

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320-088X

IJCSMC, Vol. 5, Issue. 2, February 2016, pg.255 – 259



Population Growth and Land Required for Residential Purpose Using GIS

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Abstract— Since independence, the population of India grows day by day in spite of natural resources, so natural resources are decreases as compared to population growth. Therefore, the urban development and planning is taking place. Chittorgarh is 2nd largest district in Udaipur division in term of population. The total population of Chittorgarh district is 15, 44,338 as per 2011 census. The land required for residential purpose is also increases as per the population grows. The available land for residential purpose is fixed so as the requirement occurs for residential land then the available land for agriculture, forests, hills area etc. are used for residential purpose. This study endorses to better planning and design of Chittorgarh district for urban planning as well as rural planning and also provides the information of land uses for residential purpose. GIS technique is used effectively and efficiently for land uses for residential purpose and used for urban development.

Keywords— “GIS”, “MAP”, “ARCGIS”, “ARCMAP10.1”, “Growth Monitoring”, “urban planning”, “Population Growth”, “Land Uses”.

I. INTRODUCTION

Urbanization is an index of transformation from traditional rural economies to modern industrial one. It is a progressive concentration of population in urban unit. During the last fifty years the population of India has grown two and a half times, but urban Area has increased nearly five times. In 2001, 306.9 million Indians (30.5%) were living in nearly 3,700 towns and cities spread across the country, and it is expected to increase to over 400 million and 533 million by 2011 and 2021 respectively. At the moment, India is among the countries of low level of urbanization. High rate of urban population growth is a cause of concern among India’s urban and town planners for efficient urban planning.

II. LITERATURE SURVEY

Safdar Ali Shirazi, Syed Jamil H. Kazmi 2014 [1] Population is the main focus in all studies within the framework of geography because population and basic natural resources are intimately related to each other and with the prospects of urban development and quality of the environment in a region. Therefore, the study of population growth and distribution is the logical starting point for any research of the present nature. Under the Devolution Plan, the dichotomy between urban and rural areas has ended.

A district now comprises of Tehsil (without any distinction between urban and rural areas in it), while a City district comprises of Towns.

Anwar M.M., Bhalli M.N., 2012 [2] Today urban growth all over the world is one of the most significant geographic phenomenon. This is particularly true for developing countries like India where number of urban centres are increasing with the passage of time. There is a threatening situation of Rapid urbanization, especially in the developing countries like India. Urbanization may be defined as a process in which agricultural landscape, forests, water bodies of the surface and underground water level is irretrievably lost. This is mainly due to uncontrolled population growth resulting in serious problems with regards to informal settlements, scarcity of food, environmental pollutions, destruction of ecological structure, unemployment, and so on.

III. PROBLEM STATEMENT

The majority of the world's population now resides in urban environments and information on the internal composition and dynamics of these environments is essential to enable maintenance of certain standards of living. The availability of urban land cover data is critical to policy makers, particularly for town planners, because of their ability to monitor impact of planning policies, the direction of urban growth and the development progress. Urban land cover in large urban centre including metropolitan areas continually changes over time and space, and local government must be able to update their database to reflect current land use. However, conventional methods of obtaining urban land cover data require a great deal of time, effort and money to meet fast growing cities.

IV. OBJECTIVE

The key purpose from the study is to measure the population growth for current situation from different levels in the study area. The main objectives of the research are underneath:

- To Study the population growth rate in Chittorgarh District.
- To Study and analyze the land requirement for the residential purpose as per Government norms.
- Map digitization of land required according to population growth in tehsils of Chittorgarh District using GIS.

V. PROPOSED SYSTEM

V-a) Methodology

V-a-1) Preparation for the assessment

- Review of literature regarding population and land uses in India and abroad.
- Situation analysis in one district of Rajasthan to determine which tehsils state needs to be evaluated.
- Indicators: - Norms for population and land uses for that is given in the Table 1.

V-a-2) Procedure and data collection

- Map of the study area (Chittorgarh District) showing local boundaries obtained from the Google Maps.
- Additional information was gleaned from other sources such as academic journals, gazettes, brochures, Internet and statistical publications.
- Tehsil wise population and population growth.
- Land requirement for a person sourced from book Land Policy and Urban Growth By Haim Darin-Drabkin

Three tehsils Chittorgarh, Nimbahera and Kapanas of Chittorgarh District, were selected for present study.

V-b) Study Area

The study area is Chittorgarh district located between 23° 32' and 25° 13' north latitudes and 74°21' and 75° 49' east longitudes in southeast Rajasthan, India. The district encompasses 10,856 square km (3.17 per cent of the Rajasthan State) area of land. The district is part of Udaipur Division and is divided into six districts namely Udaipur, Chittorgarh, Rajsamand, Banswara, Dungarpur and Pratapgarh. Administratively the district is divided into 10 tehsils. Total number of villages in the district is 2415 and it also has 6 urban towns. Rural and Urban population of the district is 15.15 lakh and 2.89 lakh respectively.

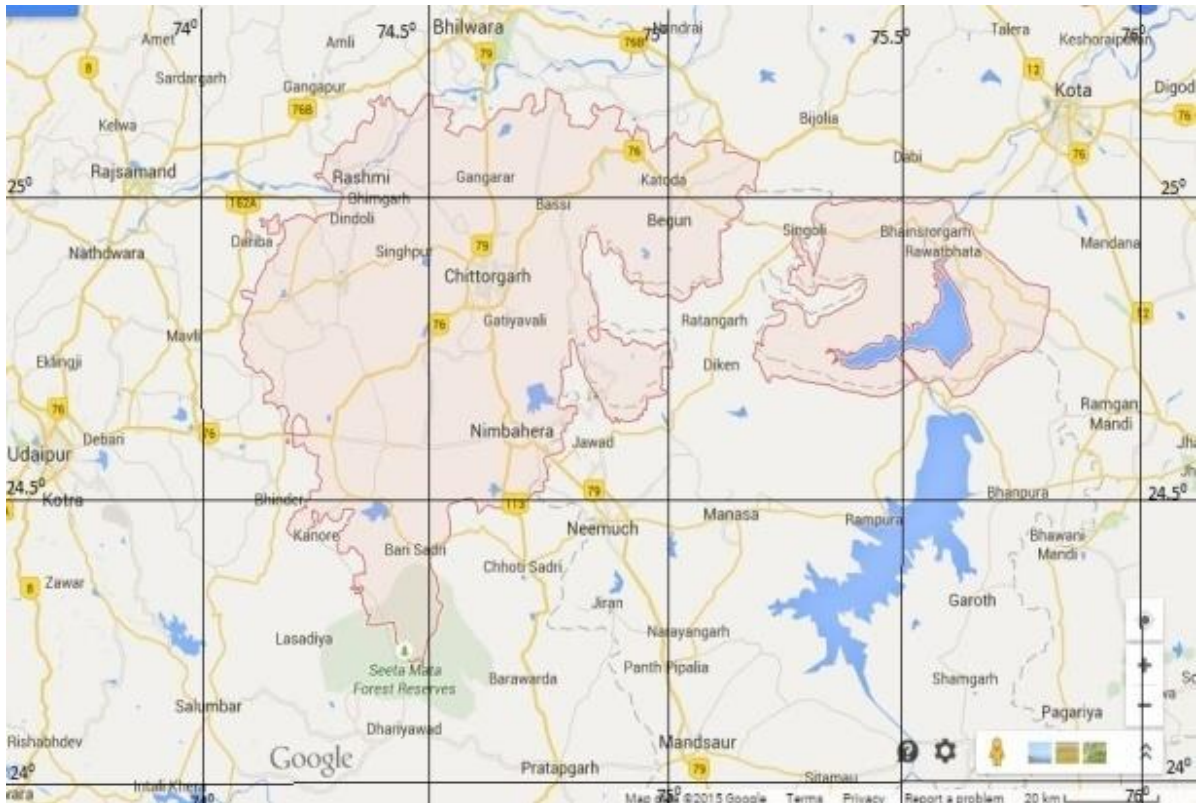


Fig. 1: Map of Chittorgarh District (Source Google Maps)

V-b-1) Population Norms

Table I
Population norms for land use

	Range	Average	Remarks
Residential	100-150m ² /person	125m ² /person	The norms of 285m ² /person gives an average density of 35 persons/hectare.
Roads	30-40	40	
Green space	40-56	48	
Public services	20-40	30	
Industry	20-40	30	
Commercial services	10-14	12	
	220-350m ² /person	285m ² /person	

V-c) Analysis

Table II
Population of three Tehsils of Chittorgarh District

Tehsil Name	1991 Population	2001 Population	Land Required For 2001 Population (in m ²)	2011 Population	Land Required For 2011 Population (in m ²)	2021 Expected Population	Expected Land Required For 2021 Population (in m ²)
Chittorgarh	71569	96219	12027375	116406	14550750	135031	16878875
Nimbahera	41921	53327	6665875	61949	7743625	71861	8982625
Kapasan	16028	18663	2332875	20869	2608625	24208	3026000

VI. RESULTS

The population growth rate of Chittorgarh Tehsil is comparatively high then Nimbahera and Kapasan Tehsil. The land required for population is also high in Chittorgarh Tehsil. The growth rate of Kapasan Tehsil is comparatively slow so there is plenty of land available for residential purpose.

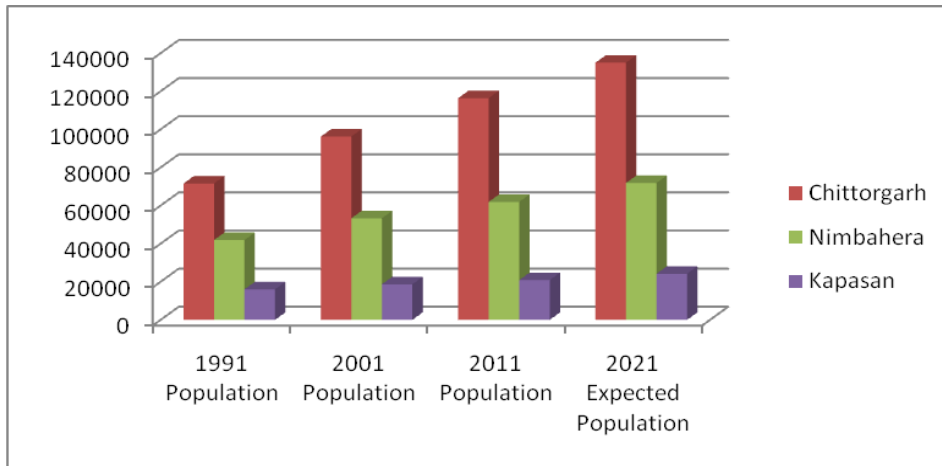


Fig. 2: Population Growths of Chittorgarh, Nimbahera and Kapasan Tehsil

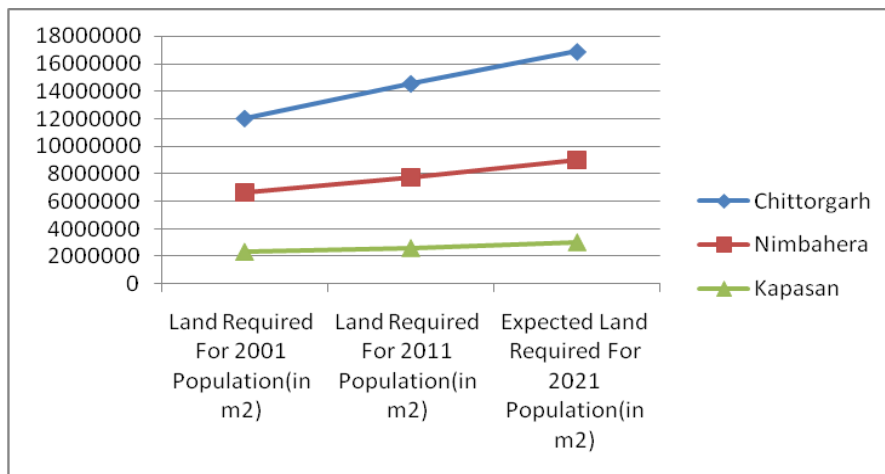


Fig. 3: Land Required for Three Tehsil according to Population

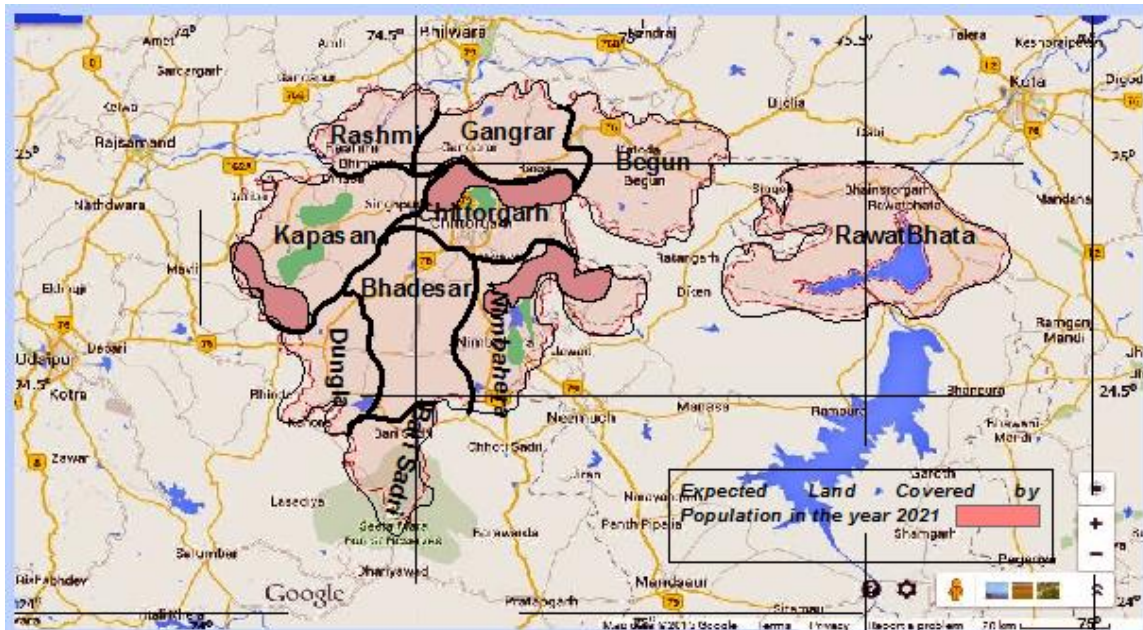


Fig. 4: Expected Land Required in Three Tehsils of Chittorgarh District according to norms in future

VII. CONCLUSION

According to thesis work, the land required according to population norms in Chittorgarh, Nimbahera and Kapasan Tehsil for the residential purpose is shown in GIS imaginary from intercensal years 1991 to 2011. Then according to growth rate of previous year the expected population according to norms, is carried out for next census and then the expected land required for that is also mapped in GIS imaginary.

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