

## Land Use and Land cover studies of the Achalvadi sub- watershed of Vaniyar River, Dharmapuri District, Using Remote sensing and GIS

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**Abstract:** *The land use pattern of a sub watershed is an outcome of both natural and socio-economic factors and their utilisation by population in time and space. Land is becoming a scarce commodity due to immense agricultural and demographic pressure. Change in land use is a dynamic process taking place on the surface and it becomes most important factor for managing natural resources. In the current study Remote Sensing technique is used to analyse the land use changes in Achalvadi sub watershed of Vaniyar river, Dharmapuri district, using remote sensing and GIS.*

**Keywords:** *Land use and Land cover, change detection analysis, Remote sensing and GIS*

### Introduction

Mohanty, R.R (1994). Analysis of urban land use change using sequential aerial photographs and Spot data. An example of north Bhubaneswar, Orissa. In India as well as in most developing countries, the excessive growth in population and the increased trend towards urbanization have led to many evils such as haphazard growth of industries, unplanned housing and utility networks, conversion of precious agricultural and forest land into urban land etc. Ajay K.Singh et.al ( 2014), “ Remote sensing techniques for Land use mapping in Lower agar Sub-Watershed, Chhattisgarh, India was studied the sub-watershed wise studies. Urban Land is one of the important resources provided to man by which necessary human activities are performed. Inaccurate and up to date information about the urban land is indispensable for scientific planning and management of urban resources of an area taking into consideration the potentials and the constraints to the environment. Alphan, H., 2003: “Land use change and urbanization in Adana, Turkey”, Land degradation and Development the rational planning and management of urban is possible through the regular survey of the land use helps in delineating land suitable for various activities. The IRS-LISS and PAN sensor provides high ground resolution and specified spectral resolution data for detailed studies of urban land use and for monitoring land use changes. Brahabhatt, V.S., Dalwadi, G. B., Chhabra, S. B., Ray, S. S., Dadhwal, V. K., 2000: “Landuse/land cover change mapping in Mahi canal command area, Gujarat, using multitemporal satellite data This study was undertaken for mapping the unplanned development in the Tiruchirapalli town region including its peripheral zones using IRS data and to provide up to-date information to the planners so as to fill up the gap between urban growth and information collection process.

## Study area

Pappiredipatti is one of the Taluk in the Dharmapuri district, is known as Vaniyar river flow via the town, utilize for agricultural activities in and around of the study area. The Achalvadi is one of the sub-watershed in the study area. The study area ranging from  $11^{\circ}56' 0''$  N and  $12^{\circ}1'30''$  of the Northern latitudes and  $78^{\circ}24'30''$  and  $78^{\circ}30' 0''$  Longitude. The sub-watershed cover 30.09 km<sup>2</sup> area. The Topography of the micro watershed is Plain with fluvial based in nature. The fluvial process passing towards west to east. The Vaniyar enter in the Achalvadi block with highly erosive stage. The sector contour interval minimum very less. The micro watershed covered other places are harur. Drainage of the sub-watershed is flow towards in North-South direction. The major drainage system is river, canal and tank. The few tanks situated along the study area. Slope of the sub-watershed is N-S, S-S direction of lineaments, same river flow in the direction. Geology of the study area is charnackoties in nature in the sub-watershed, due to the high elevated zone of achalavadi and adjoin villages. Landforms like plain and undulating terrain in nature of the sub-watershed. Land use is mainly in the built-up land, agricultural land, water bodies and other waste land area occupied in the sub-watershed.

Achalvadi sub-watershed- Odasalpatti lake, surrounded the agricultural land utilized for turmeric, paddy, and other small grain cultivated. In addition to this also the farming is shifting cultivation is used when the available water sources.

## Objectives

- To study the Land use and Land cover of the achalvadi sub-watershed of the Vaniyar river and bring out the various classes through SOI and Satellite images.
- To interpreted and delineated the land use classes with thematic layers, over 2005 and 2010 years and find the changing classes.
- To intergraded all parameters through GIS and trace out the changing land use and land cover of the sub-watershed.

## Research Methodology

A methodology has been formulated to achieve the present task of Land use and Land cover studies. The following are the sequence of execution, through which the aims and objectives of the present study has been directed and achieved.

**Data Sources:** The different source for the present study, both primary and secondary data's was collected.

- The SOI source with scale of 1:50,000 for the study area
- Data's generated through the thorough analysis of the Achalvadi sub- watershed. The addition to this data was collected from various private and public sector. The quantification of the sub-watershed land use and land cover classes of the study area.
- To analysis the Land use and Land cover studies of the Achalvadi sub-watershed of Vaniyar river in various parameters were studied. In addition to this also find the potential zone of the watershed.

## Result and Discussion

### Land use and Land cover studies of Achalvadi sub-watershed

The land use/land cover pattern of any region is an outcome of various physio-cultural factors and their utilization by human in time and space. Sharma, K. R., Jain, S. C., Garg, R. k, 1984: "Monitoring land use and land cover changes using land sat images" Hence, it is an important component in understanding the interactions of human activities with the environment and thus it will help to simulate changes (1). Land use and land cover (LULC) are two separate terminologies which are often used interchangeably (2). The land use describes the use to which the land is put, whilst land-cover describes the surface cover characteristics. Land use is the intended employment of land management strategy placed on the land cover by human agents or land managers to exploit the land cover and reflects human activities such as industrial zones, residential zones, agricultural fields, grazing, logging and mining among many others (3). On the other hand, land cover is defined by the attributes of the earth's land surface captured in the distribution of vegetation, water, desert and ice and the immediate subsurface, including biota, soil, topography, surface and groundwater and it also includes those structures created solely by human activities such as mine exposures and settlement.

### General Land Use/Land Cover study

The following study has been constituted in the sub-watershed wise general land use/land cover in the present status of the Vaniyar watershed. The most land use/land cover type based on the NRSC Land use classification is followed. The major land use type is Agricultural, Forest, Waste land, Fallow land and Available water bodies in the watershed. The data was collected both primary and secondary aspect followed the study.

### Land use and Land cover 2005-Achalvadi Sub-Watershed

Achalvadi Sub-Watershed is located upper portion of the vaniyar watershed study area with potential resources for agricultural and other allied activities. The sub-watershed included the Sub villages, Kudimiyampatti, Odasalpatti, Irular Street, Kalladipatti. The major Land use/Land cover is Agriculture, Forest, Fallow land and water bodies like canal and natural tanks. The natural tanks like Kudimiyampatti lake, Odasalpatti lake, Lingathur Lake etc. (Map No.1)

Figure 1 and table 1 reveal that in 2005, about 9.62 km<sup>2</sup> area of under the Land use and Land cover was under current fallow is 2.46, (25.57%), under deciduous forest is 1.39 (14.44%), under Double/triple is 2.28 (23.7%), Evergreen forest is 1.01 (10.5%), under Kharif is 1.03 (10.7%), Rabi is 0.08 (0.85%), under waste land is 0.02 (0.2%), under degraded forest is 0.09 (0.95%), scrub land is 1.26 (13.09%), and Water bodies is no changes .

**Table No. 1 Land Use and Land Cover - Achalvadi Sub-Watershed 2005**

S.No	LU/LC Classes	2005	%
1	Current Fallow	2.46	25.57
2	Deciduous Forest	1.39	14.44
3	Double/Trippl	2.28	23.7
4	Evergreen forest	1.01	10.5
5	Kharif only	1.03	10.7
6	Other Waste land	0.02	0.2
7	Rabi only	0.08	0.85
8	Scrub/Deg.Forest	0.09	0.95
9	Scrub land	1.26	13.09
10	Water bodies	0	0
		9.62	100

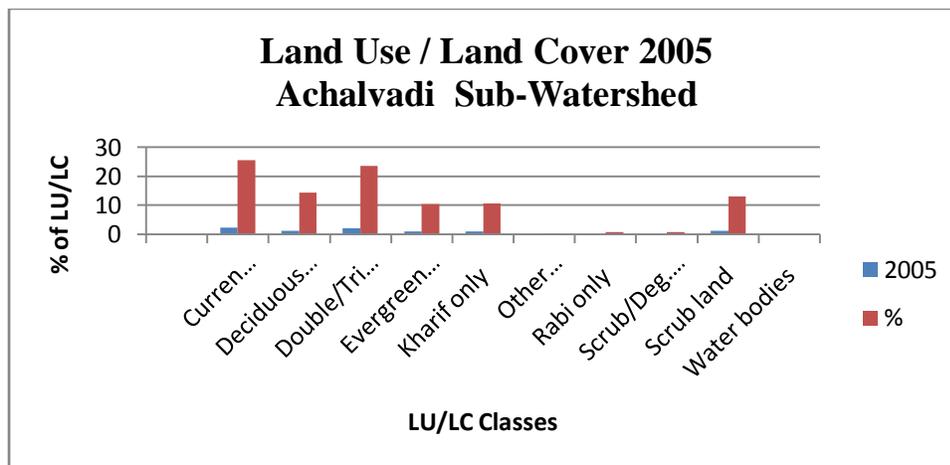
**Fig No.1 Land Use and Land Cover, Achalvadi Sub-Watershed - 2005**

Table and Figure No 1 showing the Land Use/Land Cover classes of the Achalvadi sub-watershed of the study area in the year of 2005. It indicating the absence of the rainfall for changes of land use/land cover in the watershed. From the study the last five years the Current fallow, double/triple and wasteland was increased in the watershed. In other wards the study sub-watershed is part of the foot hills of the shetheri and semi-fertile nature one. The major lakes like kudmiyanpatti, Odasalpatti and Lingathur supported to improve the well water. The figure showing the overall status of the Land use in the area

#### Land Use and Land cover 2010- Achalvadi Sub-Watershed

Figure.2 and table .2 reveal that in 2010, about 129.44 km<sup>2</sup> area of under the Land use and Land cover was under current fallow is 2.46, (1.9%), under deciduous forest is 14.82 (12.44%), under double/triple is 2.28 (1.76%), Evergreen forest is 11.98 (9.23%), under Kharif is 96.45 (75.5%),

Rabi is 0.08(0.06%), under waste land is 0.02(0.01%), under degraded forest is 0.09 (0.07%), scrub land is 1.26(0.93%), and Water bodies is no changes (Map No.2)

**Table No. 2 Land Use and Land Cover , Achalvadi Sub-Watershed 2010**

S.No	LU/LC Classes	2010	%
1	Current Fallow	2.46	1.9
2	Deciduous Forest	14.82	12.44
3	Double/Trippl	2.28	1.76
4	Evergreen forest	11.98	9.23
5	Kharif only	96.45	75.5
6	Other Waste land	0.02	0.01
7	Rabi only	0.08	0.06
8	Scrub/Deg.Forest	0.09	0.07
9	Scrub land	1.26	0.93
10	Water bodies	0	0
		129.44	100

**Fig No. 2 Land Use and Land Cover , Achalvadi Sub-Watershed - 2010**

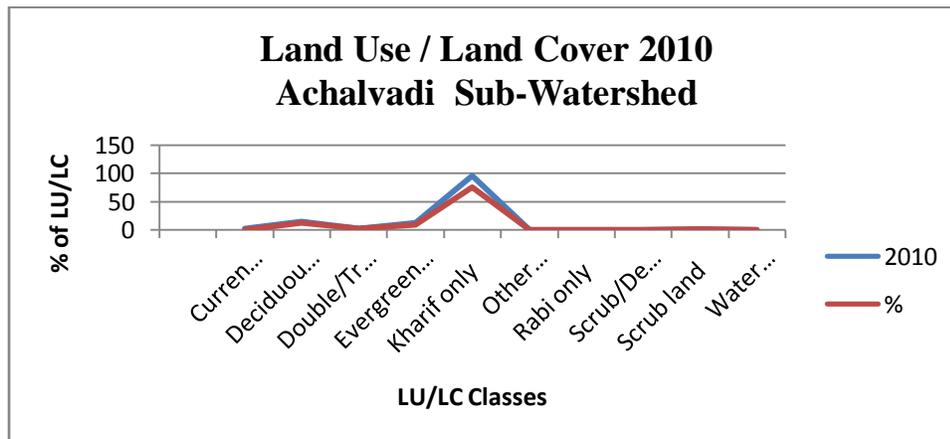


Table and Figure .2 showing the Land Use/Land Cover classes of the Achalvadi sub-watershed of the study area in the year of 2010. It indicates the favorable land use/land cover in the watershed. From the study the last five years the Kharif and evergreen forest is high ratio. The presents of the rainfall is favorable to the cultivators for practice the cropping pattern in multiple system. In other wards the study sub-watershed is part of the foot hills of the shetheri and semi-fertile nature one. The major lakes like kudmiyanpatti, Odasalpatti and Lingathur supported to improve the well water.The figure showing the overall status of the Land use in the area

## Conclusion

From the section was studied the general Land Use/Land cover the sub-watersheds of Vaniyar river, included the possible land and water utilization for agriculture, domestic and other allied activities. The Achalvadi, watersheds where engaged the agricultural activities with two yield like

Kharif/Rabi. Hereby summarized and conclusion for the section, the Land use/Land cover 2005 and 2010 years through Remote sensing data IRS P6 LISS III both two variable years.

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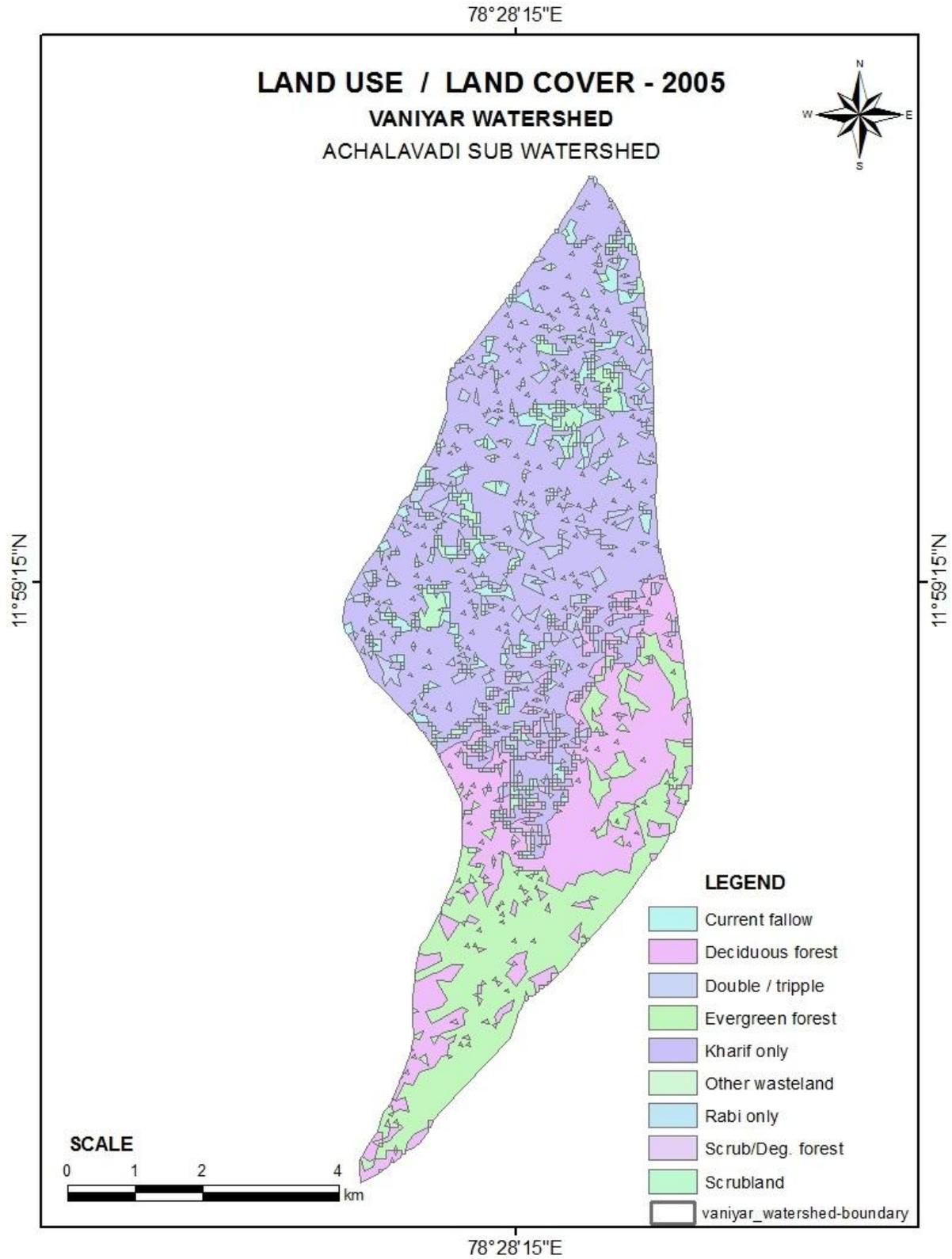
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**Map No.1 Land use and Land cover 2005-Achalvadi sub-watershed**



Map No.2 Land Use and Land Cover 2010-Achalvadi sub-watershed

