

ISBN 978-81-947698-6-6

Sustainable Innovative Development in Economics, Environment, Agriculture, Health, Society

Editor

Dr. S. M. Mulani

Head, Department of Geography,

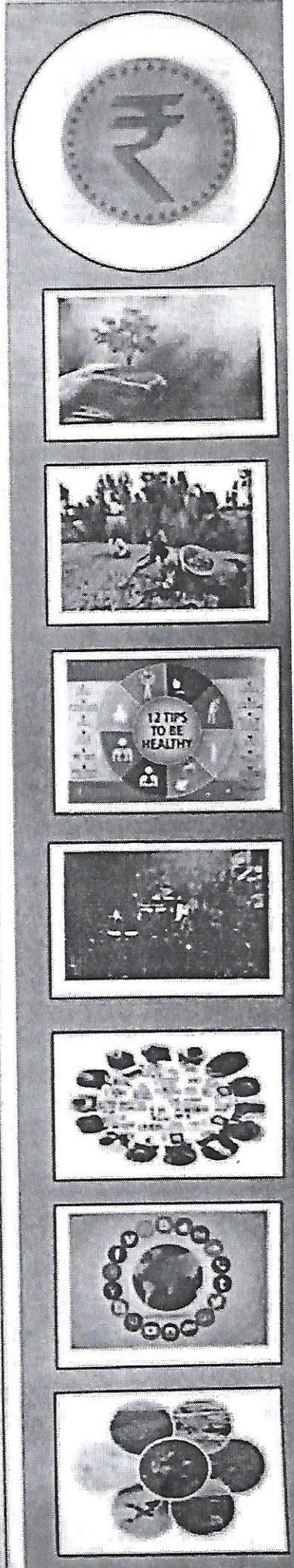
Deshbhakta Sambhajirao Mahavidyalaya College, Mohol (Solapur),

Maharashtra



Jyotikiran Publication, Pune
International Publication

(Signature)
Principal



Changing Pattern of Population Density in Marathwada Region of Maharashtra

Dr. M. T. Musande

Head Department of Geography, Jawahar Arts, Science and Commerce College, Andur, Tq. Tuljapur, Dist. Osmanabad (MS)

Abstract:-

The number of person per square kilometer is a known Population Density it is an important index of the population that shows the concentration of population in a particular area or region. As per population census 2011 population density of India 382 person per square kilometer, Maharashtra state 365 people per square kilometer and Marathwada region 289 person per square kilometer. Highest population density NCT of Delhi is 11297 persons per square kilometer and lowest density of Arunachal Pradesh 17 person per square kilometer. In Marathwada region highest population density Aurangabad district 365 person per square kilometer and lowest density of Osmanabad 219 person per square kilometer. The initial provisional data suggest a density of 289 in 2011 compared to 151 of 1981. The present paper shows that there is a complex relationship between patterns of population growth and density increase by the Marathwada Region.

Key words: Density, Population, Growth, Pattern, Change

Introduction:

The concepts of distribution and density of population, though not identical, are so intimately related to each other. The distribution of population is more location, while the density is more proportional (Chandana, 1966). The former refers to the spatial pattern in which the population finds its location such as linear, dispersed, nucleated and agglomerated etc. the latter is concerned with ratio between the size of population and area. The concept of density of population is the most rarely and is useful tool in the analysis of the diversity of man's distribution in space (Clarke, 1972).

Study Area:

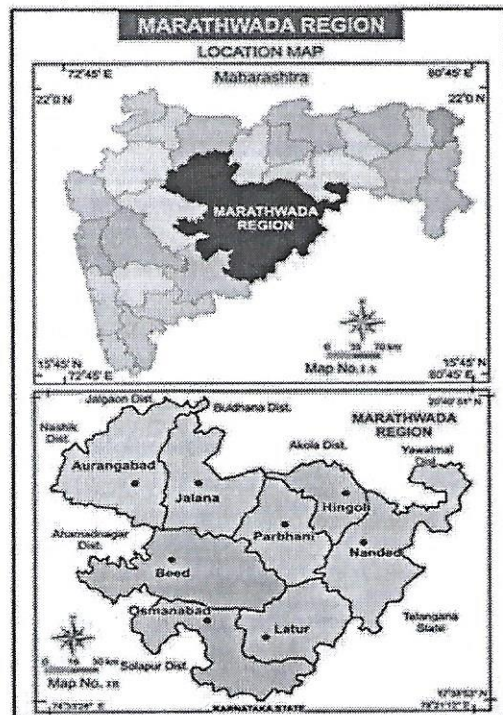
The Maharashtra State is administratively divided into six divisions, viz. Konkan, Nasik, Pune, Amravati, Nagpur and Aurangabad. The Aurangabad division is also known as Marathwada was formerly a part of Hyderabad state. Marathwada forms the South central portion of Maharashtra with Aurangabad city being located almost at the centre of the state (Map-1). Marathwada is one of the most backward regions of Maharashtra state.

The Marathwada region lies in the upper Godavari basin. The absolute location of region is $17^{\circ}38'53''$ North latitude to $20^{\circ}40'51''$ North latitude and $74^{\circ}33'28''$ East longitude to $78^{\circ}21'12''$ East longitude. The study region is bounded to the north by Jalgaon, Buldhana, and Washim districts, to the north east by Yavatmal district to the east by Nizamabad and Adilabad districts of Andhra Pradesh to the south and south east by Bidar and Gulbarga districts of Karnataka state, to the west by Ahmednagar to the Southwest by Solapur and to the North West by Nasik district. Its shape is roughly triangular. East-West maximum extension of region is 394 Kilometers and North-south extension in of region is 330 Kilometers. Total Geographical area of region is 64434 Square Kilometer which is 20.95 per cent of the state and its population is 1.87 cores which is 16.66 percent of the state as per census of 2011. Administratively study region is divided into eight districts that are further divided into 76 tahasils.

Objectives:

The present study has been undertaken with the following specific objectives.

1. To study the density of population in the Marathwada Region.




Principal

2. To find out the changing pattern of population density in study region.

Data Base and Methodology:

Present paper is based on the secondary sources data mainly collected from District Census Handbooks, Socio-Economic Abstract etc. various statistical techniques are used in the present paper. To know the demographic pattern of the study area. Population density is a measurement of the number of people in an area. It is an average number population density is calculated by dividing the number of people by area. Population density is usually shown as the number of people per square kilometer. The period from 1981 to 2011 is selected for the observation of pattern of population density changes. The data was tabulated analyzed and represented in the form of cartographic, statistical diagrams and maps. Population density is calculated using various formulas.

Interpretation and Analysis:

To study spatial distribution of population and the density of population is the main parameter of socio-economic development. With the help of different types of densities viz. Physiological, crude, agricultural and caloric, we understand the pressure of the population on agricultural land.

(I) CRUDE DENSITY OR SURFACE OR OVERALL DENSITY

Crude density gives us general idea about the population pressure on land. It is computed by dividing total population by total geographical area.

Crude density shows general condition of population pressure on land, Crude density of population is calculated by using the following formula:

$$\text{Crude density} = \frac{\text{Total population}}{\text{Total geographical area}}$$

According to census of 1981, the crude density is 151 persons per sq. kilometer in the study region that of state is 204 persons. The table 3.8 and figure No. 3.2.A indicates that the low crude density is recorded in the district of Jalna, Beed, Parbhani, Hingoli and Osmanabad i.e. below 151 per square kilometer. It is moderate in Aurangabad and Nanded district i.e. 151 to 169, whereas it is high only Latur district i.e. above 169 per square km.

The table no 1 and figure No 2. B exhibits that during 2011, the region as a whole has 289 crude density per kilometer that of state is 365. But spatial distribution varies from district to district. The low crude density is recorded in the district of Jalna, Beed, Hingoli and Osmanabad districts i.e. below 268 per square kilometer. It is moderate in Parbhani district i.e. 295, whereas it is high in Aurangabad, Nanded and Latur districts i.e. above 317 per square kilometer (Map 2.A.B). Because of industrial development and development of educational facilities.

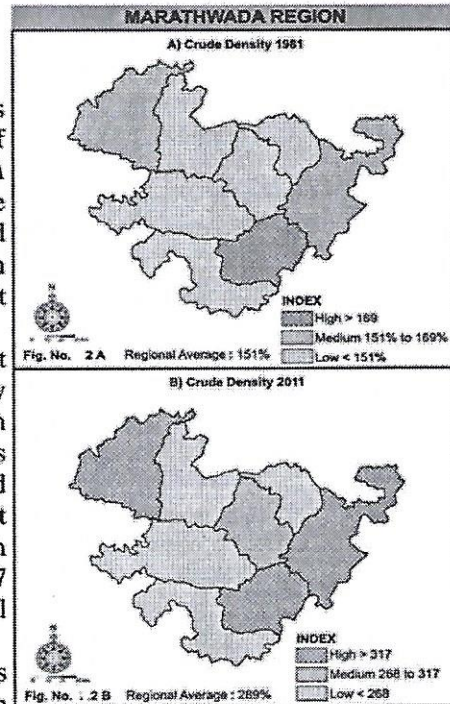
During the period of investigation crude density is increased by 138 persons per square kilometer in Marathwada region that of state is 161. But spatial distribution varies ranging from 79 to 207 persons per square kilometer. The high positive change is recorded in Aurangabad and Latur district i.e. above 164 people per square kilometer, due to industrial development and education facilities. It is moderate in Jalna, Parbhani and Nanded districts i.e. 121 to 164, whereas it is low in Beed, Hingoli and Osmanabad districts i.e. below 121 people per square kilometer.

(II) PHYSIOLOGICAL DENSITY

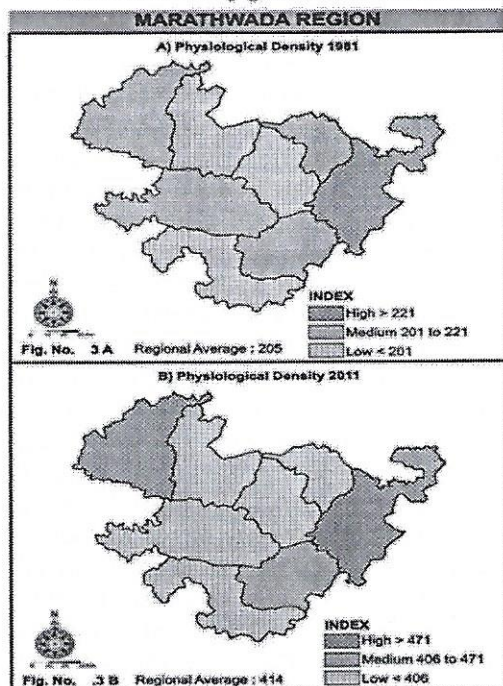
Physiological density means the population per square kilometer net sown area. Physiological density is calculated by dividing total population by total net sown area, though it gives rather a clearer picture, than Crude density. Physiological density is calculated by the following formula.

$$\text{Physiological density} = \frac{\text{Total population}}{\text{Total net sown area}} \times 100$$

(Where, 100 is used to convert total agricultural density per square kilometer)



The table 1 and figure 3.A exhibits during 1981, the region as a whole has 205 physiological density per square kilometer that of state is 344. But spatial distribution varies from district to district. The low physiological density is recorded in the district of Jalna, Parbhani, and Osmanabad i.e. below 201 per square kilometer. It is moderate in Aurangabad, Beed, Hingoli and Latur district, where as it is high only Nanded district i.e. above 222 per square kilometers.



During 2011, the region as a whole has 414 physiological density per square kilometer that of state is 646. The spatial distribution of physiological density varies from district to district. The low physiological density is recorded in the district of Jalna, Beed, Parbhani, Hingoli and Osmanabad i.e. below 406 per square kilometer. The moderate physiological density is found only in Latur district. While it is high in Aurangabad and Nanded district (figure 3.B) due to the development of surface irrigation.

During the period of investigation physiological density is increased by 209 persons per square kilometer in Marathwada region. But spatial distribution varies from district to district ranging from 142 to 323. The high positive change is recorded in Aurangabad, Nanded and Latur district, due to development of surface irrigation facilities. The low change is found in Jalna, Beed, Parbhani, Hingoli and Osmanabad district.

Table No. 1: District-wise different types of Densities in Marathwada Region
 (Densities per sq. km).

District	1981				2011			
	Crude density	Physiological density	Agricultural density	Caloric density	Crude density	Physiological density	Agricultural density	Caloric density
Aurangabad	158	212	56	171	365	535	89	340
Jalna	134	180	63	139	255	342	83	312
Beed	136	203	68	231	242	345	85	278
Parbhani	149	189	57	183	295	380	85	249
Hingoli	135	201	78	155	244	356	103	661
Nanded	167	242	45	389	319	477	98	542
Latur	187	218	59	354	343	471	76	399
Osmanabad	140	184	66	107	219	346	90	218
Marathwada	151	205	59	193	289	414	88	336
Maharashtra	204	344		274	365	646		473

Source: Compiled by researcher on the basis on district census hand book of Aurangabad, Beed, Parbhani, Hingoli, Nanded, Jalna, Latur and Osmanabad 1981 and 2011.

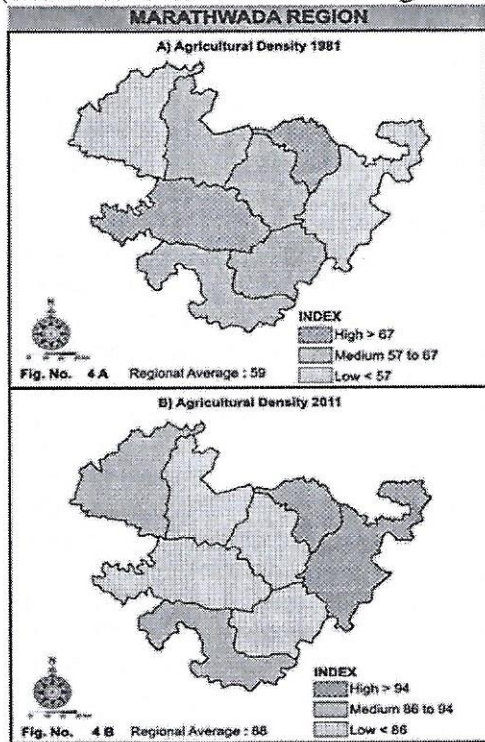
(III) AGRICULTURAL DENSITY

Arithmetic density is the ratio between population and land but this does not indicate the land capability. Agricultural density is the ratio of number of farm workers to the amount of arable land. In order to assess the agricultural development in the study region, the agricultural density is necessary. Agricultural density is calculated by using the following formula:

$$\text{Agricultural density} = \frac{\text{Total agricultural population (Agricultural labourers + cultivators)}}{\text{Net sown area}} \times 100$$

(Signature)
 Principal

(Where 100 is used to convert total agricultural density per square kilometer)



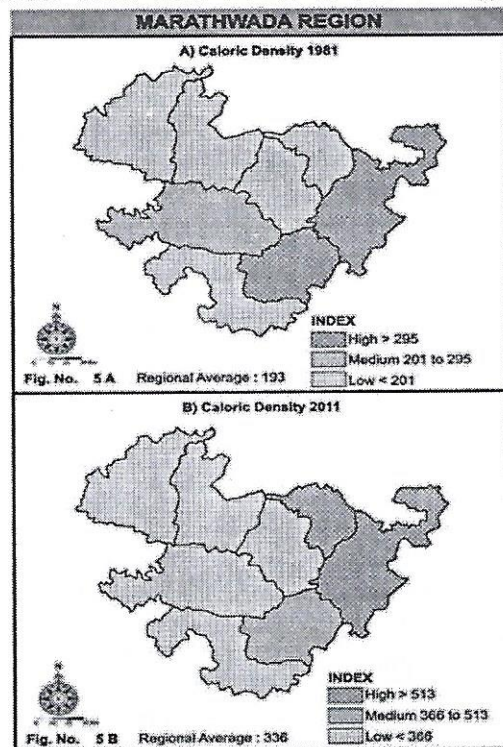
The table 1 and figure 4.A indicates that during 1981, the region as a whole has 59 agricultural density per square kilometer. But spatial distribution varies from district to district. The low agricultural density is recorded in the district of Aurangabad and Nanded district i.e. below 57 per square kilometer. It is moderate in Jalna, Parbhani, Osmanabad and Latur district, where as it is high Beed and Hingoli district i.e. above 67 per square kilometer due to the low development of mechanical implements in agriculture. The table 18 and figure 4 B reveals that during 2011, the region as a whole has 88 agricultural density per square kilometer. But the spatial distribution is uneven it varies from district to district. The low agricultural density is recorded in the district of Jalna, Beed, Parbhani, and Latur district i.e. below 86 per square kilometer. It is moderate in Osmanabad and Aurangabad district, while it was high in Hingoli and Nanded district i.e. above 94, due to the low development of mechanical implements in agriculture.

During the period of investigation agricultural density is increased by 29 persons per square kilometer in Marathwada region. But spatial distribution varies from district to district ranging

from 14 to 53 positive changes. The high positive change in agricultural density is recorded in Nanded district i.e.40 due to Vishunupuri dam. The moderate change is found in Parbhani and Aurangabad district. The low positive change is found in Jalna, Beed, Hingoli, Nanded and Osmanabad district i.e. below 27.

(IV) CALORIC DENSITY (MAN-FOOD CROP RATIO)

Caloric density of population is the ratio between total rural population and total food cropped area. It is difficult to produce a simple universally acceptable definition of pressure of population that may encompass all kinds of population pressure situations, which varies both in time and space. It is essential to determine the production of food per standard unit of surface (in calories) to compare this production with the standard physiological food requirement per capita. Caloric density of population is calculated by the following formula:



$$\text{Caloric density} = \frac{\text{Total rural population}}{\text{Total food cropped area}} \times 100$$

(Where 100 is used to convert the total caloric density per square kilo-km=100hect).

[Signature]
 Principal

The table 1 and *figure 5 A* indicates that during 1981, the region as a whole has 193 Caloric density per square kilometer that of state is 274. But spatial distribution is very uneven. The low Caloric density is recorded in the district of Aurangabad Jalna, Parbhani, Osmanabad and Hingoli districts i.e. below 201 per square kilometer. It is moderate in Beed district, where as it is high in Latur and Nanded districts i.e. above 295 per square kilometer.

The *figure 5 B* exhibits that during 2011, the region as a whole has 336 caloric density per square kilometer that of state is 473. But spatial distribution varies from district to district. The low caloric density is recorded in the district of Aurangabad, Jalna, Beed, Parbhani, and Osmanabad districts i.e. below 366 per square kilometer. It is moderate in Latur district, while it was high in Hingoli and Nanded districts i.e. above 513 per square kilometer, due to lower development of secondary and territory activities.

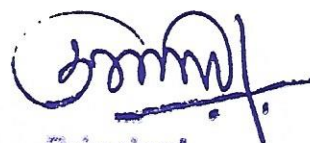
During the period of investigation caloric density is increased by 143 persons per square kilometer in Marathwada region. But spatial distribution is varies from district to district ranging from 45 to 517 positive changes. The high positive change in caloric density is recorded in Hingoli district i.e. above 359, while it is low in Jalna, Beed, Aurangabad, Parbhani and Latur, Nanded and Osmanabad districts i.e. below 202 caloric density.

Conclusion:

The population density of Marathwad region is constantly changing. On the basis of above results and discussion it can be concluded during last three decades, the growth rate of population of Marathwada region is high as compare to state, however, high growth rate of population and high crude density in Aurangabad and Latur is mainly due to development of irrigation and expansion of these two district headquarter due to development of industry and education facilities. Agricultural and caloric density is high in Hingoli and Nanded district due to lower development of mechanical implements in agriculture. In this way Marathwada region is in a high grip of population density, whereas socio-economic, natural resources are at par to imbalance the population density in rural and urban parts of the region. These population density changes represent people's opportunities of employment, educational facilities, industrial development, economic development, social environment health and recreation, political, social institutes of education and the exercise of residential preferences.

References:

- 1) Barakade A.J. (2011): A Study of Urbanization in Satara District of Maharashtra. Geoscience Research Journal, Vol.2, Issue 1, pp38-44.
- 2) Bhende A.A. and Kanitkar T., (2010): Principles of Population Studies. Himalaya Publishing House, Mumbai, pp.579.
- 3) Bose Ashish (1973): Studies in India's Urbanization, Tata McGraw Hill Publishing Co., Bombay.
- 4) Brockerhoff M. (1999): Population and Development Review, Vol.255.No. 4, pp.757-778.
- 5) Chandana R.C. (2006): Geography of Population. Concepts, Determinants and Patterns. Kalyani Publishers, New Delhi. Pp. 344-345.
- 6) Govt. of Maharashtra: Census of India 1991, Series-14, District Census Handbook Satara District.
- 7) Govt. of Maharashtra: Census of India, 2001.
- 8) Krishan G. (1971): Distribution and Density of Population in Upper Bari Doab, Punjab. National Geographer, Vol. 6 pp. 31-36.
- 9) Pathak Lalit (1998): Populations Studies. Rawat Publications, Jaipur, pp. 1.
- 10) Seema Rai (1996): Pattern of Population Density in an Indian City. National Geographical Journal of India, Vol. 42, (3 & 4), pp. 237-247.
- 11) United Nations (1973): The Determinants and Consequences of Population Change. Vol. 1, pp. 162-172 New York.
- 12) Chandana R. C. (1996): Geography of Population, Kalyani Publishers, New Delhi, p.p.12.
- 13) Clarke J. I. (1972): Population Geography, Pergamum Press, Oxford, pp. 29.


Principal



Prof. Dr. S. M. Mulani

Prof. Dr. S. M. Mulani

(M.A., Ph.D)

- Head, Department of Geography, Deshbhakta Sambhajirao Mahavidyalaya College, Mohol (Solapur), Maharashtra
- BOS Member Punyashlok Ahilyadevi Holkar Solapur University
- faculty members Science and Technology, Punyashlok Ahilyadevi Holkar Solapur University
- CRC Member, Punyashlok Ahilyadevi Holkar Solapur University
- Research Paper Publication International & National
 - 1.International - 39
 - 2.National – 15
- Paper Presentation
 - 1.International - 45
 - 2.National -27
- Book Publication- 2


Principal

Jawahar Arts, Science & Commerce College
Anandur, Tal. Tuljapur, Dist. Osmanabadi



Jyotikiran Publication, Pune
International Publication

