

Distribution of Population in Raichur District: A Spatio-Temporal Analysis

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Abstract:

This study presents a spatio-temporal analysis of population distribution in Raichur District, Karnataka, aiming to examine population density and concentration variations across its talukas. Utilizing secondary data from the 2001 and 2011 Census reports, as well as projected figures for 2021, the research applies simple statistical methods and geometric projection techniques to assess changes in population dynamics. The analysis reveals significant regional disparities in population growth rates, with Devadurga and Lingasugur talukas experiencing the highest growth rates, while Siravara shows the lowest. The study also highlights variations in population density, with Raichur taluk exhibiting the highest density across the studied periods. Factors such as unemployment, education, agricultural productivity, fertility, mortality, and migration influence these demographic patterns. Overall, the findings underscore the uneven distribution of population in the district and the impact of socio-economic and physical factors on demographic trends.

Keywords: Spatio-Temporal Distribution, Population Density, Regional Disparities, Decadal Growth Rate

INTRODUCTION

The distribution of population is the arrangement of the population in a definite area in harmony with the conditions and requirements of humanity. Population distribution is an important aspect of studying population density and other implied socio-economic problems in geographical regions. Similar to the distribution of any other natural resources, the distribution of population on the earth's surface is uneven. Population distribution is a community phenomenon that exists by the collective affection of several factors. In other words, population concentration is the ratio between the size of the population and the area. The studies related to distribution tell us how many people live in which area, which area has a high concentration of population, and which area has a low concentration of population. Political, economic, and social aspects of life are influenced by population distribution. The various geographical factors like the nature of relief, amount of rainfall, agricultural productivity, availability of water, accessibility, etc. influence the distribution of population. Density on the other hand is also some kind of man-land ratio and hence cannot be separated from distribution. The influence of these factors is seen in the socio-economic development of the region. The regional variation in the distribution and density of the population is largely affected by various physical, economic, social, and cultural factors.

OBJECTIVES:

- To analyze the spatio-temporal Variation in the distribution of the population of talukas(sub-district) level in Raichur district.
- To discuss the density of population of talukas(sub-district) level in Raichur district.

DATABASE AND METHODOLOGY

The present study is based on the secondary data. Secondary data have been collected from Census records published by the Government of India. The other sources have been used District Census Handbook of Karnataka and Raichur District, Raichur district at a glance, District Gazetteers and concern information are collected from various published theses, articles, books, journals, etc. The SOI topographical maps were used for the demarcation of the study area. The data thus collected will be processed, analyzed, interpreted, and represented with the help of tables, and quantitative and cartographic techniques.

The decadal growth rate of the population has been calculated by using the equation given below

$$1) \text{ Decadal Growth} = \frac{p^2 - p^1}{p^1} \times 100$$

Whereas p^1 = Population of the base year

P^2 = Population of present year

Population density has been calculated to analyze man land ratio by using the density equation given below

$$2) \text{ Density of population} = \frac{\text{Total Population}}{\text{Total Area sq/km}}$$

A geometric method is used to project the population for 2021, assuming a constant growth rate for each Taluka. The formula for this method is:

$$3) \text{ Project the population (Pt)} = P_0(1+r)^n$$

Whereas

Pt = Projected Population

P0 = Base Year Population

r = Growth Rate

n = Number of Periods

STUDY AREA

Raichur District is an administrative district in the Indian state of Karnataka. It is situated between 15° 30' to 16° 30' North latitude and 76° 15' and 77° 45' East longitude with total Geographical area of 8442 Sq. Kms it stands at 8th position in the State in terms of area. The general slope of the district is from the northwest towards the southeast, its average height above the Mean Sea-Level being just 1,311 feet (400 meters). It is located in the northeast part of the state. It consists of 7 taluks; which are Devadurga, Lingasugur, Manvi, Raichur, Sirwar, Maski, and Sindhanur. District has the only gold manufacturing unit in the country and the nation's most efficient thermal power plant and is bounded by Yadgir district in the north, Bijapur and Bagalkot district in the northwest, Koppal district in the west, Bellary district in the south, Jogulamba Gadwal district of Telangana and Kurnool district of Andhra Pradesh in the east. It is situated in an upland basin; The district is bounded by the Krishna River on the north and the Tungabhadra River on the south.

The temperature typically varies from 18 °C (Min.) to 45 °C (Max.). Hot summers and scanty rainfall is

what Raichur receives throughout the year. Summer begins in the middle of February and ends in May. From June to the end of September, it is time for monsoon. The months of October and November are considered to be the time for retreating monsoon and the coldest months are from December to the middle of February.

The total population is 19, 28,812 the male population is 9, 64,511 and the female Population is 9,64,301 the Density of District is 228 persons per Km² With a decadal growth rate of 15.5 percent and the sex ratio is 1000 females per 1000 males. The total Literacy rate is 59.56 percent (Source 2011 District Census Handbook)

SHAPE AND SIZE OF THE STUDY AREA:

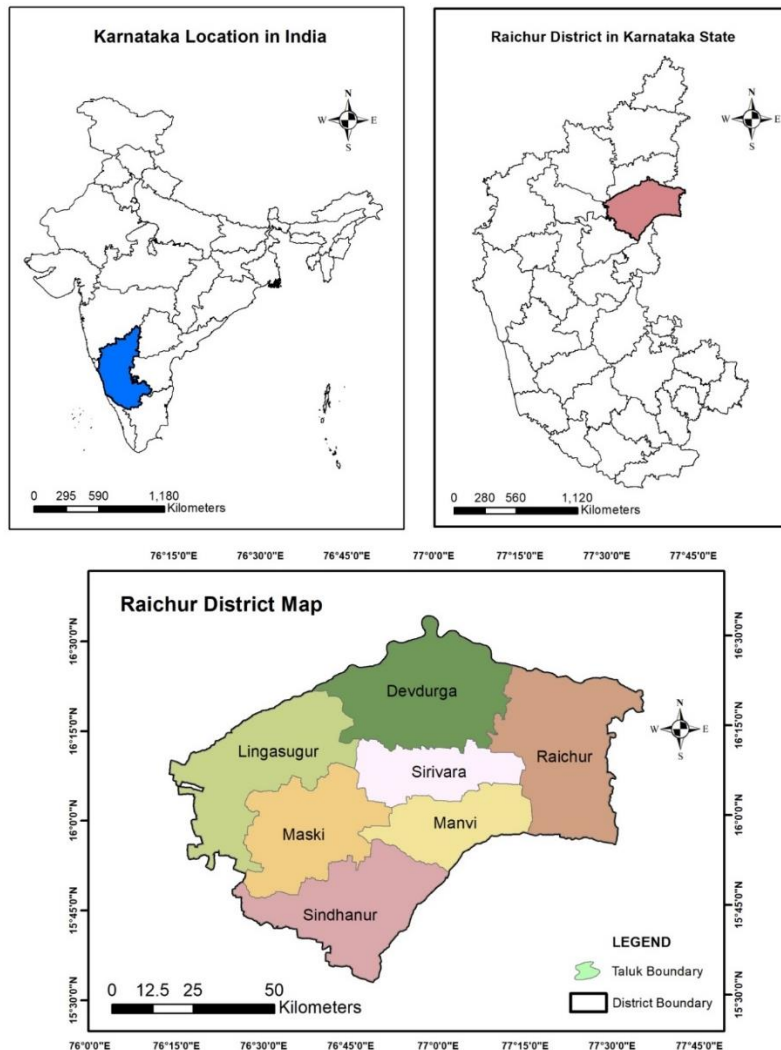


Table 1: Distribution of Population in Raichur District (2001, 2011 & 2021)

Talukas	Decadal growth of Population			Decadal growth rate of Population (%)		% Change in between 2001 to 2021
	2001	2011	2021*	2001-2011	2011-2021	
Devdurga	222457	280606	351669	26.13	25.32	58.08
Lingasugur	250668	301543	362766	20.29	20.30	44.72
Manvi	155700	179390	206624	15.21	15.18	32.71

Maski	172025	191864	213867	11.53	11.47	24.32
Raichur	435380	498637	569596	14.52	14.23	30.83
Sindhanur	303033	334706	369950	10.45	10.53	22.08
Sirivara	130499	142066	154847	8.86	9.00	18.66
Dist. Total	1669762	1928812	2229320	15.51	15.58	33.51

Source: Raichur district census handbook 2001 and 2011 and Raichur district at glance 2021-22

*Represented Projected Population

Distribution of Population in Raichur District (2001, 2011 & 2021)

The above table reveals the distribution of the population in Raichur District in decadal growth of 2001, 2011, and 2021. The district has Seven taluks in the decadal growth concerned, from 2001 to 2011 and from 2011 to 2021. Devadurga had the highest growth rate were take place with 26.13% and 25.32% respectively. The high growth rate could be attributed to improvements in local economic opportunities, and possibly increased migration into the area. It may also reflect successful agricultural or industrial developments in the taluk. Apart from this the second one the Lingasugur taluk had 20.29% from 2001 to 2011 and 20.30% from 2011 to 2021. Similar to Devadurga, Lingasugur’s growth may be driven by economic improvements, better employment opportunities, or infrastructural advancements that attract more people to the area. There was a slight growth rate taking place. The third highest is Manvi taluka has a negative growth rate from 2011 to 2021 which is compared to the 2001 to 2011 decadal growth rate which is 15.18% and 15.21% respectively.

Raichur Taluk stands in fourth rank with a growth rate of 14.52% in 2001 to 2011 and 14.23% in 2011 to 2021. As one of the more economically developed taluks, Raichur likely benefits from its status as a regional center, attracting both internal and external migration due to better services, employment opportunities, and infrastructure. The Maski taluk had 11.53% from 2001 to 2011 and 11.47% from 2011 to 2021. As far as Sindhanur and Siravar taluks are concerned, Sindhanuru taluk had 10.45% and 10.53% from 2001 to 2011 and 2011 to 2021 respectively, whereas Siravara taluka had 8.86% from 2001 to 2011 and 9% from 2011 to 2021. Factors such as limited economic opportunities, lower infrastructural development, or higher out-migration rates could contribute to the slower growth in Sirivara.

Decadal Variation of Population in Raichur District (2001-2021)

The population growth rate changes between 2001 to 2021 concerned, Devadurga and Lingasugur taluks have the highest than the average change rate of district population (33.51%). Whereas the Manvi (32.71), Maski (24.32%), Raichur (30.83%), Sindhanur (22.08%), and Siravara (18.66%) taluks are having less than district average change.

Taluk wise Decadal growth of Population

Population growth in %	Taluks with % in 2011	Taluks with % in 2021
Low (< 10)	Siravar (8.86)	Siravara(9.00)
Moderate (10-20)	Sindhanur (10.45), Maski (11.53) Raichur (14.52)	Sindhanur (10.53), Maski (11.47) Raichur (14.23) Manvi

	Manvi (15.21)	(15.18)
High (20>)	Lingasugur (20.29) Devadurga (26.13)	Lingasugur (20.30) Devadurga (25.32)

Source: Compile by Researcher

This table categorizes the talukas based on their population growth rates for the periods 2001-2011 and 2011-2021, indicating whether the growth rates are low, moderate, or high. Here's the interpretation:

Low Population Growth (< 10%):

Taluku falling in this category have experienced relatively slow population growth. In 2011, only Siravara had a population growth rate below 10%, at 8.86%. In 2021, Siravara continued to have a low growth rate, slightly increasing to 9.00%.

Moderate Population Growth (10-20%):

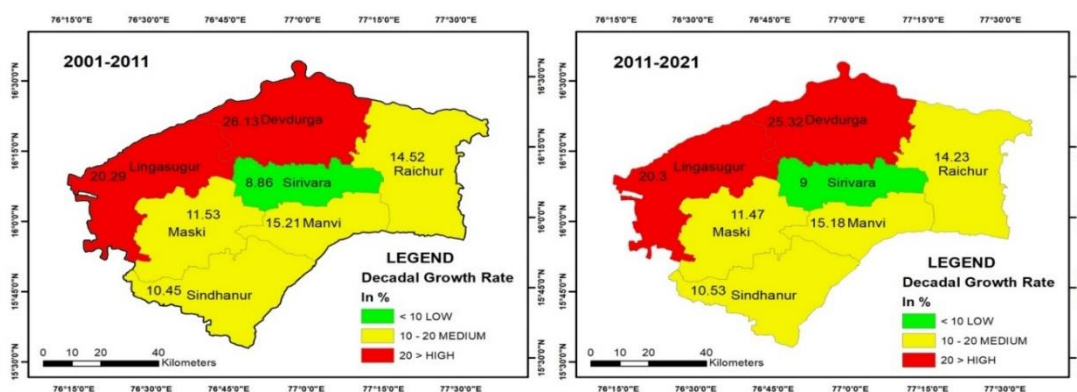
Taluku in this category have seen moderate population growth rates. In 2011, Sindhanur, Maski, Raichur, and Manvi fell within this range, with growth rates ranging from 10.45% to 15.21%. In 2021, the same taluku remained in this category, with slightly varying growth rates ranging from 10.53% to 15.18%.

High Population Growth (20% and above):

Taluku categorized as high population growth have experienced rapid increases in their population. In 2011, Lingasugur and Devadurga had growth rates exceeding 20%, at 20.29% and 26.13%, respectively. In 2021, Lingasugur and Devadurga maintained high growth rates, with values of 20.30% and 25.32%, respectively.

Overall, this table offers a clear classification of taluku based on their population growth rates, providing insights into the varying demographic trends across different areas within the district.

Decadal Growth rate of Population in Raichur District 2001-2021



DENSITY OF POPULATION

Density has been measured as one of the most significant elements of population distribution. The geography of every spatial unit can play a vital role in influencing the distribution of population. Undoubtedly, there are a lot of physical factors which can play an important role in the distribution of

population like landscape, soil, and climate and cultural and social factors considerably influence the distribution of people. Every one of these factors cannot play in isolation but all combined affects the population distribution. Factors like physical, demographic, economic, social, and political-cultural factors are interwoven in a composite way and influence the population of any country or region. The physical accessibility and interconnectivity from urban areas are significant for the distribution of resources and economic development. To understand the interrelationship between population and the land, it is therefore essential to study the density of the population of a region.

DENSITY OF THE POPULATION AT THE TALUKA LEVEL

The spatial distribution of the population of any region remains incomplete without knowing the density of a particular region. Therefore, the density of the population of any region provides a measure to analyze the concentration of the population.

Table 2: Density of Population at the Taluka Level in Raichur District 2001-2021.

Taluks	Density			Variations	
	2001	2011	2021	2001-2011	2011-2021
Devdurga	148	187	234	39	47
Lingasugur	195	235	283	40	48
Manvi	153	176	203	23	27
Maski	184	205	228	21	23
Raichur	282	323	368	41	46
Sindhanur	238	263	291	25	28
Sirivara	149	162	176	13	15
Dist. Total	198	228	264	31	36

Source: Raichur district census handbook 2001 and 2011 and Raichur district at glance 2021-22

Density of Population at the Taluka Level in Raichur District 2001 to 2021

Table No 2 reveals the fact that the density of the population at the taluka level in Raichur District from 2001 to 2021 are seven taluks have been distributed in the district in the average density of population is 198 in 2001, 228 in 2011 and 264 in 2021 respectively. As far as 2001 Density is concerned, Raichur taluka has the highest with 282 persons, Sindhanur has 238 persons which stands in the second rank, Lingasugur (195), Maski (184), Manvi (153), Siravara(149) and Devadurga (148) taluks are secured Third, Fourth, Fifth, Sixth and Seventh ranks respectively. As far as the 2011 census is concerned, the Density of the population in Raichur District Raichur taluk is leading with 323 persons which highest than the district average (228) apart from Sindhanur (263), Lingasugur (235) taluks are having above the district average. And the Maski (205), Devadurga (187), Manvi (176), and Siravar (162) taluks are having less than the district average. In 2021 projected population density is concerned, the Raichur taluk (368), Sindhanur (291), Lingasugur (283), and three taluks in First, Second, and Third ranks respectively these are having more than the district average (264). Whereas the Devadurga (234), Maski (228), Manvi (203), and Siravara (176) have Fourth, Fifth, Sixth, and Seventh Ranks respectively. These taluks have less than the district average density of population.

Taluk wise Density of Population

Density (Persons per km ²)	Taluks in 2001 (Persons per km ²)	Taluks in 2011 (Persons per km ²)	Taluks in 2021 (Persons per km ²)
Low (< 200)	Devdurga(148) Sirivara(149) Manvi (153) Maski (184) Lingasugur(195)	Srivara(162) Manvi (176) Devdurga(187)	Srivara(176)
Medium (201-300)	Sindhanur(238) Raichur (282)	Maski (205) Lingasugur(235) Sindhanur(263)	Manvi (203) Maski (228) Devdurga(234) Lingasugur(283) Sindhanur(291)
High (301>)	NA	Raichur (323)	Raichur (368)

Source: Compile by Researcher

Certainly, this table categorizes the talukas within a district based on their population density (persons per square kilometer) for the years 2001, 2011, and 2021. The talukas are classified into three categories: Low, Medium, and High, based on their population density.

Low Population Density (< 200):

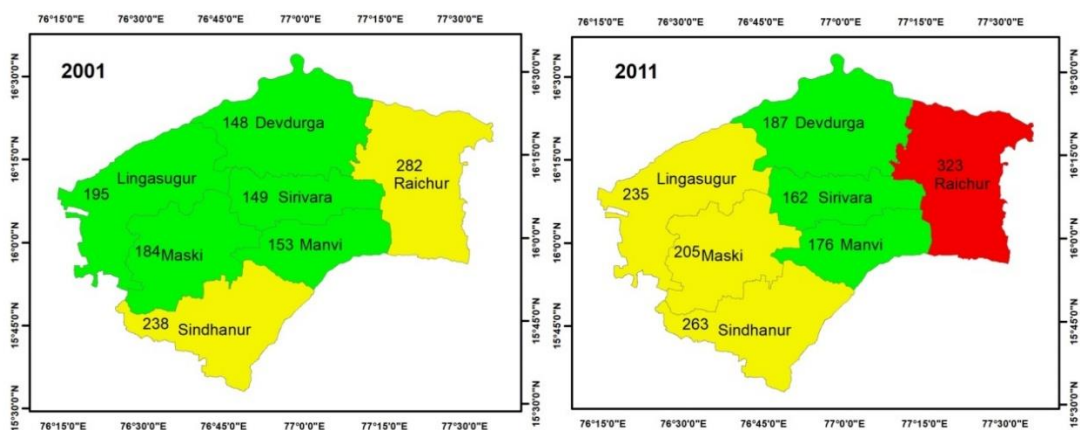
Talukas with population densities below 200 persons per square kilometer are categorized as having low population density. Talukas listed in this category for 2001 include Devdurga (148), Sirivara (149), Manvi (153), Maski (184), and Lingasugur (195).

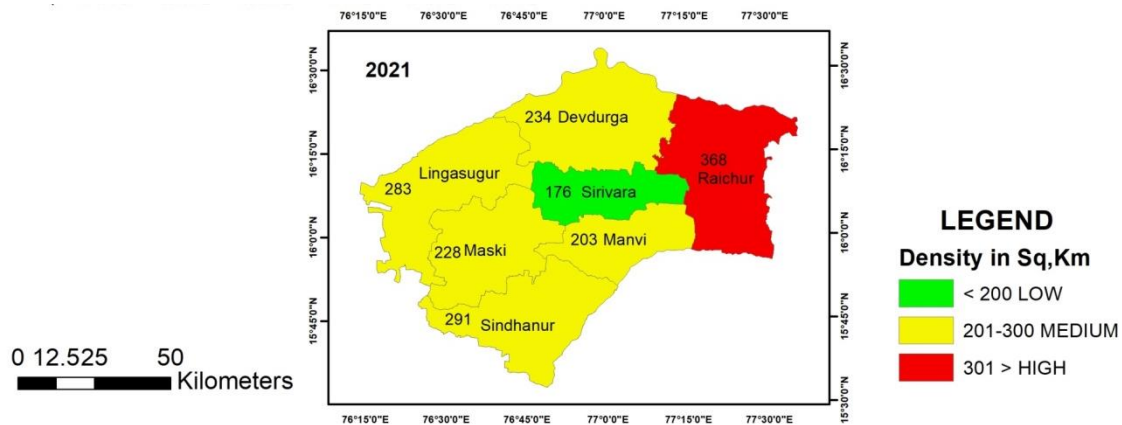
Medium Population Density (201-300):

Talukas with population densities ranging from 201 to 300 persons per square kilometer are categorized as having medium population density. Talukas listed in this category for 2001 include Sindhanur (238) and Raichur (282).

High Population Density (301>):

Talukas with population densities exceeding 301 persons per square kilometer are categorized as having high population density. There are no talukas listed in this category for the year 2001.





CONCLUSION

The analysis of population distribution in Raichur District reveals notable spatial and temporal variations across its talukas, influenced by a complex interplay of socio-economic and physical factors. Over the study periods from 2001 to 2021, significant differences in population growth rates and densities are observed. Devadurga and Lingasugur talukas have shown the highest growth rates, indicating dynamic demographic changes in these areas. Conversely, Siravara has experienced the slowest growth, reflecting lower population pressures.

The density analysis highlights Raichur taluk as the most densely populated region, a trend that has persisted over the years, driven by factors such as better employment opportunities, educational facilities, and industrial development. In contrast, areas like Siravara have lower densities, which may be attributed to less favorable socio-economic conditions and geographical constraints.

Overall, the study underscores the significant impact of various factors—including economic opportunities, infrastructure, agricultural practices, and migration—on the population distribution within the district. The findings suggest that tailored policy interventions addressing regional disparities and promoting balanced development could help mitigate uneven population growth and enhance the overall socio-economic fabric of Raichur District.

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