

Application of satellite data : a case study of Sunsari district

Swoyambhu Man Amatya¹

Remote sensing has increasingly becoming a viable tool in efficient mapping and monitoring the natural resources. The availability of high resolution satellite data (i.e. IRS, SPOT, Landsat TM) have made possible in planning and management of natural resources even at local level. Computer based image processing systems have become less expensive and more efficient. Integration of Geographical Information System (GIS) with remotely sensed data had added a new

Application of satellite data : a case study

The forest cover change analysis was carried out for only one Terai districts (Sunsari) of the country with a view to observe the change of forest and other land use in more detail which would help planning and preserving the natural resources. Landsat TM data of December 17, 1991 and January 18, 1998 were used in this study. Available aerial

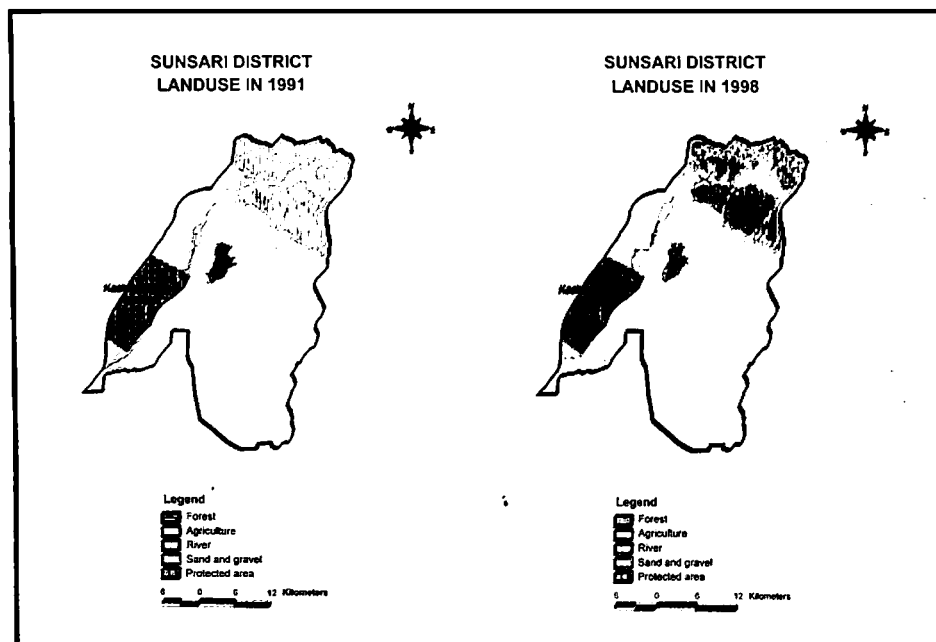


Figure: Landuse changes in Sunsari District between 1991-1998

dimension in remote sensing applications. The Department of Forest Research and Survey of Nepal has been using remote sensing data in assessing the forest resources of the country since 1980. Particularly, satellite data have been used in forest resource mapping, monitoring and detecting forest cover change.

Although satellite data were in use since early eighties, it was used as a technique in analyzing the forest cover change in the 20 Terai district of the country during 1990/91. It had used Landsat TM and Indian Remote Sensing (IRS) data for forest cover mapping.

photographs and maps were also used for selecting the samples. The satellite data were purchased from Indian Receiving Station at Hyderabad. ERDAS IMAGE soft were was used for the image analysis and Arc-View software was used for image lay out design and map printing.

Results

The study had showed that forest cover and other land use have decreased quite substantially between the period of seven years (figure). The river basin has also decreased by one hundred hectares approximately (Table 1).

¹ Deputy Director General, Department of Forest Research and Survey, Babarmahal.

Table 1: Landuse changes in Sunsari District

Landuse	Area in 1991 (ha)	Area in 1998 (ha)	Difference (ha)
Forest and shrub	25,967	20,551	5,416
Sand and Gravel	4,551	2,735	1,816
River and water body	1,912	1,818	94
Others	94,303	101,629	7,326
Total	126,733	126,733	

Discussions

Forest cover of Sunsari District in 1991 has 25 967 ha which had decreased to 20, 551 in 1998. This gives a glimpse of the rate of depletion of forest in that district data helps in planning and managing the forest resources for sustained supply of forestry products for future.

This type of figures could be obtained easily from aerial photographs as well. In Nepal, aerial photographs have been in us for three decades for

mapping and monitoring the natural resources. But specially for forestry purposes large scale (1: 10,000 to 1: 50,000 scales) photographs are needed which are costly. And for countries like Nepal, it is not always practicable to take aerial photographs frequently because of it difficult terrain. As computer based image processing is relatively cheaper and more efficient than manual working, the role of satellite data has become increasingly important in assessing the natural resources in the country like Nepal.

Limitations

It has been observed that use of satellite data in forestry applications is still a challenging job given the hilly and mountainous nature of the country. Two types of limitations have been experienced in satellite data application in forestry. Firstly, it is very difficult to get cloud free data and secondly the shadow effect. In a mountainous country like Nepal, shadow pose a major limitation in accurate vegetation classification. Normalised Difference Vegetation Index (NDVI) do not improve very much the classification accuracy. The clouds are pertinent problem in optical sensing systems.