STUDY OF BHOPANI BASIN LANDUSE COVER IN UDGIR TEHISIL OF LATUR DISTRICT BY USING REMOTE SENSING AND GIS.

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Abstract

As Latur is world famous for its water related problems. In the present study work for sustainable water management of the physical coverage of Bhopani basin in Udgir tehsil, Latur district is studied. Present study focuses on mapping and monitoring the LULC of the region. In present study cartosat image DEM is used to analyze the drainage pattern. By using supervised and unsupervised classification technique using ERDAS 9.1 and ArcGIS10.1 software the satellite imagery were processed on screen visual interpretation method was done for mapping the land use/land cover of the entire study area. Classes like water-bodies, forest, land, cultivated land, vegetation and settlement were identified by ERDAS 9.1 software. The digital map was then transferred into ArcGIS 10.1 and edited using Arc tool box command. These edited maps wereused further for the analysis of the study area. Finally, landuse pattern of the basin is studied and its proportion is identified. Which is helpful for planning of watershed area in the basin.

Key words:LULC, ERDAS, ArcGIS, Cartosat DEM Watershed Management.

Introduction

The geographical distribution and its use is always of prime importance because land use and land cover pattern decides the social and economic growth of a region. Due to anthropogenic activities land in India is badly affected. Hence, to meet the increasing demandsfor basic human needs and welfare. This information also assists in monitoring the dynamics of land use information on land use / land cover and possibilities for their optimal use is essential for the selection, planning and implementation of land use schemes.

Now a Days the land use land cover study has prime importance for all the developmental activities, secondly for sustainable development land use land cover study is a basic tool to plan sustainability.

Beside studying land use land cover accurate mapping it is also a primary need to evaluate the spread of various land use and land cover for example agricultural land, scrub land, grassland cover, forest settlements, industries etc. Remote Sensing and GIS facilities are helpful in different ways like data collection, analysis and interpretation goes easy and within a short period of time, with less cost, recorded land unknown biodiversity, water body studies, drainages depth, Ecology etc. can be easily interpreted managing natural resources and studying environmental change. Remote Sensing (RS) and Geographic Information System (GIS) are now providing new tools for advancedecosystem management.

The system function, patterning, and change at local, regional and global scales over time; such data also provide an important link between intensive, localized ecological research and regional, national and international conservation and management of biological diversity (Maska etal, 2010).

Therefore, an attempt is made in this study to map out the status of land use land cover of studyregion to find out the maximum land which can be utilized for the water management using both Geographic Information System and Remote Sensing data.

Study Area

Udgir is one of ten tehsil places in Latur District located in Maharashtra at an elevation of 632m from sea level. Its global position is 18° 23' 46" N latitudes to 77° 7' 3" East longitudes. As shown in figure 1. In Udgir tehsil there are 98 villages and two small towns,the total area under Udgir tehsil is 736.6 sq.km. and population density of 422/sq.km. As per the Census of India 2011, Udgir tehsil has 56,806 households, population of 3,11,066. Out of the total population 64.06% of population lives in urban area and 35.94% lives in rural areas. Agricultural activities are prime in rural areas. The population in rural area consists majorly of marginal and small farmers. The soil of study areais a part of Deccan plateau, black basalt soil, which is rich in humus. It is best suitable for the cultivation of cotton. The main crops cultivated here are whole grains including Jowar, Bajra, wheat, etc. Also crops like sorghum, Mung, Tur, Urad Gram, Soyabean, Sugarcane, onions and other green leafy vegetables are cultivated. Hence optimum water is need for the agricultural activates. Bhopani lake is towards the south of Udgir tehsil it shares its boundary with Deoni tehsil, as water from Bhopani basin plays an important role in the economic growth of the region. Hence it is necessary to visualize the future needs as water demand will increase with the leading time,so with the perspectives of identification of suitable area for watershed management site is done in the present study to overcome with the scarcity problems.
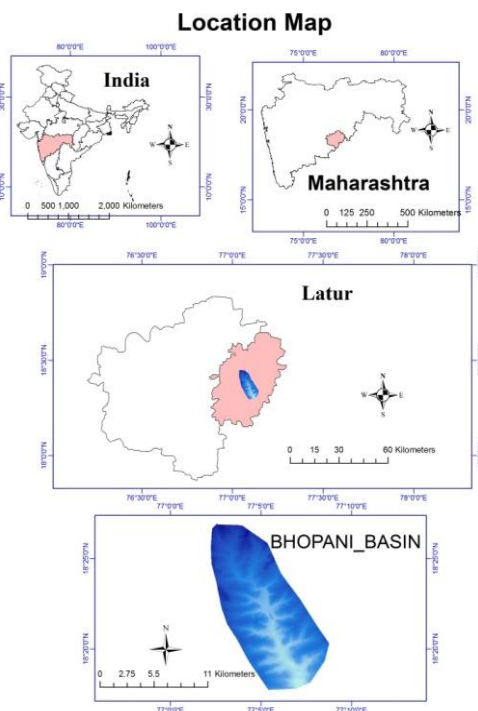

Figure1. Location Map.

Objectives

To determine the land-use pattern in the study region. To study and suggest sustainable watershed management site in the basin.

Methodology

The cartosat image wasprocessedfor studying the drainage pattern of the region under study. The image was obtained from BHUVAN portalandwas processed using various tools in ERDAS 9.1 and ArcGIS10.1 softwares. Theimage was classified in by unsupervised and supervised classification techniques and various classes were obtained.. Before classification the study area was mask out by the help of shpfile of the region. After the classification raster to vector operation was carried out and by using statistical techniques the area under different classeswas found as shown in the figure no2.The detail of contour study was also done using cartosat DEM image.
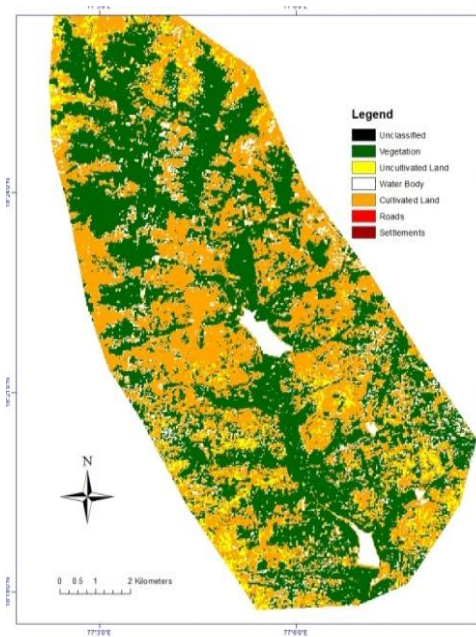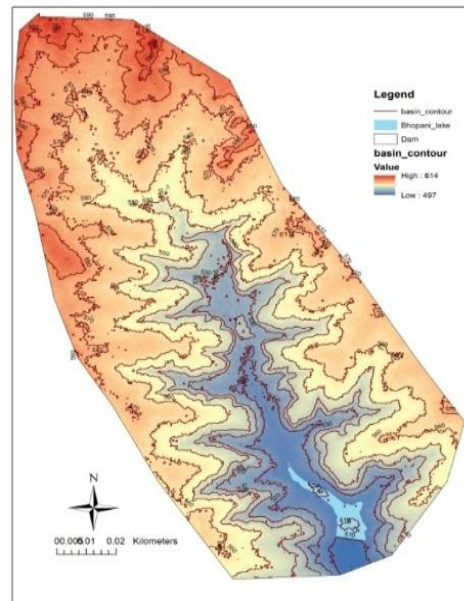

Figure 2. Bhopani basin landuse classification   Figure 3 Basin Contour map

Table 1. **The total area of land use pattern of Bhopani basin.**

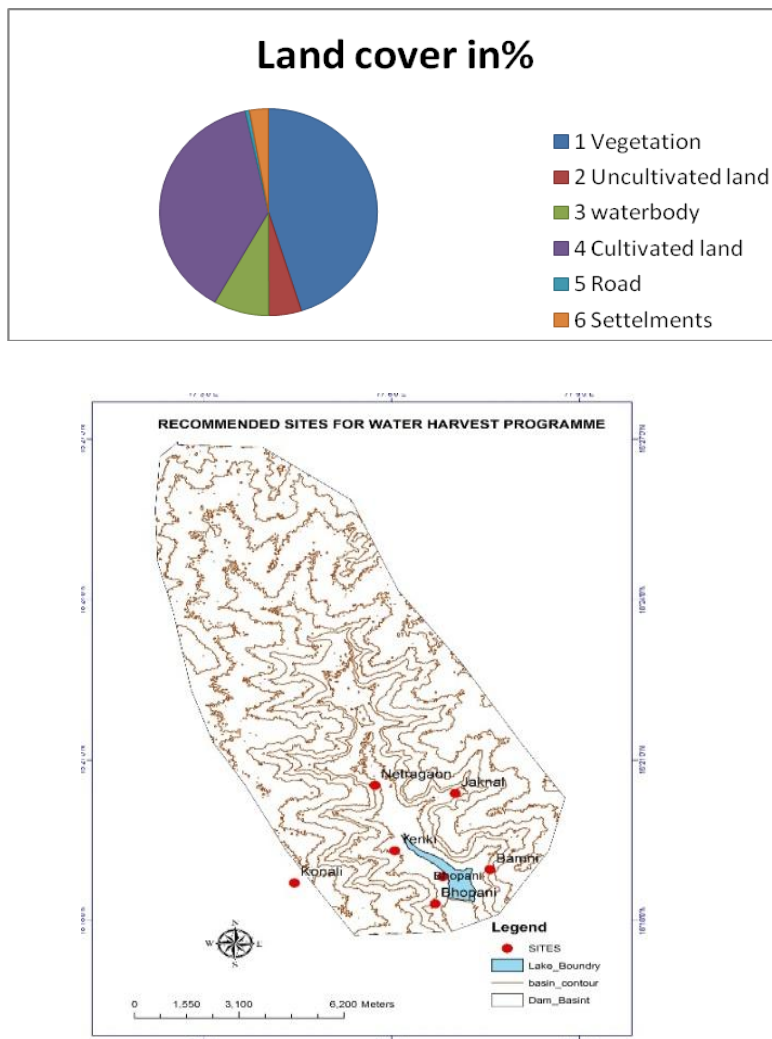| Sr.No.	Land use pattern	Land cover in%	Total area in Sq. K.m.
1	Vegetation	45.10	35.178
2	Uncultivated land	4.86	3.790
3	water body	8.26	6.459
4	Cultivated land	38.32	29.889
5	Road	0.62	0.485
6	Settlements	2.82	2.199
Total		100%	78.00

Figure 4. Recommended site for water harvest management program.

Result and Discussion

Remote Sensing and GIS technology has been found very useful for the spatial mapping of the geographical area with respect to its land use and land cover patterns. Area using data of remote sensing and GIS based modeling has given the whole picture of the land use and land cover patterns in the study area. In the study it is seen that out of the total area of the basin 45.10% area is under vegetation while an area of 5% is uncultivated area. The roads and settlement occupies about 0.62% and 2.82% respectively. It is observe that water bodies in the region is 8.26%. as included in table1. And graphically expressed in graph.

The catchment area of the dam is 7800 Ha. and the total storage capacity of the lake is 9.458Mm^3. The maximum discharge of water is 12.58 CuSec. Beside this the non irrigational use of the water i.e. water supply to Udgir city is totally depended on the water from dam. It is observed that the annual requirement of water for the city is not sufficiently fulfilled by the dam water. Hence in near future it will be difficult to sustain the water demand based on Bhopani dam. So there is an urgent need to study the possible region for effective arrangements of water harvest using various techniques like farm ponds natural reservoirs or tanks, or the infiltration of surface water into subsurface aquifers (before it is lost as surface runoff). Hence a study based on contour distribution,as shown in figure 3, as it will be useful to interpret catchment area which can be suggested for water conservation activity. It is seen that the villages in the south eastern part (Manki, Bhopani, Yanki and Bamni) of the basin can be helpful to extend the watershed activity. Beside this the central area which lies to the northern side of the Bhopani lake (where villages like Konali Jaknal, Netragaon) can be useful as watershed management sites.as shown in figure 4. As this area lies between the MSL 550 meters and 520 meters. Hence we can utilize a large area which is in the counter zone of 550and520 elevation as the elevation is fairly steep hence a large area can be utilized in the Bhopani Basin region for water harvest and water shed management plan.

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