



**International Journal of Biology, Pharmacy  
and Allied Sciences (IJBPAS)**

*'A Bridge Between Laboratory and Reader'*

[www.ijbpas.com](http://www.ijbpas.com)

---

## **GEO-TEMPORAL STUDY OF POPULATION DENSITY: A CASE STUDY OF KARAD TEHSIL FROM THE YEAR 1991 TO 2011**

**DESHMUKH RSM**

Assistant Professor, Chhatrapati Shivaji College, Satara, Department of Geography

**\*Corresponding Author: DR. Ramraje Shivajirao Mane-Deshmukh**

Received 10<sup>th</sup> June 2021; Revised 11<sup>th</sup> July 2021; Accepted 20<sup>th</sup> Aug. 2021; Available online 15<sup>th</sup> Jan. 2022

<https://doi.org/10.31032/IJBPAS/2022/11.1.1089>

### **ABSTRACT**

The population density basically represents the ratio of land and population and so, the geographical factors mostly influence to the density of population. Population density is a best tool to measure the degree of population concentration. Population density determine the nature of population distribution. In the case of Karad tehsil, population density is not equally distributed over the tehsil. Mostly geographical and socio-economic factors are affecting on this unequal population density. Generally the high population density is found in Karad city and its surrounding villages because most of younger population comes toward the city region surrounding rural area for higher education and employment. Population density of Karad tehsil is rapidly increasing around to Karad city and along to the national highway No. 4 then the very low population density shows to north, north eastern and southern site of the tehsil and it is constant from the year 1991 to 2011. Very high population density found at central area of the tehsil because this places located on the fertile plain of Krishna and Koyana River as well as national highway No. 4 goes through this region and so agriculture and agricultural supplementary business rapidly developed here. The peoples mostly in younger age group migrate in this region for higher education and employment.

**Keywords: Censes, Socio-Economic Reports, Density, Arc GIS, Interpolation, Variation**

---

## INTRODUCTION

Generally, the term population is associated with a group of a particular living component that live together in a specific region with same characteristics. There are some characteristics which shows in the concept population those are they have a similarity in living components, they have a particular region, size, age and sex structure, death and birth rate etc. Demography is a study of population. There are basic tools in population geography which always use to the study of the nature of population geography those are counts, race, different ratios, proportions, rates and variations etc. There are some indicators which indicates to change in population that's are changing size, fluctuations in growth rate, sex ratios, age compositions and growth. The population changing indicators highlights in sample survey. Basically, door to door survey conducts in the process of population counting.

The term population density firstly used in 1837 by Henry D. Harness. The population density basically represents the ration of land and population and so, the geographical factors mostly influence to the density of population. Population density is a best tool to measure the degree of population concentration. Population density determine the nature of population distribution. As per discussion in chapter I number of factors are

there which determine to population density. These factors generally categorized in to three groups which discussed with following points.

- I. Geographical factors - Physiography, climate, soil, water resources, mineral resources etc.
- II. Socio-Economic factors - Economic growth of the region, opportunities of employment and business, Social awareness, Health and educational facilities etc.
- III. Political Factors - Government policies and political stability etc.
- IV. Demographic factors – Death and birth rate, migration etc.

Generally dense population density is found at the place where there is a favorable environment for human life survival and its overall development and vice versa. According to the census 2011, Maharashtra state recorded 365 population density in per sqkm and it counting eleventh highest state in India. The population density of Satara district is not equally distributed.

The term demography is comes from Greek language. The term demography is associated with the study of human population. Demography includes all the study of human population. In this process demographic data collects through different sources like census,

different registers, sample survey, socio-economic survey, different research works, old government records etc. This term derived from two Greek words “Demos” and “Grapho”. “Demos” means people then “Grapho” means graphy. The term demography used from ancient years. This term found in the study materials of ancient thinkers like Herodotus, Hippocrates, Epicurus, Thucydides, Protagoras, Polus, Plotus and Aristotel. This term also found in the study materials of ancient philosophers of Rome like Cato, Columella, Macus, Aurelius, Epictetus etc. That means the roots of demography term is seen since ancient period. There are two methods of demographic data collections those are direct method and indirect method. In the direct method demographic data collects through direct survey in which includes census data. Socio-economic survey reports, vital statistics etc. In the vital statistics mainly found some registers like register of natural growth which records counts of deaths and births, migration register which records status of migration etc. In the indirect method the direct survey is not conducted. Demographic data collects through previous records like historical records, research articles, newspapers, records of different government

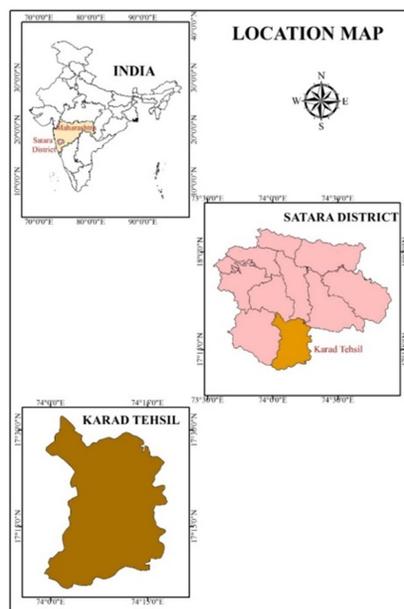
offices etc.

In the population geography use different data forms to correlate relations of population counts with spatial as well as temporal situations. In these data farms includes quantitative population data, age groups, sex composition with age groups, population counts with religions, casts, numbers of households with that’s status, different ratios such as male-female ratios, sex ratios; occupations, vital statistics including death rate, birth rate, migration; marital status; different rates such as growth rate, birth rate, death rate and literacy rate etc. There are various sources for

collection of demographic data such as socio economic reports, decade population census, vital statistics, different sample researches and research articles etc.

The present study in closely associated with Population Geography. It is a sub branch of human geography. Especially population geography studies the different characteristics of population and that’s relationship with geo-spatial factors. There is more imbalance in the spatial distribution of population over the world.

### **Study Area**



**Fig. 1 Study Area**

The present research is focusing on Karad tehsil. Karad tehsil is located on the alluvial plain of Koyana and Krishna river and its tributaries. Most of the area of Karad tehsil is covered by alluvial plain. The geographical extend of Karad tehsil is  $17^{\circ}31'59.082''\text{N}$  to  $17^{\circ}5'29.779''\text{N}$  latitude and  $73^{\circ}58'59.705''\text{E}$  to  $17^{\circ}18'58.985''\text{N}$  longitude. The elevation of Karad tehsil is ranging from minimum 552 mt. to maximum 920 mt. from mean sea level. The Karad city is administrative center of this tehsil and it located at  $17^{\circ}17'25.54''\text{N}$  and  $74^{\circ}10'52.09''\text{E}$ . the average elevation of Karad city is 575 mt. from mean sea level. Figure 2.1 shows the absolute location of the tehsil. The Karad is a south tehsil of Satara district. Shirala, Islampur and Kadegaon tehsils of Sangli district are located to south western

side, south side and south eastern side of Karad tehsil respectively. Patan tehsil of satara district is located to west side of Karad tehsil then Satara and Kadegaon tehsils founds to northern side of the study area. Khatav tehsil is located to north eastern side of the tehsil.

Karad tehsil is located at the fertile plain of Koyana and Krishna river and its tributaries. Most of the area of Karad tehsil is covered by alluvial plain. These two rivers are the main sources for irrigation. Sugarcane is major crop in Karad tehsil. Higher educational facilities are setup in the Karad city. Different trades and marketing centers concentrated in the Karad city and its surrounding. Major two type soils found in the Karad tehsil those are black alluvial soil which found along to the Krishna and Koyanariver then the red soil is found in

hilly areas. The elevation of Karad tehsil is ranging from 552 mt. to 920 mt. The national highway No. 4 gave through center of the tehsil then Karad tehsil is located along to this highway and on the confluence of Koyana and Krishna river. The absolute location of the Karad tehsil says that it is a south most tehsil of the Satara district.

### **Aim and Objectives**

The main aim of the present research project is to study of population density of Karad tehsil from the year 1991 to 2011.

There are decided some objectives in the present research to achieve the main aim of the study.

- i. To study geo-spatial relations of demographic characteristics of the study region.
- ii. To study of spatial distribution of population density.
- iii. To determine population density changing aspects in the study area.

### **Data collection and Methodology**

Data collection is a core task in any research work. In the process of data collection includes the collection of necessary data with respect to research topic using particular methods and techniques. In any research, right data collection technique and accurate data leads our to research goal. Usually, the research data founds in two types those are primary data and

secondary data. Primary data includes the data which through direct survey, experiments and interviews. Primary data provide the current status of the field situation so this type data known as real time data. Secondary data means the data which collects through secondary sources such as previous government records, various survey reports, books, journals, government publications and websites. This type of information is obtained quickly. There primary and secondary data again classified in to two categories that's are spatial data and non-spatial data. In geographical point of view the spatial data construct with the spatial reference including latitudes, longitudes and altitudes then other attribute data comes under non-spatial data.

The present research conducted with a geographical point of view. In this research work used various types of data which collected through various different sources. These data broadly divides in to two groups those are spatial data and non-spatial data then these two groups again categorized in to two groups. First is spatial data and second is non-spatial data. Spatial data defined as the data which has the geographical reference such as the geographical extent and elevation. In the GIS and Remote Sensing demine there are explain geographical extent and elevation using X, Y, and Z values. X value represent Latitudinal extent, Y value

represent Longitudinal extent then Z value represent elevation from the sea level. In the primary spatial data also includes Satellite

imageries, Arial photographs, and geo-tagged photos etc.

Primary Data		Secondary Data	
Spatial Data	Non-spatial Data	Spatial Data	Non-spatial Data
GPS Locations points for georeferencing and ground truths	Population counts through village survey	Village boundary map and vector data set	Censes Data
Geotagged Photos	Numerical and descriptive data through different interviews	Toposheet	District level socio-economic survey report
		Satellite Imagery - Sentinel 2A	Vital statistics

In the present research population density calculates using following formula.

$$\text{Population Density} = \frac{TP}{TA}$$

Where,

TP = Total Population

TA = Total Geographical Area in square kilometers.

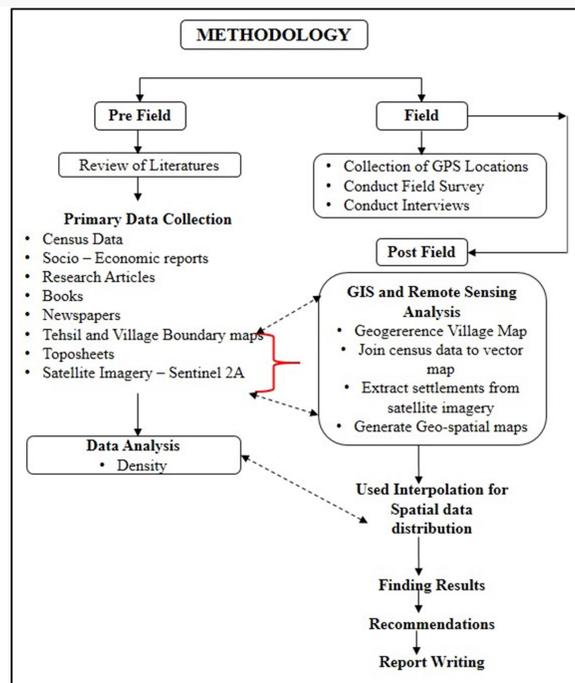


Fig.2 Methodology

Using above formula there will calculates the population density for per square kilometer area.

In the case of Karad tehsil, population density is not equally distributed over the tehsil. Mostly geographical and socio-economic factors are affecting on this unequal population density. Generally the high population density is found in Karad city and its surrounding villages because

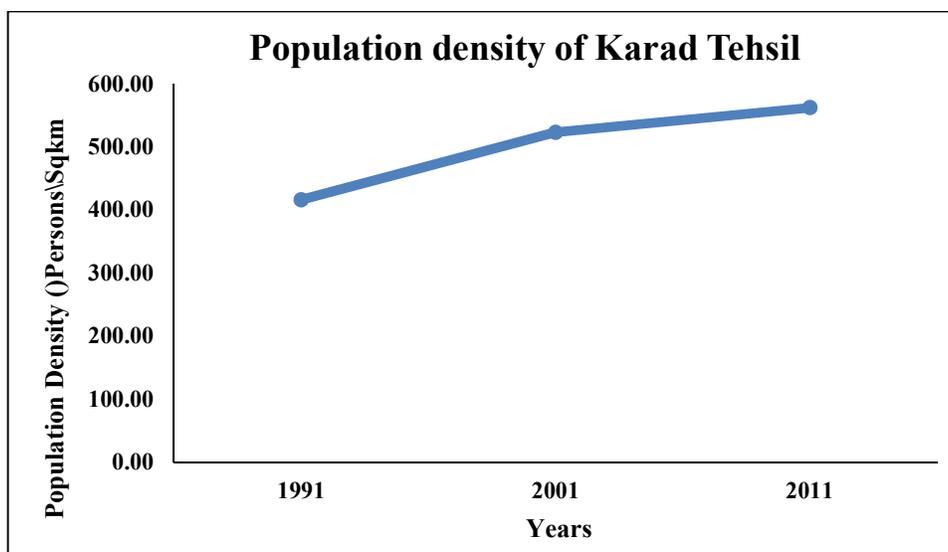
most of younger population comes toward the city region surrounding rural area for higher education and employment.

Table 3.3 shows the decade wise total population, population density and decadal variation of density of Karad tehsil from the year 1991 to 2011. According to this table the population density of Karad tehsil is gradually increase with increasing percentage of decadal variation.

**Table: 1.1:  
Population density: Karadtehsil**

Year	Total Population	Population density in per sqkm	Decade Variation in %
1991	432458	416.23	-
2001	543424	523.03	25.66
2011	584085	562.16	7.48

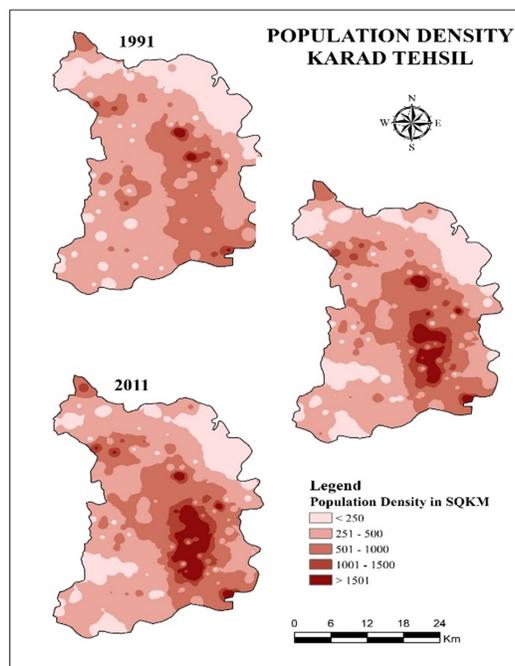
Source – Census of India



**Chart: 1.1: Population Density of Karad Tehsil From 1991 to 2011**

Figure 3 reveals the spatial distribution of population density in Karad tehsil. According to present map the population density is rapidly increasing around to Karad city and along to the national highway No. 4 then the very low population density shows to north, north eastern and southern site of the tehsil and it is constant from the year 1991 to 2011. Very high population density found at central area of the tehsil because this places located on the

fertile plain of Krishna and Koyana river as well as national highway No. 4 goes through this region and so agriculture and agricultural supplementary business rapidly developed here. The peoples mostly in younger age group migrate in this region for higher education and employment. In this area include Karad city and Malkapur, Saidapur, Gote, Koyanavasti Nandalapur, Julewadi, Hajarmachi, Sabalwadi, Umbraj and Bhosalewadi villages.



**Figure 3 Spatial Distribution of population Density**

A reverse population density trend shows to south and south western site of the tehsil where population density is continuously decreasing from the year 1991 to 2011 in which found Tarukh, Bamanwadi, Vanarwadi, Tulsan, Ondosha, Latkarwadi, Pachupatewadi, Shendawadi, Pawarwadi, Jinti, Yenape, Akaichiwadi, Matekerwadi and Shewalewadi

villages. There are some major reasons for the declining population density at this places such as this is a hilly area where agriculture is only income source and most of agricultural of this area is depends on the monsoon and lack of education and transportation facilities. And so, the most of peoples migrate to nearest cities such as Karad, Satara, Pune and Mumbai for

education, job and business.

## RESULTS AND CONCLUSION

In the case of Karad tehsil, population density is not equally distributed over the tehsil. Mostly geographical and socio-economic factors are affecting on this unequal population density. Generally the high population density is found in Karad city and its surrounding villages because most of younger population comes toward the city region surrounding rural area for higher education and employment. Table 1.1 shows the decade wise total population, population density and decadal variation of density of Karad tehsil from the year 1991 to 2011. According to this table the population density of Karad tehsil is gradually increase with increasing percentage of decadal variation. Very high population density found at central area of the tehsil because this places located on the fertile plain of Krishna and Koyana river as well as national highway No. 4 goes through this region and so agriculture and agricultural supplementary business rapidly developed here. The peoples mostly in younger age group migrate in this region for higher education and employment. In this area include Karad city and Malkapur, Saidapur, Gote, Koyanavasti Nandalapur, Julewadi, Hajarmachi, Sabalwadi, Umbraj and Bhosalewadi villages. A reverse population density trend shows to south and south western site of the tehsil where

population density is continuously decreasing from the year 1991 to 2011 in which found Tarukh, Bamanwadi, Vanarwadi, Tulsan, Ondosha, Latkarwadi, Pachupatewadi, Shendawadi, Pawarwadi, Jinti, Yenape, Akaichiwadi, Matekerwadi and Shewalewadi villages. There are some major reasons for the declining population density at these places such as this is a hilly area where agriculture is only income source and most of agricultural of this area depends on the monsoon and lack of education and transportation facilities. And so, the most of peoples migrate to nearest cities such as Karad, Satara, Pune and Mumbai for education, job and business.

## REFERENCES

- [1] C.M. Thakar, S.S. Parkhe, A. Jain et al., 3d Printing: Basic principles and applications, Materials Today: Proceedings, <https://doi.org/10.1016/j.matpr.2021.06.272>
- [2] Khan, R. M. I., Kumar, T., Supriyatno, T., & Nukapangu, V. (2021). The Phenomenon of Arabic-English Translation of Foreign Language Classes During The Pandemic. *IjazArabi Journal of Arabic Learning*, 4(3). <https://doi.org/10.18860/ijazarabi.v4i3.13597>

- 
- [3] Sajja, G., Mustafa, M., Phasinam, K., Kaliyaperumal, K., Ventayen, R., & Kassanuk, T. (2021). Towards Application of Machine Learning in Classification and Prediction of Heart Disease. 2021 Second International Conference On Electronics And Sustainable Communication Systems (ICESC).<https://doi.org/10.1109/icesc51422.2021.9532940>
- [4] Veluri, R., Patra, I., Naved, M., Prasad, V., Arcinas, M., Beram, S., & Raghuvanshi, A. (2021). Learning analytics using deep learning techniques for efficiently managing educational institutes. Materials Today: Proceedings. <https://doi.org/10.1016/j.matpr.2021.11.416>