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RESEARCH ARTICLE

To Examine the Demographic change of settlements along the Mysore-Bangalore corridor region

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Abstract

Study has been conducted to analyze the demographic change and proximity of the villages located on the Mysore and Bangalore corridor, for the three decade of 1991 and 2011. The existing village wise population percentage of decadal growth and changes in the proximity from the two cities has been analysed. The result shows that most villages in the study area are between 0 to 5000 inhabitants. Notably, the range between 500 – 2000 people is higher than any other class, while excessive numbers of people are very few in cities such as Bangalore, Mysore, Mandya, Channapattana and Ramanagaram. The result of decadal changes shows that negative population growth and higher positive growth in villages is increasing, while lower population growth rate villages with no change are decreasing. The results of villages' proximity to cities show that the population of villages near to the cities has increased while a decrease can be noticed away from the cities.

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INTRODUCTION

Population growth and Urbanization are the basic concepts in regional development. Land use planning presently has become a serious necessity even in third world countries. In countries like India, the study of the general public is essential because of the rapid growth in population, economic development as well as population migration from rural to urban areas. Singh (2010) mentions that, the population growth of a region and its economic development is closely linked. Therefore the assessment of the population of a region can help in making necessary decisions for the future development.

High population growth and scarce resources cause many environmental and social problems. The study of population growth conducted by Singh (2010) states that the rapid population growth in any populated state will lead to many problems, such as pressure on land, environmental deterioration, fragmentation of land holding, shrinking forests, rising temperatures, pressure on health, availability of food grains and employment.

The spatial distribution of a population varies between regions depending upon the availability of resources. However as and when the resources fall short of demand, or when resources are distributed in an unequal manner, migration takes place. In India employment plays a major factor for migration. Since the new economic boom, there has suddenly developed a new segment of employment opportunities which is causing a huge rural to urban migration.

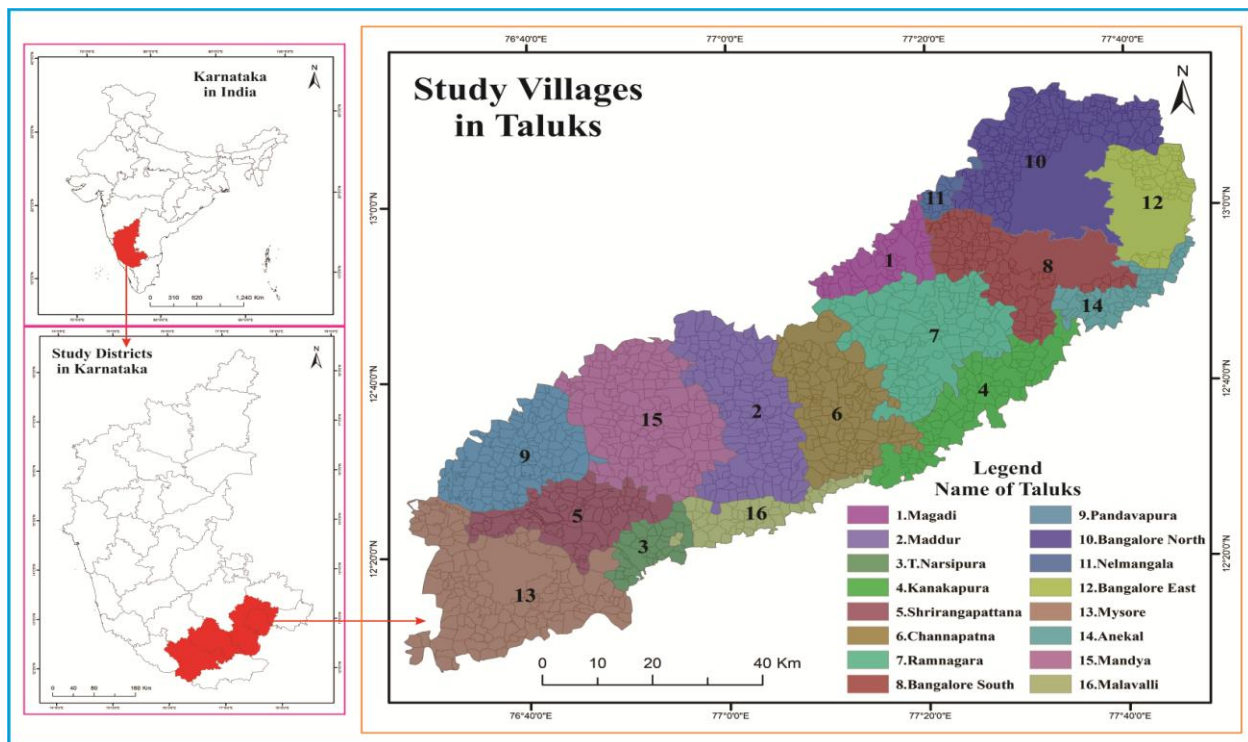
The study conducted by Shobha (2013) discussed the problems occurring in the city because of the increased diversification and the addition of newly developed software industries in Bangalore. Sudhira (2007) studied the growth of Bangalore city's urban area, in which she concluded that Bangalore stands out as a beacon in a

globalizing world. Therefore the study of population growth in Bangalore would help the policy makers and planners to make appropriate decisions for the present as well as for the future. Mysore is a popular city in the state of Karnataka, which is located in the southern part of the state. The study conducted by Aithal et al. (2012) states that Mysore is a growing traditional region of Karnataka, where rapid urban growth has been witnessed from 2000 to 2009 and moderate growth from 1980 to 1990.

The proximity of Mysore and Bangalore (140 Km) creates an inter-link in the growth of both cities. The Infrastructure corridor between these two cities is a major connecting mode, where tremendous changes have happened in the demographic structure. Therefore this present study has been carried out to explore the population changes of villages that are located between these two cities from the year 1991 to 2011.

Study Area

The present study (map1) has been conducted along the Mysore-Bangalore Infrastructure Corridor, which is situated in the southern part of Karnataka. This is the fastest growing region of the country. Bangalore is the fifth largest metropolitan city in the country, and Mysore is the second fastest growing city in Karnataka. The study area will be within a buffer of 20 kms on both sides of the Mysore-Bangalore highway. This includes all the towns and cities along this corridor. The distance between the two urban centres is 140 km. The total study area will comprise of approximately 5600 kms² including the major taluks which come along the corridor are Mysore, Shrirangapatna, Mandya, Maddur, Channapatna, Ramanagaram and Bangalore.



Map-1: The Study Area

Methods and Materials

The present study has been conducted based on secondary data, such as the village wise population. The village boundaries of the study area have been collected from the Census of India, through which the temporal changes have been analyzed. The ArcGIS software has been used to calculate the spatial analysis of the data like geo-referencing, digitized, temporal changes and map layout.

The administrative boundary changes between the selected study years (1991 to 2011) are a major problem in temporal studies. The number of villages in the study area varied from one study period to another. In 1991 the number of villages was 1,936, and there were 1,793 during 2001, but in the year 2011 the number of villages was 1,690. Therefore it is necessary to generalize the number of villages into similar administrative units for temporal analysis. Present studies have considered 2011 village boundaries for all the selected years and the analysis has been

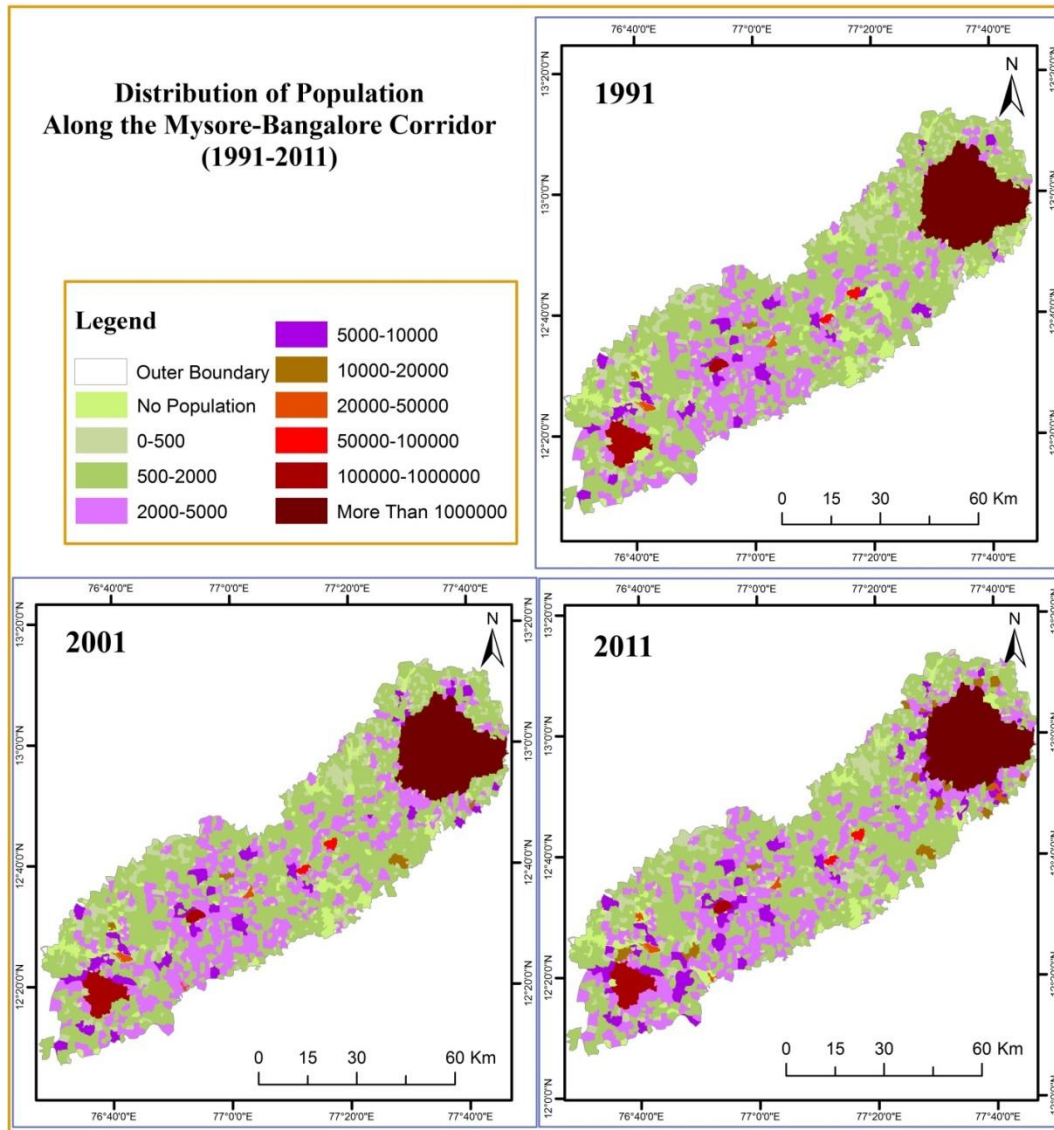
carried out. A proximity analysis was carried out using buffer analysis in ArcGIS to find out the spatial variation of the population between the two cities.

Assessment of existing population, village wise

The population of any place is not constant, but has positive or negative growth from time to time. The present study area has also witnessed population changes over the study period. Detailed reports on the existing population of certain years are shown in table 1.

Classes	Year - 1991		Year - 2001		Year - 2011	
	No. of Villages	in %	No. of Villages	in %	No. of Villages	in %
Uninhabited	159	9.41	127	7.51	128	7.57
0 - 500	367	21.72	338	20.00	298	17.63
500 – 2000	899	53.20	904	53.49	862	51.01
2000 – 5000	231	13.67	271	16.04	319	18.88
5000 – 10000	25	1.48	38	2.25	55	3.25
10000 – 20000	2	0.12	4	0.24	17	1.01
20000 – 50000	2	0.12	3	0.18	6	0.36
50000 – 100000	2	0.12	2	0.12	2	0.12
100000 – 1000000	2	0.12	2	0.12	2	0.12
>1000000	1	0.06	1	0.06	1	0.06

The population of the study area has been classified into ten groups as shown in Table 1, from which it is clear that less populated villages are decreasing with numbers ranging from “0-500” and “500-2000”, while higher population villages are increasing such as “2000-5000”, “5000-10000”, “10000-20000” and “20000-50000” for the years 1991, 2001 and 2011 respectively. This clearly depicts the growth of population in the villages of the study area. The remaining higher population classes are constant for the respective years which are the urban cities along the Mysore-Bangalore corridor such as Ramanagaram and Channapatna which are in the class “50000-100000”. On the other hand, Mysore and Mandya come in the “100000-1000000” class population. The city of Bangalore is constant in > 1000000 class. The spatial distribution and its changes between selected years have been mapped and shown in Map 2.



Map 2

Assessment of decadal population growth

The percentage of population growth in each village has been found using the mentioned formula in methodology. The results have been grouped into six classes as negative (the villages which has negative population growth), very low (0-25), low (25-50), moderate (50-75), high (75-100) and very high (> 100). The villages which do not have population changes have been noted as 'no change'.

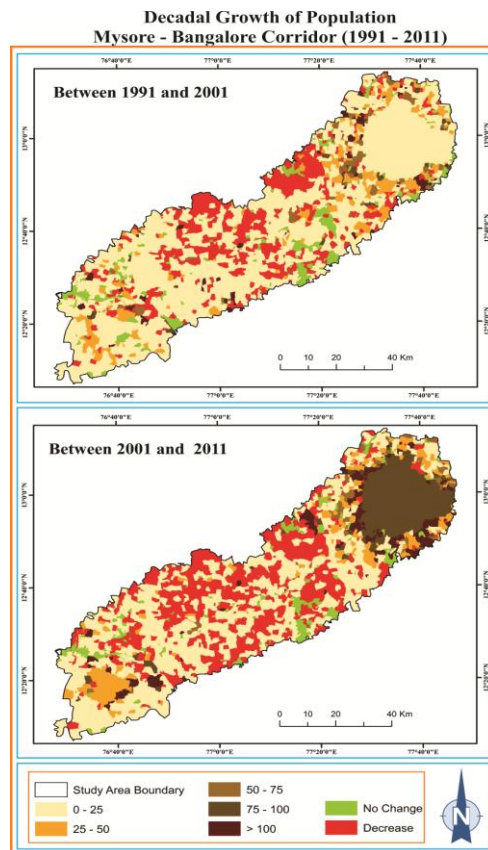
Table 2 and Map 3 show the classification of population growth in the study area. From this it is clear that the changes that happened between 2001 and 2011 are higher than those in 1991 and 2001. The number of villages that experienced negative population growth in 1991-2001 was 376, but this later increased to 500, between the years 2001 and 2011. This demonstrates that during the second decade, 124 additional villages witnessed negative population growth compared to the previous decade. The classification also depicts that the number of villages in the lower growth-rate classes (0 per cent to 75 per cent) have decreased while higher growth-rate groups (75 per cent to > 100 per cent) have increased. The numbers of villages with no change has decreased from 163 to 133.

The overall assessment of the results shows that the number of villages which had a negative population growth is increasing with higher population growth villages, whereas lower population growth rate villages with no change are decreasing. This is evidence of implausible growth on one side and tremendous decrease on the other. The extreme changes in the two sides may cause a problem in the socio economic condition in the area. Notable are the villages which had > 100 per cent growth during 1991-2001. There were 52 in total, and this increased to 116, which may create a negative impact on the existing environment of the villages if any necessary action is not taken.

Table 2: Temporal Changes Population in the Study Villages

Classes (%)	From 1991 To 2001		From 2001 To 2011		From 1991 To 2011	
	No. of Villages	in %	No. of Villages	in %	No. of Villages	in %
Negative	376	22.25	500	29.59	370	21.89
0 – 25 (very low)	866	51.24	717	42.43	601	35.56
25 – 50 (low)	160	9.47	147	8.70	241	14.26
50 – 75 (moderate)	53	3.14	44	2.60	88	5.21
75 – 100 (high)	20	1.18	33	1.95	56	3.31
> 100 (very high)	52	3.08	116	6.86	171	10.12
No change	163	9.64	133	7.87	163	9.64
Total	1690	100.00	1690	100.00	1690	100.00

The numerical values of population change cannot be used to find out the spatial relationship among the villages in the study area, so it is necessary to map the data using cartographic techniques. Therefore village wise growth rate has been mapped and it has been grouped into six classes as mentioned in the table 2. The spatial analysis shows that, the two main cities in the study area have witnessed a positive growth of population. The city of Bangalore’s growth rate was 0-25 per cent in 2001 and 75-100 per cent in 2011, while Mysore city’s growth rate was 0-25 per cent in 2001 and 25-50 per cent in 2011. This shows that the population of Mysore is increasing gently while Bangalore is increasing very rapidly. The villages around these two main cities have witnessed positive growth from low to very high while the villages away from these cities have witnessed only very low or decreased population growth.



Map 3

Proximity Analysis of Population Changes from the cities

The study further analyzed the spatial patterns of population changes from Bangalore to Mysore. For this the well-known buffer analysis in ArcGIS software was used. To classify the villages based on the distance, the buffer rings were 20, 40 and 60kms from both cities as shown in Map 4 (the straight line distance between these two cities is 140kms). The villages 60kms away from both cities are considered as a single group in comparison to the villages more than 60kms away. The centre of the cities has been considered as an origin point for the buffer analysis. Finally the villages within or which intersect the buffer’s outer-boundary have been consider as villages in that buffer area.

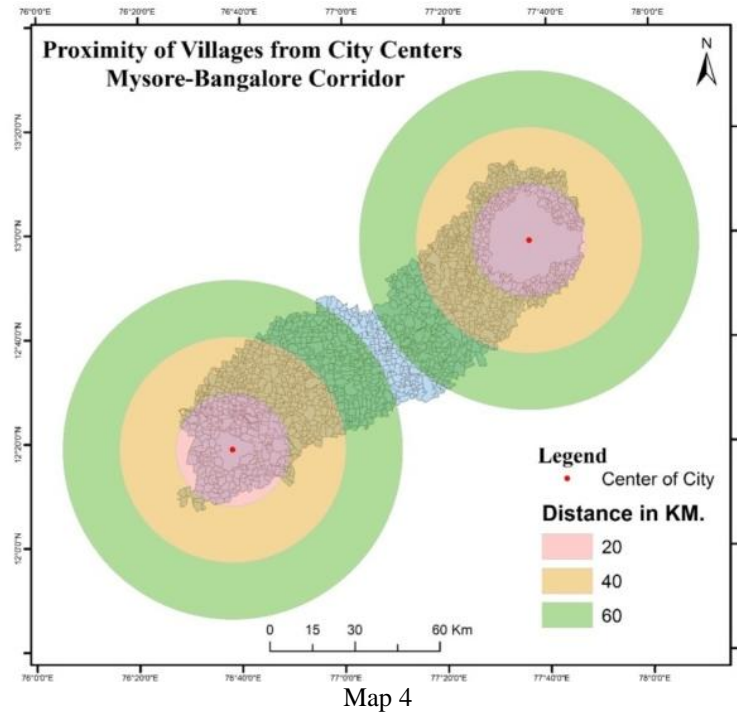


Table 3: Percentage of Population Growth in Study Villages - Based on the Distance from Bangalore City

Classes	0 - 20 Km		20 - 40 Km		40 - 60 Km	
	(1991 - 2001)	(2001 - 2011)	(1991 - 2001)	(2001 - 2011)	(1991 - 2001)	(2001 - 2011)
Negative	24	18	71	84	60	97
0 – 25 (very low)	105	58	157	146	97	59
25 – 50 (low)	54	55	47	49	7	5
50 – 75 (moderate)	28	23	14	12	1	3
75 – 100 (high)	7	21	7	5	1	1
> 100 (very high)	25	78	10	19	1	3
No change	27	17	35	26	18	17

Table 3 shows the growth of village population from Bangalore city for two selected decades. The result shows that, the villages within 0-20 km have witnessed higher growth in their population. The number of villages with 75-100 and > 100 per cent in this distance have tripled, which clearly indicates the tremendous growth rate in the population around the city. The population growth in the villages between the 20-40 km radius shows an increase in the number of decreasing village populations (71 in 1991-2001 and 84 in 2001-2011), with only a slight changes in other groups. The growth rate of villages between the 40-60km radius shows high rate of negative growth. The number of decreased villages in this zone was 60 in 1991-2001 has increased to 97 in the years 2001-2011. The number of villages in very low and low groups also decreased while there was only a slight increase in moderate and very high groups, only one village had a high level of growth during both the periods. The overall

result shows that the population growth in the villages near to Bangalore city has increased rapidly while decreasing hastily in the villages far.

Table 4: Percentage of Population Growth in Study Villages- Based on the Distance from Mysore City

Classes	0 - 20 Km		20 - 40 Km		40 - 60 Km	
	(1991 - 2001)	(2001 - 2011)	(1991 - 2001)	(2001 - 2011)	(1991 - 2001)	(2001 - 2011)
Negative	39	47	40	84	96	129
0 – 25 (very low)	141	144	188	154	137	110
25 – 50 (low)	30	21	12	8	6	6
50 – 75 (moderate)	4	3	2	2	3	0
75 – 100 (high)	2	5	3	0	0	0
> 100 (very high)	6	10	4	4	6	1
No change	34	26	29	26	14	16

Table 4 shows the growth of village populations from Mysore city for two selected decades. The villages within 0-20 km show a gradual increase in population growth in the number of villages in the very low, high and very high per cent groups, which illustrates the growth rate in the population around the city. The growth in the population of villages within the 20-40 km radius shows an increase in the number of shrinking village populations (40 villages in 1991-2001 to 84 villages in 2001-2011). The decreasing growth of populations in villages is seen in other classes except for 2 villages and another 4 villages which have moderate and very high growth rates during both periods. Villages within a 40-60km radius show negative growth rate. Ninety-six villages in the years 1991-2001 increased to 129 villages in 2001-2011. On the other hand, the very low, moderate and very high groups have shown a decrease. The six villages have shown low growth rates during both the periods. The overall result shows that the population growth in villages near Mysore city has been increasing with a decrease in growth rate population in villages as the distance increases from the city center.

Table 5: Percentage of Population Growth in Villages - Based on the Distance from Mysore and Bangalore City

Classes	Above 60 Km	
	(1991 - 2001)	(2001 - 2011)
Negative	46	41
0 – 25 (very low)	39	46
25 – 50 (low)	4	2
50 – 75 (moderate)	1	1
75 – 100 (high)	0	0
> 100 (very high)	0	1
No change	6	5

Table 5 shows the growth of village population away from Mysore and Bangalore cities at 60km for two selected decades, wherein totally 96 villages are located in this radius. The result shows that in this zone there is an increase in the population growth of villages in very low groups. There are a decreasing number of negative and low classes and only one village has very moderate growth during both the periods while no changes villages decreased from six to five.

Conclusion

The result of the present study gives the answer to three main questions, namely, what is the population of each village in the selected years (1991, 2001 and 2011) and how the village population has changed over the study period as well as the influence of a city's proximity to the population changes in the villages. The analysis was done using GIS. The result of existing population of villages in the study area shows that about 88 percent of villages have less than 5000 inhabitants while a very low number of villages have high populations in all the selected years.

The analysis of temporal population changes in the villages depicts that the negative population and higher population growth villages have increased, whereas lower and no-population change villages have all decreased. This clearly states that the imbalanced growth of village population has rapidly increased on one side and tremendously decreased on other. This unbalanced growth of population may cause problems in the future relating to society, the economy as well as biodiversity. Hence it is essential to take necessary action in villages where rapid changes have occurred.

Finally the result of changes in the village population according to the proximity from Bangalore and Mysore shows that the villages near the cities have a high growth in their population, while the rate of growth decreased gradually away from the cities. Notably the positive growth of villages' population was high with the distance of 20kms from both the cities, whereas the number of shrinking and less populated villages is higher in the 60km and > 60km radius. This clearly depicts the influence of cities on their surrounding villages as well as migration of population from far to nearby cities. The comparative population changes between Mysore and Bangalore show that Bangalore witnessed rapid growth during the study period while the growth in Mysore was moderate. The result of present study clearly represents the influence of urban centers around the villages as well as the migration of population towards the urban center. This study also suggests that the same techniques followed herein can be adopted to find out the spatial-temporal and proximity changes of population for places similar to the present study area.

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