RESEARCH FRONT

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A MICRO LEVEL STUDY OF LAND USE AND LAND COVER PATTERNS IN ASNA RIVER BASIN

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Abstract:

Land use and land cover is an important component in understanding the interactions of the human activities with the environment and thus it is necessary to monitor and detect the changes to maintain a sustainable environment. In this paper an attempt has been made to study the land use and land cover parts of Asna River Basin. The study was carried out through Remote Sensing and GIS approach using SOI toposheets, Sate light imagery. The land use and land cover classification was performed based on the SOI toposheets and Satellite imageries. GIS software is used to prepare the thematic maps and ground truth observations were also performed to check the accuracy of the classification. Agricultural activities were decreased from 13% to 67%, alternately fallow land was increased 4-5% and built-up-land was increased 2%. However, plantation, land with scrub, wet logged, barren rocky, tanks and reservoirs have also experienced the change. It is necessary to closely monitor the land use and land cover for maintaining a sustainable environment for a proper development.

Keywords: Land use, Land cover, GIS, Asna Basin.

INTRODUCTION

Land use and land cover are major issues of global environment change. The satellite remote sensing data with their repetitive nature have proved to be quite useful in mapping land use and land cover patterns and changes with time. Such studies have helped in understanding the dynamics of human activities in space and time. Land use refers to man's activities. During the past millennium, humans have taken an increasingly large role in the modification of the global environment. With increasing numbers and developing technologies, man has emerged as the major, most powerful, and universal instrument of environmental change in the biosphere today. Land use refers to man's activities and the varied uses which are carried on over land and land cover refers to natural vegetation, water bodies, soil, artificial cover and others noticed on the land (Rao, 1999). Land Cover, defined as the assemblage of biotic and a biotic component on the earth's surface is one of the most crucial properties of the earth system. Land cover is that which covers the surface of the earth and land use describes how the land cover is modified. Land cover includes: water, snow, grassland, forest, and bare Soil. Land Use includes agricultural land, built up land, recreation area, wildlife management area etc. Moreover, this type of analysis provides a valuable tool to increase the efficiency of land use and land cover, and to diminish the negative environmental and societal impacts related to LULC (Pandian et al, 2014). Application of remotely sensed data made possible to study in land cover in less time, at low cost and with better accuracy. Remote sensing and GIS provide efficient methods for analysis of land use issues and tools for land use planning and modeling. In this present study, an investigation has been carried out in Parts of Asna River Basin of Maharashtra to detect the land use land cover. It is believed that this aggressive human activity might have influenced on the land use

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and land cover patterns resulting in a possible impact on the environment. This work is taken up to better understand this aspect.

STUDY AREA

Asna River basin is located in the Parbhani, Nanded and Hingoli district. It is a main tributary of Godavari River. Asna River flows from north-west to south-east direction for about 60.30 Km and meets to River Godavari at village Trikut of Nanded tahsil. The geographical location of this basin is 19˚ 10' to 19˚ 30" N latitude and 77˚ 05' to 77˚ 30' E longitude. The basin height between 350 and 548 Meter from mean sea level. The northern parts of the basin are hilly.

OBJECTIVES

1. To analyze nature and extent of land use land cover.
2. To Creation of land use and land cover classification scheme.

METHODOLOGY

The base map of the study area is prepared from the Survey of India 1:50000 scale toposheets. Data has been extracted from the toposheets. Key for interpreting satellite imagery elements is shown (Table 1). Area statistics of each land use category is calculated in Sq.km in attribute table. The land use and land cover classes include crop land, fallow land, built-up land, Water bodies etc. the feature classes were identified based on the visual interpretation of the satellite imagery coupled with filed checks. These datasets were digitized and analyzed to obtain land use and land cover statistics for the areas under each of these categories.

Table 1: Land use and Land cover categories in Asna Basin

Sr. No.	LULC Units	Area (Sq. Km)	Percentage
1	Degraded Forest	76	6.00
2	Scrub Forest	51	3.00
3	Land without Scrub	83	5.00
4	Land with Scrub	77	4.00
5	Single Crops	210	13.00
6	Double Crops	805	67.00
7	Built-up Land	47	2.00
	Total	**1349**	**100.00**

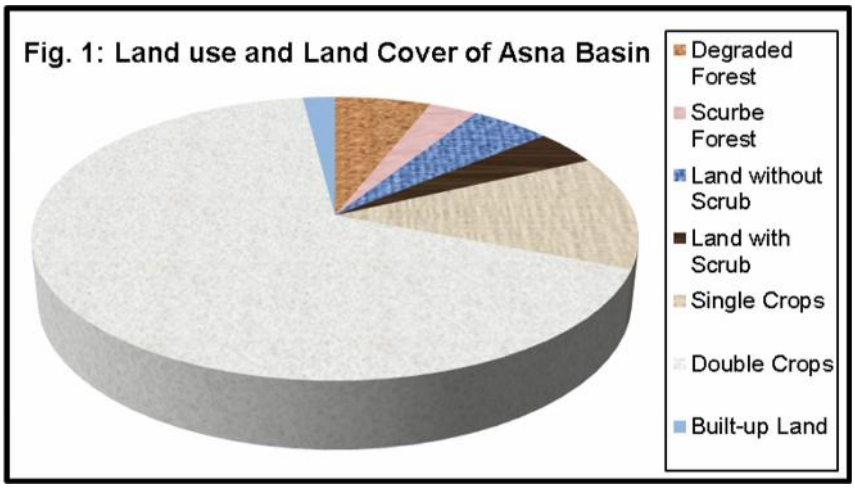

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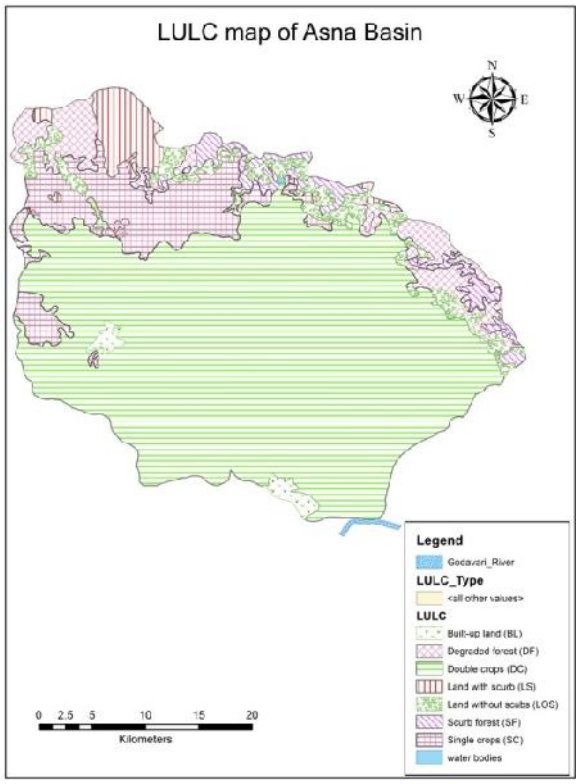
Fig. 2: Land use and Land Cover Map of Asna River Basin



RESULT AND DISCUSSION

The total geographical area of the Asna river basin is 1349 Sq.km. The land uncultivated comprises of forests degraded forest and scrub forest 127 Sq.km (9%) is the Chabra reserve forest and the land without scrubs 83 Sq.km (5%). Along with land with scrubs is 77 Sq.km (4%). People utilizing the the land for various agriculture field practices. Single crop area is 210 Sq.km (13%). In which crops type are Jowar, Udid, Groundnut and Paddy. The Double Crop area is 805 Sq. km (67%) consists wheat, Hybrid jowar, Gram and others crops. Village and towns are under the built-up land category, covering 47 Sq.km (2%) area the total number of settlement in the study area are 218, one of which is Nanded town and tahsils are viz. Basmath and Ardhapur (Table 1).

CONCLUSION

It will incorporate demographic, economic and environment impact which have occurred in an area. Land use and land cover map will serve as a basis for monitoring land use change. The land use map will serve as a base in the integrated overall planning of agricultural and industrial development of the region. The land use map will be utilized as a basic database, which provides the information for allocating new land use practices.

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