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RESEARCH ARTICLE

**SPATIO - TEMPORAL LAND USE AND LAND COVER CHANGING ANALYSIS IN YERCAUD
TALUK, SALEM DISTRICT, TAMIL NADU, INDIA**

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ABSTRACT

In the present study, to evaluate the land use and land cover change detection in the shevaroyan hill, Yercaud Taluk, Salem District. It is located in the Shevaroy range of hills in the Eastern Ghats. The study area an about 385 Km². In these above study using Landsat TM and Landsat ETM+ imagery in 30 meter resolution data during the year of 1990 and 2013. The major portion of the study area covered by dense forest and following the Dry deciduous forest land. This study clearly showing about the study period of last twenty four years are noticed in the drastic changes of land use/land cover. Dense forest and land without scrub features was decreased from 1990 to 2013. Agricultural land, Dry deciduous forest, land with scrub and built up area are increased during the study period. Water bodies and current fallow land features is not change because of study area an about hilly terrain.

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INTRODUCTION

Land use / Land cover is the indicator of socio economic development of a region and its reflects impact of man determination over a resource utilization. The term land cover relates to the type of feature present on the earth surface, the term land use relates to the human activity or economic function associated with a specific piece of land. (Lilles and. T.M and R.W. Kieferetal.2007) the region growth can be validated based on Land use / Land cover. Topography is determining factor of land use pattern, in hilly terrain, resource availability and accessibility are the major factors to determine. Land is a resource, over utilization of land will create bad impact on environment once the system started to collapse, the sequential problems will arise to global community. So monitoring the changes of land use/land cover is important for a particular region present geospatial technology highly useful to make a meaning full measurement regarding land utilization. Since from 1940s PAN images and aerial photographs were using by analysis for land use mapping (Lillesand. T.M and R.W. Kieferetal.2007) for this analysis land sat satellite images were used and processed on remote sensing platform.

Study Area

Yercaud taluk is a hill station in Salem District, in Tamil Nadu, India. It is located in the Shevaroy range of hills in the Eastern Ghats. The area is called the Shevaroy Hills. The yercaud taluk is a part of Salem district located between latitudes 11°42' 58" to 11°56'26"N and longitudes 78°07'38" to 78°22'9" E and spreads to an area of about 385 square kilometers (Fig.1). In the north eastern boundary has a Valapadi taluk in Salem District, while its southern boundary is located in Salem taluk, which forms a boundary of northern

side is Papirettipatti taluk in Dharmapuri District and the weastern boundary located in Omalur taluk in Salem District. The temperature never rises above 30 °C or goes below 13 °C. The general elevation ranges from 300 to 520 m above MSL and higher elevation of 1200 to 1500 m confine to hill ranges due north with the exception of Yercaud which is at 1524 m above MSL The study area falls in three river namely 1) Thirumanimutharu, 2) Sarabanga and 3) Vaniyar River basin. The flow in the River is seasonal and surface flow could be seen during peak monsoon seasons.

METHODOLOGY

The land use/land cover prepared LANDSAT satellite imageries

Data (Path 143, Row 052, acquired on 30 meter resolution image). The image characteristics like size, shape, shadow, tone/colors, texture, pattern and various associated features were considered for interpretation and to achieve it initial identification of different land use classes was pointed out on the image before carrying out the image classification and Geo-referencing of the image was also carried out. The satellite digital data was rectified using Survey of India (SOI) topo sheets and field visits.

Yercaud Taluk is a hilly terrain; in accessibility is the main reason to exploitation of land resources. They cannot transport required resource from outer side of the region, so people inevitability exploit the available resource and they discover possible steps to clear the natural barriers. Overload of population is a great to towards exploitation of hilly terrain natural resources. The land use was classified into nine classes.

1. Agricultural land, 2. Current fallow land, 3. Built up land, 4. Dense forest cover, 5. Dry deciduous forest, 6. Land with scrub, 7. Land without scrub, 8. Mining site, 9. Water bodies.

Table. 1 Spatial Distribution Result of the Land use/Land cover-1990 in the Yearcaud Taluk

Sl.No.	Land use/land cover class	Area in sq.km	Area in percentage
1	Agricultural Land	19	5
2	Current Fallow Land	8	2
3	Built up Area	5	1
4	Dense Forest	216	56
5	Dry Deciduous Forest	65	17
6	Land With Scrub	34	9
7	Land without scrub	35	9
8	Mining Site	2	0.5
9	Water Bodies	1	0.5
	Total Area	385	100

RESULTS AND DISCUSSION

Land use/ Land cover – 1990

First phase mapping consist 1990 land use/land cover analysis. For this landsat 5 TM 30 meter resolution image was used. Total area of the Yercaud Taluk is 385 sq km. Yercaud Taluk is a hilly terrain, major portion of land covered by dense forest cover, its is moist deciduous forest, second largest land cover is dry deciduous forest and third major land cover is agricultural land .These are the three major land cover of Yercaud Taluk. Nearly percent (200 sq km) of land covered by dense forest cover. Dry deciduous forest was covered by 17 percent and 5 percent of land covered by agricultural land. Land with scrub and land without scrub are equally covered and shared by 9 percent. Rest of the classes are covered less than two percent like, current fallow land, built area, mining site and water bodies. Bauxite and magnetite are the major ores available in this region, nearly 2 sq km mining area recorded in classified images. The results shows moderate land use and people not yet started to extract the resources fully

Table 2 Spatial Distribution Result of the Land use/Land cover-2013 in the Yearcaud Taluk

Sl. No.	Land use/land cover class	Area in sq.km	Area in percentage
1	Agricultural Land	69	18
2	Current Fallow Land	12	3
3	Built up Area	16	4
4	Dense Forest	123	32
5	Dry Deciduous Forest	108	28
6	Land With Scrub	32	8
7	Land without scrub	23	6
8	Mining Site	1	0.5
9	Water Bodies	1	0.5
	Total Area	385	100

Land use / Land cover -2013

Land use of 2013 was extracted from landsat 8 ETM + image and its resolution is 30 meter. In this phase also dense forest cover further decreased as 32 percent from 56 percent, Dry deciduous forest increased from 17 percent to 28 percent. Its clearly stating deforestation still containing in this phase. Red pixels indicates canopy cover of the trees in satellite image, this decreasing continuously every phase. In this phase agricultural land reached 18 percent and presently this region having 70Sq Km agricultural area.

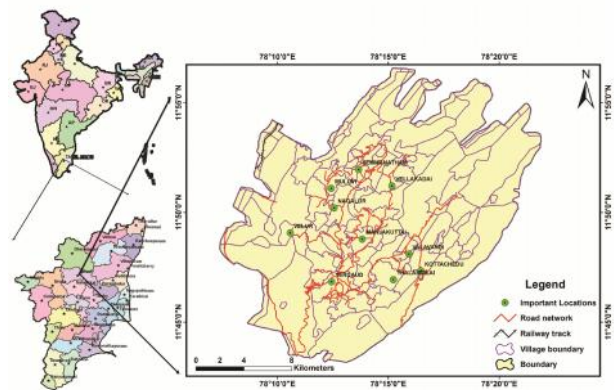


Fig. 1.1 Location Map of the Yercaud Taluk

Agricultural land increase clearly starting people are encroaching land from other classes. Forest department and Government authorities are making more restrictions towards illegal encroachment, people are helpless, they depend on only agricultural for them income. Built up area increased as 4 percent, its alarming cultural landscape are increasing and it will demand more land for built up area in future. Land with scrub decreased as 8 percent from 10 percent, land without scrub remaining the same. This result conveying land without scrub and less vegetative cover areas are frequently occupied by human interventions. Mining is gone to ending stage, in this output recorded mining only half present. Many environmentalists criticized about the mining of this region and quantity of ores also decreased so resource exploitation is decreased. Current fallow land and water bodies are remaining the same. This is final phase of our mapping, land use change is continuously in this phase and its depicts will feature the intensity and speed increase in next decades.

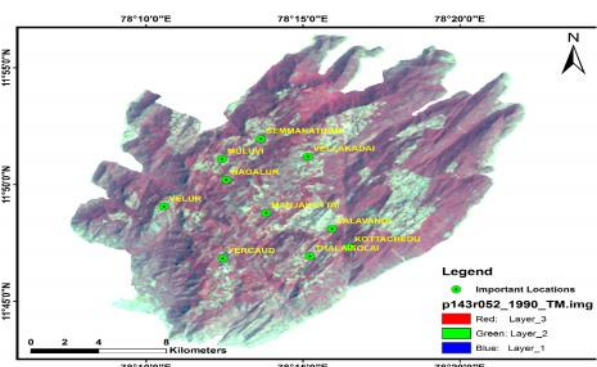


Fig. 1.2 Landsat image on Yercaud Taluk 1990

Land Use/ Land Cover Change Detection

Dense forest covered area was 56 percent during 1990 and it was decreased as 32 percent in 2013. Nearly 24 percent of dense forest cover was degraded, the dense forest cover decreased from 210 Sq Km to 120 Sq Km, nearly 90 Sq Km of forest was converted into non forest activity. land without scrub decreased as 6 percent i 2013 during 1990 it was 9 percent .Aerial unit wise 35 Sq Km of land without scrub recorded in 1990, its decreased as 23 Sq Km in 2013, nearly 12 Sq Km of land without scrub converted into usable land. These two class changes clearly indicate the influence of human activity over the land use.

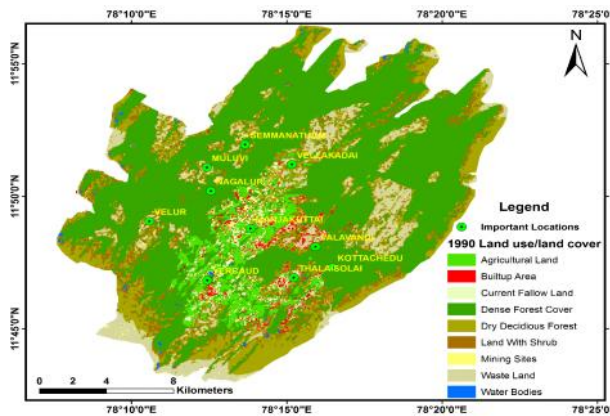


Fig. 1.3 Land use and land cover Map of the Yercaud Taluk 1990

Agricultural land use claiming first place towards increasing trend. During 1990 agricultural land covered about 5 percent of land, in 2013 it was increased as 18 percent, the net increase is 13 percent .Since from 1990 to 2013 nearly 50 Sq Km of area was added into agricultural land in 1990 agricultural land was exist 20 Sq Km, in 2013 it was increased as 70 Sq Km .

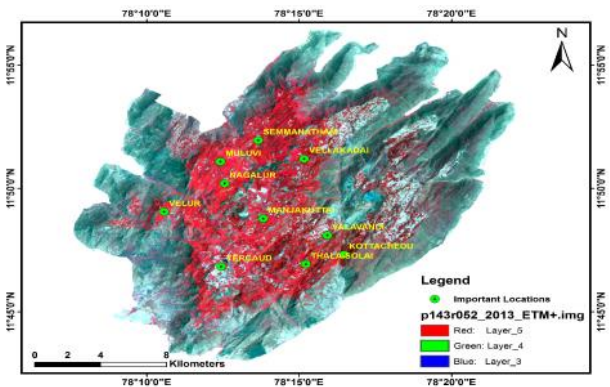


Fig. 1.4 Landsat image on Yercaud Taluk 2013

Agricultural is the main source of income for this hilly terrain, so people highly extracting the land resources for them needs. Every phase of mapping agricultural land use was increased constantly.

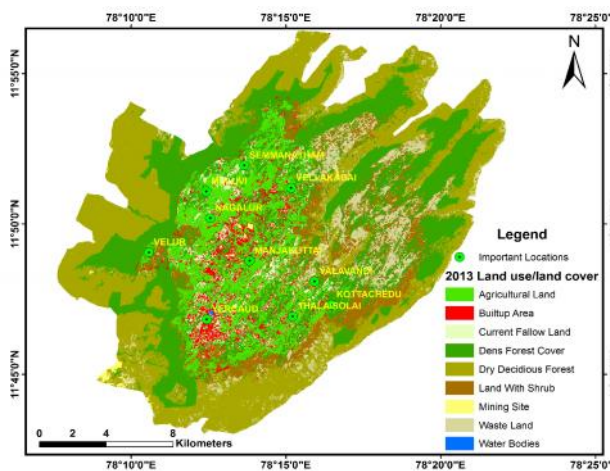


Fig. 1.5 Land use and land cover Map of the Yercaud Taluk 2013

Dry deciduous forest is the second land use increased from the

first phase to six phase during 1990 it was recorded as 17 percent, in 2013 it was recorded as 28 percent. Nearly 11 percent increase in dry deciduous forest. areal unit wise in 1990, nearly 65 sq Km of area covered by dry deciduous forest, but in 2013 its increased as 108 sq Km. Totally 43 Sq Km of dense forest cover converted into dry deciduous forest. The main reason behind this conversion is rainfall failure. Built up area increased from one percent to four percent during 1990 it was recorded 5 Sq Km, in 2013, it was recorded 16 Sq Km. This increase purely based on population growth. Very few current of built up area occupied by tourism industry like resort, hotel and parks. Remaining all is because of human activity. Finally this analysis concluding over load of population and resource exploitation are the major factors for the land use / land cover change of Yercaud taluk. This study clearly showing about the scenario of last twenty four years of land use/land covers changes. Dense forest and land without scrub features was decreased from 1990 to 2013. Agricultural land, Dry deciduous forest, land with scrub and built up area are increased. Water bodies and current fallow land features is not change because of study area an about hilly terrain.

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