

Research Paper :

## Automatic generation of land capability map using remote sensing and geographic information system techniques

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Accepted : May, 2009

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### ABSTRACT

The research study area covers Malegaon watershed of Nasik District. This study was undertaken to generate thematic maps and to design and develop a package in Geographic Information System (GIS) for automatic generation of land capability map using Arc Macro Language (AML). 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 various thematic maps such as landuse/land cover, soil, hydrogeomorphology and slope. The land capability map was developed automatically in GIS using AML by assuming and standardizing the soil parameters. On the basis of standardization, the parameters of the soil were assigned with the appropriate weightages by program. The spatial and non-spatial data of the soil were taken into consideration for generation of the layer.

**Key words :** Thematic maps, Arc macro language, Graphic user interface menu

A sound and complete farm-conservation plan, requires an inventory of the land, which is most conveniently recorded on a map and a farm business available facilities. Thus it is necessary to know the carrying capacity of each land. Land capability is referred as suitability of the land based on inherent characteristics of the soil, associated land features, and climatic conditions that limit their safe use under agriculture, forestry etc. in sustainable manner. The method recognizes the whole land into eight classes from class - I to class - VIII, in which class-I to class-IV are suitable for cultivation, while the class-V to class-VIII are not suitable for cultivation.

Remote Sensing and Geographic Information System (GIS) are the most handy and accurate tools to identify the various earth resources and its potentials. Using Remote Sensing techniques, various resource maps can be generated and with the help of GIS these maps can be further analyzed to derive composite maps with various information on different layers. Finally, with their integration derive new maps like land capability and land suitability.

Mohanty (1994) detected 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. 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. Pandit *et al.* (1999) carried out a case study of Nasik district (Maharashtra) using remote sensing and GIS based integrated watershed development. Murthy *et al.* (2000) planned village level action plans for land and water resources development, which required higher scales for planning. The action items for plan implementation were either area specific or local specific and to identify the end beneficiaries. This study was undertaken to generate thematic maps and to design and develop a package in Geographic Information System (GIS) for automatic generation of land capability map.

### METHODOLOGY

#### Study area:

The study area covered 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 area was 5022.97 ha. Physiographically, the area can be divided into alluvial plain, undulating upland, plateau plain, high plateaus, foot slope followed by the hill slopes. The general elevation ranges from 538 m to 1245 m above MSL. 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 and mean maximum and minimum temperatures of 34°C and 10°C.