

## **Generation of soil map using remote sensing and geographic information system for Malegaon watershed in Maharashtra**

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### **ABSTRACT**

The research study was undertaken to generate soil map for Malegaon watershed of Nasik district in Maharashtra. The base maps such as watershed boundary, drainage network were prepared with the help of Survey of India (SOI) topographical map. The satellite data of IRS-1B (LISS-II) of 11<sup>th</sup> November 1993, 30<sup>th</sup> January 1994 and 8<sup>th</sup> May 1994 of the study area were used for generating thematic map of soil map. Soil mapping of the study area was carried out to study characteristics, qualities and classes of the different soils, their location and spatial distribution. IRS-1B (LISS-II) data of November 1993, January 1994 and May 1994 was used along with the available soil map of the area for the generation of the soil map. The soil map was prepared in the category of soil series map. The soil map shows that about 62 per cent of soil was cultivable.

**Key words :** Base maps, Soil map, Remote sensing, GIS.

**T**hematic maps serve three primary purposes. First, they provide specific information about particular locations. Second, they provide general information about spatial patterns. Third, they can be used to compare patterns on two or more maps. When designing a thematic map, cartographers must balance a number of factors in order to effectively represent the data.

Soil survey or soil mapping, is the process of determining the soil types or other properties of the soil cover over a landscape, and mapping them for others to understand and use. It applies the principles of soil science, and draws heavily from geomorphology, theories of soil formation, physical geography, and analysis of vegetation and land-use patterns. Primary data for the soil survey are acquired by field sampling, supported by remote sensing,

Remote sensing and Geographic Information System (GIS) are the most handy and accurate tools to measure the various earth resources and their potentials. Using satellite based remote sensing various resources maps can be generated and using GIS tools these maps can be further analysed to derive a composite maps with numerous information, which finally derives new maps like land capability and land suitability maps.

Mohanty (1994) made an attempt to detect the changes in land use pattern using sequential aerial photographs of 1974 and 1989 and compared with SPOT data of 1988 with the help of 'USEMAP' GIS software package. He suggested that in order to know the trend of development and land use patterns, analysis of sequential aerial photographs and satellite imagery of different years is useful tool. Das *et al.* (1997) conducted the study for groundwater exploration and development in Keonjhar district of Orissa. In this study, air borne and space borne

data was used for qualitative evaluation of groundwater resources. Rao *et al.* (1997) undertook a study in Neelkanthpuram Watershed with the objective of generating action plans for sustainable development of land and water resources through the integration of information on soils, land use/land cover, slope hydrogeomorphology etc. using GIS approach. Chaurasia and Sharma (1999) studied the land use through IRS-1C (LISS-II) data of the Saroa block in Nawanshahr district, Punjab. Pandit *et al.* (1999) carried out a case study of Nasik district (Maharashtra) using remote sensing and GIS based integrated watershed development.

### **METHODOLOGY**

The information provided by the satellites in combination with other sources of information can be integrated through GIS to quantify the various parameters for efficient management of land and water resources in watershed.

#### **Study area:**

The study area covers the Malegaon watershed of Nasik Tehsil, which is located in the south-western part of Nasik district (Maharashtra) and lies between 72°28' to 73°37' E Longitude and 20°00' to 20°05' N Latitude. The watershed covers an area of 5022.97ha. Physiographically, the area can be divided into alluvial plain, local valleys, undulating upland, plateau plain, high plateaus, foot slope followed by the hill slopes. The general elevation ranges from 538 m to 1245 m above mean sea level. The general slope of the area is from north-west to south-west. The study area has subtropical, semi-arid monsoon climate with average annual rainfall of 1100 mm