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Research Paper Geography

Population Growth Impact on Land Use pattern in Hyderabad City using Remote Sensing and GIS Techniques

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ABSTRACT

Urbanization is a process of increase of modernization system which modifies the socioeconomic activities and revolutionizes the land use practice according to time frame. Due to the proximate and underlying causes, land use and land cover change has become the main challenge of the present world. Various causes of the urbanization process bring the unrestrained impact on land use and land cover change. Population growth, migration, political instability, economic opportunities, accessibility of physical infrastructure, globalization are some of the major causes of the high level of urbanization in Hyderabad. This paper presents the historical urban growth phenomenon and analysis of land use and land cover change of Hyderabad city by utilizing remote sensing imagery and GIS. The study finds that the population growth is a major factor for changing land use and land cover change. Due to the rapid urbanization process in Hyderabad city, huge transition in land use and land cover has occurred.

Keywords : Urban Growth, Land use Land cover, GIS and Remote Sensing

1. INTRODUCTION

Urban growth remains a major topic concerning GIS and remote sensing applications. Remote sensing and GIS have proved to be effective means for extracting and processing varied resolutions of spatial information for monitoring urban growth (I. Masser, 2001) . Urban areas contain very complex land use structures. Due to the huge course of urbanization, the major cities of the world are compelled to face the severe threats. Various causes of the urbanization process bring the unrestrained impact on land use and land cover change. An unplanned urbanization process is becoming the major problem in the developed and developing countries. The process of urbanization has been influenced mainly by the combination of driving forces: geographical location, population growth, public service accessibility and political activities. The study focuses on the analysis of urban growth trend, population impact on the land use land cover change. The aim of this study is to examine the impact of population growth pattern and trend on urban sprawl and to detect the spatial patterns of land use land cover changes over the periods 1988 to 2004 using Remote sensing and GIS.

2. STUDY AREA

Hyderabad, the historic beautiful city is the capital of Andhra Pradesh extends from longitude 78° 23' to 78° 33'E and latitude of 17° 17' to 17° 31' N. The size of the study area is shown in Figure 1 covers for about 217 km2. It encompasses the administrative districts in the integrated town and city planning scheme which are greatly influenced by urban sprawl.

3. RESULTS AND DISCUSSIONS

3.1 Population Growth in Hyderabad City

Out of the total population of the district, all the persons consisting 100% of the district population are treated as urban population, as the entire district is urban. According to 2011 census, total population of Hyderabad district is 4,010,238 with 2,064,359 males and 1945879 females. The district holds 5th rank in the state as far as population is concerned.

The district has registered 4.7% growth during the decade. Most of the growth in Hyderabad is occurring in the surrounding municipalities ranging from 56% to 103%, where as the population growth in Municipal Corporation of Hyderabad area is only 4.57%. Growth in non-core areas is driven by residential settlements and the industrial growth has been hampered by expensive real estate. Residential growth is creating demand for service delivery /infrastructure development in the surrounding municipalities. The fundamental reason for growth was the closeness to Hyderabad and proximity to employment.

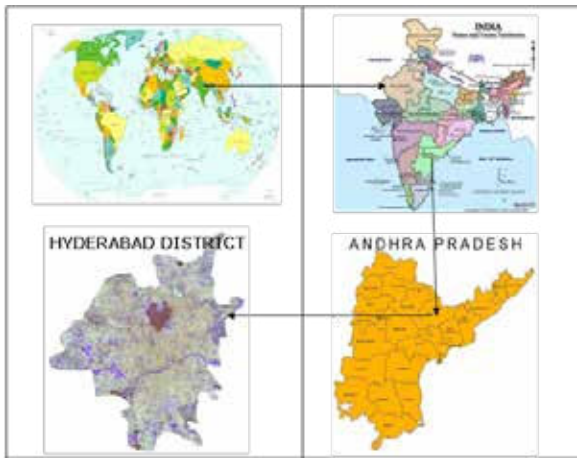

Figure 1: Study Area

3.2. Land use / Land Cover Changes

The land use / land cover change occurred in Hyderabad city between 1988 and 2004 has been analysed. The study area comprises of many land use features. As a stipulation of a supervised classification, the training areas are collected. It is observed that there is decrease or increase in areas for each of the broad categories. The total built up land of Hyderabad was about 30.59% of the total geographical area on 1988. By 2004, this category has increased to about 55.81% of the total

geographical area. The major share of this category is occupied by the residential land use. Within the built-up area each category is showing the increasing trends in areas.

The agricultural land is decreased by the year 2004 was about 10.65% due to the invasion mostly by the built – up land and partly by the scrub land. It has to be emphasized that the discontinuity of agricultural practice by the builders make the agricultural land look like a waste land. Water bodies shows shrinkage in the course of its flow by the year 2004 was about 6.71% of the total geographical area. This is mainly due to population pressure. The agricultural land is decreased continuously and it is converted into waste land for making house plots. The barren land is also gradually converted into house plots especially around the localities of Banjara Hills and Jubilee Hills.

This clearly explains a part of forest land and water bodies have been converted as settlements and commercial areas. The major conversion of land use takes place along the roads and the pattern of sprawl is found to be linear.

3.3 Population Growth Impact on Urban Land Use

Due to the proximate and underlying causes, the urbanization process bring the unrestrained impact on land use and land cover change. The process of urbanization has been influenced mainly by the combination of driving forces: geographical location, population growth, public service accessibility, economic opportunity, government plans and policies, land market, globalization, tourism activities and political activities. With increase in population there is growth in the built-up area which leads to decrease in agricultural and water body area. The density of population per square kilometre is also increasing rapidly. If the same trend continues in future, there is more scope for development in barren land and also decline in natural resources.

The relation between population growth and land use change in Hyderabad city is depicted in Table 1. Hyderabad has high level of urbanization in terms of both urban population and number of urban clusters. According to the population census between 1981 and 1991, the increase of total population of the district is only 39.16 per cent. Urban settlements were few in 1981 when compared to 2011 with the increasing population trend.

Table 1: Comparison of Population with Land use

Year	Population	Per cent of Increase	Density	Built_Up Area (per cent)	Per cent of Increase
1981	2,260,702	-	10,418	30.59	-
1991	3,145,939	39.16	14,497	38.72	26.58
2001	3,829,753	21.74	17,649	55.81	44.14
2011	4,010,238	4.71	18,480	64.19	15.02

For the last 30 years, the picture has changed dramatically. Although the percentage increase of population is in reducing order, the process of urbanization has gained momentum. The level of urbanization has experienced rapid growth due to several “push” and “pull” factors. The pull factors are security situation in rural and natural disasters like floods, draughts etc. The push factors are in search of improvement of the individual socio-economic situation, centers of potential employment and income, access to education and healthcare attracting more and more people have been coming to the cities. The fastest growing urban centers are located both within and around the city.

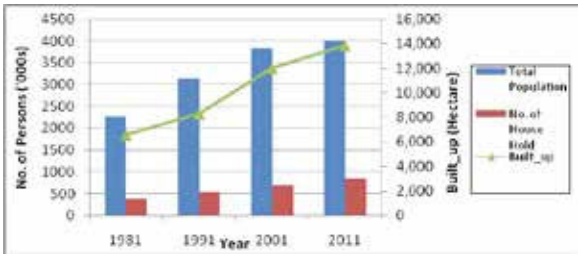

Figure 2: Correlation between Population and urban land use change

Table 1 and Figure 2 provide correlation between urban areas and the total population as per census from 1981 to 2011. Accordingly, the number of designated urban areas has gone up from 6000 ha in 1981 to 14000 ha in 2011. In the last three decades since 1981, urban population has increased from 2.26 million to 4.01 million ie. almost double, while the number of designated urban places has increased from 6000 ha to 14000 ha which is more than double increment in urban areas. The population trend is in increasing mode only.

Though the percentage increase of population is in decreasing order, the density of population of the city is in increasing mode. The density of population is continuously increasing and correspondingly the built-up areas are also increasing. Hence the population growth is a major factor for changing the land use and land cover.

5. CONCLUSION

From the above study, it can be concluded that there is remarkable increase in urban area of Hyderabad city. Urban proximity and IT industries are vitally responsible for the development of urbanization. In the last three decades or so, the population of Hyderabad has increased by 77 percent. The land use in the city has experienced rapid changes since the urbanization process and more population growth. Urban planning concerns actions located in space and time. There is no significant progress in the quantification and understanding of land-use/land cover changes has been achieved over the last decade. The use of remotely sensed data shows that Hyderabad has undergone a significant change in land use cover over the last 24 years. The study reveals that the remotely sensed data can provide information for effective routine tasks related to environmental inventorying and monitoring. Hyderabad, the fast growing city is now undergoing a major land cover change through the conversion of agricultural land into residential and commercial developments. Migration is a very complex phenomenon and a tremendous challenge for Hyderabad city and its local authorities, who are at the sharp end of integrating different group of people. Due to the rapid urbanization process, huge transition in land use and land cover has occurred. It has created imbalance in the biological and social environment. In the name of utilization, people are blindly destroying the natural resources. The derived maps from satellite imageries have provided new information on spatial-temporal distribution of built-up areas in the region. The information presented in this report not only presents urgent and needed statistical information but also provide a spatial context to this information. This complete task set can serve as a tool for policy formulation and evaluation, planning and natural resource management in the city.

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