Land Use/Land Cover Mapping In Lehra Gaga Block, Sangrur District, Using Multidate Satellite Data

ANIL SOOD, D.C. LOSHALI AND P.K. SHARMA
Punjab Remote Sensing Centre, Ludhiana - 141.004 (Pb.)

ABSTRACT

An attempt has been made to map land use/land cover classes and to identify the low productive areas in Lehra Gaga block of Sangrur district, Punjab. Five broad classes i.e. built up lands, agricultural lands, forest lands, waste lands and water bodies were identified at level I. Further sub division of the broad classes resulted in fourteen classes at level II. The areas under different land classes, their potentials and differnet land use options are discussed in the paper.

Introduction

Landuse/land cover information is the basic pre-requisite for land, water vegetation resource utilisation, conservation and mangement. The information on land use/land cover availbale today inthe form of thematic maps, published statistical figures in records and publications are inadequate, inconsistent and do not provide up-to-date informaton on the changing land use pattern, processes and their spatial distribution. It is here, satellite remote sensing offers alternate, accurate and faster mode of data collection and updating the land use/land cover information.

In the present study an attempt has been made to map land use/lant cover classes and to identify the low productive areas in Lehragaga block (covering an area of 73527 ha) of Sangrur district using multidate satellite data.

Materials and Methods

The Indian remote sensing satellite (IRS 1B LISS II) data in the form of False Colour Composite (FCC) generated from bands 2, 3 & 4 of three seasons *viz.,* May, 1992, October 1992 and March 1993 on 1:50,000 scale were used for mapping land use/land cover of the block.

The multidate imageris generated from bands 2, 3 and 4 on 1:50,000 scale were interpreted visually for mapping land use/land cover of the area using the different image interpretation elements. The local knowledge of the area has also been taken into consideration at the time of interpretation. Base maps on 1:50,000 scale of the area were prepared using the Survey of India topographical sheets. The interpreted features were transferred onthe base maps. An extensive

ground truth of the area was made to check doubtful units and the corrections were made. Emphasis was given to map and measure the agricultural crop land area under *Kharif* and *Rabi,* double cropped area, fallow land and agricultural plantations to estimate the Net Area Sown (NAS) and Gross Cropped Areas (GCA) in the block alongwith area under wastelands, water bodies and built up land. Finally geographical area under each land use/land cover class was computed and tabulated.

Results and Discussion

It was found that built up lands, agricultural lands, forest lands, wastelands and waterbodies are the five broad land use classes identified at level-I. The agricultural lands comprising 87.31 per cent of the total geographical area of the block (TGA) is the largest class. The next is the built up lands with an area of 3916.9 ha (5.33 percent of the TGA) followed by wastelands occupying 4.62 percent of the TGA. The forest and water bodies cover very small area which comes out to be 1.31 and 1.43 percent of the TGA, respectively. Further sub-division of the broad classes on the basis of photo elements *viz.,* tone, texture, size, shape, association etc. revealed that there are fourteen classes identified at level II (Table 1). A brief resume of the classes is given as under :

Built up land

This category comprises of built up areas (rural and urban) and major roads and railways connecting the villages and towns. It occupies 3916.9 ha (5.33 percent of the TGA in the block), out of which settlements (urban and rural) covers an area of 2975.7 ha (75.97 pecent of the area under built up lands).

Table 1   Area under different landuse/land cover categories in Lehra Gaga block (district Sangrur)

Landuse class		Area (ha)	% of the total area (73527 ha)
Level-I	Level-II		
Builtup lands		3916.9	5.33
	Settlement	2975.7	4.05
	Roads	920.2	1.25
	Railways	21.0	0.03
Agricultural lands		64195.5	87.31
	Kharif crop land	60990.3	82.95
	Rabi crop land	62437.7	84.92
	Double cropped	59259.8	80.60
	Net area sown	64195.5	87.31
	Gross cropped area	1245.52	16.79
	Agricultural Plantation	27.2	0.04
Forest lands		961.3	1.31
	Forest plantation	961.3	1.31
Waste lands		3397.8	4.62
	Sand dunes	1528.0	2.08
	Water logged	942.3	1.28
	Salt affected	927.5	1.26
Water bodies		1055.5	1.43
	River	296.4	0.40
	Reservoir/pond	60.4	0.08
	Canals	698.7	0.95
Total		73527	100

Agricultural lands

The study of the landuse/land cover map (Fig. 1) and area statistics given in table 1 showed that the net area sown in the Lehra Gaga block is 64195.5 ha i.e. 87.31 percent of the TGA of the block, out of which, 59259.8 ha (92.31 percent) is doubled cropped. Rice-wheat is the main cropping sequence followed in the area. Crops like sugarcane, gram, sustard, toria and vegetables are also grown by the farmers. Among the agroforestry plantations, Eucalyptus, popular and ber orchards are common.

Forest lands

The plantations along the roads, railway lines and canals have been taken under this class. The area covered by forest plantations is 1.31 percent of the TGA, thus the block lacks the minimum required area under forest to maintain the ecological balance.

Waste lands

A considerable area (4.62 percent of the TGA) covered by various types of wastelands was seen in the Lehragaga block. Among the wastelands, sand dunes/ sand bars occupied the maximum area (1528.4 ha). Some of the sand dunes are also cultivated when there is adequate rain. The
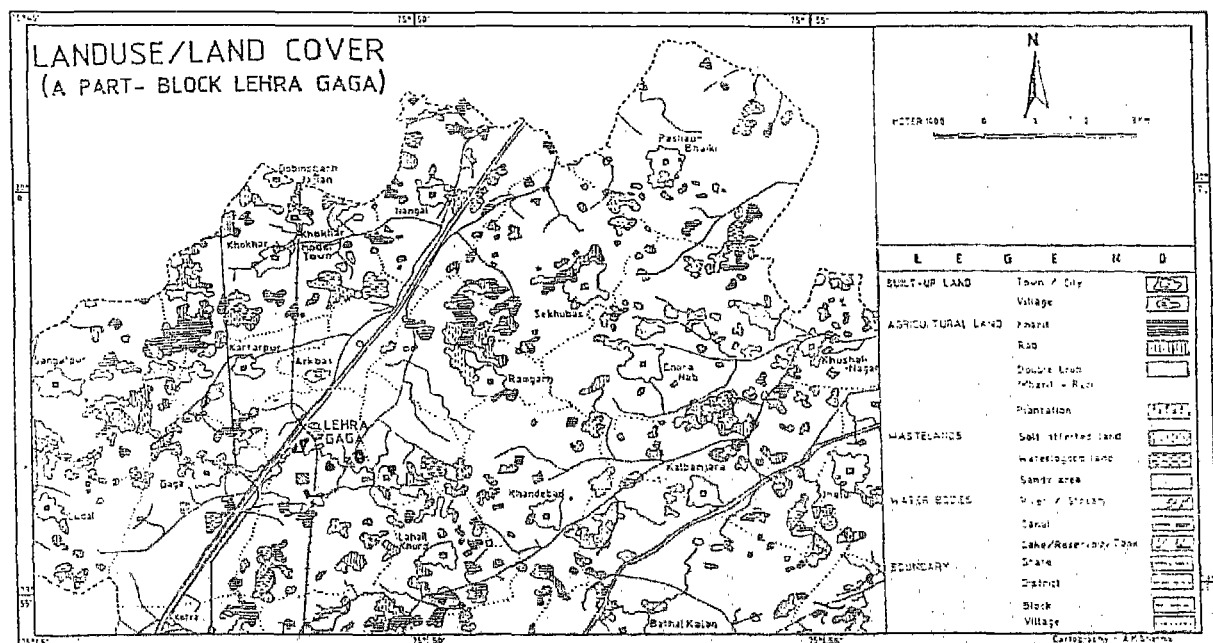

Fig. 1   Landuse/Land Cover (A part - Block Lehra Gaga)

waterlogged area in the block is 942.3 ha (1.28 percent of TGA), whereas 927.5 ha area (1.26 percent) is affected by salinity. The waterlogging problem suggests that existing drainage network in the area is inadequate to effectively drain the excess water from the area.

Water bodies

This category of land use includes rivers, canals and reservoir/ponds and occupies an area of 1055.5 ha (1.43 percent of TGA). Among water bodies canals cover the highest area (66.20 percent of the total waterbodies) followed by river (28.08%) and reservoir/ponds (5.72%), respectively. Some of the village ponds that have good size can be exploited for pisciculture after shaping and deepening them.

Recommendations

The following recommendations have been suggested for sustainable development of the area, (i) levelling and clearing of sand dunes and bring them under agrohorticulture/agroforestry with provision of drip irrigation; (ii) reclamation of salt affected-cum-water logged areas and bring them under plantation with species which act as bio

pumps such as *Eucalyptus spp, Prosopis juliflora, Acacia nilotica,* etc.; (iii) promotion of horticultural crops like ber (*Zizyphus maurtiana*), guava (*Psidium guajava*) and amla (*Emblica officinalis*) in marginal land having good to marginal underground waters; (iv) adoption of agrohorticulture (ber, guava, amla with crops like *Vigna radiata* (moong), *Cicer arietinum* (gram) and oilseeds (mustard and toria) in sand dune areas after their levelling; (v) agroforestry in marginal lands with pulse crop like moong, gram and oilseeds (mustard, toria); (vi) the lining of water courses to check the phenomena of water logging and soil salinity and (vii) bringing village ponds under pisciculture after shaping and deepening them.

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