Research Paper

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Assessment of Road and Settlement Area of Ratanpur, District Bilaspur, Chhattisgarh Through Remote Sensing and GIS

Sociology

KEYWORDS : Remote Sensing, Geographical Information System, Land Use and Land Classification.

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ABSTRACT

Remote-sensing system provides a repetitive and consistent view of the Earth facilitating the ability to monitor the natural recourse and the effects of human activities on the Earth. In the present study purpose two satellite imageries (LANDSAT and Google Earth) were used. The parameter settlements were detected by polygon tool of digitization and Roads were digitized with polyline tool. The rural settlement status in the year 2001 was 0.717 sq km which has increased upto 2.123 sq km in year 2013. The road network of the Ratanpur area is still is under consideration, the village road was 19.0 km. in 2001 and 19.0 km. in 2013. The mud road in year 2013 was calculated 24.7 km. which has decreased up to 16.75 km. in year 2013. The result of the study shows the significance change in settlement and road network of the Ratanpur.

Introduction :

Remote sensing is important and acquiring useful data of the earth or it surface by means of sensors. These remotely collected data will be analysis to obtain information about the object area or phenomena being investigated (Schowengerdt, 2007). Remote sensing and G.I.S. is the measurement of object properties on Earth's surface using data acquired from aircraft and satellites. It attempts to measure something at a distance rather than *in situ* and for research purposes. It displays those measurements over a two-dimensional spatial grid i.e. images. Remote-sensing system on satellites provides a repetitive and consistent view of the Earth facilitating the ability to monitor the earth system and the effects of human activities on the Earth. There are many Electromagnetic (EM) band-length ranges absorbs by earth's atmosphere. The EM band ranges transmittable through Earth's atmosphere are sometimes referred to as atmospheric windows. Also it include the analysis and interpretation of the acquire data and imaginary which are the most aspects for environmental scientists to provide relevant information for monitoring earth recourses (Landgrebe, 2003).

The human eye only detects the band length range from 0.4 – 0.7 µm of electromagnetic spectrum. The remote sensing technology allows us for the detection of other reflective and radiant (e.g. thermal) energy band-length ranges that reach or are emitted by Earth's surface and even some earth's atmosphere reflects e.g. the EM reflective qualities of clouds. Hence, for viewing purposes red, green, and blue (RGB) false colour assignments are used to express the reflective qualities of objects in these EM band-length groups (http://www.yale.edu/gsp/gis-files/remote_sensing).

Indian Society of Geometrics (ISG) and Indian Space Application Centre (ISRO) defined GIS as a system which provides a computerised mechanism for integrating various geo-information data sets and analysing them in order to generate information relevant to planning needs in a context. According to Centre for Spatial Database Management and Solutions (CSDMS), GIS is a computer based tool for mapping and analyzing things that exist and events that happen on earth. It is the well known phenomenon where the road network is developed; the place of development is very fast. This study proceeds with change that occurs in the Settlement area and roads length of Ratanpur area. The settlement change study is very useful to local government and urban movement of residential and commercial land to rural areas at the periphery of metropolitan areas, has long been considered a sign of regional economic vitality. Thus the present study is done on following objectives

1. To quantify the settlement change from 2001 to 2013 through remote sensing and G.I.S.
2. To determine the road change related to rural sprawl of Ratanpur area in Bilaspur district Chhattisgarh through Remote sensing and G.I.S.

Methodology :

The present study was based on the satellite data assessment of the Ratanpur area of Bilaspur district in Chhattisgarh state. The proper field survey and ground truth analysis was done during the study period. For the study purpose two satellite imageries (LANDSAT and Google Earth) were used. The LULC change detection analysis was done.

Data Source : For the study LANDSAT imagery of year 2001 had been downloaded from the website htpp://glovis.usgs.gov. The path and row of the image was 144/45. The spatial resolution of the LANDSAT imagery was 30 meter. Another image was down loaded from Google earth of year 2013 from the website-http://serverkh.google.com. The path and row of the image was 144/45. The spatial resolution of the Google earth image was 10 meter. The parameter settlements were detected by polygon tool of digitization and Roads were digitized with polyline tool.

Results and Discussion :

The table 1 and figure 1 & 2 shows that the total settlement were settled in 0.717 sq. km. area in the year 2001 and 2.123 sq. km. area in the year 2013, whereas unsettlement village area were in 18.498 sq. km. area in the year 2001 and 17.983 sq. km. area in the year 2013. The data shows that the settlement area has increased 1.406 sq. km. and unsettlement area has decreased from 18.498 sq. km. to 17.092 sq. km. in between the year 2001 to 2013. Similar trends are found by Tiwari and Singh (2014), Niyaj and Singh (2014) and Beck *et al.* (1990).

Table 1: Settlement status of Ratanpur area.

S.NO.	Settlement Class	Area in Sq. Km.	
		Year 2001	Year 2013
1.	Settlement area	0.717	2.123
2.	Unsettlement area	18.498	17.092
	TOTAL	19.215	19.215

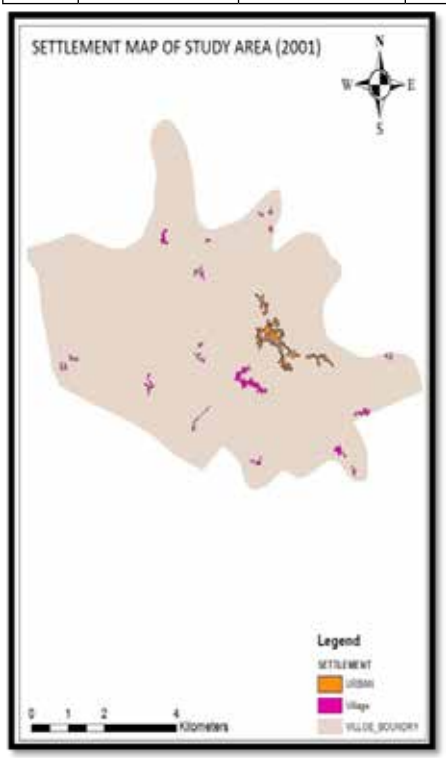

Fig 1: Settlement map of Ratanpur area, 2001

Fig 2: Settlement map of Ratanpur area, 2013

The Ratanpur area has well connected with the road network. Bilaspur-Ambikapur SH-200 crossed from this area. Bilaspur and Korba is also connected with Ratanpur. Bilaspur-Pendra road has bifurcated from Ratanpur and enters the forest area near the Ratanpur. Still the scarcity of good roads has been shown in the area; most of the small villages which are basically inside the forest are still the cart track. The table 2 and fig 3 shows that the village road was 19.00 km in 2001 and 19.00 km in 2013, while the length of C.C. Road was increased from 3.05 km. to 11.91 km. in the same duration. New road has constructed 13.00 km in year 2001 which is still 13.00 km in year 2013. The condition of mud road in year 2001 was 24.75 km which has decreased upto 16.75 km in year 2013, whereas no change can be seen in National highways and district roads.

Table 2: Detail road study of the Ratanpur area:

S. No.	CLASS	Length in KM.	
		Year 2001	Year 2013
1.	Village Road	19.10	19.00
2.	CC Road	03.05	11.91
3.	New Road	13.00	13.00
4.	National Highway	08.03	08.03
5.	District Road	07.61	07.61
6.	Mud Road	24.75	16.75
	total	75.54	75.54

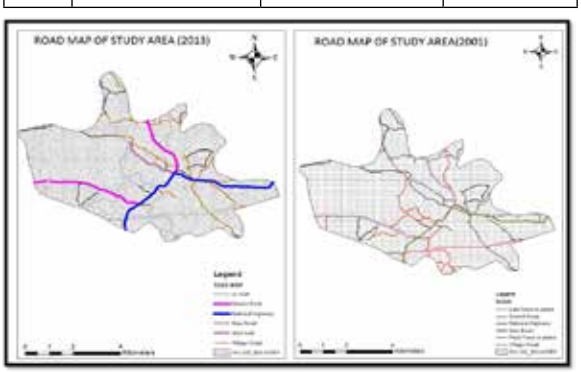

Figure 3: Road map of Ratanpur in the year of 2001 and 2013.

Conclusion :

The study revealed that total settlement status in the year 2001 was 0.717 sq. km. which has increased upto 2.123 sq. km. in year 2013. The main reason of increasing the settlement area of Ratanpur is the growth of population and urbanization. The total area recorded as 18.498 sq. km. in 2001 which has decreased 17.092 sq. km. in 2013 due to urbanization. The result also show the significant changes in CC road in the study area.

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