



LAND USE CHANGE IN SOM RIVER CATCHMENT: POLYGON WISE STUDY

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Abstract

The study area has distinguishing features with diversified setting largely dominated by hilly tracks and forests. The study area lies in Tropical semi-arid area particularly in Chittorgarh, Banswara, Pratapgarh, Udaipur, and Dungepur districts of Rajasthan. A semi-arid climate describes climatic regions that receive precipitation below potential evapotranspiration. The entire catchment lies in Udaipur, Banswara, Chittorgarh, PratapgarhandDungarpur districts and extents from 73° 32' E to 74°50'E and 23° 50' N to 24° 58 N, respectively. The whole catchment has been divided into polygons and each polygon has experienced change in land use/land cover.

Key words ; -theissen polygon, Land use, Catchment

INTRODUCTION

The study area has predominantly tribal population which accounts 70 % of the total population and there is close cultural proximity with the natural resources. The area is tribal dominated area where natural resources play vital role for the livelihood of these tribes. (Bhalla, 2004).

The fluctuation of climate and a variety of anthropogenic activities has a sizeable impact on the socio- economic and physical fabric of the area. Colossal cutting of trees on account of gluttony of human beings and growing demand for timber, fodder, fuel, wood, etc. have caused severe strain on the environment, distressing all the river valleys located down the Aravalli hills. The ongoing deforestation and the destruction of soil cover from the majority of the hill slopes have caused micro-climatic changes, mainly in the nature of rainfall. (Nigam et al., 1993).

The entire catchment lies in Udaipur, Banswara, Chittorgarh, PratapgarhandDungarpur districts and extents from 73° 32' E to 74°50'E and 23° 50' N to 24° 58 N, respectively. The Som River catchment has an area of about 8007 km². It is a tributary of Mahi River. Som River originates in the hills near the village Som in Kherwara Tehsil of Udaipur District. It runs south-east through a hilly region and joins river Mahi near the village Baneshwar.

LOCATION AND EXTENT

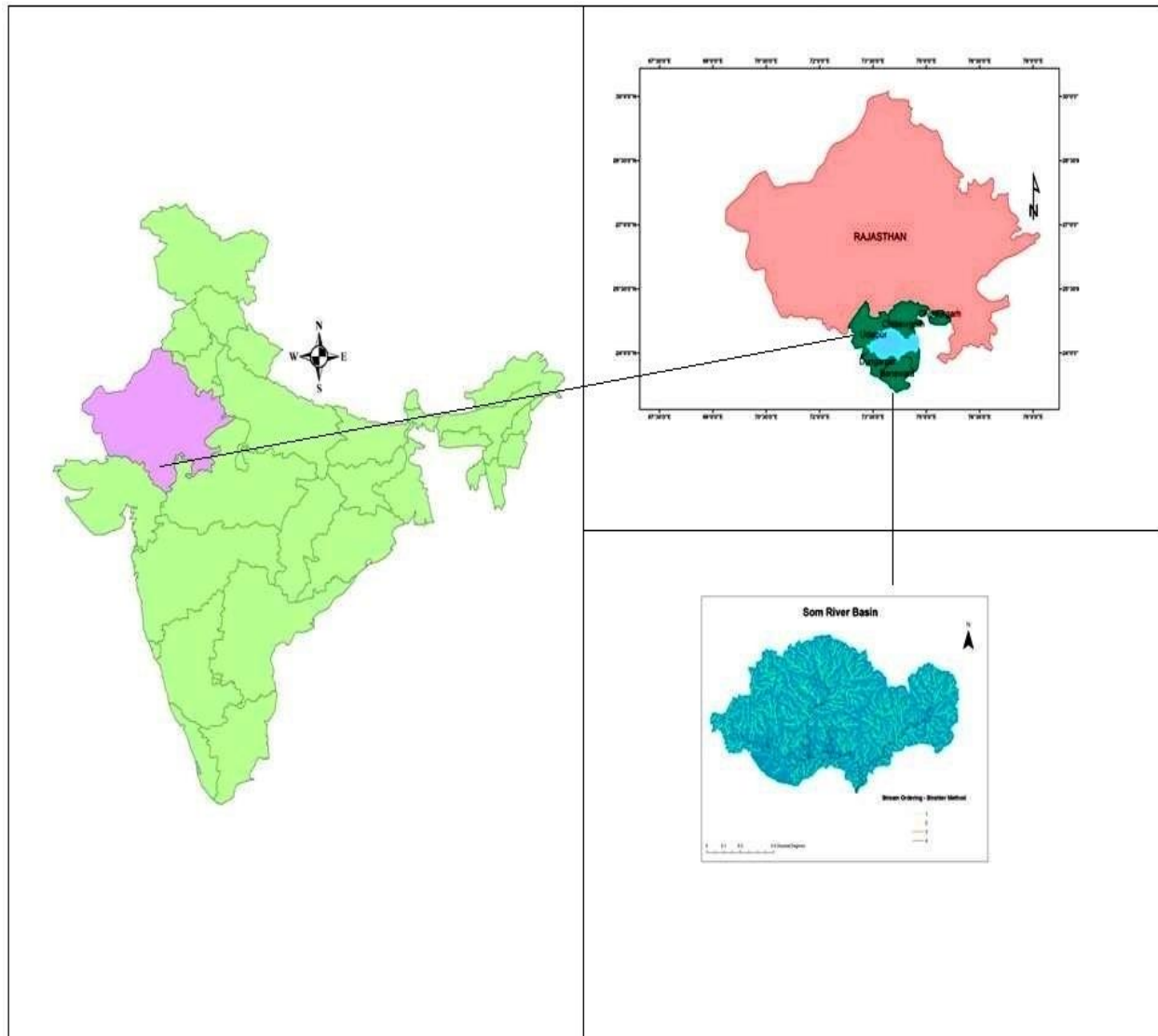
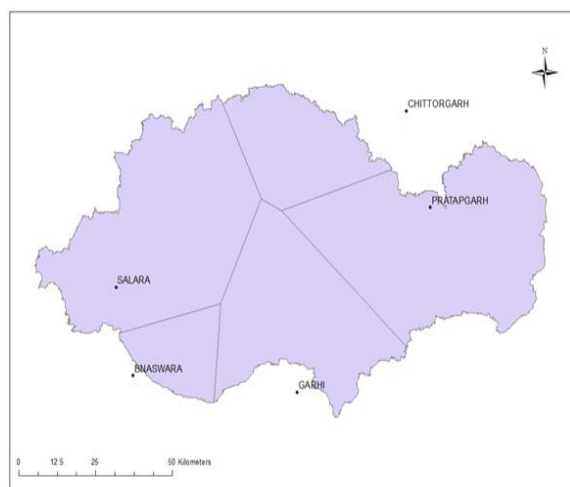


Figure 1: Location of Som river catchment

Theissen polygon

Theissen polygon also known as Voronoidiagram, is a way of dividing space into a number of regions. In a nutshell, theissen polygon is a polygon of influenced area of that polygon where homogeneity of considered parameters is found and it differentiate with the corresponding

polygon. In the study area five polygon has been created according to meteorological stations.(Table 1) and (fig. 2).



Theissen polygon	Area (km2)
Chittorgarh	1186
Banswara	768
Salara	1435
Garhi	2297
Pratapgarh	2317
Som river basin (Total)	8007

Figure 2: Theissen Polygon Table :1Theissen polygon and their area

In a nutshell, the information of land cover/land use pattern is necessary for future planning activities (Ghosh et al. 1996).The maximum area is covered by the Aravalli Mountains simultaneously covered with vegetation occupying second position in terms of land use. The sectorial division of land use clearly indicated that this area has always been adobe of natural autonomy and never been exhausted by the human interference except few mining activities prevailing now a day. Though, the natural course of the river has not been disturbed by the anthropogenic factors but the natural scenic beauty of the Aravalli no doubt has deteriorated to a large extent. The outlet point of the river shows a healthy trend in terms of green and lush vegetation while the origin faces absence of vegetation (fig 3).

The area is mineral rich and has always been reclusive from the main stream. This may be the reason for the illegal mining activities. The area has an important lakes, that is Jaisamand lake.. It is also known Dhebar lake. Excepts lakes, sand dunes are the features that is found near the course of the river and has extended to a large extent on both the banks of the Som river.The land use pattern is not highly influenced by urbanization but there is clear indication of human interference in the area. The natural scenery has been seriously damaged to a large extent.

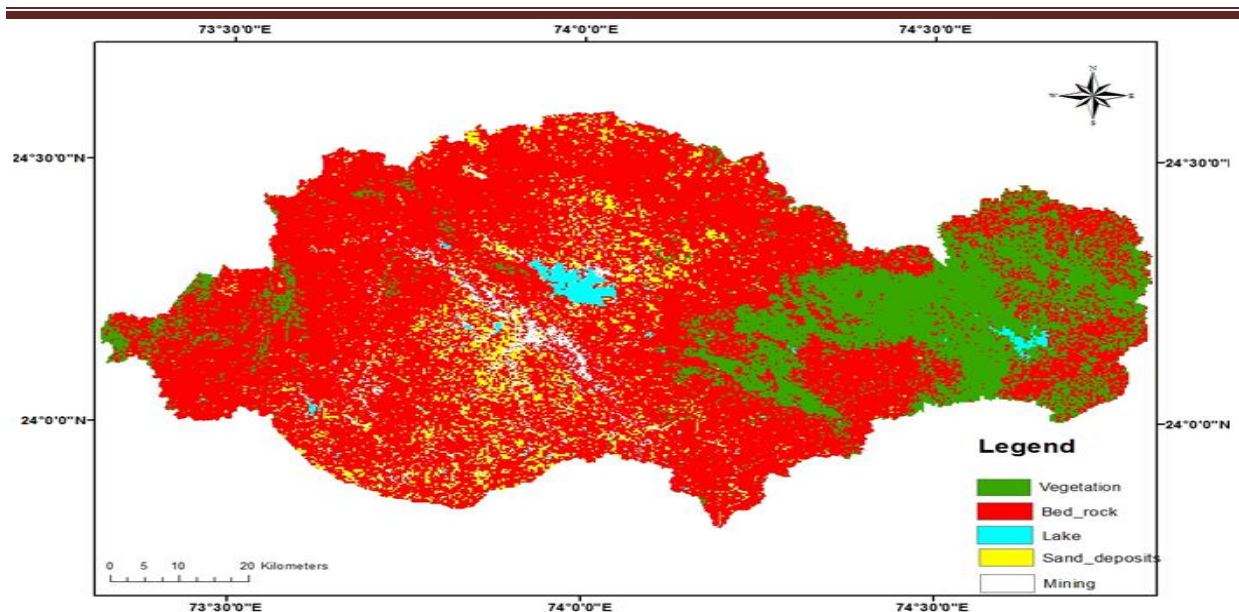


Figure 3: Land use of Som river catchment, 2016

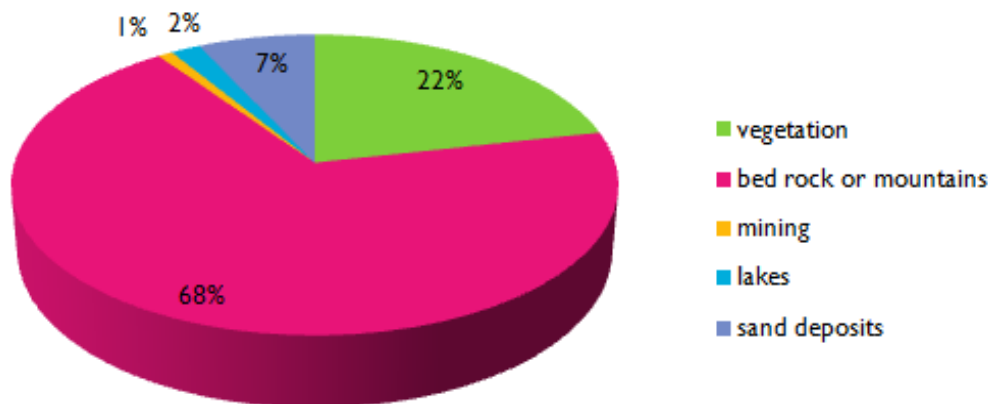


Figure 4: Sectoral distribution of land use in Som river catchment

The land use map has been prepared from the satellite data available of Liss-III in four bands (2001) and for 2016 (Bhuvan) data has been used.

Table 3 :- Satellite data used by author

Data	Year of observation	Spatial resolution
Landsat 5 TM	2001	30 meter

Bhuwan	2016	2.5 meter
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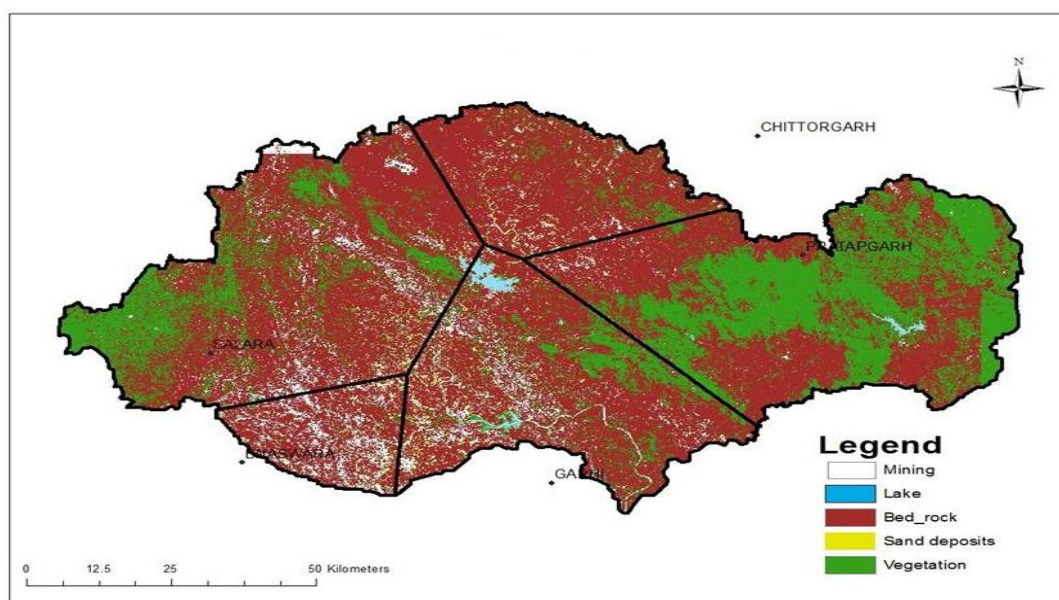


Figure 5 : Land use with Theissen Polygons in 2001

The Bhuwan data (2016) land use map has not much difference from the land use pattern of 2001 but mining activities has deterioration of the vegetation cover that can be a threat to the tribal as they eke out their life from natural resources. The change in any form of land use is largely related either with the external forces and the pressure built up within the system (Bisht and Kothiyari, 2001). The external forces in the form of deforestation can be seen in Salara polygon as this area has lost significant portion of vegetation cover.

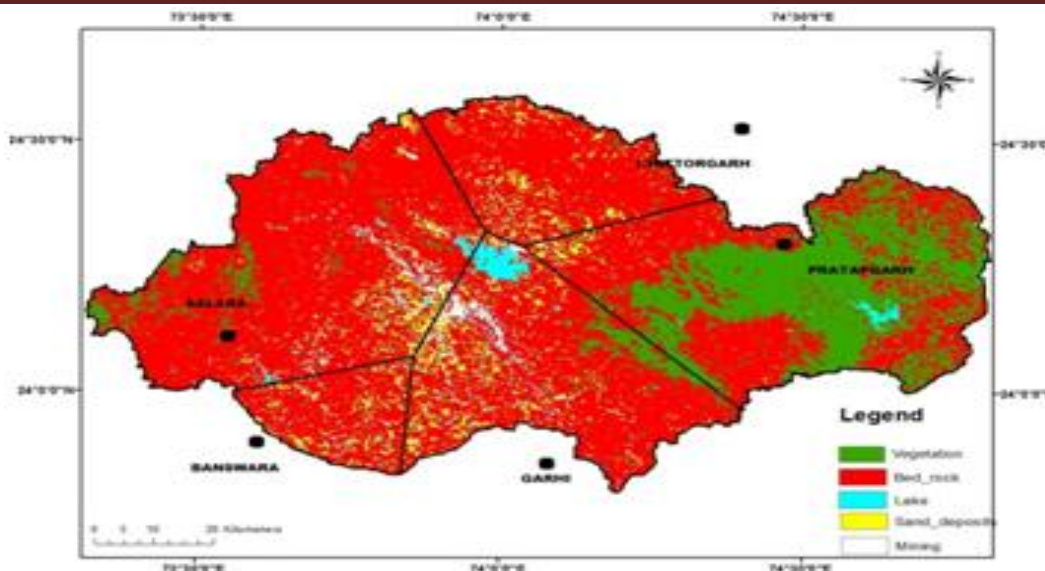


Figure 6: Land use pattern with Theissen polygons, 2016

8.4. CONCLUSION

Table 3:- land use (Percentage wise) in Som river catchment

Land use type	YEAR (2001)	YEAR (2016)
Vegetation	45.08	39.66
Bed rock	43.53	46.19
Mining	1.61	3.47
Lake	5.87	5.32
Sand deposits	3.91	5.36

Polygon –wise results are as following:

Mining activities has deteriorated the scenic beauty of Aravalli and has influenced the run off pattern to a large extent. The inner part of the catchment specially Garhipolygon is covered by the sand deposits and the sand deposits are more in quantity as this area has severely been a part of tragic mining activities. Mining leads to loosening of soil and exposed the area vulnerable to erosion activities (fig 6).



The Salara polygon has witness loss of vegetation cover due to ongoing deforestation. Though Chittorgarh polygon has not changed much. In brief, the whole catchment has faced deterioration in vegetation and increase in bed rock, sand deposits.

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