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# Study on High Resolution Satellite Data for Mapping in Karamala Taluka

**Nileshwari Yeole[1], Suyog P. Urade[2]**

College of Agricultural Engineering and Technology,
Dr. Panjabrao Deshmukh Agricultural University, Krishi Nagar, Akola (MS), India- 444 104

**Abstract:** ***Remote sensing technology has been used actively in getting near real time information on various aspects of agriculture. India, with advanced satellite programmes and also largely agriculture-based economy is well placed for effective application of Remote Sensing Technology and Geographic Information System (GIS) in managing the agriculture resource in the country. The study is focus on high resolution satellite data for land use, land cover mapping in Karmala taluka of Solapur District in Maharashtra. Study was under taken to digitize the classes in various land use land cover classes such as waste land, water bodies, built up, agriculture and agricultural plantation are classified (digitized) with the help of Remote sensing and GIS and high resolution satellite data (LISS-IV). The class which was digitized in LULC mapping was found that the agricultural land is 80%, land without scrub covers 7.9%, forest land 0.48%. Water bodies such as river 0.5, land 0.92%, tank, lake, and pond is 0.43%, reservoir 8.5% and built up (settlement) is 1.29 % of the total geographical area.***

**Keywords:** Remote Sensing, Geographic Information System, LULC mapping

## 1. Introduction

Maharashtra is large and prosperous State with rich natural resources and extensive variability in terrain characteristics and associated eco-system. The State is occupying a geographical area of 3.08 million sq. km and currently supporting an estimated human and cattle population of 100 million and 60 million respectively, distributed over seven distinct rainfall zones [1].

The generation of spatial information related to earth surface has become handy with the advent of satellite remote sensing which coupled with Geographical Information System (GIS) technology has enhanced the data storage, retrieval and data analysis. Further, creation of computerized data base also adds a new dimension to the dissemination of information in the form of networking for the free flow of data and information exchange for speeding up implementation programmes.

Advances in farming technology provide the tools needed to apply information from multispectral images to agricultural monitoring and management. Some of the parameters that can be studied by a combination of satellite imagery, GIS and field verification include crop type, state of maturity, crop density, crop geometry, crop vigor, crop moisture, crop, temperature, crop health, soil moisture, soil temperature, etc. At grassroots level, such studies offer farmers various opportunities to increase production, reduce input costs, and manage the land more efficiently in combination with new technology and farming practices [1].

## 2. Materials and Method

Land use / land cover mapping studies have been carried in Karmala tahsil of Solapur district. Database used and methodology adopted in the present study is described below [2].

### 2.1 Geographical Location and Extent

Project area selected is Karmala tahsil of Solapur district which is a part of Scarcity zone in Maharashtra, located in the southern part of the state and lies between $18^0$ 25' and $18^0$ 45' north latitudes and $75^0$15' and $75^0$25' east longitudes, covering an area of about 1595 $km^2$.

### 2.2 Administrative Setup

The Solapur district is divided into 11 administrative subunits (tahsil).The city of Solapur is the district headquarter. It is located on the south east of the state and lies entirely district is drained by the Bhīma river. Figure 1 shows the administrative units of the Karmala tahsil.

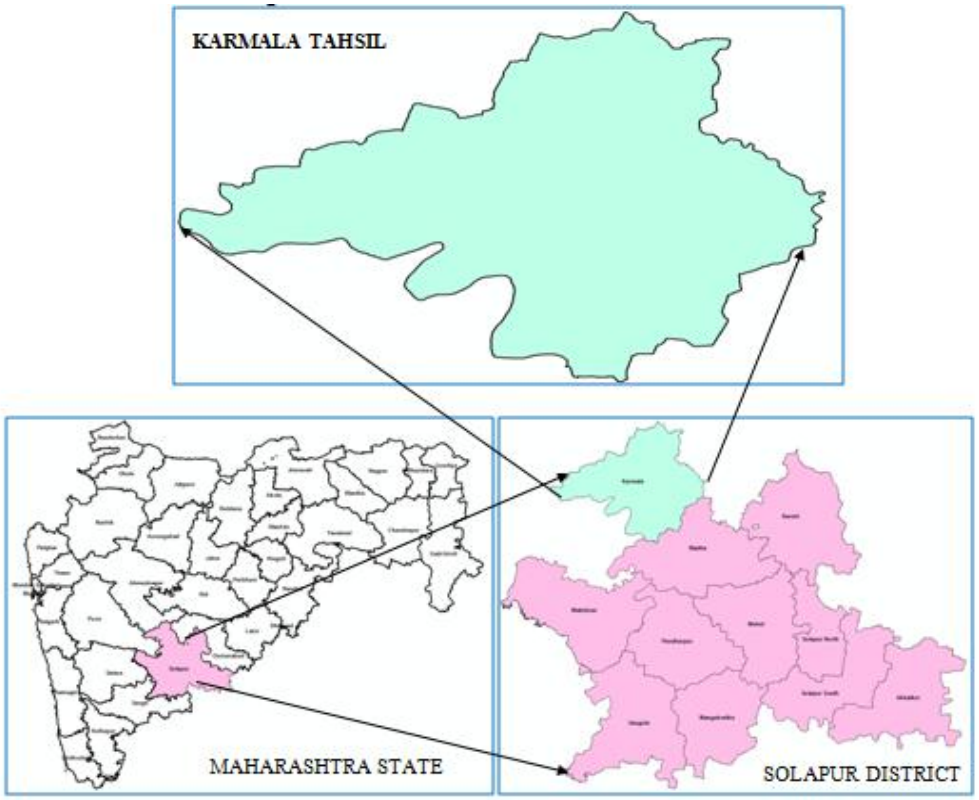


**Figure1:** Index map of study area

### 2.3 Database Used

#### 2.3.1 Satellite Data

IRS-P6 LISS IV digital data of November 2011 of the project area have been used. High resolution satellite data used for identification of different land use / land cover features in Karmala taluka, Solapur District [3]. The FCC of study area is as shown in Figure 2.

#### 2.3.2 Software and System

ARC-GIS 10.2, Arc-Info softwares were used in the present study. Arc-GIS 10.2 is a suite of integrated applications that allow you to perform GIS tasks, from simple to advanced, including mapping, geographic analysis, data editing and compilation, data management, visualization and geo-processing.

## 3. Results and Discussion

**Satellite Data Rectification and Re-sampling**

Image rectification operations aim to correct distorted or degraded image data to create a faithful representation of the original scene.

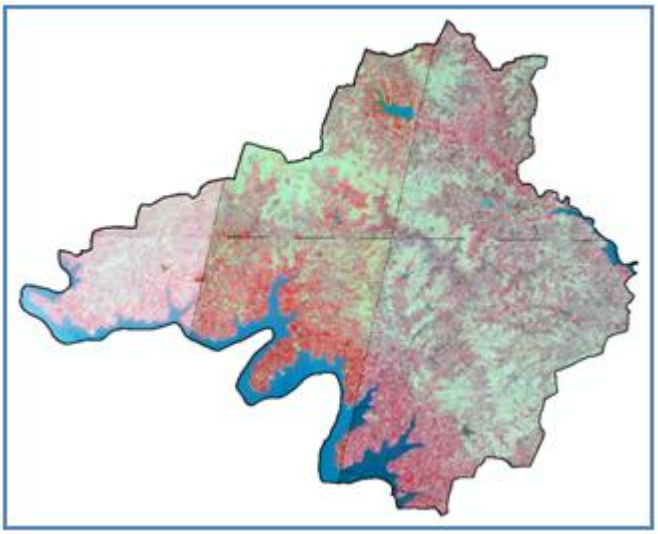

**Figure 2:** FCC of Karmala Taluka, Solapur District

Study resulted in significant outcome on land use/land cover pattern of Karmala taluka is as below .

**Land Use / Land Cover Mapping**

The land use map of the proves to be very useful for analyzing the ecological and socio-economic features and to study the effects of atmospheric activities on the is environment and vice-versa. It can be also be used to analyze and compare the findings of natural, modified and managed ecosystems. The land use/land cover map prepared using satellite data is presented in Figure 3 showing all dominant land use categories in Karmala tahsil of Solapur district [6].

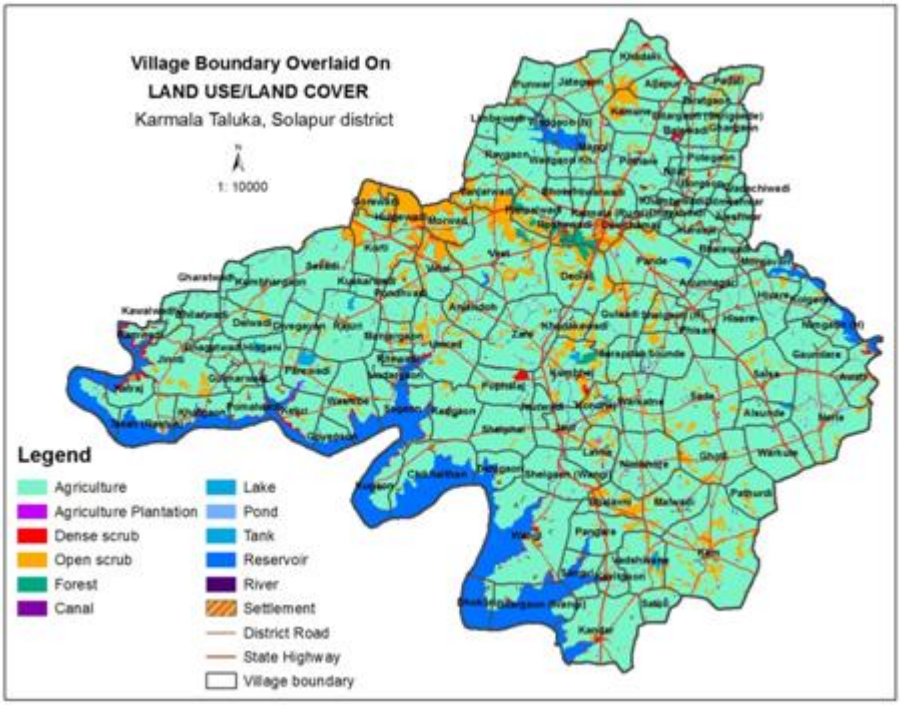


**Figure 3:** Land Use / Land Cover map of Karmala Taluka, Solapur District

The main land use / land cover categories delineated on the satellite imagery on 1:10000 scales are discussed below. Areas under different land use / land cover categories are presented in Table 1. [9]

**Table 1:** Statistics of land use and land cover map categories in Karmala taluka.

| *Sr. No* | *Land use / Land Cover Classes* | *Area (Ha)* |
|---|---|---|
| 1 | Agriculture | 126646.00 |
| 2 | Agriculture Plantation | 391.00 |
| 3 | Dense scrub | 1411.00 |
| 4 | Open scrub | 12673.00 |
| 5 | Forest | 770.00 |
| 6 | Canal | 1475.00 |
| 7 | River | 28.00 |
| 8 | Pond | 165.00 |
| 9 | Tank | 8.00 |
| 10 | Lake | 524.00 |
| 11 | Reservoir | 13692.00 |
| 12 | Settlement | 2070.00 |
| | Total = | 159853.00 |

## 4. Conclusion

The Land Use / Land Cover mapping carried out in the Karmala tahsil, Solapur district using High Resolution satellites data for LULC mapping using Remote sensing and Geographical Information System. Out of total geographical area of Karmala tahsil, it was found that agricultural land was 80%, land without scrub covered 7.9%, forest land 0.48%. Water bodies such as river 0.5, land 0.92%, tank, lake, and pond 0.43%, reservoir 8.5% and built up (settlement) 1.29 %.

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