

Research Paper :

Development of thematic maps for a watershed using remote sensing and geographic information system

S.L. SURYAWANSHI AND S.H. BHUTADA

Accepted : March, 2010

See end of the article for authors' affiliations

Correspondence to:

S.L. SURYAWANSHI

Department of Soil and Water Conservation Engineering
Aditya College of Agricultural Engineering and Technology,
BEED (M.S.) INDIA

ABSTRACT

The research study was undertaken to generate various thematic maps for Malegaon watershed of Nasik district. The base maps such as watershed boundary, drainage network were prepared with the help of Survey of India topographical map. The satellite data of IRS-1B (LISS-II) of 11th November 1993, 30th January 1994 and 8th May 1994 of the study area were used for generating various thematic maps such as land use/land cover, soil, hydrogeomorphology and slope map. The land use/land cover map indicates that 35.07% was *Kharif* cultivated land and 4.32% was the double crop land. The watershed area consisted of eleven soil series, most of them were cultivable. The hydrogeomorphology map showed that 77.18% area of the watershed has moderate ground water potential. The slope map showed that about 50% of the land was slope less than 5% that should undergo cultivation.

Key words : Thematic map, Watershed, Remote sensing

A thematic map focuses in a specific idea or theme. A thematic map illustrates a particular subject and contrasts the general map, in which the variety of geological and geographical phenomena regularly appear together. Thematic maps also emphasize spatial variation of one or a small number of geographic distributions. These distributions may be physical phenomena such as climate or human characteristics such as population density and health issues. Thematic 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. A thematic map is a map that emphasizes a particular theme or special topic such as the average distribution of rainfall in an area. They are different from general reference maps because they do not just show natural features like rivers, cities, political subdivisions and highways. Instead, if these items are on a thematic map, they are simply used as reference points to enhance one's understanding of the map's theme and purpose.

Remote sensing and GIS are the handiest 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 were 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. 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.

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