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## SPATIO TEMPORAL VARIATIONS OF POPULATION DENSITY IN SOLAPUR DISTRICT

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**Abstract:**Population dynamics denote the trend of changes in population of a region. The analysis of density of population is fundamental for understanding the population geography of an area. A significantly wider regional variation in the pattern of density is revealed at tahsil level. Once again sharp edged boundaries can be noticed in the area of a high density on the one hand and area of low density on the other. In Solapur district, the North Solapur tahsil is highly densely of populated and Karmala tahsil is lower densely of populated region. An attempt has been made in the present article to analyze the variation both spatially and temporally, which are highly useful for planning purposes. The aim of this paper is to study the density of population. The density of population varies from one tahsil to another. The physical factors such as climate, soil, socio economic factors like irrigation, industry and transport are very significant in the analysis of the population density in Solapur district. The term density of population refers to a ratio between population and land area. Thus, it is a measure of the degree of population concentration. Generally, it is expressed in terms of number of persons per unit of area. With the rapid growth of population, the density of population of Solapur district is also increasing day by day which in turn is increasing the pressure on amenities and resources extensively in the region under study.

**Keywords:**Population dynamics, Arithmetic Density, Trend of Population Density.

### INTRODUCTION

Geography is a spatial science. Population Geography belongs to that border land of geography, which depends on demography, sociology and Economics. The physical factor such as climate, soil, natural vegetation, geology, and socio-economic factors including land use, agriculture, irrigation, transport, distribution of settlement are very significant in the analysis of population of the Solapur district. Such as demographic factors is also influenced on density of population, changes in the distribution of population are influenced by variations in birth and death rates in different areas and variations in volume and nature of migrations between the areas.

### STUDY AREA:

The district of Solapur is one of the most important districts of Maharashtra State in terms of both area and population. It lies entirely in the Bhima-Sina-Man basins. The district of Solapur is located between 17°10' North and 18°32' North latitudes and 74°42' East and 76°15' East longitudes. The East-West Length of the district is about 200 kilometer and North-South width is about 150 kilometer. The total geographical area of the Solapur district is about 14,878 square kilometer and population of 43, 15,527 according to 2011 census.

### OBJECTIVE:

The chief objective of this paper is to find out a spatial and temporal variation in density of population in Solapur District.

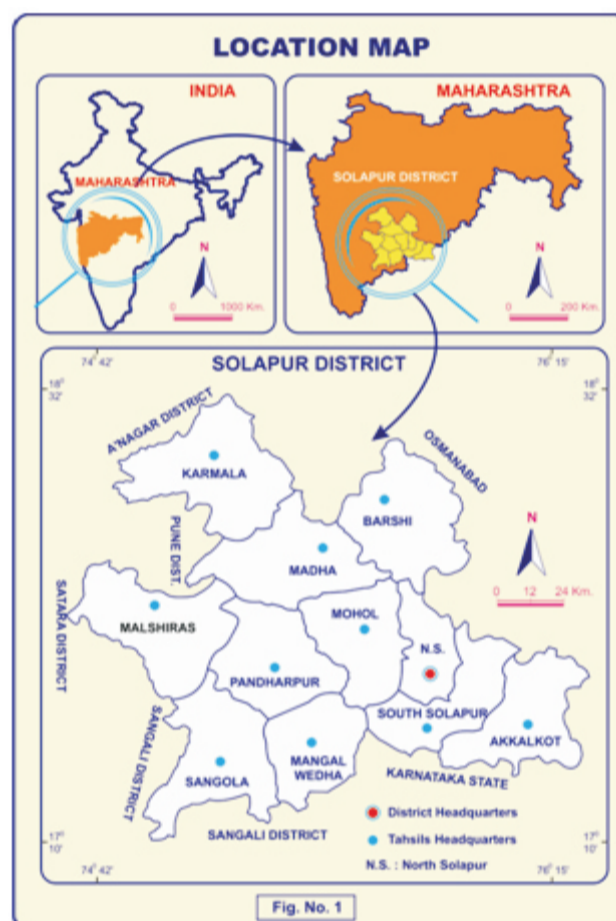
**HYPOTHESIS:-**

Density of population is increasing with space and time in Solapur District.

**METHODOLOGY:**

The data collected from secondary sources such as census, socio-economic abstract and gazetteer of Maharashtra state for Solapur district. The collected data have been processed in percentages and desired proportions, tabulated and processed through statistical and cartographic techniques have been applied to represent data in the form of maps.

$$\text{Arithmetic Density} = \text{Total Population} / \text{Total Area.}$$



**SPATIAL VARIATIONS IN DENSITY OF POPULATION IN SOLAPUR DISTRICT:-**

For district as a whole and taluk level density of population were calculated for the decadal years of 1971, 1981, 1991, 2001 and 2011. In the year 2011, the total density of population for the region as a whole was 290 persons per square kilometer, which has increased substantially since 1971, when it was 150 persons per square kilometer. For the year 1981, it was 173 people and became as high as 217 persons per square kilometer. In 1991 and 2001 density of population for the region as a whole were 258 persons per square kilometers. This trend of density clearly reveals that during last four decades, there has been consistent increase in the density of population, due to natural increase of population as well as contribution made by in-migrants to the district of Solapur.

The table concerned reveals, that the densities of population for various taluks of Solapur district varies enormously from one taluk to another. In the year 1971, as expected, it was highest for the North Solapur taluk due to the existence of city of Solapur, where it was 662 persons per square kilometer. On the other hand, it was lowest for Karmala taluk due to entirely rural taluk in the Solapur district. The Barshi and North Solapur show higher density than the region average in the year 1971. Rest of other taluks shows lower density than the region average. In the year 1981, the average density for region as a whole was 173 persons per square kilometer. Due to the presence of Solapur

**Spatio Temporal Variations Of Population Density In Solapur District**

city it was 825 persons for North Solapur tahsil. Besides, Barshi, Pandharpur and Malshiras tahsils have also shown the density of population more than region average in the year 1981. Apart from this, the remaining tahsils have much lower density than the district as a whole. No doubt, the same trend was also observed in 1981, as it was for the earlier decades highest being North Solapur and lowest for the Karmala and Mangalwedha tahsils.

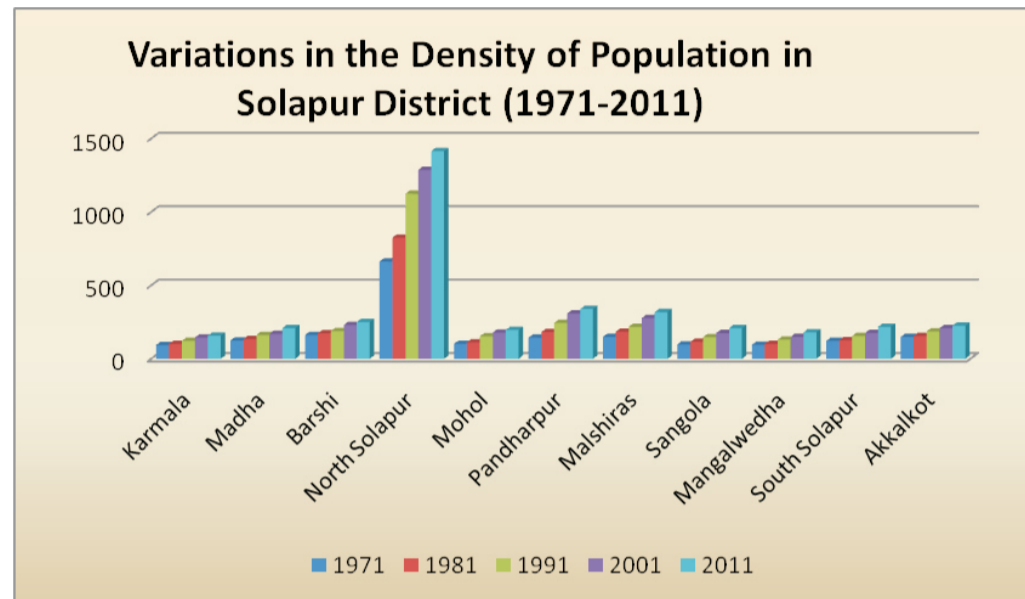
In the year 1991, more or less, the similar trend was found as for as the density of population is concerned. For region as a whole, it was 217 persons per square kilometer and for North Solapur tahsil it was 1124 persons per square kilometer, since Solapur city contributes a large number of persons from urban area. It is followed by Pandharpur tahsil as well as Malshiras, where the density is higher than the region as a whole. Karmala being entirely rural tahsil represents the lowest density of population for the year 1991. While rest of other tahsils, are much below than the district as a whole as per as the density of population is concerned in 1991.

**Table 1- Tahsilwise Density of Population for Solapur District (1971-2011)**

Sr. No.	Tahsil	Density of Population (Sq.Km.)				
		1971	1981	1991	2001	2011
1.	Karmala	94	102	123	145	158
2.	Madha	125	134	162	169	209
3.	Barshi	162	174	189	230	251
4.	North Solapur	662	825	1124	1287	1415
5.	Mohol	101	112	153	179	196
6.	Pandharpur	144	182	245	309	339
7.	Malshiras	149	185	218	278	318
8.	Sangola	98	115	148	175	209
9.	Mangalwedha	95	102	130	150	181
10.	South Solapur	122	126	155	176	218
11.	Akkalkot	149	155	187	209	226
	<b>District Total</b>	<b>150</b>	<b>173</b>	<b>217</b>	<b>258</b>	<b>290</b>

Source: Socio-economic Abstract and Census Handbook of Solapur District 1971-11.

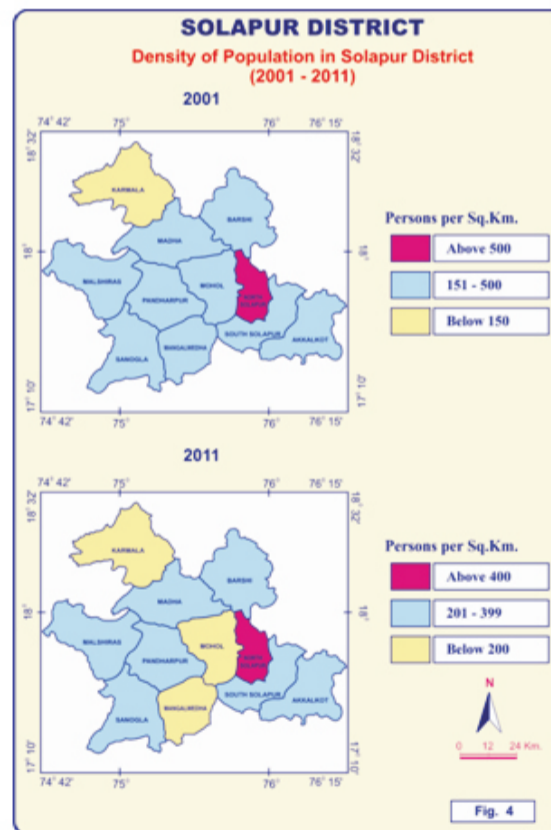
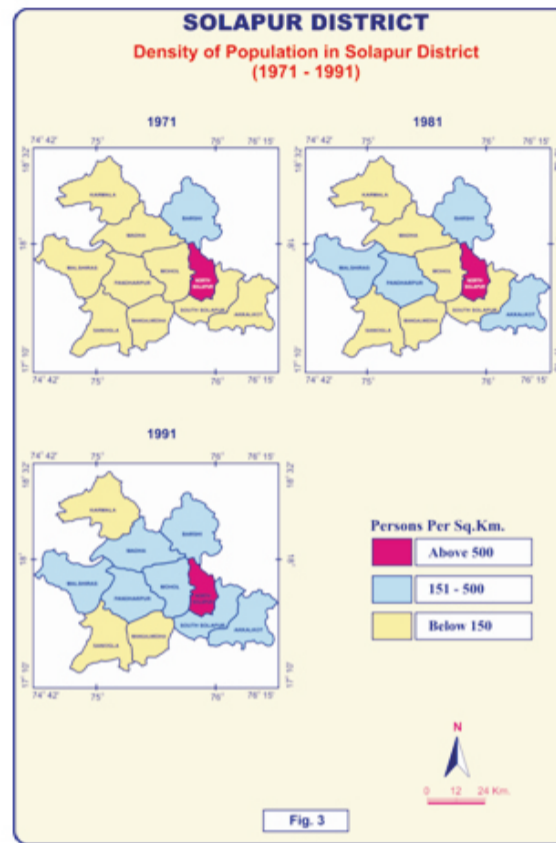
The spatial variations in the density of population for the Solapur district in 2001, varies from one tahsil to another. As expected, it is highest for the North Solapur tahsil, where it was 1287 persons per square kilometer and lowest for Karmala tahsil, where it was as low as 145 persons per square kilometer.



**Fig. 2 Variations in the Density of Population in Solapur District(1971-2011)**

North Solapur, Pandharpur and Malshiras have much higher density than the region as a whole. Remaining other tahsils show much lower density of population than Solapur district as a whole. There are number of factors responsible for the variations in the density of population. Some of them have already being discussed in the preceding discussion. Even though, the nature of terrain, proportion of land under agriculture, degree of urbanization and industrialization are some of the important factors responsible for the variations in density of population in the Solapur district.

In the year 2011, density of population varies from one tahsil to another. For region as a whole it was 290 persons per square kilometer. As expected it is highest for the North Solapur tahsil, where it was 1415 persons per square kilometer and lowest for Karmala tahsil, where it was as low as 158 persons per square kilometers. North Solapur, Pandharpur and Malshiras have shown much higher density than the region as a whole, while remaining tahsils have shown much lower density of population than Solapur district as a whole. There are number of factors responsible for the variations in the density of population.



**CONCLUSIONS:**

The density of population of the region has substantially increased in the last five decades. Due to increasing density of population, which adversely affect on the region. There should be necessary to decentralization of industries, establishment of agro based industries area, improvement of service sector in rural areas, development of medical, education, infrastructure facilities in remote and rural areas of the region are needed.

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