



# **LAND USE / LAND COVER MAPPING IN ANALYSIS OF TIRUCHIRAPPALLI DISTRICT, TAMILNADU USING GEOINFORMATICS**

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**Abstract** -They are important to develop effective management strategies for watersheds worldwide (Ashraf, 2013, Bazgeera et al., 2008, Caruso et al., 2005, Dietzel et al., 2005, Fortin et al., 2003, Gajbhiye and Sharma, 2012, An unplanned conversion of land under agriculture and water bodies to build up area must be checked by government legal procedures. This will enable the land to be sustained for agriculture. Kavitha.K, (2012) Remote sensing and Geographic Information Systems (GIS) are powerful tools to derive accurate and timely information on the spatial distribution of land use/land cover changes over large areas Past and present studies, mostly, has concentrated on the application of LULC changes. Tiruchchirappalli district, one of the three districts carved out of the composite district of the same name is located in the central part of Tamil Nadu between 10° 18' and 11° 25' north latitudes and 78° 08' and 79° 0' east longitudes is situated on the plains between the Shevaroy Hills to the north and the Palani Hills to the south and south-west. The city acts as an important trade centre for the surrounding districts and one of the 32 constituent administrative districts of the Tamil Nadu State. Aim and Objectives Preparation of digital geological data from Geological survey of India (GSI) for the study area. Preparation of various thematic data such Land use / Land cover Mapping using Remote Sensing Data products - IRS P6 Satellite imagery acquired during 2013 from (NRSC) Create a land use land cover map from satellite imagery using supervised classification. Find out the areas from the classified data. After having set up the objectives of the study, primary and secondary base line data .The base map of the study area has been prepared by Survey of India topographic sheets on 1: 50, 000 scales. The sequences of techniques used to fulfill the above objectives are as follows: Land use maps have been prepared using Remote Sensing Data products- - IRS P6 satellite imagery acquired during 2013 from National Remote Sensing Center (NRSC) The various Land Use / Land Cover classes interpreted in the study area include, built-up land, agricultural land (crop land, fallow land and agricultural plantation) forest (dense and degraded forest), Current fallow and other fallow occupies 30 % of the area and this implies the pressure of agricultural activities. Marungapuri, Manapparai, Mannachanallur and Vaiyampatti are dominantly found with other fallow lands followed by Thathaiyangarpettai, Musiri, Pullambadi, Manikanadam and Thiruverumpur blocks. On the district whole about 39% of the area comes under net cultivable land.

**Keywords** - Land use/Land cover, Image classification, Tiruchy District, GIS and Remote Sensing.

## **1. INTRODUCTION**

The land use and land cover map clearly shows that area of crop land is higher than others. Alaguraja.P, et.al 2010. Various studies have been conducted all over the world regarding the change analysis of watersheds through different methods. They are important to develop effective management strategies for watersheds worldwide (Ashraf, 2013, Bazgeera et al., 2008, Caruso et al., 2005, Dietzel et al., 2005, Fortin et al., 2003, Gajbhiye and Sharma, 2012, An unplanned conversion of land under agriculture and water bodies to build up area must be checked by government legal procedures. This will enable the land to be sustained for agriculture. Kavitha.K, (2012) Remote sensing and Geographic Information Systems (GIS) are powerful tools to derive accurate and timely information on the spatial distribution of land use/land cover changes over large areas Past and present studies, mostly, has concentrated on the application of LULC changes. GIS provides a flexible environment for collecting, storing, displaying and analyzing digital data Remote sensing imagery is the most important data resources of GIS. Satellite imagery is used for recognition of synoptic data of earth's surface.

## **2. STUDY AREA**

Tiruchchirappalli district, one of the three districts carved out of the composite district of the same name is located in the central part of Tamil Nadu between 10° 18' and 11° 25' north latitudes and 78° 08' and 79° 0' east longitudes is situated on the plains between the Shevaroy Hills to the north and the Palani Hills to the south and south-west. The city acts as an important trade centre for the surrounding districts and one of the 32 constituent administrative districts of the Tamil Nadu State. This district consists of 9 Taluks, namely Lalgudi, Manachanallur, Manapparai, Musiri, Srirangam, Thuraiyur, Thottiyam, Tiruverumbur and Tiruchirappalli. The land immediately surrounding the Kaveri is made up of fertile alluvial soil deposited by the Kaveri and its tributary, the Kollidam. Further south, the surface is covered by poor-quality black soil. The alluvial soil

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is conducive for agriculture and crops such as ragi (finger millet) and cholam (maize) are cultivated. North-east of Tiruchirappalli runs a belt of cretaceous rock known as the "Trichinopoly Group". Layers of archaean rocks, granite and gneiss covered by a thin bed of conglomeratic laterite are found to the south-east of the city.

It has a total geographical area of 4403.83 sq.km, which is about 3.40 per cent of the total geographical area of the state. It is bounded by Salem district in the north, Namakkal district in the north-west, Karur district in the west, Madurai and Pudukkottai districts in the south and Thanjavur and Perambalur district in the east. A location map of the district is shown as Fig 2.1 Tiruchirappalli district, comprising 504 villages has been subdivided into 9 taluks and 14 blocks for administrative convenience. The detailed administrative set-up of the district is furnished in the following. The district enjoys a tropical climate and it is hot and dry for at least eight months of the year. The hottest months are from March to July during which the city experiences frequent dust storms. During this period, the days are extremely warm and dry while evenings are rendered cooler due to the cold winds that blow from the south-east. Tiruchirappalli experiences a moderate climate from August to October, tempered by heavy rain and thundershowers, and cool and balmy climate from November to February. Fog and dew are rare and occur only during the winter season. The normal annual rainfall over the district varies from about 730 mm to about 900 mm. It is the minimum around Musiri (732 mm) in the western part.

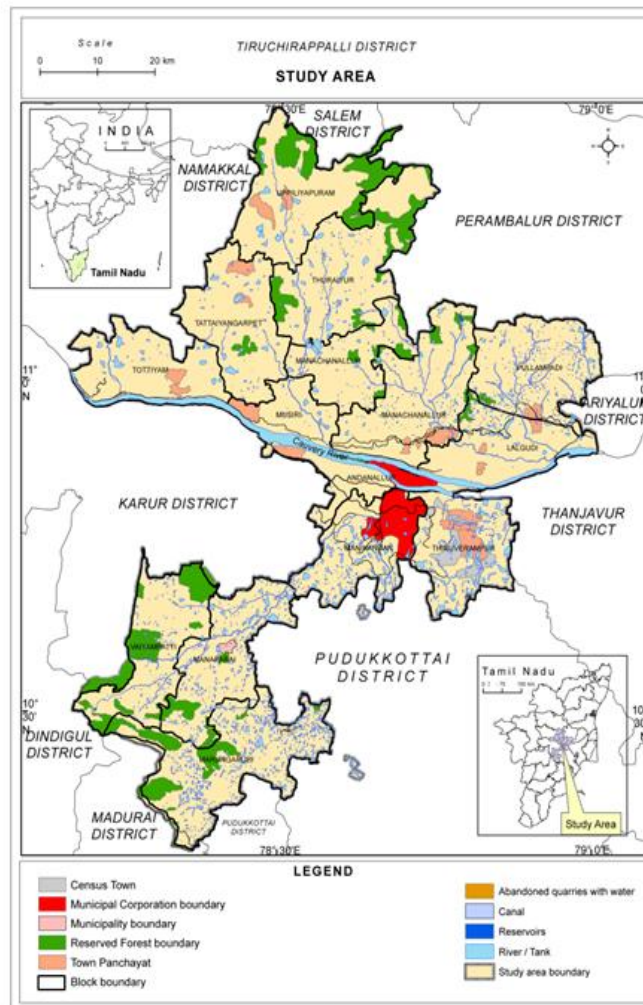


Figure: 1. Study Area

### 3. AIM AND OBJECTIVES

- 1) Preparation of digital geological data from Geological survey of India (GSI) for the study area.
- 2) Preparation of various thematic data such Land use / Land cover Mapping using Remote Sensing Data products - IRS P6 Satellite imagery acquired during 2013 from (NRSC)
- 3) Create a land use land cover map from satellite imagery using supervised classification.
- 4) Find out the areas from the classified data.

### 4. METHODOLOGY

After having set up the objectives of the study, primary and secondary base line data .The base map of the study area has been prepared by Survey of India topographic sheets on 1: 50, 000 scales. The sequences of techniques used to fulfill the

above objectives are as follows: Land use maps have been prepared using Remote Sensing Data products - IRS P6 satellite imagery acquired during 2013 from National Remote Sensing Center (NRSC) The various Land Use / Land Cover classes interpreted in the study area include, built-up land, agricultural land (crop land, fallow land and agricultural plantation) forest (dense and degraded forest), wastelands, (land with scrub, land without scrub and barren rocky areas) and water bodies detailed accounts of these Land Use / Land Cover classes of the study area

## 5. LAND USE CLASSIFICATION

Till 1949-50, the land area in India was classified into five categories known as the five-fold land utilisation classification. These categories were : (i) forests, (ii) area not available for cultivation, (iii) other uncultivated land, excluding the current fallows, (iv) fallow lands, and (v) the net area sown. This five-fold classification was, however, a very broad outline of land-use in the country & was not found adequate enough to meet the needs of agricultural planning in the country. The states were also finding it difficult to present comparable data according to this classification owing to the lack of uniformity in the definitions & scope of classification covered by these five broad categories. To remove the no comparability & to break up the broad categories into smaller constituents for better comprehension, the Technical Committee on Co-ordination of Agricultural Statistics, set up in 1948 by the Ministry of Food & Agriculture, recommended a nine-fold land-use classification replacing the old five-fold classification, & also recommended standard concepts & definitions for all the states to follow such as.

### 5.1 Forests

This includes all lands classed as forest under any legal enactment dealing with forests or administered as forests, whether state-owned or private, and whether wooded or maintained as potential forest land. The area of crops rose in the forest and grazing lands or areas open for grazing within the forests should remain included under the forest area.

### 5.2 B. Area under Non-agricultural Uses:

This includes all lands occupied by buildings, roads and railways or under water, e.g. rivers and canals and other lands put to uses other than agriculture.

### 5.3 .Barren and Un-cultivable Land:

Includes all barren and uncultivable land like mountains, deserts, etc. Land which cannot be brought under cultivation except at an exorbitant cost should be classed as unculturable whether such land is in isolated blocks or within cultivated holdings.

### 5.4 .Permanent Pastures and other Grazing Lands:

Includes all grazing lands whether they are permanent pastures and meadows or not. Village common grazing land is included under this head.

### 5.5 .Land under Miscellaneous Tree Crops, etc.:

This includes all cultivable land which is not included in 'Net area has sown' but is put to some agricultural uses. Lands under Casurina trees, thatching grasses, bamboo bushes and other groves for fuel, etc. which are not included under 'Orchards' should be classed under this category.

### 5.6 .Cultivable Waste Land:

This includes lands available for cultivation, whether not taken up for cultivation or taken up for cultivation once but not cultivated during the current year and the last five years or more in succession for one reason or other. Such lands may be either fallow or covered with shrubs and jungles, which are not put to any use. They may be assessed or unassessed and may lie in isolated blocks or within cultivate holdings. Land once cultivated but not cultivated for five years in succession should also be included in this category at the end of the five years.

### 5.7 .Fallow Lands other than Current Fallows:

This includes all lands, which were taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years.

### 5.8 .Current Fallows:

This represents cropped area, which are kept fallow during the current year. For example, if any seeding area is not cropped against the same year it may be treated as current fallow.

### 5.9 .Net area Sown:

This represents the total area sown with crops and orchards. Area sown more than once in the same year is counted only once.

## 6. LAND USE ASSESSMENT

Land use assessment of the study area is done with the aid of both statistical data from village papers and the satellite imagery. The geographical extension of each land use category has been assessed from the interpretation of 2011 - 2012 land records (Table 5.5.) and the IRS P6 LISS -IV Satellite imagery.

Forest occupies only 4% of the study area of which Thuraiyur block shares larger area (3097.915 hect), followed by Marungapuri (7742 hecct) and Mannachanallur blocks (1555 hect).

20% of the study area is covered by non-agriutual landuse mainly attributed by check dams and roads.

Notably, current fallow (5%) and other fallow (25%) occupy 30% of the area implies the pressure of agricultural activities. Marungapuri, Manapparai, Mannachanallur and Vaiyampatti are dominantly found with other follow lands followed by Thathaiyangarpettai, Musuri, Pullambadi, Manikanadam and Thiruverampur blocks.

Regarding net cultivable land, there is 39% of the area comes under this category largely shared by Pullanbadi, Musuri, Thuraiyur, Mannachanallur and Thottiyam blocks. The blocks namely Marungapuri, Uppliyapuram, Lalgudi, Thathaiyangarpettai and Vaiyampatti blocks also share considerable amount of net cultivable area.

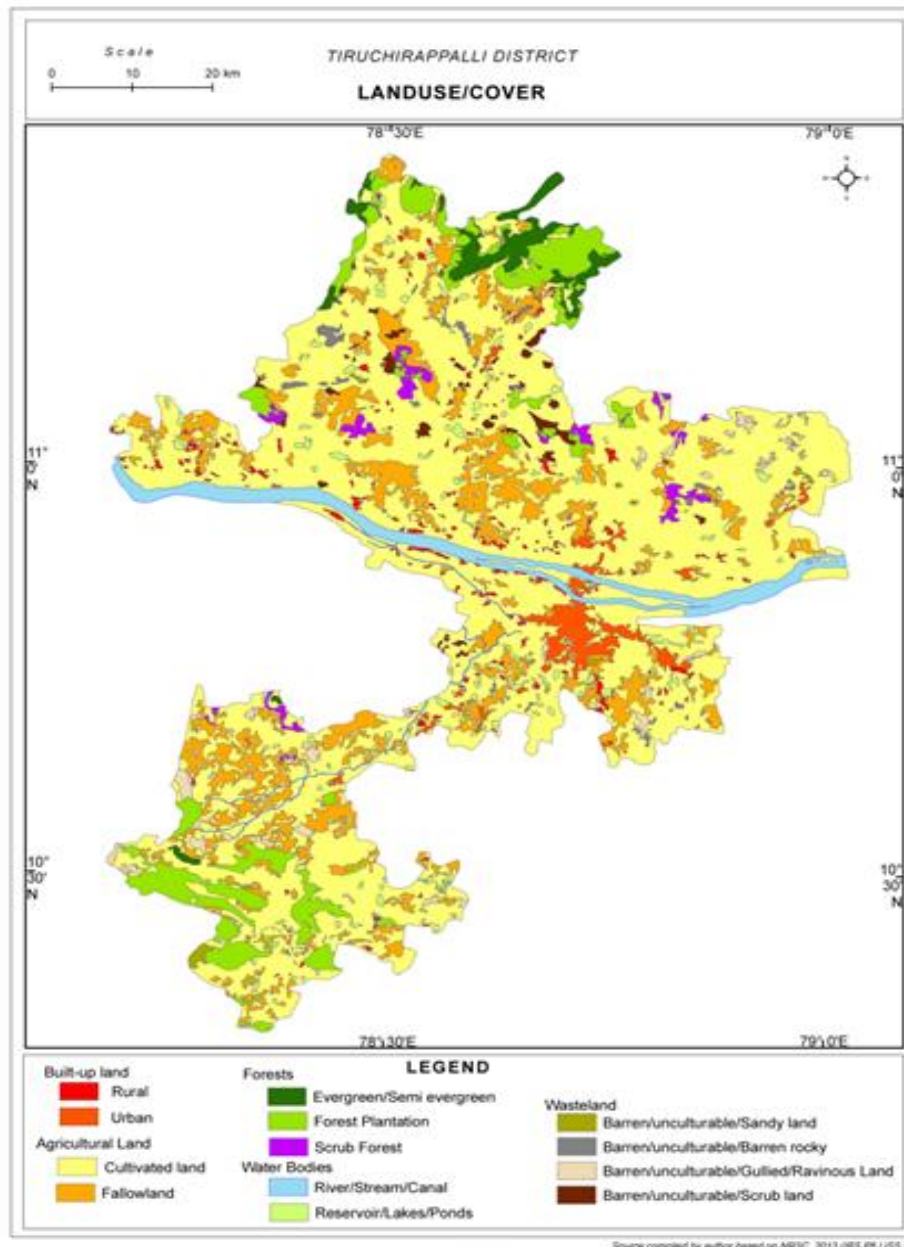


Figure: 2. Landuse/Land cover

## 7. CONCLUSION

Land use assessment of the study area is done with the aid of both statistical data from village papers and the satellite imagery. Accordingly, forest occupies only 4% of the study area and 20% of the study area and is covered by non - agricultural landuse. Current fallow and other fallow occupies 30 % of the area and this implies the pressure of agricultural activities. Marungapuri, Manapparai, Mannachanallur and Vaiyampatti are dominantly found with other fallow lands followed by Thathaiyangarpettai, Musiri, Pullambadi, Manikanadam and Thiruverumpur blocks. On the district whole about 39% of the area comes under net cultivable land.

## 8. ACKNOWLEDGMENT

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