

CHAPTER – IV

DETERMINANTS OF POPULATION DISTRIBUTION

4.1 INTRODUCTION

4.2 PHYSICAL FACTORS AND DISTRIBUTION OF POPULATION

4.2.1 Relief and distribution of population

4.2.2 Rainfall and distribution of population

4.2.3 Soil and distribution of population

4.2.4 Forests and distribution of population

4.3 SOCIO-ECONOMIC FACTORS AND DISTRIBUTION OF POPULATION

4.3.1 Net sown area and distribution of population

4.3.2 Irrigation and distribution of population

4.3.3 Transportation and distribution of population

4.3.4 Urbanization and distribution of population

4.3.5 Literacy and distribution of population

4.3.6 Industrialization and distribution of population

4.3.7 Minerals and distribution of population

4.3.8 Levels of socio-economic development and distribution of population

REFERENCES

CHAPTER -IV**DETERMINANTS OF POPULATION DISTRIBUTION****4.1 INTRODUCTION:**

In the previous chapter an attempt is made to analyse the patterns of density and concentration of total, rural and urban population which are directly and indirectly influenced by various physio-socio-economic factors. Hence the present chapter aims at measuring the influence of these various factors on the distribution of population. In any study of population distribution, it is necessary to identify the factors which determine the way in which it distributed within an area of a country, or in a country as well as in the continent in which that country lies, or in a region, or in the world considered as a whole (Bhende and Kanitkar, 1988). These factors provide the necessary explanation for particular pattern and population distribution and are generally grouped into three categories viz. physical, economic, social and demographic factors. These categories have however, no way like water-tight compartments. There is a great deal of interaction among the types of factors. It is difficult for us to identify the factor which is exclusively responsible for a particular pattern of population distribution.

The population distribution in the Maharashtra is quite uneven. The regional variation in the density pattern are perhaps more

conspicuous. In 2001, the average density for the Maharashtra is 314 persons per sq.km. Among the various districts Mumbai and Mumbai suburb are densely populated districts with average density of 21,190 and 19,855 persons per sq.km. respectively. Gadchiroli with only 67 persons per sq. km. is the least densely populated district of Maharashtra. This regional disparity in the density and concentration of population is investigated by applying techniques like Spearman's rank correlation, Scatter diagram and Superimposed method. As such a brief description of influence of all these factors in the state is given below.

4.2 PHYSICAL FACTORS AND DISTRIBUTION OF POPULATION:

Although Ellen Semple's 'environmentalism' has since long been discredited, yet there is no denying the fact that the physical factors influence not only man's activities but also pattern of this distribution and density (Chandana and Sidhu, 1980).

Various physical factors which attributed to distributional patterns include relief, amount of rainfall, productivity of soils and availability of land. In fact it would not be an exaggeration to say that two factors viz. relief and rainfall together have attributes of the establishment to the pattern of population (Rajankar Nazith, 1947). The distribution of population and the impact of prominent physical factors are discussed in the following paragraphs.

4.2.1 Relief and distribution of population:

Relief has been influencing the distributional pattern of population since long. The region of difficult terrain has low population density. Whereas the valleys have always been preferred for living.

The nature of the terrain is an important geographic feature determining the population distribution. The correlation between relief and density of population is analysed by superimposed method. Density of population becomes very low in Sahyadrian range, Astambha mountain range in Dhule, Gavilgad range of Satpudas in Amarawati and Gadchiroli range in eastern Vidarbha (Refer Fig. 2.1 and 3.2). Slope of mountain in these regions is very steep, altitude is high, land is eroded rapidly, there is poor accessibility and the area of arable land is limited. Hence leads to lower population densities.

The major population concentrations in the State occur in low-lying plains with vast agricultural land, fertile soil, leveled land available for settlements, industries and means of transportation. Hence the river basins of Godavari, Bhima, Krishna, Wardha, Wainganga, Penganga, Narmada and Tapi have registered high population concentration.

Normally plateaus are suitable for human settlements. In Maharashtra, a large part of Deccan Plateau is covered with black cotton soil and irrigation from well, canals, tanks and lakes. Along with the transportation network, availability of minerals have led to the

development of mining activity. Hence concentration of population is moderate in plateau districts of Maharashtra.

4.2.2 Rainfall and distribution of population:

Amount of rainfall influences human life to a considerable extent. From the point of view of human habitation, regions with very heavy rainfall and very scanty rainfall are less attractive (Sawant and Athawale, 1994). Greater contrasts in population distribution are observed in case of distribution of rainfall than of temperature in Maharashtra.

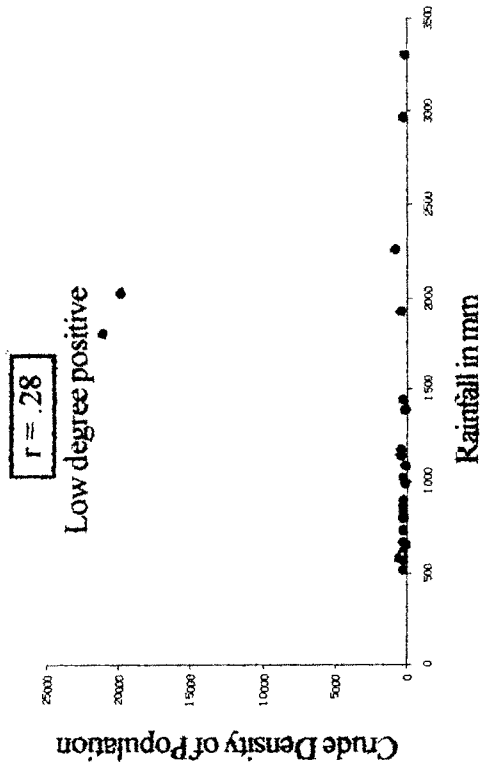
The correlation between rainfall and crude density of population is analysed by Spearman's rank correlation. Fig 4.1.a shows the degree and direction of correlation between two variables. The correlation between rainfall and density of population is low degree positive with 'r' value 0.28.

Raigarh, Ratnagiri, Amarawati, Gondiya, Chandrapur, Bhandara and Gadchiroli districts show negative correlation. The density of population is very low as these districts receive heavy rainfall. The remaining districts of study region show positive correlation between these two variables. The area which lies in the rain shadow areas in central Maharashtra registers low density of population.

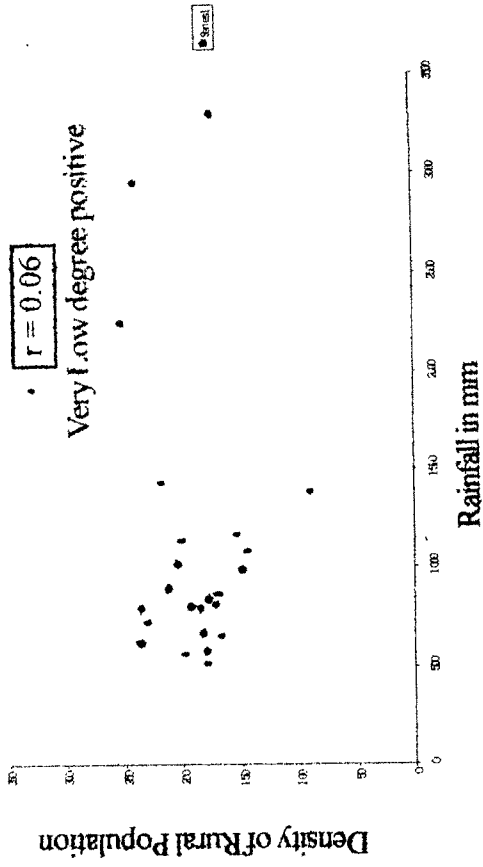
The correlation between rainfall and density of rural population is also analysed. Fig 4.1.b shows very low degree positive correlation with 'r' value 0.06. Raigarh, Ratnagiri, Pune, Parbhani, Akola, Amarawati, Yavatmal, Wardha, Nagpur, Bhandara, Gondiya, Chandrapur and

MAHARASHTRA: SCATTER DIAGRAM

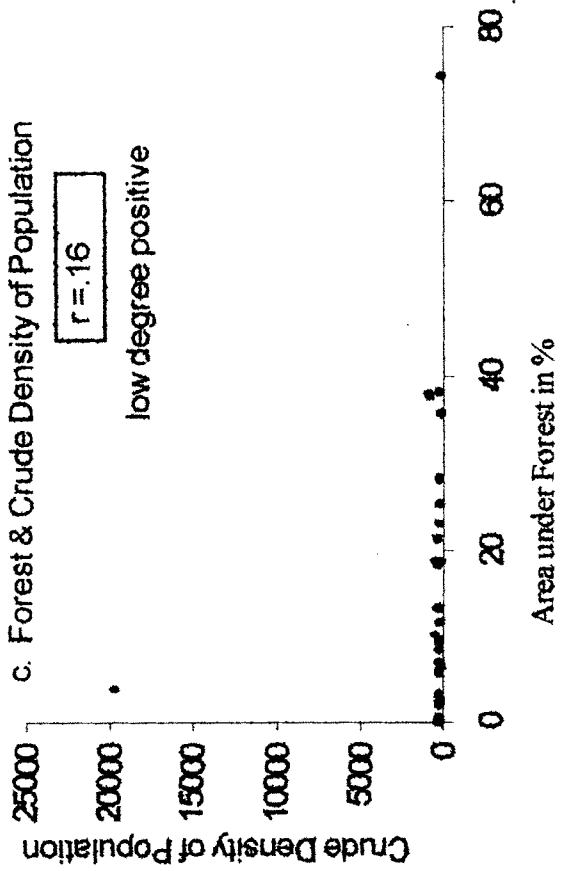
a. Rainfall and Crude Density of Population



b. Rainfall and Density of Rural Population



c. Forest & Crude Density of Population



d. Forest & density of Rural Population

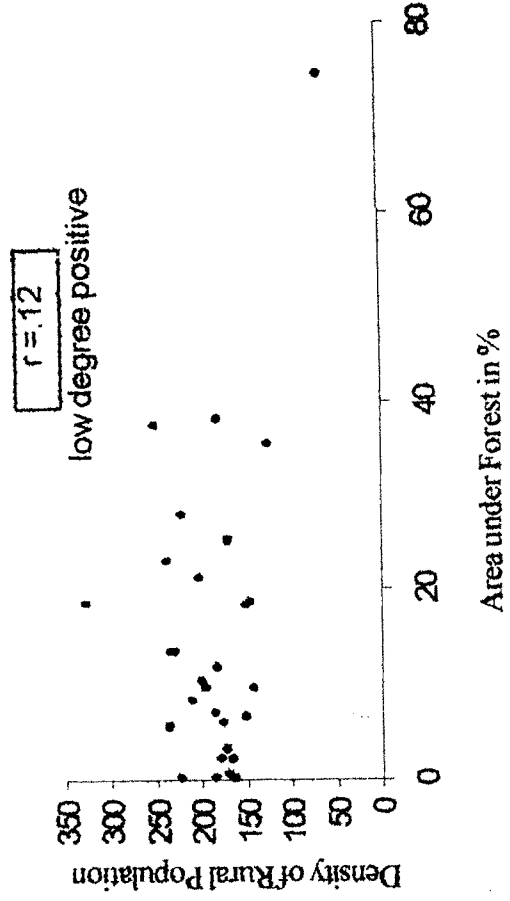


Fig 4.1

Gadchiroli districts of the study region show negative correlation between these two variables. In the remaining districts of study region, positive correlation is observed.

4.2.3. Soil and distribution of population:

Soil constitutes the physical base for any agricultural enterprise, farming is a business and good soil is a part of the farmer's stock in trade (Singh and Dhillon, 1987). The attractiveness of region or human settlement may depend partly upon the quality of soil. Soil is one of the basic factors of identification of population concentration of particular region.

The correlation between soil and density of population is analysed by the superimposed method. The fertile alluvial soils in the river valleys of Maharashtra have dense population (Refer Fig. 2.3 and 3.2). The Godavari, Bhima, Krishna, Tapi, Wardha-Wainganga valleys of Maharashtra support dense population. The medium and deep black soils in the Deccan Plateau popularly is known as 'Black Cotton Soil' or 'Regur' and it is good for agriculture. Therefore the region having these soils have high concentration of population.

On the other hand coastal saline sandy soils are not suitable for agriculture. Hence the regions with these soils have low population densities. Population densities are low where the layer of soil is thin. Coarse shallow soils are found in the northern part of Yavatmal, Ahmednagar, Dhule, Parbhani, Solapur, Nasik, and Wardha districts.

This soil group is poor in texture and structure. Therefore, they register low concentration of population.

Reddish brown soils are found on the hill slopes of Pune, Satara, Kolhapur and Nasik districts. It is poor from cultivation point of view. Laterite soil is found in Western Ghats in the districts of Ratnagiri, Sindhudurg and western part of Kolhapur, Satara, Pune, Nasik and Gadchiroli district in Vidarbha. This soil group is less suitable for intensive cultivation. Hence the region with these soils have low population densities.

Yellow soil occur in the eastern part of Vidarbha and is not suitable for agriculture. So very sparse population densities are recorded in this region.

4.2.4 Forests and distribution of population.

Forest provides raw materials like timber, gum, lak, fruits, medical plants, herbs, fuel etc. Natural vegetation also plays an important role in maintaining the environmental balance in a region. Natural vegetation exerts a favorable influence on temperature, rainfall and humidity. It also prevents soil erosion. Soil gets supply of humus from natural vegetation. Because of all these reasons it is considered necessary to keep one third area under vegetation. All these aspects of forest also influence population distribution.

The correlation between percentage of area under forest and crude density of population is analysed by spearman's rank correlation.

Fig. 4.1.c shows the correlation between these two variables. It is low degree positive with 0.16 'r' value.

Raigarh, Sindhudurg, Dhule, Amarawati, Yavatmal, Bhandara, Gondiya, Chandrapur and Gadchiroli districts of the study region show negative correlation between these two variables. Areas under tropical evergreen, tropical semi-evergreen and tropical moist deciduous forests are found in these districts and flanks of the Sahyadris. In these areas culturable land is less. There are poor transportation facilities. Hence in this region population density is low. The remaining districts of Maharashtra observe positive correlation between these two variables.

The correlation between percentage of area under forest and density of rural population is also analysed by Spearman's rank correlation. Fig. 4.1.d shows the correlation between these two variables. It is low degree positive with 0.12 'r' value.

Thane, Ratnagiri, Jalgaon, Ahmednagar, Pune, Satara, Sangli, Solapur, Kolhapur, Aurangabad, Jalna, Parbhani, Beed, Nanded, Latur and Akola districts of the study region show positive correlation between these two variables. The remaining districts of Maharashtra observe negative correlation between these two variables.

4.3 SOCIO-ECONOMIC FACTORS AND DISTRIBUTION OF POPULATION:

Opinions of the geographers vary on the relative significance of physical and cultural determinants of population distribution and

concentration, Pearson's has held that physical factors are of first importance, while Clarke and Zelinsky emphasize the role of cultural factors in determining the distribution of population. However, it has generally been agreed that as the science and technology advance, the influence of physical factors declines while that of cultural factors increases. It is in this context that Clarke comments that rapid urbanization is an index of diminishing influence of the physical environment upon the pattern of population distribution (Chandana and Sidhu, 1980).

Among the various socio-economic factors that have been considered in the present study are net sown area, irrigation, transportation, urbanization, literacy, industrialization, minerals and levels of socio-economic development. They are discussed in following lines.

4.3.1 Net sown area and distribution of population:

Distribution of population is also influenced by type of agriculture and availability of area for cultivation. In the tribal areas of the Sahyadris and other hill ranges, the proportion of area under crops is low and primitive and shifting type of agriculture is still practiced. It supports only few people. This area under cropping is a major element of agriculture and varies from district to district. The correlation between net sown area and crude density of population is analysed by Spearman's rank correlation. Fig. 4.2.a shows the low degree negative correlation with 'r'

value -0.02. The negative correlation is observed in Aurangabad, Jalana, Parbhani, Nanded, Osmanabad, Latur, Buldhana, Akola, and Yavatmal districts. The remaining districts of Maharashtra observe positive correlation, except Mumbai and Mumbai suburb which are entirely urban. The correlation between net sown area and density of rural population is also analysed by Spearman's rank correlation. Fig. 4.2.b shows the low degree positive correlation with 'r' value of 0.16. The negative correlation is observed in Jalgaon, Solapur, Aurangabad, Jalna, Parbhani, Osmanabad, Latur, Buldhana, Akola, Amarawati, Yavatmai, Wardha, Nagpur and Chandrapur districts. In the remaining districts of Maharashtra positive correlations is observed.

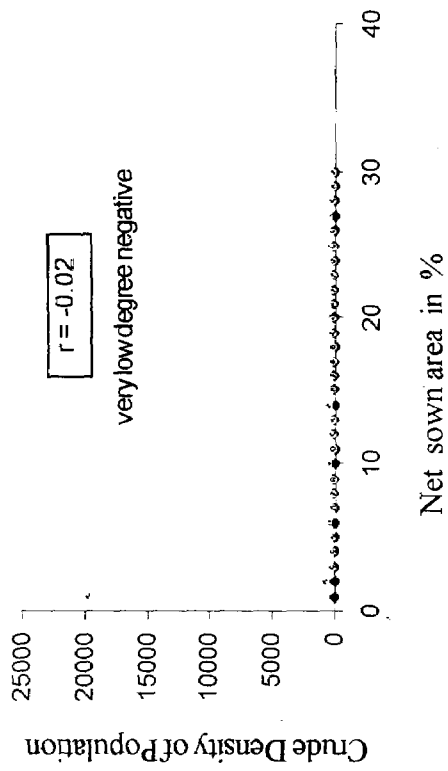
4.3.2 Irrigation and distribution of population

Better irrigation facilities are important factors responsible for greater population density (Ghosh, 1985). Irrigation, is the most important and basic ingredient which plays a vital role in population distribution. In study region irrigated agriculture is practiced only in the river basins. And it supports more people. While dry farming is practised in Solapur, Ahmednagar, eastern part of Sangli, Satara, Pune, Dhule, Nasik and Western Part of Aurangabad, Jalana, Beed, and Osmanabad districts. It supports only few people.

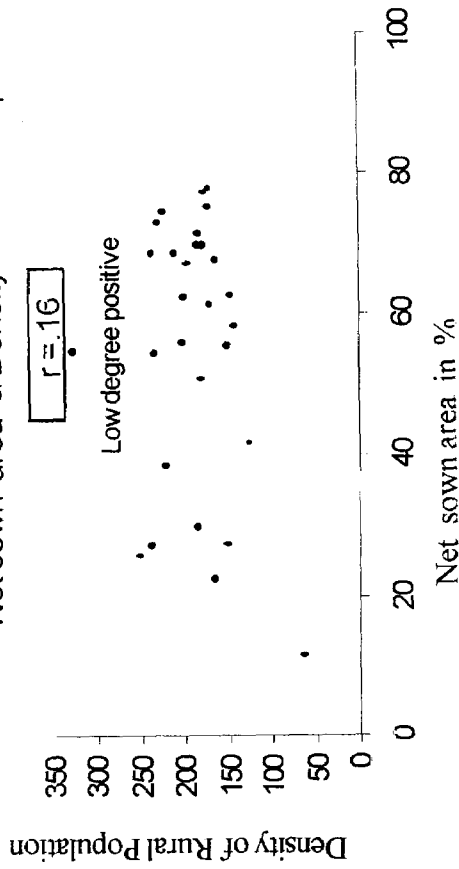
The correlation between area under irrigation and crude density of population is analysed by Spearman's rank correlation. Fig 4.2.c

MAHARASHTRA : SCATTER DIAGRAM

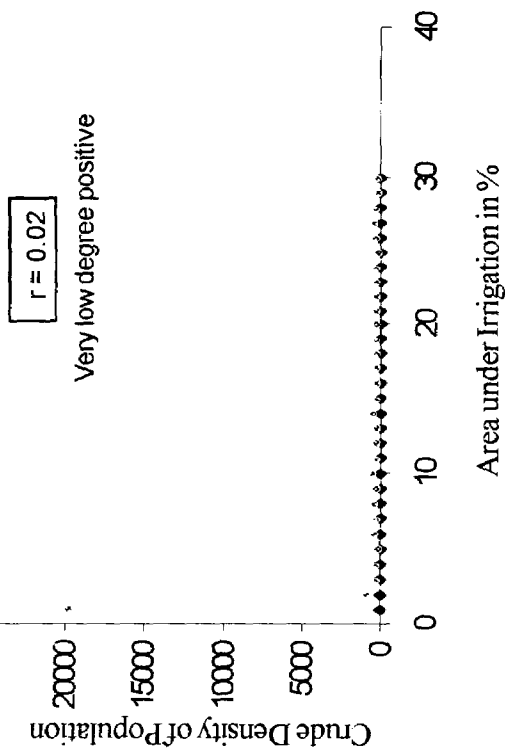
a. Net sown area & Crude density of population



b. Net sown area & Density of Rural Population



c. Irrigation & Crude density of Population



d. Irrigation & Density of Rural Population

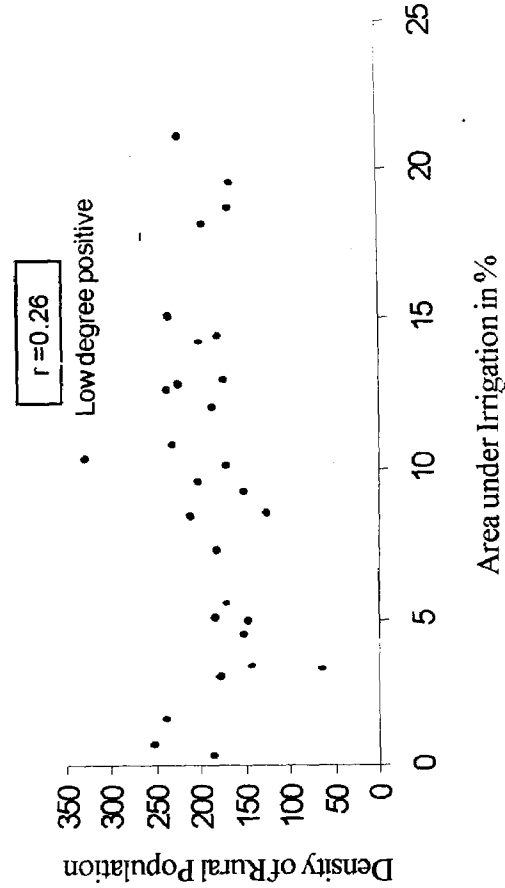


Fig. 4.2

shows the correlation between these two variables which is very low degree positive with 0.02 'r' value. Sindhudurg, Satara, Aurangabad, Jalana, Parbhani, Latur, Amarawati, Wardha and Chandrapur are the districts of the study region which show negative correlation. Area under irrigation is less in these districts. Hence they do not allow to increase the population density. The remaining districts of Maharashtra observe positive correlation. They provide better irrigation facilities which lead to increase in population density.

The correlation between area under irrigation and density of rural population is also analysed by Spearman's rank correlation. Fig 4.2.d shows the correlation between these two variables. It is low degree positive with 0.26 'r' value. Sindhudurg, Ahmednagar, Pune, Solapur, Aurangabad, Jalna, Parbhani, Beed, Osmanabad, Amarawati, Yavatmal, Wardha, Nagpur, Bhandara, Chandrapur and Gadchiroli districts of the study region show negative correlation. The remaining districts of Maharashtra have observed positive correlation. They have better irrigation facilities which leads to increase in population density.

In general the Godavari, Bhima, Krishna, Tapi, Wardha-Wainganga river basins have high concentration of population due to fertile soil, irrigation facilities, double cropping and growth of agro-based industries.

4.3.3 Transportation and distribution of population:

Good transportation facilities are one of the factors that influence the population density (Verma Sat Dev. 1956). The network of transport is fundamental in the present distribution of population. The correlation between road length per 100sq.km. and crude density of population is analysed by Spearman's rank correlations (Fig 4.3.a). It is low degree positive with 0.33 'r' value. Sindhudurg, Ahmednagar, Satara, Sangli, Nanded and Bhandara districts of the study region have observed negative correlation. The remaining districts of Maharashtra show positive correlation.

The Gadchiroli district and the hilly areas of Sahyadri are rugged and so they are poor in transportation. These areas have observed low population density. In Mumbai and Mumbai suburb districts, population density is high. Mumbai is the capital of the State and is well connected to all major part of the State.

In terms of area distribution, the south-central part of the State is well connected with criss-cross pattern of roads. Hence in this area density of population is high. In contrast, central and eastern part, north-eastern parts (except Bhandara, Gondiya and Chandrapur districts) of the State have poor networks. Hence these areas have very low population density.

The correlation between road length per 100sq.km. and density of rural population is also analysed by Spearman's rank correlation. Fig.

MAHARASHTRA: SCATTER DIAGRAM

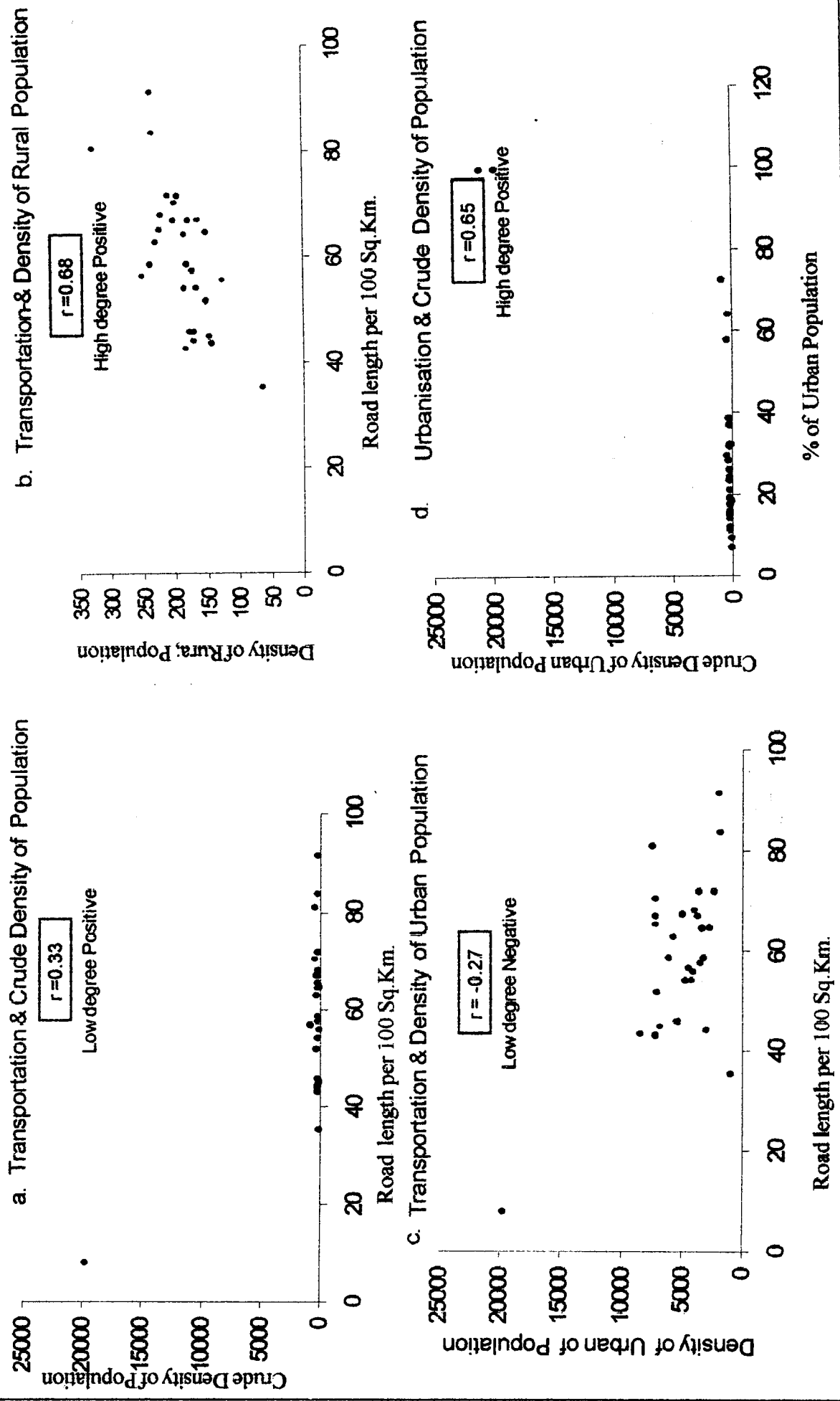


Fig.4.3

4.3.b shows the correlation between these two variables. It is high degree positive with 0.68 'r' value. Ratnagiri, Sindhudurg, Nasik, Ahmednagar, Pune, Satara, Sangli, Solapur, Kolhapur, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Yavatmal, Nagpur, Bhandara and Chandrapur districts of the study region show negative correlation between these two variables. The remaining districts of the study region show the positive correlation.

The correlation between road length per 100sq.km. and density of urban population is also analysed. Fig 4.7.c shows the correlation between these two variables. It is low degree negative with -0.27 'r' value. Raigarh, Ratnagiri, Sindhudurg, Nasik, Ahmednagar, Satara, Sangli, Parbhani, Hingoli, Nanded, Osmanabad, Bhandara, Gondiya, and Gadchiroli districts of the study region show negative correlation between these two variables. The remaining districts of Maharashtra observe positive correlation.

Mumbai, Thane, Pune, Kolhapur, Sangli, Nasik and Jalgaon districts have good transport network and so they have very high concentration of population.

4.3.4 Urbanization and distribution of population

Urbanization is an important factor influencing the population distribution. In Maharashtra the districts of Mumbai and Mumbai suburb have the highest concentration of urban population followed by Pune, Nagpur, Wardha, Kolhapur, Latur, Buldhana and Dhule districts.

Educational, medical facilities and trade are responsible for high concentration of urban population.

The correlation between percentage of urban population and density of urban population is analysed by Spearman's rank correlation. Fig 4.3.d shows correlation between these two variables which is high degree positive with 0.65 'r' value in all the districts except Kolhapur and Satara.

4.3.5 Literacy and distribution of population

Literacy is one of the factors that influence the population density. In modern days, a certain minimum level of literacy is the basic requirement of the people to get out of ignorance and backwardness. Literacy is essential for eradicating poverty and isolation, for cultivating peaceful and friendly international relations and for permitting free play of demographic process (Chandana, 1986). Generally higher the literacy the higher is the density and concentration of population in the State.

The correlation between percentage of literacy and crude density of population is analysed by Spearman's rank correlation. Fig 4.4.a shows the moderate degree positive correlation ($r = 0.51$) between these two variables in the State. Ten districts namely Ratnagiri, Sindhudurg, Ahamednagar, Satara, Osmanabad, Amarawati, Washim, Buldhana, Akola and Wardha have observed negative correlation.

The correlation between percentage of rural literacy and density of rural population is also analysed by Spearman's rank correlation. Fig

MAHARASHTRA : SCATTER DIAGRAM

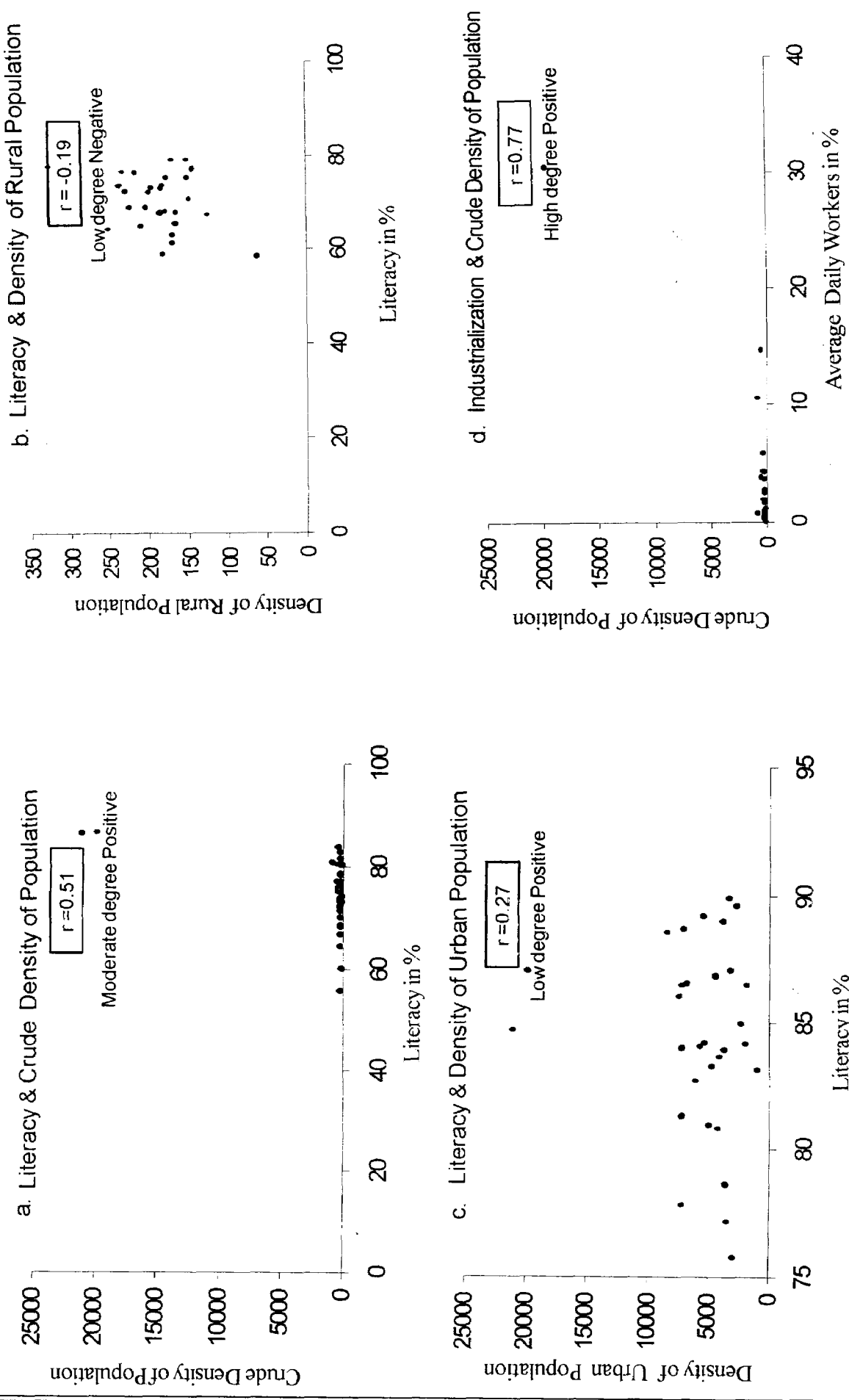


Fig 4.4

4.4.b shows low degree negative correlation with -0.19 'r' value. Ratnagiri, Sindhudurg, Hingoli, Amarawati, Akola, Washim, Buldhana, Yavatmal, Nagpur, Wardha, Bhandara, Gondiya, Chandrapur and Gadchiroli districts of the study region show negative correlation. The remaining districts of the Maharashtra have observed positive correlation between these two variables.

The correlation between percentage of urban literacy and density of urban population is also analysed by Spearman's rank correlation. Fig 4.4.c shows the low degree positive correlation between two variables ($r = 0.27$). The negative correlation is observed in Thane, Ratnagiri, Sindhudurg, Ahmednagar, Satara, Sangli, Hingoli, Amarawati, Washim, Nagpur, Bhandara, and Chandrapur districts. The remaining districts of Maharashtra observed the positive correlation.

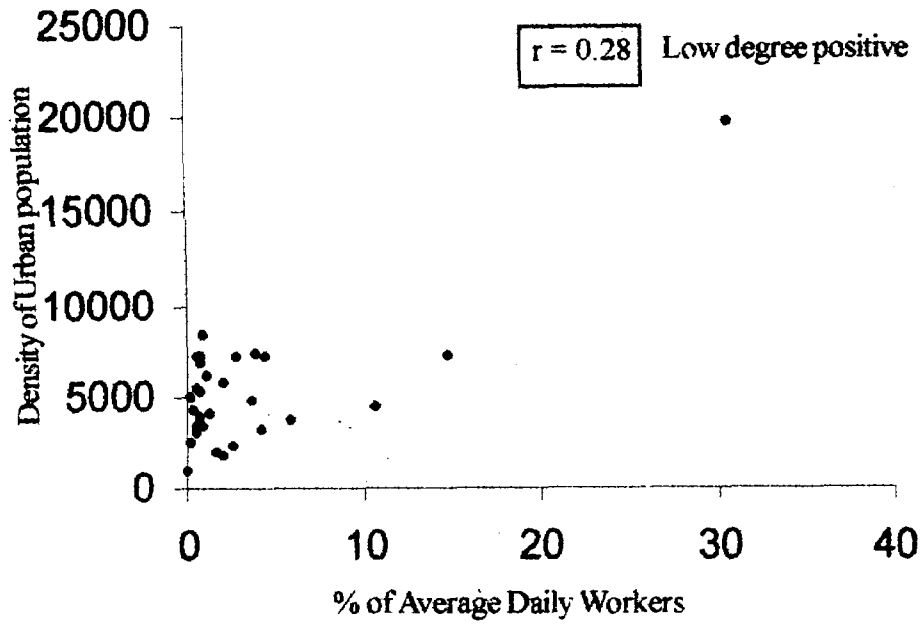
4.3.6 Industrialization and distribution of population.

Higher density of population may be due to the result of industrialization (Ghosh, 1985). Maharashtra is one of the industrially leading states of the country. The State is industrially developed but there is a great disparity at district level.

The correlation between percentage of average daily industrial workers and crude density of population is analyzed by Spearman's rank correlation. Fig 4.4.d shows high degree positive relationship with 0.77 'r' value. Raigarh, Nasik, Ahmednagar, Satara and Aurangabad districts

MAHARASHTRA : Scatter Diagram

a. Industrialization and Density of Urban Population



b. Levels of socio - economic development & Crude density of population

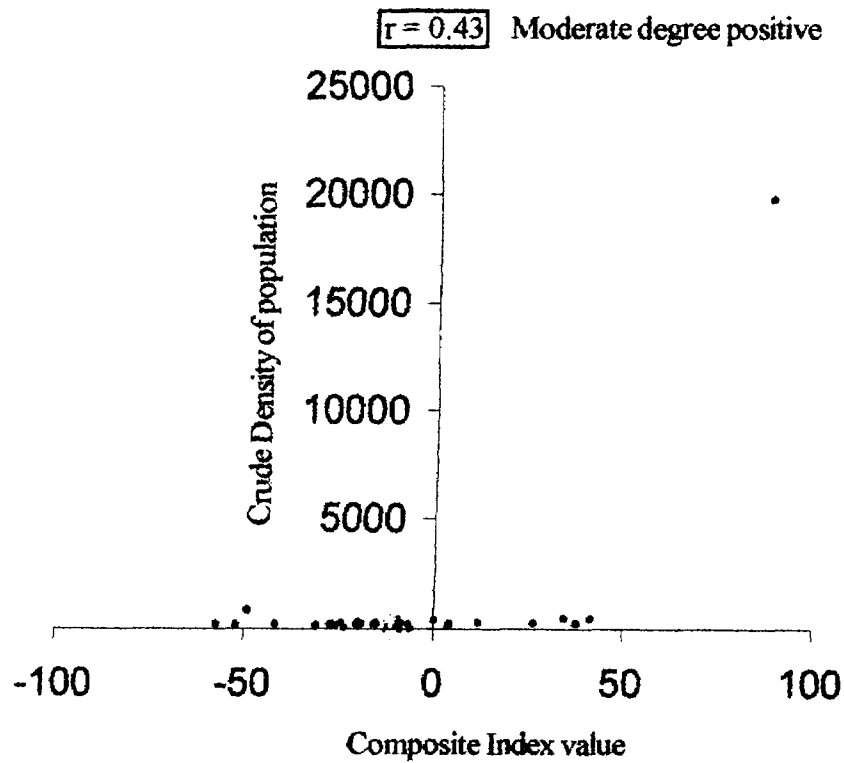


Fig. 4.5

have observed negative correlation. Mumbai, Mumbai suburb, Thane, Pune, Kolhapur, and Nagpur districts have very high concentration of population. This is due to good transportation network and industrialization. Low concentration of population is observed in Ratnagiri, Satara, Ahmednagar, Solapur, Beed, Jalna, Parbhani, Hingoli, Buldhana, Nanded, Yavatmal, Amarawati, Chandrapur, Dhule and Gadchiroli districts due to low industrialization.

The correlation between average daily workers and density of urban population is also analysed by Spearman's rank correlation. Fig. 4.5.a shows low degree positive correlation with 0.28 'r' value. Mumbai, Mumbai suburb, Sindhudurg, Dhule, Jalgaon, Solapur, Kolhapur, Parbhani, Beed, Osmanabad, Latur, Buldhana, Akola, Amarawati, Yavatmal, Wardha and Bhandara districts of the study region show positive correlation. The remaining districts of the Maharashtra have observed negative correlation between these two variables.

4.3.7 Minerals and distribution of population:

Availability of minerals is also a factor influencing distribution of population. It becomes more important with the discovery of new minerals and increase in their utility. Basically it is natural factor but is also considered as an economic factor with the increase in its production.

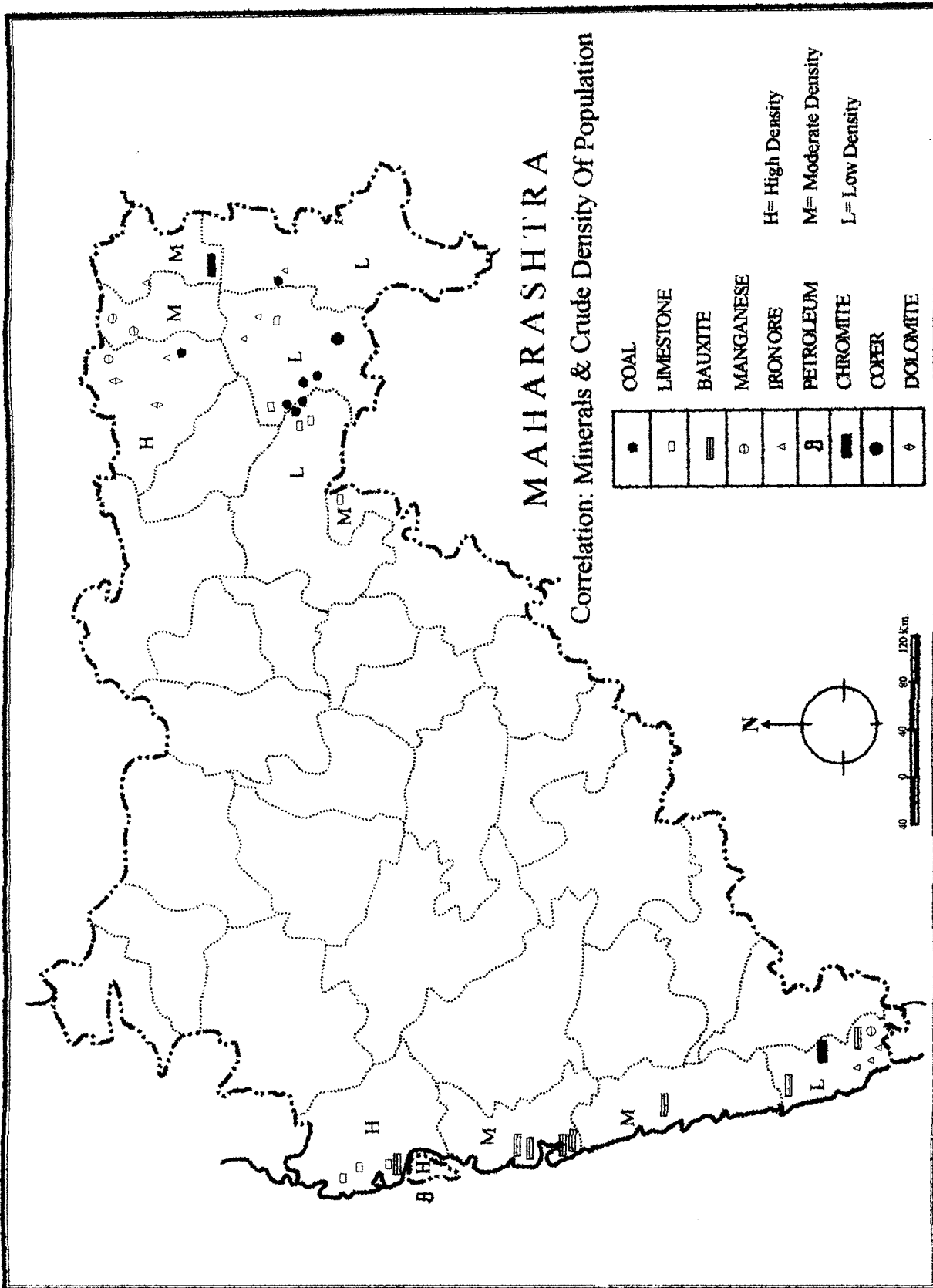


Fig.4.6

The correlation between minerals and crude density of population is analysed by superimposed method. Eastern Vidarbha, Southern Ratnagiri and Sindhudurg districts claim most of the more useful deposits. Hence the areas where minerals are present in large quantities have high population density and concentration (Fig. 4.6).

4.3.8 Levels of socio-economic development and distribution of population

Maharashtra is always a leading state in Socio-economic development in India. But the level of Socio-economic development is not even throughout the State. This level of socio-economic development also influences distribution. The correlation between levels of socio-economic development and crude density of population is analysed by Spearman's rank correlation. Fig. 4.5.b shows moderate degree positive correlation with 0.43 'r' value. G. Mumbai, Thane, Raigarh, Nasik, Dhule, Jagaon, Pune, Parbhani, Nanded, Latur, Buldhana, Yavatmal and Nagpur districts of study region show positive correlation. The remaining districts of the Maharashtra have observed negative correlation between these two variables.

The major concentration of population in the study region has occurred in the areas of high level of socio-economic development while the low concentration of population is observed in the areas where there is low level of socio-economic development (Refer Fig. 2.10 and 3.2).

REFERENCES

1. Bhende Asha and Kanitkar Tara (1988), Principles of Population studies, Himalaya Publishing House, Bombay p. 340.
2. Chandana, R.C. (1986), A geography of Population Kalyani Publisher, New Delhi, p. 228.
3. Chandana R.C. and Sidhu M.S. (1980), An introduction to population geography, Kalyani Publisher, New Delhi, p. 22.
4. Ghosh B.N. (1985), Fundamentals of population Geography, Sterling Publisher Private Limited., New Delhi, p. 31-32.
5. Rajankar, Nazith (1947), The Geographical Control of Population distribution over the Earth – A Case Study in Human Ecology, *Indian Geographical Journal*, Vol. XXII, Jan-March, 1947, No. 1, p. 14-21
6. Sawant S.B. and Athawale A.S. (1994), Population Geography, Mehata Publishing House, Pune, p. 25.
7. Verma Sat Dev. (1956), Density and Patterns of Population in Punjab, *The National Geographical Journal of India*, Vol. II, Part 3, p. 193-202.