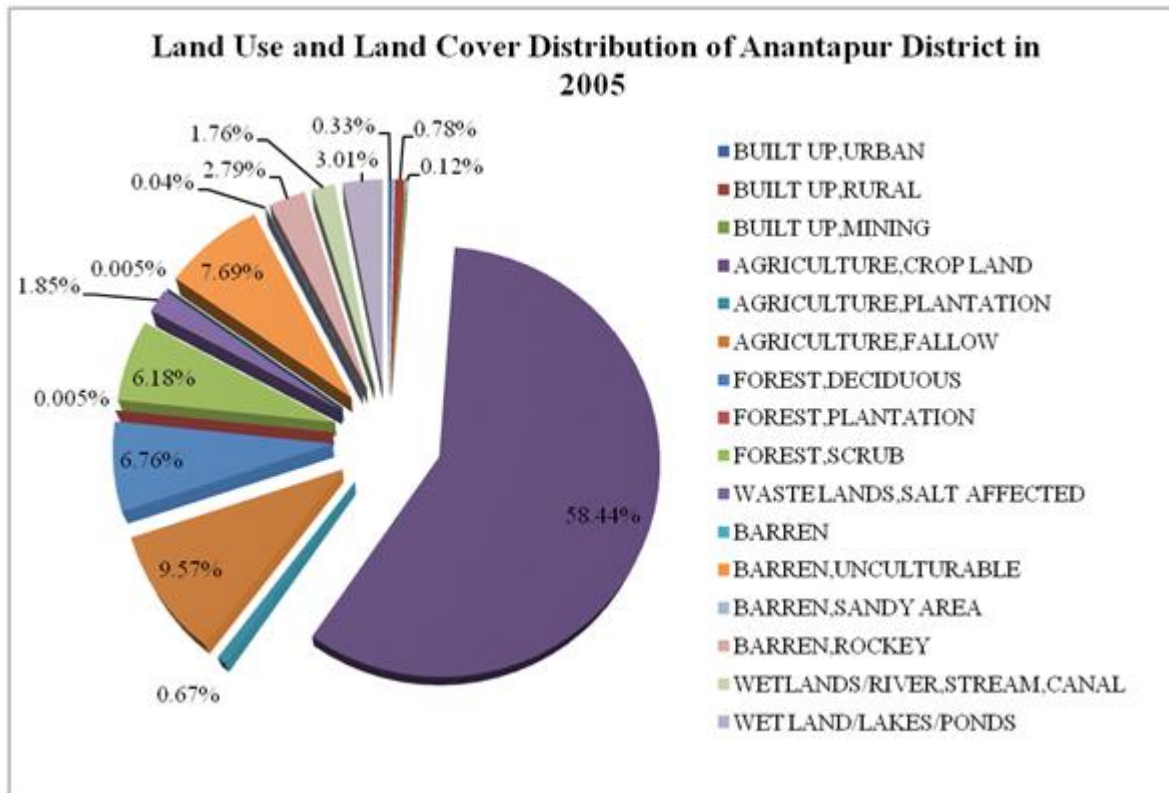


Map 2: Map Showing Land Use & Land Cover of Anantapur District in 2005

This map source is NRSC (Bhuvan) open source site. Through this analysis we get total eight LULC pattern those are built up, Agriculture land, Scrub land, Deciduous forest, Degraded forest, Plantation, Waste land and Water bodies.

Table 1: Table showing Land use land cover distribution of Anantapur District in 2005

SL. No	LULC Pattern	Area (IN SQ KM)	SL. No	LULC Pattern	Area (IN SQ KM)
1	Total Built Up Area	234.4	a.	Agriculture, Plantation	128.34
a.	Built Up, Urban	62.77	b.	Forest, Plantation	0.23
b.	Built Up, Rural	149.2	7	Waste Land	2367.47
c.	Built Up, Mining	22.43	a.	Waste Lands, Salt Affected	353.88
2	Agriculture Land	11179.32	b.	Barren	0.52
3	Scrub Land	3014.33	c.	Barren, Uncultivable	1471.99
a.	Forest, Scrub	1183.1	d.	Barren, Sandy Area	7.28
b.	Agriculture, Fallow	1831.23	e.	Barren, Rocky	533.8
4	Deciduous Forest	1292.31	8	8. Water Bodies	913.6
5	Degraded Forest	0	a.	Wetlands/ River, Stream, Canal	337.17
6	Plantation	128.57	b.	Wet Land/Lakes/Ponds	576.43
Total Area					19130

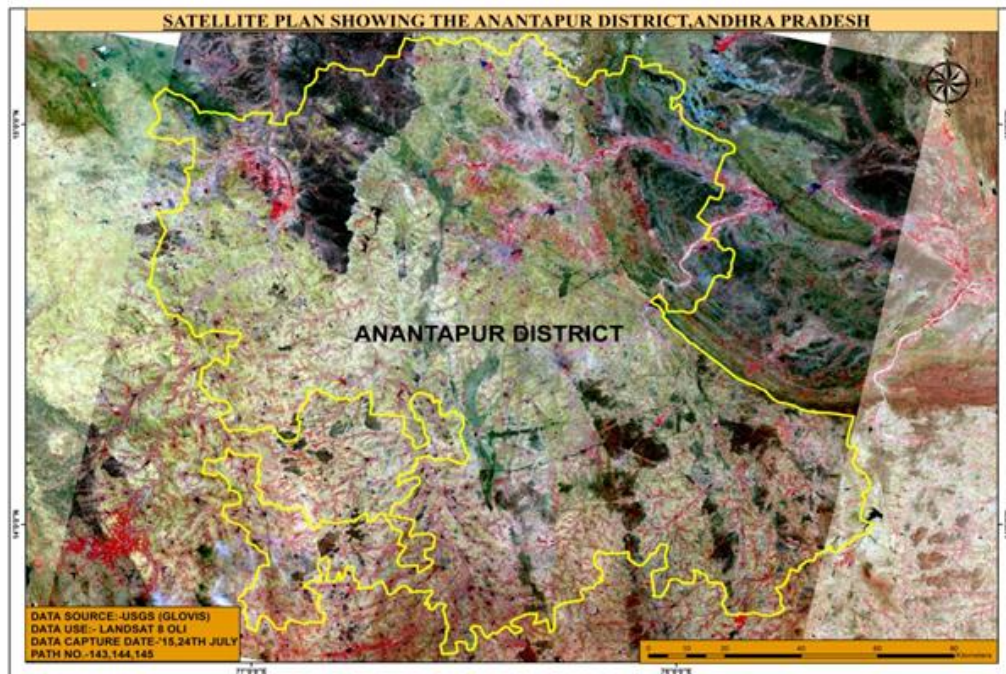


Map 3: Map Showing Land Use & Land Cover of Anantapur District in 2012

Table 2: Table showing Land use land cover distribution of Anantapur District in 2012 NRSC Bhuvan (Land Use and Land Cover Thematic data Service)

S. no	LULC Pattern	Area(In Sq Km)	S. no	LULC Pattern	Area (In Sq Km)
1	Total Built Up Area	373.54	b.	Forest, Plantation	1.62
a.	Built Up, Urban	109.06	7	Waste Land	2160.54
b.	Built Up, Rural	226.89	a.	Waste Lands, Salt Affected	294.52

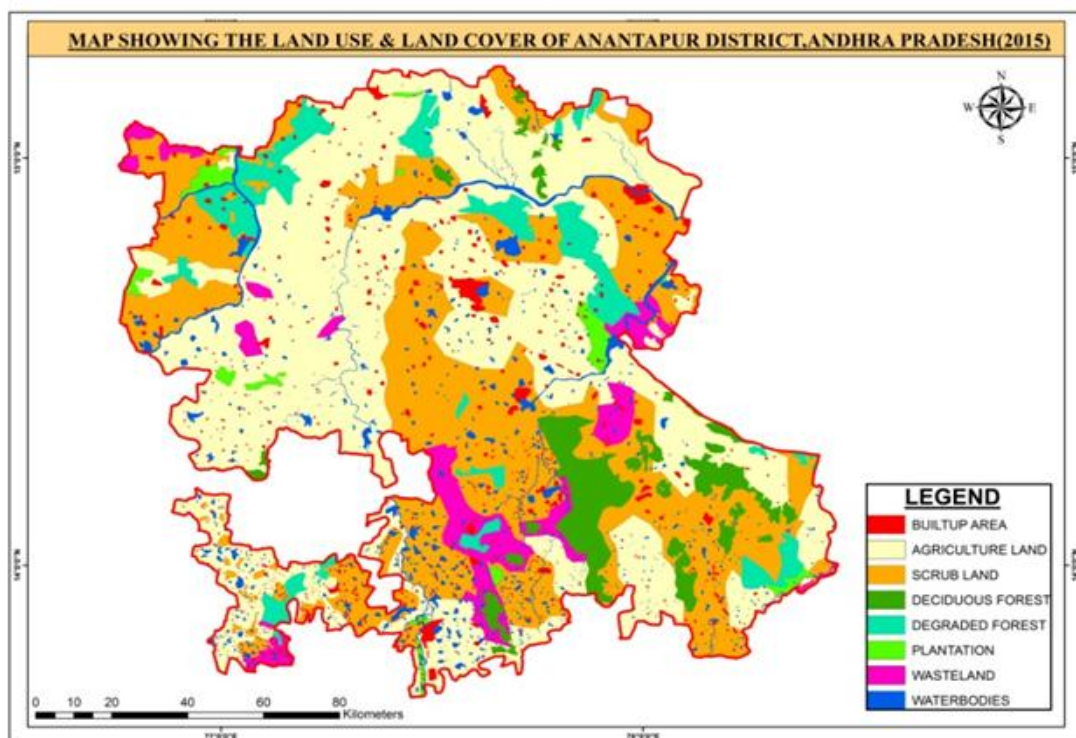
c.	Built Up, Mining	37.59	b.	Barren	0.34
2	Agriculture Land	11581.56	c.	Barren, Uncultivable	1328.53
3	Scrub Land	2868.47	d.	Barren, Sandy Area	6.12
a.	Forest, Scrub	1114.82	e.	Barren, Rocky	531.03
b.	Agriculture, Fallow	1753.65	8	Waterbodies	1017.29
4	Deciduous Forest	678.59	a.	Wetlands/Inland Wetland	0.94
5	Degraded Forest	279.43	b.	Wetlands/River, Stream, Canal	436.07
6	Plantation	170.53	c.	Wet Land/Lakes/Ponds	580.28
a.	Agriculture, Plantation	168.91			
Total Area					19130



Data source USGS Glovis (NASA)

Map 4: Satellite plan of Anantapur District 2015

To prepare the land use and land cover map of Anantapur in the year of 2015, we have used LANDSAT 8 OLI 24th July, 2015 data. We have downloaded this data from NASA recognized site USGS Glovis'.



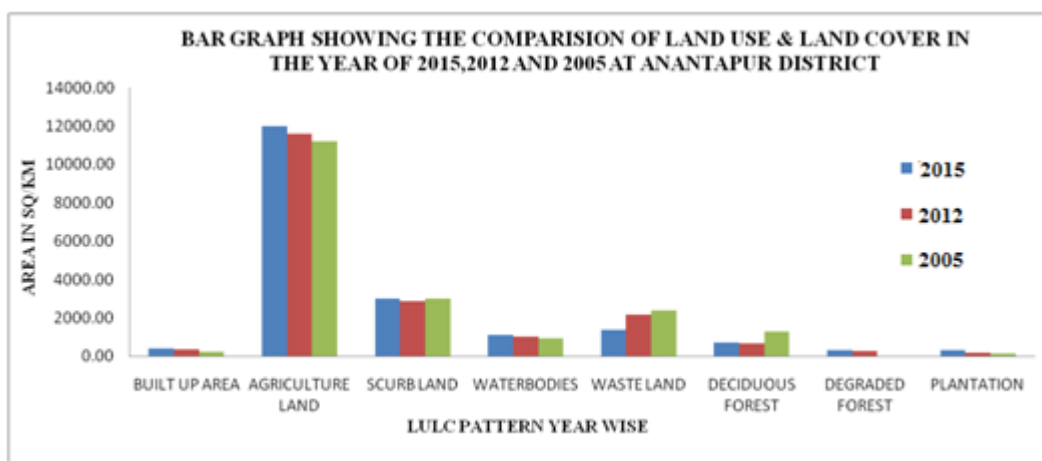
Map 5: Map showing the land use land cover of Anantapur District 2015

Table 3: Land Use & Land Cover Map of 2015

S. No	LULC pattern	Area(In sq.km)
1	Scrub Land	3015.07
2	Plantation	289.14
3	Wasteland	1344.34
4	Degraded Forest	314.42
5	Built-up Area	410.43
6	Water bodies	1104.35
7	Deciduous Forest	687.26
8	Agriculture Land	11965.00
	TOTAL LAND	19130.00

Table 4: Comparison of LULC Pattern Area Year Wise of Anantapur District

Comparison of LULC Pattern Area Year Wise(in sq/km)			
LULC Pattern	2015	2012	2005
Built Up Area	410.43	373.54	234.4
Agriculture Land	11965.00	11581.56	11179.32
Scrub Land	3015.07	2868.47	3014.33
Water Bodies	1104.35	1017.29	913.6
Waste Land	1344.34	2160.54	2367.47
Deciduous Forest	687.26	678.59	1292.31
Degraded Forest	314.42	279.43	0
Plantation	289.14	170.53	128.57
Total Area	19130	19130	19130



Through this analysis we identify the land use and land cover changes in Anantapur district. We identify that Built up area is increasing day by day in 2005 total built up area was 234.4 sq/km, in 2012 area was 373.54 and in 2015 it is increased up to 410.43 Sq.km. Similarly Agriculture land, water body and Plantation also increased. It is the good sign for economy and environment. Day by day Waste land also decrease we find that in 2005 waste land area was 2367.47 sq/km, in 2012 it was 2160.54 and in 2015 it is 1344.34. We observe from this analysis that in 2015 scrub land increase some extent it is because of waste converted in scrub. Forest cover is not change show much because most of the forest is reserved forest. So overall we can find Anantapur district improving the land use land cover pattern by using human activities and modern technologies.

5. Conclusion

This study amply demonstrates the use of Remote Sensing & GIS analyze to detect morphological changes of land use pattern through different year. Satellite data are found to be useful in mapping and quantifying the extent of the area in particular time period. Geographical Information System (GIS) and Satellite data have been used in this study to provide spatial inputs and test the statistical modal describing growth. The study area is located in the middle of the peninsular region, far away from coastal areas and riverbanks. The area does not receive the full benefit of the southwest monsoon because of rainfall cut off by the high elevated Western Ghats. Therefore, this area was falling under a hot, arid and scanty rainfall zone.

To improve the human resource quality as per the Land use and Land cover I want to say remote sensing & GIS

techniques & MIS integration should be used in the study area extensively in planning, implementing, monitoring and resolving the complicated issues. We know that the study area has above 60% agriculture land but most of the area under single crop, it to be convert into double crop for better improvement of land and human resource, health, power supply, education government have to take a good responsibility and modern technology should be used in this place.

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