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Dimensions of Households in Bahadurgarh City: A Geographical Analysis

Monika Kaushik[1], Dr. Salahuddin Mohd[2]

[1]Research Scholar Department of Earth Science Banasthali Vidyapith Rajasthan,
monikakaushik40@gmail.com
[2]Assistant Professor Department of Earth Science Banasthali Vidyapith Rajasthan
msalahuddin@banasthali.in

Abstract

The present paper illustrates the status of household in different years of Bahadurgarh city which is a municipal council of Jhajjar district, Haryana and a part of national capital region of Delhi. The study includes total number of households with decadal variations as well as decadal growth rate with the help of geometric extrapolation method based on secondary sources of data. The household status has been measured by help of annual compound growth rate and mean household size taken from 1991 to 2031 (2021 and 2031 are predicted years). The findings of the study reveals that the total number of households are increasing with decreasing growth rate from 1991 to 2031. The study also reveals the household density which has been divided into three category i.e. low, moderate, and high household density on the basis of quantile method of categorization.

Key Words: *Household, Annual compound growth rate, mean household, Extrapolation method, Bahadurgarh, Haryana*

INTRODUCTION

In present time, urban geography has attained great status In India. This drift for the urban geography was presented by few Indian Geographers who completed their studies in the British Universities like University of London. Now in present time this shifting trend is more focused on the specific aspects of urban geography such as regional distribution, function, urban field, growth of new urban areas, towns as regional centres, development and planning of the urban areas. Now the studies are more empirical or based on observations, field work as well as investigations. From such studies few important examples are: R.L. Singh (Banaras: A Study in Urban Geography, 1955), M. Guha (The Development of Calcutta: A Study of Urban Geography, 1952), S.M. Alam (Hyderabad – Secunderabad (Twin Cities): A Study in Urban Geography, 1965), M. Balaram Singh (Imphal: A Study on Urban Geography, 1980) etc. "E. Ahmad has identified some of the components of urban morphology as site characteristics, historical background, sky-line, green open spaces, water bodies, physical and cultural dominants." (Enayat, 1954).

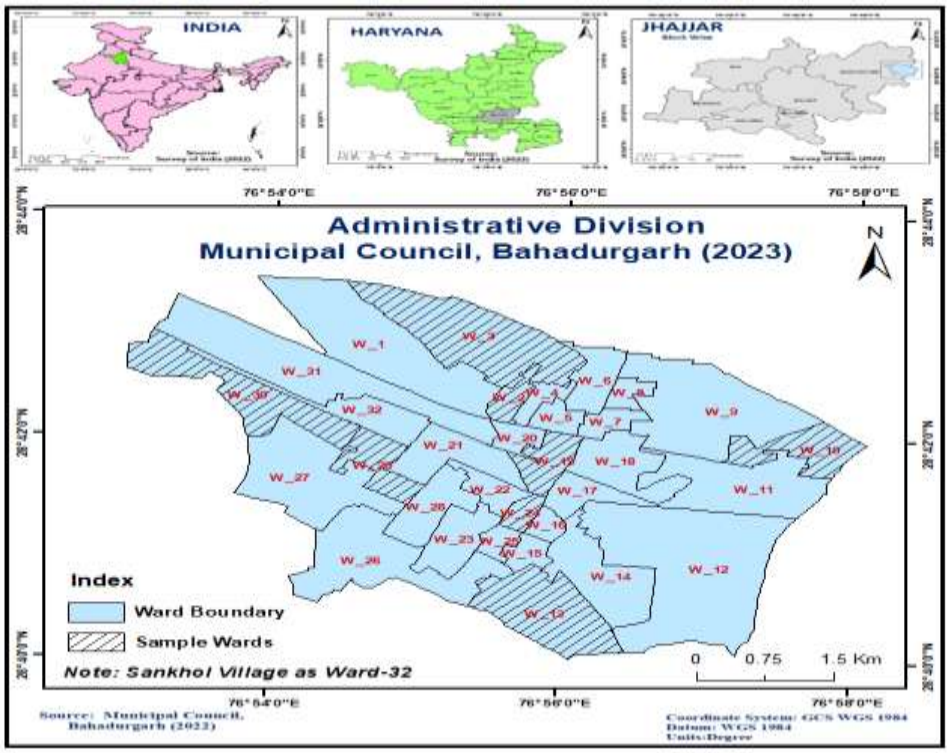
Based on above mentioned discussion the present study tries explore the following issue.

The main objective of the study is:

- to examine the household status of the Bahadurgarh municipal council of Jhajjar district in Haryana.

Study Area

Bahadurgarh is a Municipal Council of Jhajjar district, Haryana; which is divided into 32 wards. Bahadurgarh city is located on Delhi-Hisar National Highway number 10 at a distance of 2 Kilometers from the Tikri border, Delhi. Its latitudinal and longitudinal extension is 28°43'50" North latitudes and 76°55'25" East longitude.



The total area of Bahadurgarh city is 29.5 sq. km. In terms of Physiography, the city is low-lying and gradients towards South-East direction. The old settlement in the city is located on a mound in the South-East. The altitude of the town is 262 meters. The inclination of its development is along the National Highway towards the west, along Bahadurgarh- Najafgarh road, Bahadurgarh-Jhajjar road, and across the Railway Line on the North side.

Data Source and Research Methodology

This study is based on the secondary source of data that is collected from different government and quasi-governmental departments like Census of India (1991, 2001, 2011), The municipal council of Bahadurgarh city (2023), Statistical Abstract of Haryana (2021-2022, 2022-2023), Department of Town and Country Planning, Haryana (2022, 2023).

To defines the status of household in Bahadurgarh city an effort has been made for analysis of total number of households, variations, decadal growth rate, compound growth from 1991 to 2031 (2021 and 2031 are projected years). To represent the Bahadurgarh city household status tables, graphs and map have been used. The variation in the population and area has been calculated using following mathematical equation:

$V = X_n - X_{n-1}$

Here, V is the variation,

X_n = Population of n^{th} year,

X_{n-1} = Population of $(n-1)^{th}$ year

The growth rate has been calculated with the help of following formula,

$R = (X_n - X_{n-1})/ X_{n-1}*100$

Here, R is the growth rate

The annual compound growth rate has been calculated with the help of following formula,

$R_c = [\text{Anti Log } \{(\text{Log } X_n - \text{Log } X_{n-1})/i\} - 1] *100$

Here, R_c is the annual compound growth rate,

i = Interval between two periods in Years.

The projection in population/number/area has been computed using geometric extrapolation method. Mathematically,

$P_n = P_o(1+k/100)^n$

Here, P_n is the forecasted value of population/number/area after n decades from present known value.

P_o = Value of population/number/area of present decade
k = Percentage growth rate
Here, value of k has been calculated by taking cube root of multiples of growth rate ($R_1xR_2xR_3x.... Rn_)$
n = Number of decades

The household density class interval size has been defined on the basis of Quantile method.

RESULT AND DISCUSSION

Urban Growth: Status of Number of Households in City

Household number is one of the important aspects to measure city expansion. In 1991 there were 9852 households in Bahadurgarh city, which extended to 23405 in 2001 with a decadal growth rate of 137.57 percent (Table 1). The findings of geometric extrapolation method reveal that in 2021 number of households will be 41511 with a decadal growth rate of 18.91, whereas, the number is expected to reach 49436, with a decadal growth rate of 19.10 percent in 2031.

Table 1

Status of Households in Bahadurgarh City, Number, Variation, Growth Rate and Future Projection (1991 to 2031)

Years	No. of Households	Variation in No. of Households	Decadal Growth Rate (%)
1991	9852	--	--
2001	23405	13553	137.57
2011	34910	11505	49.16
2021*	41511	6601	18.91
2031*	49436	7925	19.10

Source: Census of India, Registrar General and Census Commissioner, India (Data from 1991 to 2011)

Note: *Projections are based on geometric extrapolation method

Table 2

Annual Compound Growth Rate of Bahadurgarh City Households (1991 to 2031)

Period	Annual Compound Growth Rate (%)
2001 over 1991	9.03
2011 over 2001	4.07
2021 over 2011	1.74
2031 over 2021	1.76
2031 over 1991	4.11

Source: Census of India (Different Issues)

Table 2 & fig. 1 shows the annual compound growth rate of number of households from 1991 to 2031. The findings of the study shows that annual compound growth rate of households 'number was highest during first decade of study (2001 over 1991), whereas, it was lowest during the third decade of study (2021 over 2011). It is important to note that there was a sharp decline in annual compound growth rate of number of households during the third decade of study, after this, the annual compound growth rate shows stability. Overall, annual

compound growth rate for the entire study (2031 over 1991) is 4.11 percent.

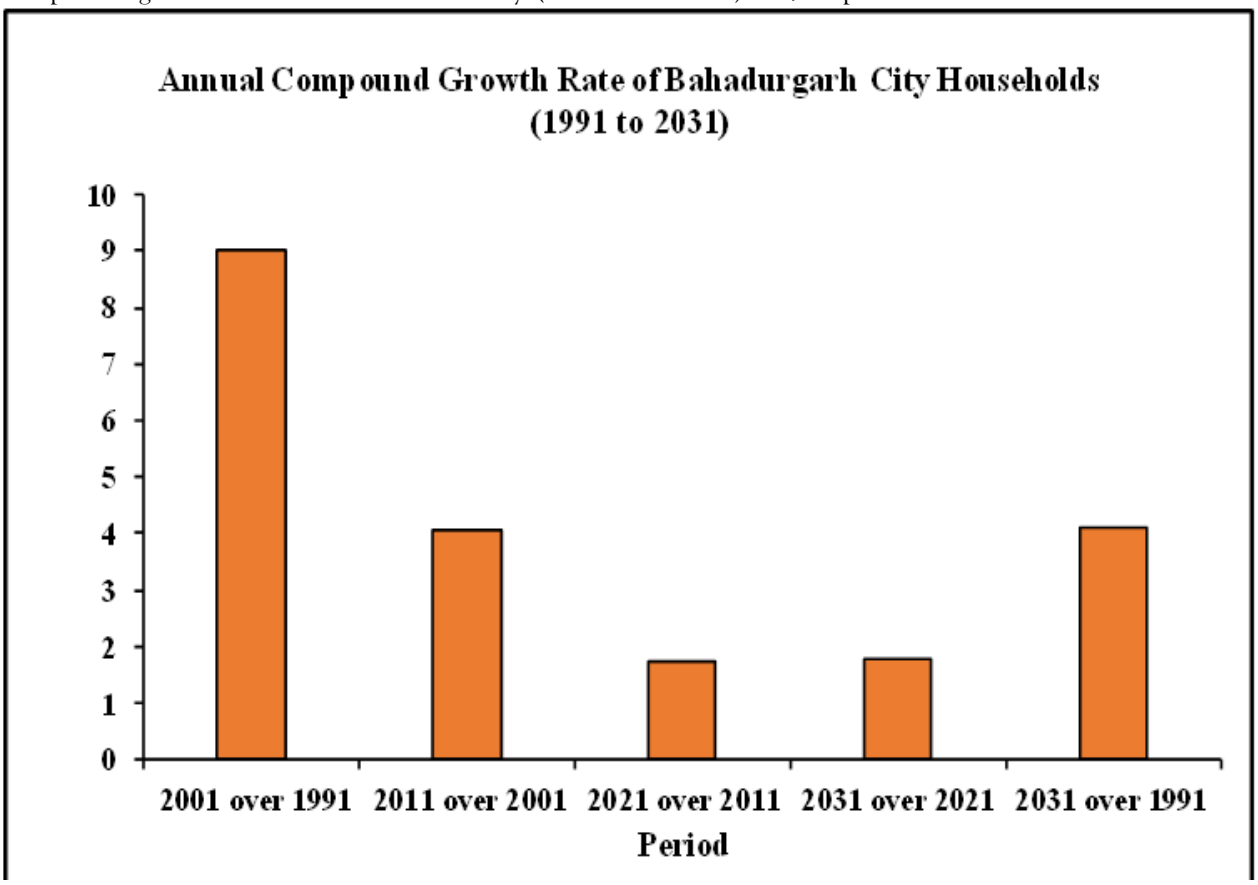


Fig 1

Table 3	
Mean Household Size in Bahadurgarh (1991 to 2031)	
Years	Mean Household Size
1991	5.81
2001	5.42
2011	4.89
2021	4.78
2031	4.66
Source: Census of India (Different Issues)	

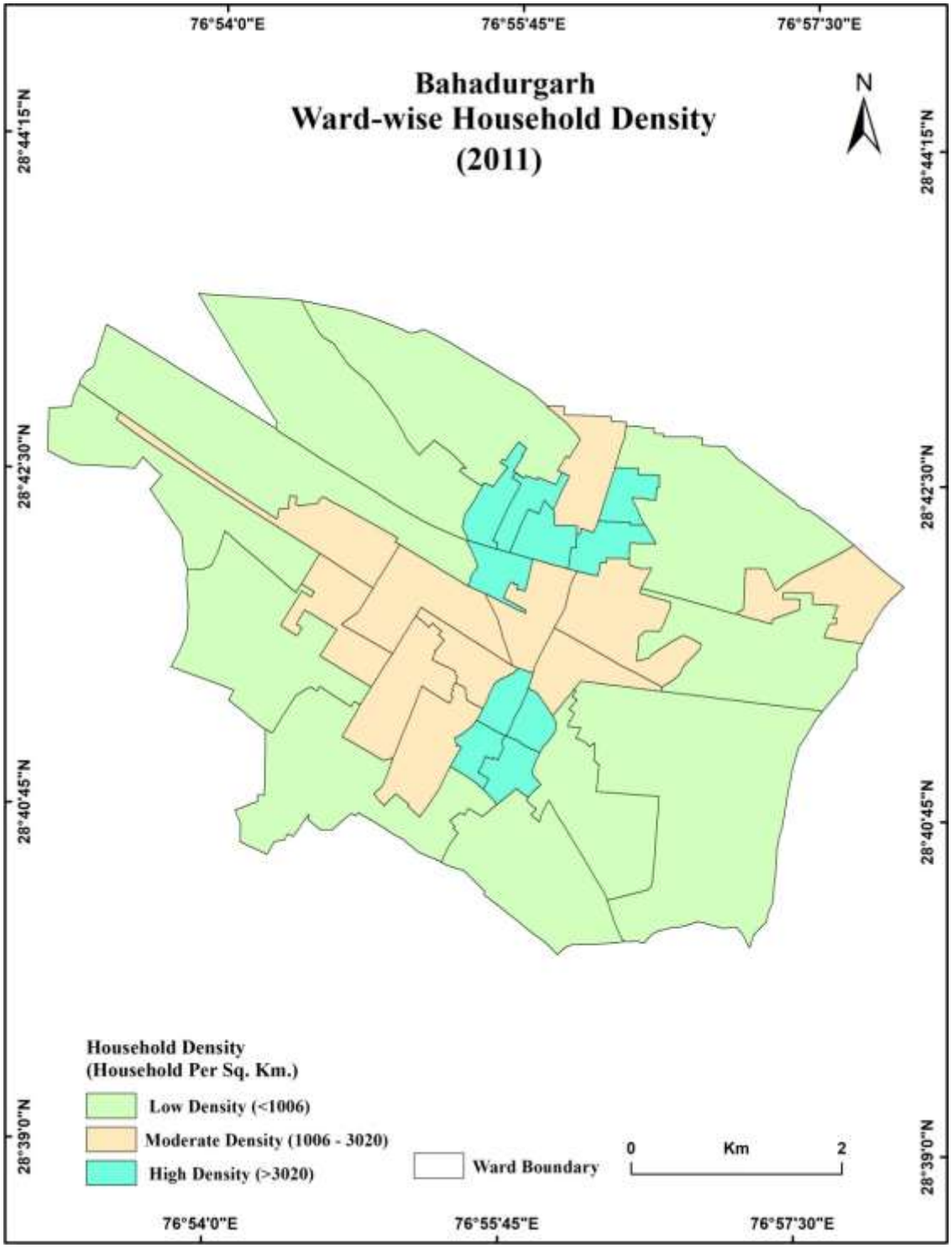


Fig. 2

Mean household size has been calculated by dividing population to the number of households (Table 3). It refers to the average size of house members who live in a household. This exercise has been computed to know the impact of household size in the development and growth of Bahadurgarh city over a time period. This exercise also helps in the depiction of change in mean household size with respect to time. The findings of the study show that with respect to time mean household size kept on decreasing (Table 3). It was highest (5.81 person per household) during initial phase of study (1991). Whereas, mean household size was lowest (4.66 person per household) during the final phase of study (2031). The change detected in the mean household study

refer to the more increment in the number of households than population.

Fig. 2 shows the spatial variation in household density of Bahadurgarh city. Household density has been calculated by dividing ward area to number of households of that ward. The household density has been divided into three category i.e. low, moderate, and high household density on the basis of quantile method of categorization.

The findings of the study depict that low household density (<1006 household per sq. km) found in the outer wards of city. There are 11 wards in the municipal which has household density less than 1006 households per sq. km. However, the wards which lies n ear by the national highway (NH 9), show moderate household density (1006 – 3020 household per sq. km.). The total number of such wards is also 11. It is important to note that highest household density (>3020 household per sq. km.) lies in the wards which are located in the old part of city and surrounding wards of Bahadurgarh railway station. It denotes that high household density in the old part of city is mainly due to small size houses with respect to their population.

CONCLUSION

Bahadurgarh is a new town and it does not have a very long and complicated history. The present day Bahadurgarh city was inhabited around 800 years ago. Before the habitation this region was a part of deserted forest. Bahadurgarh town was founded by Mughal emperor Alamgir II during his reign from 1754 to 1759. The initial name of this city was Sharafabad. The physiography of Bahadurgarh city is composed of alluvial plain having sand, silt, and gravels as its lithology. The slope of the city is moderate and it is prone to floods. The climate of city is characterized by hot summer and mild to severe winter. The annual compound growth rate of households' numbers was highest (9.03 percent) during first decade of study, whereas, it was lowest during the period 2021 over 2011. There seems a sharp decline in annual compound growth rate of number of households during the third decade of study. Overall, the annual compound growth rate for the entire study (2031 over 1991) is 4.11 percent. The number of wards is almost equally (11, 11, and 12 for low, moderate, and high household density respectively) distributed in the Bahadurgarh city.

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