URBAN BUILT UP ASSESSMENT IN ROHTAK CITY USING REMOTE SENSING AND GIS TECHNIQUES DURING 1960-2010.

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ABSTRACT

Built up area is increase due to Urbanization. Urbanization is the procedure of conversion of rural areas into urban areas due to immigration, industrialization and economic development. Urbanization has usurped rich agricultural land. In the present paper, we analysis the pattern of built up over the five decades in Rohtak city were examined with reference to topographical map (1960), guide map (1983), TM LANDSAT (2000) and LISS IV(2010) which indicated that the built-up growth was mainly taken place over state and
national highways. The increase population and urbanization causes huge change in the core and peripheral of the city. It has been found that the built up area has not recorded rapid transformation in 1960 to 2000 like other towns of NCR region but after 2004 the built up area rapidly increase which the impact of government influence in study area.

**Keywords**: Urban Built up, Open Access Data, Remote Sensing GIS.

**INTRODUCTION**

Rohtak is one of the important cities in NCR region of Haryana which land use conversion takes place dynamically in recent time. Urbanization is an important factor for the Rohtak city where rate of urban built up has occurred over the last few decades. In Indian cities, the high-rise residence is fast growing since last two decades. High-rise residential construction has become very popular in large cities. The demand of space due to the pressure of urbanization in the inner cities has resulted in high-rise apartments to withstand the higher densities in these areas (Reddy 1996). In the present paper, open access satellite data and different time topographical sheet was used to monitor urban built-up landscape and geographic features of Rohtak city. The strategy for development of the settlement system, as per NCR Regional plan 2021, allows other towns of the NCR to develop within their carrying capacity and development potential, as may be determined by the Development/Planning Agencies of the constituent States of the NCR. The Plan has envisaged that these regional centres will perform highly specialized secondary and tertiary sector activities for providing job opportunities, which cannot be provided by the lower order centres. These centres, according to the NCR Plan, will be developed for advanced industrial and other economic activities and will have concentration of administrative and higher order service functions, which are expected to exert an increasingly dynamic influence on attraction of investment. (Singh and Kumar; 2012) Rapid urban development
and increasing population and economic growth has changed the urban landscape which is being witnessed all over the world. It is an important component to understand the human intervention with the environment (Anil et. al., 2011). Satellite data are useful for monitoring the spatial distribution and growth of urban built-up areas due to synoptic views of urban land use in temporal frame (Bhatta 2009; Griffiths et al. 2010). Over the past two decades, researchers have become increasingly interested in using satellite data to address urban and peri-urban problems (Jacquinet et. al. 2008). However, the spatial and spectral variabilities of urban environments present fundamental challenges to derive accurate remote sensing-based information for urban areas (Powell et. al. 2007).

**STUDY AREA**

Rohtak city is located at the meeting point of 28°41'1'' North latitude and 76°12'42'' East longitude in the NCR region of Haryana on National Highway No. 10. Spread over 100.57 km2, it lies 70 kms north-west from Delhi and 240 kms south of Chandigarh (Figure 1), the state capital.

**OBJECTIVES**

The study examines the urban built up assessment and land use transformation in Rohtak city during 1960 to 2010, and its impact on land use.
DATA SOURCE AND METHODOLOGY

- Data Acquisition
  - Toposheet of study area (1960) survey of India
  - Guide map of study Area (1983)
  - LISS IV 2010, from Department of Geography (Resolution 5.8 meter)
The tographical map (1960), guide map (1983), TM LANDSAT (2000) and LISS IV(2010) which cover the city were initially geo-referenced using toposheet of study area. The image TM LANDSAT with resolution 30 meter are enhanced using histogram equalization to increase the volume of visible information. Further, each data belongs to different years are following the geometric corrections, the base map is laid over different time data have clip using Arc Gis 9.3 and creation of sub set using ERDAS 9.0. Built up area are analyses by the use of different time data. The built-up land in 2010 was mapped using LISS IV through visual interpretation.

SOFTWARE USED

- ERDAS IMAGINE 9.0(data import, layer stacking, georeferencing, subset, image classification)
- ARC GIS 9.3 for map construction
- MS office 2007 (MS Word, MS Excel) for statistical diagrams and analysis.
RESULT AND DISCUSSION

The assessment of built-up expansions provides an accurate assessment of built-up development. In this paper, the multi-temporal topographical map, guide map and satellite data have used for urban growth mapping (1960–2010). The built-up area has highly increased in the region during 1960–2010 on the cost of agricultural land. The topographical maps (1960), guide map (1983) and satellite image (2000 and 2010) shows that the built-up land expanded from 9.23 km$^2$ to 32.02 km$^2$ during 1960–2010 with more
than four times in comparison to population growth in Rohtak city (Table. 1 & 2 ). Major change in built up area is the conversion of vacant land and agricultural land to residential in the low density areas and along major roads like Delhi and Sonipat roads. The urban sprawl is along the state and national highways. In fact there has been substantial road development, construction of over bridges on the entry and exit points of the city, widening of the roads within the city by removing encroachments. The outward expansion of the ring-road system is found to be one of the most important driving forces explaining the temporal and spatial pattern of land use change (Singh and Kumar; 2012). The built-up growth in the study area should be monitored regularly in terms of expansion of the city, in order to regulate sustainable built-up development.

<table>
<thead>
<tr>
<th>Years</th>
<th>Built up Coverage in sq.kms</th>
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<tbody>
<tr>
<td>1960</td>
<td>9.23</td>
</tr>
<tr>
<td>1983</td>
<td>14.48</td>
</tr>
<tr>
<td>2000</td>
<td>20.11</td>
</tr>
<tr>
<td>2010</td>
<td>32.02</td>
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</tbody>
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**Table: 2** Calculated from Toposheet, Guide Map and Satellite data
Figure: 3 Built up assessment of Rohtak City During 1960-2010

CONCLUSION

The study demonstrates that built up area have increased in particularly between core and peripheral newly constructed bye pass in the cost of agricultural land. Built up area is rapidly increased in study area because of its location, and active role of Haryana Urban Development Authority (HUDA) in well organized sectors of industrial/commercial/residential purposes. Major built up is coming on National Highway and State Highway. Where new administrative areas have come up which shows the policy induced sprawl of
the study area. Result showed that the built up area has not recorded rapid transformation in 1960 to 2000 like other towns of NCR region but after 2004 the built up area rapidly increase which the impact of government influence in study area. Remote Sensing and GIS tools have been helpful to find out the built up assessment over periods and these tools are more effective for monitoring for the sustainable environment and urban development in the study area.

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REFERENCES


