A STUDY OF POPULATION CHARACTERISTICS IN SOLAPUR DISTRICT

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FOR THE AWARD OF DEGREE

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Dattatraya Swamirao Harwalkar

Place : Solapur

Date : / /2010

DECLERATION

I, hereby, declare that the entire work incorporated in the thesis entitled **"A Study of Population Characteristics in Solapur District"** which I am submitting for the award of the degree of master of philosophy in Geography, to the Tilak Maharashtra University, Gultekdi, Pune, 411 037, is carried out by me under the guidance of **Dr. Y.S. Khan.** To the best of my knowledge and belief, it is not published wholly or partly and not submitted for the award of any degree or diploma in any other university or institute.

D.S. Harwalkar

Candidate

Place : Solapur

Date : / /2010

CERTIFICATE

This is to certify that the thesis entitled **"A Study of Population Characteristics in Solapur District"** is being submitted, herewith, for the award of the Degree of Master of Philosophy in Geography to Tilak Maharashtra University, Pune. It is the result of original research work completed by **Shri Dattatraya Swamirao Harwalkar** under my supervision and guidance. To the best of my knowledge and belief, the work incorporated in the thesis has not been published and submitted earlier for any degree or diploma to this or any other university.

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Date : / /2010

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CHAPTER - I

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1.2 Choice of the Topic and Region.

1.3 Hypotheses

1.4 Objectives

1.5 Sources of the Data

1.6 Methodology

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1.8 Organization of the Work

CHAPTER- I

INTRODUCTION

INTRODUCTION

Population Geography is a recently developed branch of human geography. This branch of geography has awakened a great deal of interest among geographers which is evidenced by the detailed bibliography on population geography.

The present work entitled “A study of population characteristics in Solapur district” is an attempt to study the major characteristics affecting population trends and influence of these factors on population. Due to growing awareness among geographers of the fact, that geography is one of the social sciences, they are taking increasing interest in the study of problems related to population.

Population geography is rather a newly developed branch of geography. While geographers have, generally, been interested in relationship, between population compositions, migration, the factors influencing population characteristics have only recently assumed importance in geographical study.

In the words of Miller, geography may be defined as an exact, organized knowledge of the distribution of phenomena on the earth surface. According to Trewartha, population geography can be defined as “The understanding of regional differences in the earth’s covering of peoples” Zelinsky has defined, “population geography as the science that deals with the ways in which the geographic character of places is formed by and in turn reacts upon a set of population phenomena that vary within it, both through space and time, as they follow their own behavioral laws, interacting one with another and with numerous non-demographic phenomena”. According to Madame Beaujea Garnier, “the problems of

population geographers are one of describing, the demographic facts in their present environment context, studying also causes, their original characteristics and possible consequences".

The importance of spatial context is also emphasized by Clark. According to him population geography is concerned, "with demonstrating, how, spatial variations in the distribution, composition, migration and growth of population are related to spatial variations in the nature of places". As a result of this, the importance of spatial context, the population geographers relate numbers to area and rely on maps. The study of population by geographers, therefore, leads to a better understanding of the process creating aerial distribution, Population geography places far greater emphasis upon maps and therefore, man becomes the focus of the study in a more precise sense. Population geography treats the spatial variation in demographic and non demographic qualities of population and the socio-economic consequences arising from the interaction with the condition existing in a region. Unlike some other branches of geography, population geography is highly sensitive to time dimension.

The study of population geography is concerned itself, with population size, its structure, characteristics and distribution and changes taking place in them through time. Besides, the study also deals with the underlying causes of population phenomena. The study of population, therefore, is multi-disciplinary in nature, involving, and the knowledge of Geography, Biology, Statistics, Economics and Sociology.

1.1) MEANING, NATURE AND SCOPE OF POPULATION GEOGRAPHY:

At the very outset, it was most appropriate to define the term population geography. Now it is, therefore, necessary to discuss, its need

scope and aim. But we may first start with the term demography. Demography, as a field of enquiry, originated in 1662 with publication of John Grants observations, but the term seems to have been first used by Achille Guillard in 1855. A working definition of this word is given by Houser and Deccan. The study of population as the study of size, distribution and composition of population and changes there in and components of such changes, which may be defined as fertility, mortality and territorial movements, infact, form elements of demography.

Some authors have distinguished between demography and population studies. Thus, while demographic analysis is confined to the study of the components of population variation and changes in population studies are concerned not only with population variables but also with the relationship in between population variables like social, economical, biological and geographical.

For the economists, the inter-relationship between population growth and economic development, as a source of man power and labour supply must be of principal interest. It may be remembered that important studies in population have been made by students of economics. The interest of sociologist in population studies has been indicated by half watch. According to him, the science of population, demography is not only part but necessarily essential part of social sciences. Morphologic social term, used by this, auther includes, of the physical form and structure of groups of populations. It may also be remembered that the varying degree of agglomeration of human beings is associated with particular social characteristics.

The role of geographers, in population studies is well expressed in the words of Garnier. It is the business of a geographer to describe the facts in their present environmental context studying also their causes, their original characteristics and possible consequences with the above

preamble. A definition of population geography can now be attempted; population geography may be defined as “the analysis and geographic interpretation of spatial variations of the structures and values of demographic phenomena. These phenomena consist of size and changes of population and various population processes such as fertility, mortality and mobility".

It may initially be necessary to explain the reasons for enhanced interest in population studies. Firstly, the tremendous growth in population of the world during the past two centuries is a matter of great concern, in the realm of economic, social and political sphere. Three centuries back, the world population was 500 million. It has swollen to more than 6300 million at present. This has, of course, become possible because of man’s conquest over many diseases; on the other hand the lack of birth control especially in the underdeveloped countries has resulted in the unpredicted growth in human numbers.

The contents of population geography have varied slightly from author to author, but there is essential unity. Trewartha has given a tentative system of content and organization of the subject. There are three sections viz geography of population in past, population number and qualities of population and their regional pattern of distribution.

Beajued Garnier also considers three aspects of population geography viz., the distribution of people over the globe, the evaluation of human societies and degree of success, which they have achieved. It is interesting to note that only the first and last aspects have generally been considered in human geographical studies, but the second i.e. evaluation is equally important. This aspect of evaluation includes both in city developments i.e. births, deaths and displacement.

A more advanced study of population can form a course in applied Geography. Such a study, infact, provides for the applied Geography

course at Punjab University, Chandigarh known as Population Geography. This means that the specialist has the following topics-

1) The nature of demography.
2) Elements of demography.
3) World population distribution, growth and economic development.
4) Population theories, population problems and migration.
5) Urban population of the world social characteristic of the urban population. Urban population growth and industrialization.

It must, however, be remembered that various aspects of population will have to be covered by certain other branches of applied Geography as well, for instance, Urban and regional planning. After all, any planning is meant for benefit of humanity.

1.2) CHOICE OF THE TOPIC:

Since, population explosion is serious problems before the country, the study of problems related to population acquire a special importance in an economically backward country like India. Similar studies have been carried out at international and national levels. Since, population phenomena vary at regional levels also to understand the problems related to population precisely, it is necessary to undertake a study of problems related to population at the regional level.

The choice of the topic entitled “A study of population characteristics in Solapur district” is not very arbitrary, since, no study of Solapur district has been seriously attempted from population characteristics in Geography point of view, so far. Solapur district is a peculiar region with areas at different economic and social development. The analysis of the problem entitled "A study of population characteristics in Solapur district" is therefore, highly useful to understand the nature of the problems, related with characteristics of

population. It is, with this end in view, the study of characteristics of population in Solapur district has been undertaken.

The present study belongs to the field of geography of population. The geography of population, in spite of its immense significance remained neglected for a long time to the inquiry of geography to develop this systematic branch of geography. Of all the geographic phenomena, population in terms of its various attributes is the most representative of the total personality of any area. It is pivotal and dynamic element in area differentiation, which is the central theme of the science of Geography. It is with this consideration which stimulated the researcher to work in this branch of Geography.

It is true that population study does not belong exclusively to the population geography, but to diverse disciplines of knowledge, like Demography, Sociology, Anthropology, Psychology, Economics, History as well as Geography. The scholars of these disciplines have been contributing a lot to the analysis of population. A Geographer, studies population not as a phenomenon itself but as an already varying and area characterizing elements. The emphasis of the geographer is particularly on an aerial differentiation and this is the most diagnostic feature of geography which sets it apart from other subjects.

CHOICE OF THE REGION:

The region under study lies in southern Maharashtra. Its geographic location is typical i.e. occupying region on the border of Maharashtra and Karnataka and sprawling on dry and semi-humid part of the state. This has given peculiar characteristics to the population structure of the district. Therefore, it is necessary to bring out the salient features of the population through geographic analysis.

The problem being tackled in this piece of research work is to analyze the population land relationship existing in this typical region

described above. Some specific aspects emerge due to the regions location along the state border. A part from the fertility and mortality the aspect of mobility also plays a major role. The investigation proceeds further to unfold the relation of population with the regional characteristics. It has also been examined as to how the geographical factors are utilized by the people of the region in correspondence with their specific characteristics. Solapur district occupies an important position in Maharashtra state in terms of Area and Population. Hence, it is selected for the study of characteristic of population in Solapur district. (fig. 1.1)

1.3) HYPOTHESES :

Hypotheses in fact, are the basis of any research. These are facts and realities that exist in the region. Hypotheses are the presupposition on which entire research work is based. Hence, hypotheses are foundation and basis to the research to be carried out on a particular problem.

No study can be carried out without forming certain hypotheses. The following are certain hypotheses which have been formulated for present study.

1) Solapur districts belong to drought prone area where the amount of rainfall is below than the state average.
2) The growth of population is influenced by various socio-economic variables.
3) The proportion of population belonging to different religious group is sizable.
4) Literacy and occupation structure has a direct bearing upon the growth of population.

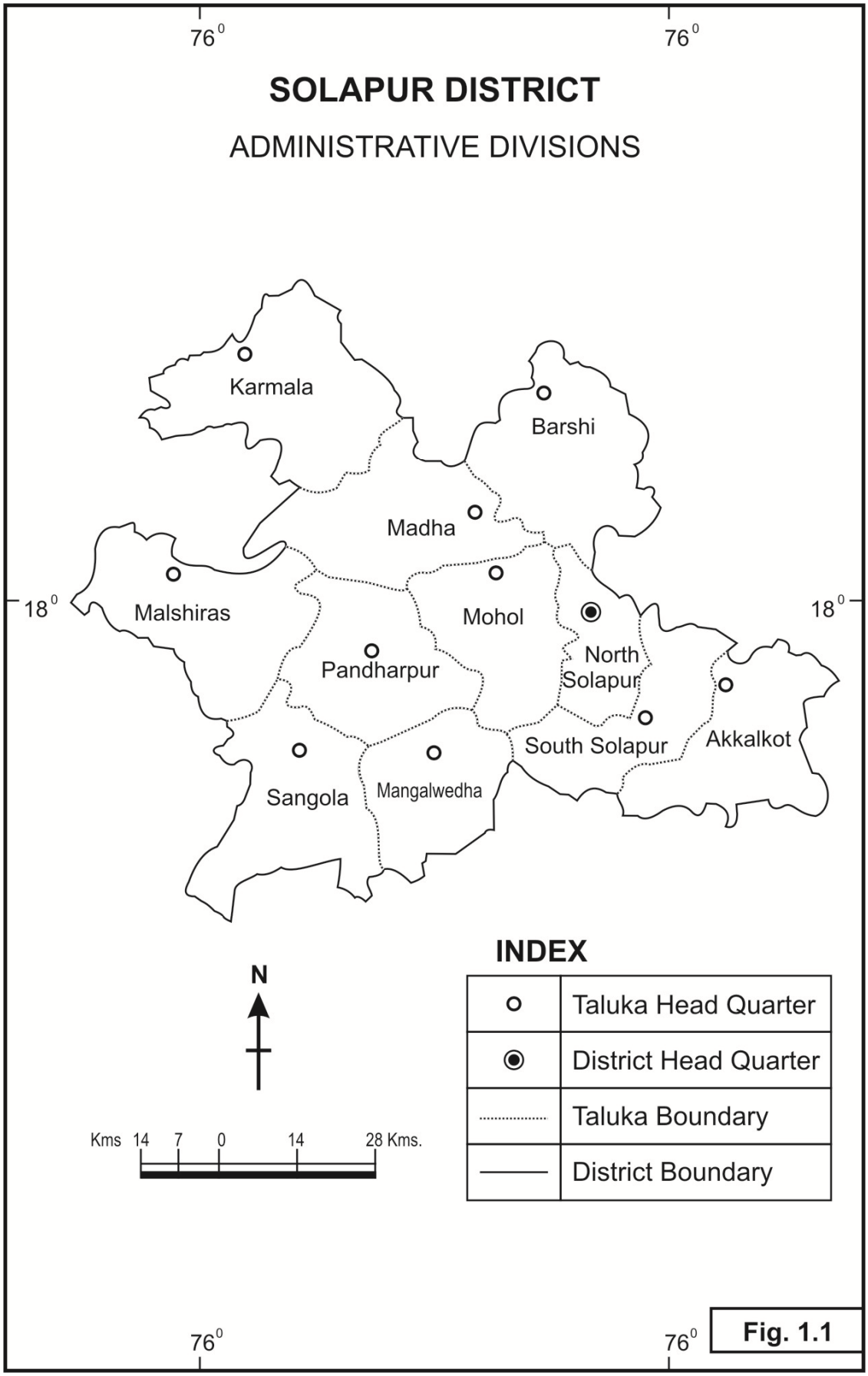

76°
76°
SOLAPUR DISTRICT
ADMINISTRATIVE DIVISIONS
Karmala
Barshi
Madha
Malshiras
Mohol
18°
18°
Pandharpur
North Solapur
South Solapur
Akkalkot
Sangola
Mangalwedha
INDEX
Taluka Head Quarter
District Head Quarter
Taluka Boundary
District Boundary
N
Kms 14 7 0 14 28 Kms.
76°
76°

Fig. 1.1

5) The pattern of density and distribution has impact upon the growth of population.
6) The process of urbanization and consequent industrialization has influenced the growth of population in the region.
7) Migration particularly in the city of Solapur has influenced the growth of population to a significant extent.
8) Per capita income is relatively low in Solapur district.
9) Proportion of people belonging to schedule caste is relatively higher than many part of the state.
10) Sex ratio is low due to social backwardness and infant mortality rate among the female.

1.4) OBJECTIVES:

Without objectives, no study can be fulfilled and completed. As a matter of fact, the chief purpose of research is to obtain, the result by fulfilling its objectives. Each and every study is carried out on the basis of certain hypotheses and objectives. In fact, the objectives are the goals to be obtained by the researcher for the study. The present study entitled, "A Study of population characteristics in Solapur district" has the following objectives.

1) To understand the spatial pattern of density and distribution of population and its impact upon growth of population.
2) To know about the birth rate, death rate and infant mortality rate and its impact upon the growth of population.
3) To understand the role of literacy, age, sex and occupational structure upon the growth of population in the Solapur district.
4) To see the picture of the process of industrialization and consequent urbanization and its impact upon the characteristics of population in Solapur district.

5) To observe the impact made by the socio-economic and physical factors upon the growth of population through a co-relation matrix in Solapur district.
6) To know the pattern of age and sex structure in Solapur district.

1.5) SOURCES OF DATA:

The data has been collected from the secondary source such as district census handbook of 1971, 1981, 1991 and 2001. The data is collected in respect of total population, urban and rural population. The family planning data have been collected from District Health Office, Solapur. Apart from this, various data and information have been collected from socio-economic abstract of Solapur district for different periods. Gazetteer of Maharashtra state for Solapur district has been extensively used for different purposes for present research work.

1.6) METHODOLOGY:

Thus, the data collected from various sources have been processed in percentages and desired proportions. Finally, the processed data have been put in the table forms; certain statistical and cartographic techniques have been applied to represent data in the form of maps and diagrams.

The values thus, derived for the total population male, female population, growth, birth, death and migration and population engaged in different activities have been tabulated in different tables. Different tables are prepared for different purposes. The tables are used to analyze the data. Some mathematical equations are used to obtain the results. For example, to calculate the growth rate of the population following formula is used.

$$r = \frac{Pn - Po}{Po} \times 100$$

The results obtained for above demographic characters have been used to prepare the maps. Simple cartographic techniques are used to show the density of the population separate maps are prepared for different demographics characters. Maps are prepared to show the spatial variation of the demographic characteristics in the district. Diagrams are prepared to show the growth of the population.

1.7) THE REVIEW OF LITERATURE:

Before one starts working on a particular concept, at the very outset, its origin and development should be considered. It would be more useful for comparing the views of work done earlier.

Brief account of the work done earlier is given below.

1. DAS K.N. (1973) has studied the population pressure and intensity of cropping in the Kosi areas, Bihar. In his study he has used statistical methods to find out correlation between population pressure and intensity of cropping. He has used Pearson's in correlation co-efficient method. Students “t” test and rectilinear regression of y upon x by the method of least squares has been applied.

   He has observed that population growth without a substantial increase either in the area of cultivation suggested that the problem of increasing pressure of population can be solved by two ways. Firstly, an increase in yield is to be brought about by making more intensive land use and secondly a higher production per acre is to be obtained with the help of adequate irrigation facilities use of organic matter and chemical fertilizers and improved seeds.

2. Pyre, Ram (1976) has studied the spatial distribution and temporal trends of population in Bundel khand region. In his study, he has suggested that the region should be planned in such away that its

resources which have not yet been fully utilized may get due attention and the imbalance in growth should be checked.

3. More, K.S. and Shinde S.D. (1978) have studied the population pressure on agricultural land in south Maharashtra by measuring the pressure of population on agricultural land. They have computed different land use densities such as crude physiological, agricultural nutritional and caloric. They have also computed the relative co-efficient of over population. Their study shows that the relative co-efficient of over population of the region was 1.49 and that for Maharashtra state was 0.76. The region exhibits an example in south Maharashtra with its increasing pressure of population on agricultural land, which is more pronounced in plains than upland part of the region. In their study, they have suggested that for minimizing the pressure of population on agricultural land, agricultural production has to be substantially raised by making more intensive use of land.

4. DAS M.M. (1981) also studied population pressure and intensity of cropping in Assam. The objectives of his study are to find out association of population pressure and intensity of cropping on the basis of the Boserupian Modle of agricultural growth. In order to achieve this objective, the hypothesis postulated is that there exists a positive correlation between population pressure and intensity of cropping in Assam. The hypothesis has been tested by the statistical technique of correlation regression analysis.

   He has observed that there is a considerable scope for increasing the area under double or multiple cropping though there are physical limitations. He also observed that abnormal growth rate of rural population resulting high rural density leads to the problems of over population in agricultural sector.

5. MISHRA, V.C. and SHARMA, S.K. (1983) have analyzed population growth and agricultural changes of Madhya Pradesh. The aim of this study was to see how far population pressure has been responsible for introducing agricultural changes in Madhya Pradesh which was the largest state of Indian Union.

   They have studied spatio-temporal patterns of population growth during 1901 to 81, changes in agriculture in perspective of growth of rural population and agricultural changes during 1911 to 81. They also studied changes in net sown area irrigated area, area sown more than once growth of area under high yielding variety of seeds, use of fertilizers, changes in productivity, changes in value of crops and changes in the average yield.

   They concluded that from the point of view of food supply the state has reached the critical stage. To meet this challenges there is urgent need for i) reducing birth rate ii) intensifying farming using yield raising technology instead of colonization iii) Promoting the growth of small and cottage industries in rural areas of the state.

6. Mohammad, Abuzar (1987) has studied agricultural responses to population differentials in the Punjab-Haryana plain. He has used different statistical techniques to correlate crop yield with population pressure. He has found that the crop yield with population pressure. He has found that the crop yield and pressure of population are having a positive relationship.

7. Sawant S.B. and Y.S. Khan have worked on the factors influencing growth of population in western Maharashtra. They have taken into consideration various socio-economics factors and calculated a correlation matrix in order to understand impact the made by these factors on growth of population. It has been found that in western Maharashtra, the natural increase of population in general and birth

rates in particular are high as result of high death rates in western Maharashtra.

1.8) ORGANIZATION OF THE WORK :

In order to understand, various population characteristics in Solapur district, the region under study, the entire research work has been divided into following chapters.

1) **Introduction –** The first chapters deals with the introduction of the topic in which the justification of the topic and the choice of the region have been considered. It is followed by the hypotheses, objectives, the sources of the data and information as well as methodology has been discussed. Lastly the organization of the work has been taken into consideration.
2) **The Backgrounds of the Region –** The second chapter is associated with the different kinds of backgrounds. It is followed by the detail physical setting in which the physiography and relief, Geology, drainage pattern, climate have been discussed. After this, historical background of the Solapur district has been traced out. Besides, economic and social backgrounds have also been taken into account, in order to understand the impact of geographical factors on social and economic conditions on the region.
3) The third chapter is associated with the growth of population in Solapur district. Birth rate, death rate and infant mortality rate are considered in this chapter to assess the growth of population spatio-temporal trends have been taken into account in this chapter.
4) The fourth chapter is associated with the density and distribution of population in Solapur district. It also takes into account the rural and urban density of population in the Solapur district.

5) The Chapter five is associated with Age and Sex composition in Solapur district. It also considered rural and urban structure of age and sex in Solapur district.
6) The sixth chapter deals with the impact of literacy and occupational structure on the various characteristics of population in Solapur district during the last four decades.
7) An attempt has been made to understand precisely, the impact of the factors influencing the growth of population in Solapur district. Various social and economic factors have been taken in to consideration to find out the co-efficient of correlation. These have been calculated and the values have been interpreted accordingly in the seventh chapter.
8) The last section gives generalization of the work done in the earlier chapters and it concludes with certain suggestions and remedies for the improvement of population condition in the region have also been included in the last section.

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CHAPTER – II

BACKGROUND OF THE REGION

2.1 PHYSICAL BACKGROUND

2.1.1 Location and Extension of the area under study.

2.1.2 Physiography

2.1.3 Drainage Pattern

2.1.4 Geology

2.1.5 Climate

2.1.6 Soil

2.1.7 Natural Vegetation

2.2 HISTORICAL BACKGROUND

2.3 SOCIAL BACKGROUND

2.3.1 Population

2.4 ECONOMIC BACKGROUND

2.4.1 Land use pattern.

2.4.2 Irrigation.

2.4.3 Transportation.

CHAPTER – II

BACKGROUND OF THE REGION

INTRODUCTION -

At the very outset, it is most suitable and appropriate to understand different backgrounds of the region under study, since these backgrounds have a great bearing upon each other and one influence the other to a greater extent. These backgrounds of the region such as physical, historical, social, economic and political influence, the scenario of the region concerned. Man can change and modify the physical landscape with his expertise, as he desired for his comfort ness. From the historical events, man can learn a lot and may implement his past experiences for future oriented plans for the various kinds of developments. To a certain extent, political factors also play a very important role in the changing the face of the region. Man can implement various policies and programs by establishing of different projects for improvement of social, economic conditions of the region. In this way, the physical landscape may be changed into social and economic landscape such as converting forest area into agricultural land and arresting the river water into artificial reservoirs, thus, bringing a tremendous change in the region. In view of this, it is most essential to give an account of each background, in order to make clear over all picture of the region to interpret various aspects of the region.

2.1 PHYSICAL BACKGROUND -

2.1.1 LOCATION AND EXTENSION OF THE AREA -

The district of Solapur is one of the most important districts of Maharashtra State, both in terms of area and population. It lies entirely in the Bhima-Sina-Man basins. The district of Solapur is located between $17^0$10' North and $18^0$32' North latitudes and $74^0$42' East and $76^0$15' East longitudes. The East-West Length of the district is about 200 Km and North-South width is about 150 Km. The total Geographical area of the Solapur district is about 14878 sq. Km, and population of 3855383 according to 2001 census. (Fig. 2.1) Within the region under study, Karmala is the largest tahsil in area and the lowest is North Solapur tahsil. This tentatively consistute 4.88 percent area and 4.51 percent population of the Maharashtra State. In other words, the region under study ranks fourth in terms of area and seventh in terms of population among the districts of Maharashtra.

The district of Solapur is well defined to its west as well to its east by the inwards looking scarps of Phaltan and Osmanabad plateau respectively. The adjoining districts are Sangali to its South-West, Satara to its West, Pune to its North-West, Ahamadnagar to its North-West and Osmanabad to its North and North east and the Bijapur district lies to its South as well as Gulbarga district to its east of Karnataka State. (Fig. 2.2)

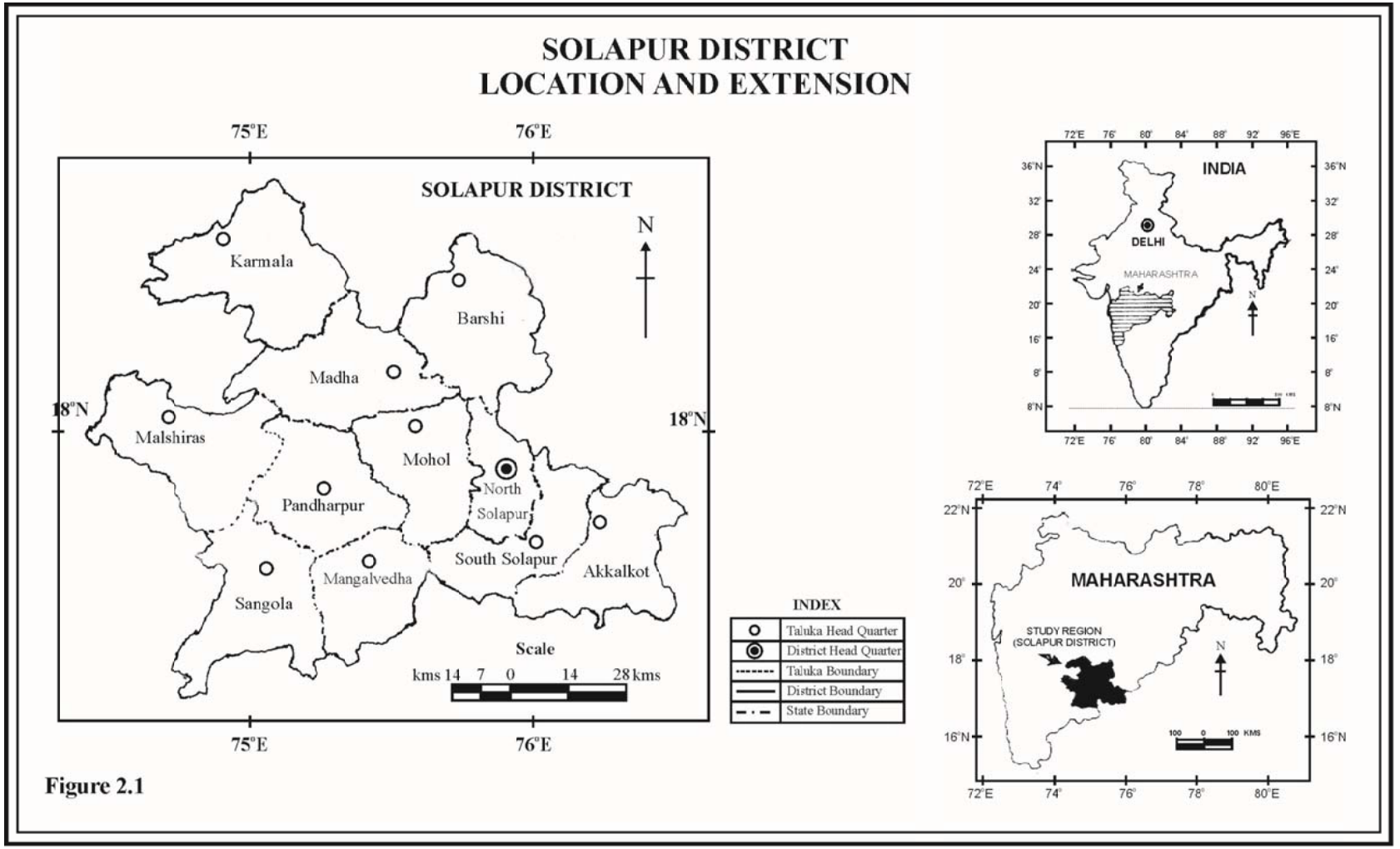

SOLAPUR DISTRICT
LOCATION AND EXTENSION
75°E
76°E
SOLAPUR DISTRICT
N
Karmala
Barshi
Madha
18°N
Malshiras
Mohol
North Solapur
Pandharpur
South Solapur
Akkalkot
Mangalvedha
Sangola
Scale
kms 14 7 0 14 28 kms
INDEX
Taluka Head Quarter
District Head Quarter
Taluka Boundary
District Boundary
State Boundary
INDIA
DELHI
MAHARASHTRA
MAHARASHTRA
STUDY REGION
(SOLAPUR DISTRICT)

Figure 2.1

SOLAPUR DISTRICT
LOCATION IN MAHARASHTRA

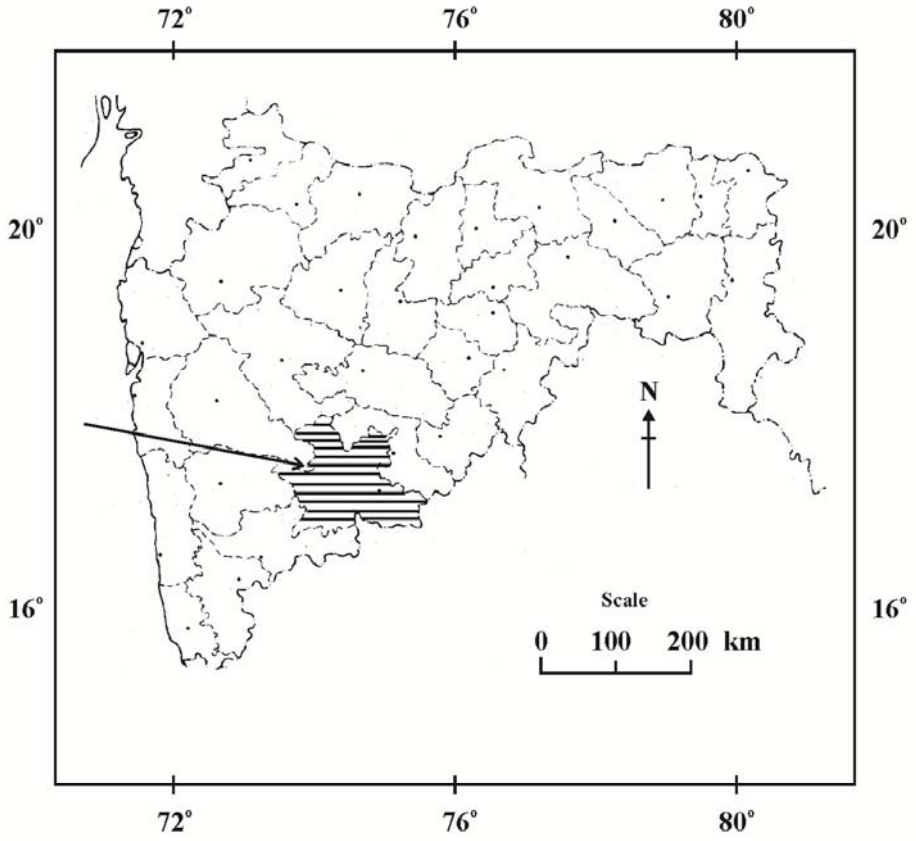


Figure 2.2

2.1.2 PHYSIOGRAPHY OF THE REGION -

On the basis of relief and structure, the physiographic divisions of the region are formed. These physiographic divisions have a profound impact on the economy of the region. To a certain extent, the relief and structure also influence the climate, soil types, and vegetation pattern in a particular region. It is, therefore, necessary to demarcate the district of Solapur, into its physiographic regions, in order to have a precise geographical understanding.

There are various landforms as expected in Solapur district. Bhima is the major river flowing through the Solapur district; most of the area in the Bhima river basin is more or less plain. Most of the area of the district belongs to the Deccan plateau region.

There are two important hill ranges in the district namely Mahadev hill and Balaghat hill. On the basis of their height from the mean sea level, different landforms, in the district of Solapur constitute its physical setup. On the basis of these physical setup, the region is divided into three major physiographic divisions. (Fig. 2.3)

i) The hilly region -

The hilly region, in the western and south western region occupies its sizable area by Mahadev ranges and Shukracharya ranges having average height more than 600 mts. At the same time the region also includes plateaus in the Malshiras, Sangola, Pandharpur and Mangalvedha tahsil of the district. In the north eastern part of the Solapur district along the border of Osmanabad district, there is an important Bhalaghat range particularly in the Barshi tehsil which have an altitude between 600 mts. to 750 mts.

Most of the small rivers and streams like river Man, river Korada, river Warai, river Bhogawati, river Sina and river Bori, originate from the Balaghat and Mahadev ranges. Some isolated ranges are also found in the various tahsil notably in the central part of Karmala and Madha tahsils locally they are known as Vadoba and Bodaki respectively. These hilly regions as expected are very poor agriculturally and hence, human settlements are very few and far. These ranges occupy about 10 percent geographical area of the district.

ii) The plateau region -

The contour of 550 meters above mean sea level, parting in the South Central and South eastern parts of the Solapur district. This, infact, demarcates the district into plateau region and plain region of Bhima basin. Almost 70 percent of total Geographical area of the district is occupied by the plateau region. The average height of the plateau region is in between 450 meter to 600 meter. The region also includes some individual separate hills in different parts of the plateau. This comprises the area of the Karmala, Madha, Barshi and Akkalkot in the left hand of the river Bhima and parts of Malshiras Pandharpur, Sangola and Mangalvedha tahsil in right hand of river Bhima. (Fig.2.3)

Most of the plateau region in the Solapur district is drained by the river Bhima and its tributaries. Therefore, the soils of plateau region are suitable and fertile for the production of various kinds of crops.

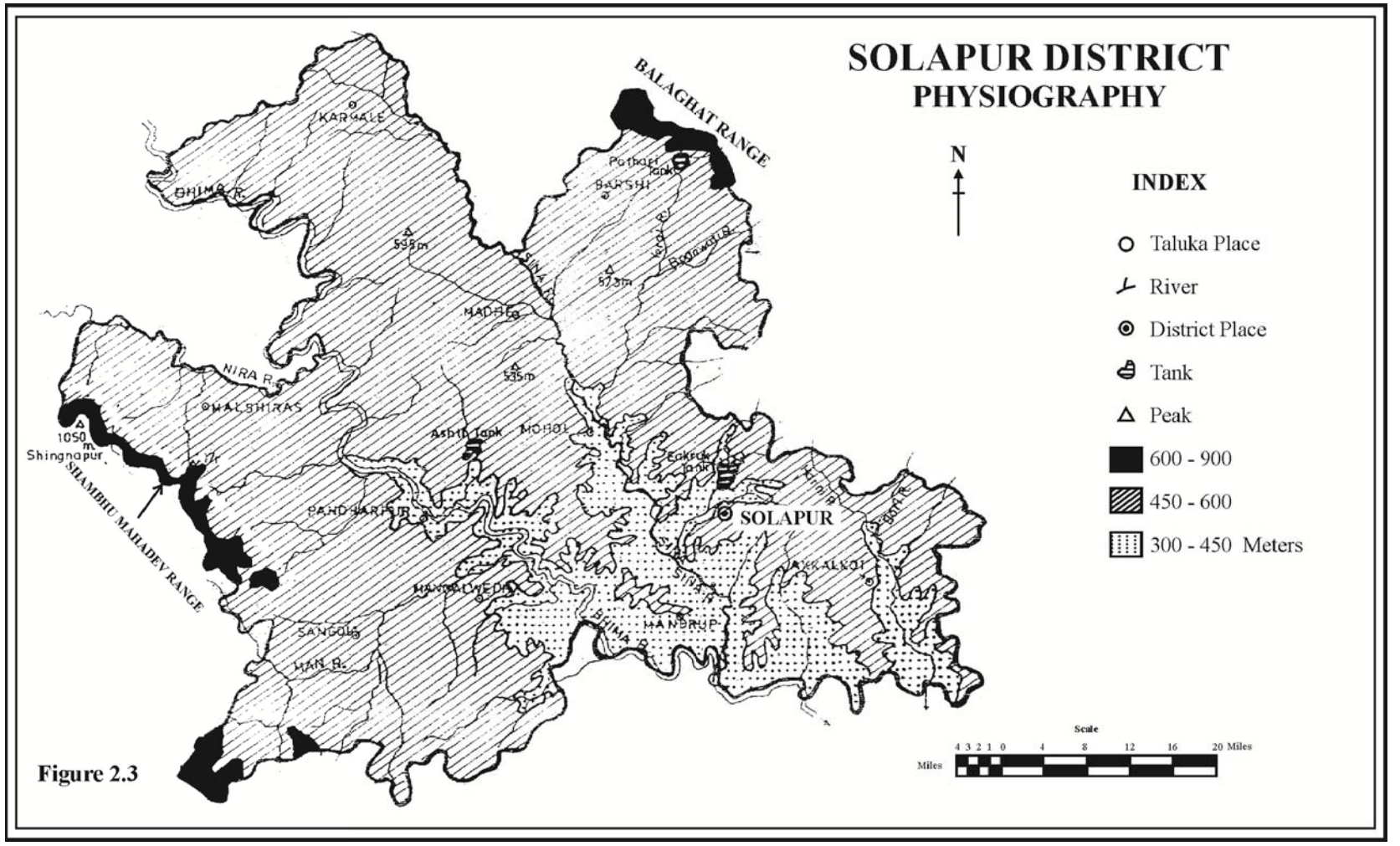

SOLAPUR DISTRICT
PHYSIOGRAPHY
N
INDEX
Taluka Place
River
District Place
Tank
Peak
600 - 900
450 - 600
300 - 450 Meters
BALAGHAT RANGE
KARMALE
BHIMA R.
598m
MADHA
NIRA R.
MALSHIRAS
1050 m
Shingnapur
SHAMBHU MAHADEV RANGE
PANDHARPUR
Ashti Tank
MOHOL
Kokrak Tank
SOLAPUR
AKKALKOT
MANGALVEDHA
SANGOLA
MAN R.
MANDRUP
BARSHI
Pothari Tank
573m
535m
Scale
4 3 2 1 0 4 8 12 16 20 Miles
Miles

Figure 2.3

iii) The plain region -

The plain region in the district of Solapur is occupied by Bhima river and its tributaries. The central part of the district lies in the plain region. The plain region naturally is found along the both sides of river Bhima and its major tributaries such as river Sina, and river Man. The soil of the plain region is most fertile due to the deposition of eroded material transported by the river Bhima and its tributaries. The Solapur city, the head quarters of district is located at the border of plateau and plain region. The plain area in the district covers about 20 percent of the geographical area of the district. Surprisingly, there are few hills and uplands isolated found with the plain region, which have the height of more than 550 meter above mean sea level. On an average, the plain region has an altitude which is ranging between 300 to 450 meters.

2.1.3 DRAINAGE PATTERN -

Bhima is the most significant river flowing through Solapur district. The river Bhima originates from the Bhimashankar plateau of Ambhegaon tahsil in Pune district. After leaving the Solapur district, it enter into Karnataka State and meets with the Krishna river. The right bank tributaries of Bhima are Nira and Man, while left bank tributaries is the Sina. Besides, a good number of lesser streams in the Solapur district which form the tributaries of the Bhima and Sina are infact local feeders. The Bhima and the Sina flow roughly South easterly direction while the Nira convex east and the Man North east direction. Most of these rivers are non perennial in nature and flows only during the rainy season. In order to understand their detail characteristics, it

is most appropriate to take these rivers into consideration one by one. (Fig. 2.4)

i) The river Bhima -

The river Bhima drains in the central part of the district, comprising the greater part of Karmala, Madha, Malshiras, Pandharpur, Mangalvedha, Mohol and South Solapur tehsils. The river Bhima is one of the main feeders of river Krishna. The river Bhima rises from the Bhimashankar plateau in Pune district and runs south east direction and flows through the district of Pune, Ahamadnagar and Solapur in Maharashtra, and Bijapur district in Karnataka and it falls into Krishna river about 25 kilometers North of Raichur in Karnataka State.

The Bhima has an overall length of 289 kilometers within the limits of the district of Solapur. The length of Bhima about 110 kilometers acts as winding the river separate, Karmala on the left from Indapur in Pune district on the right hand side of the river Bhima.

For about 10 kilometers it separates Madha on the left and Malshiras on the right. Further, for about 34 kilometers, it separates Pandharpur in the left and Malshiras on the right. Again for about 65 kilometers, it passes through the central part of the Pandharpur tahsil.

The Mohol tehsil in the left for about 20 kilometer, it separated Mangalvedha tahsil on the right, then it turn toward south for about 10 kilometers, forming the boundary between South Solapur tahsil on the left and Mangalvedha tehsil on the right. After this the river Bhima acts as a boundary between

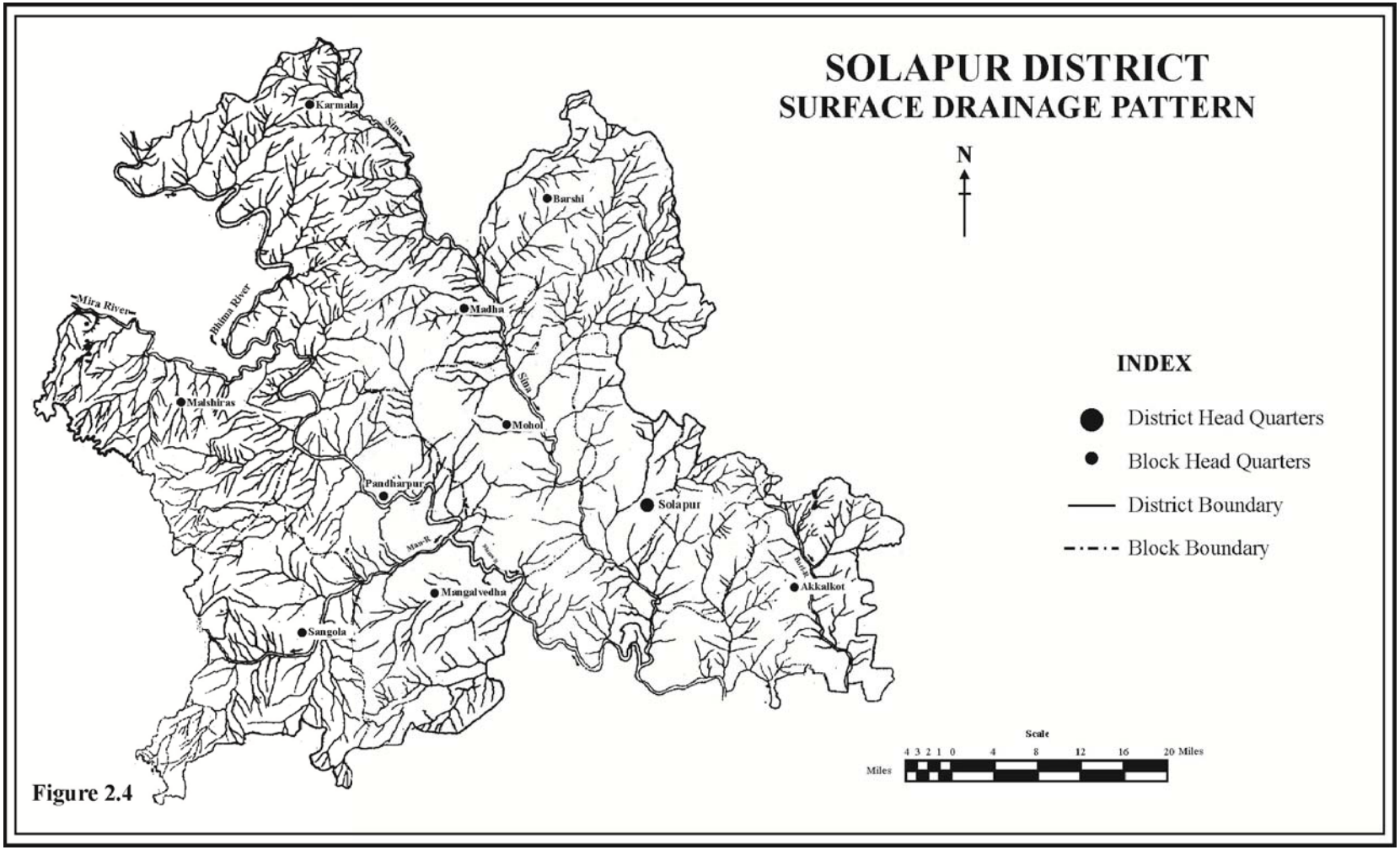

SOLAPUR DISTRICT
SURFACE DRAINAGE PATTERN
N
INDEX
District Head Quarters
Block Head Quarters
District Boundary
Block Boundary
Karmala
Sina
Barshi
Mira River
Bhima River
Madha
Malshiras
Mohol
Pandharpur
Solapur
Man R.
Mangalvedha
Akkalkot
Sangola
Scale
4 3 2 1 0 4 8 12 16 20 Miles
Miles

Figure 2.4

Maharashtra and Karnataka states for about 70 kilometers. The South Solapur and Akkalkot tahsils are on the left hand of the region under study and the districts of Bijapur and Gulbarga on the right hand.

One more point worth mentioning is that the river Bhima is making a shape of crescent near Pandharpur. Due to such appearance of the river near Pandharpur, locally it is called as Chandrabhaga, which is regarded as a holiest place in Maharashtra. (Fig.2.4)

ii) The river Nira -

The river Nira rises in the Bhor tahsil in Pune district. The river Nira is the Chief right bank feeder of the Bhima river. It runs to South east and east along the borders of Pune, Satara and Solapur districts before joining the main flow of Bhima river, out of its total length of about 180 kilometer, only 48 kilometer lie on the borders of the Pune and the Solapur district. The banks of the river Nira are steep and rocky.

iii) The river Man -

The river Man rises in the Phaltan ranges which are the parts of Mahadeo ranges in Satara district. It flows in the west side of Dahiwadi. It is a right bank feeder of river Bhima and run through eastern parts of Satara district and turns towards Sangola, Pandharpur and Mangalvedha tehsils. It forms entire boundary between Pandharpur and Mangalvedha tahsils. The total lengths of river Man is about 160 kilometer. Out of which 80 kilometer lies within the limits of Solapur district. The Belvan the Khurdh, the Sanganga and the Vankadi are the main feeder streams of the

river Man within the district of Solapur which are seasonal in their nature.

iv) The river Sina -

The river Sina rises about 22 kilometers west of Torana in Ahamednagar district of Maharashtra State and enters the Solapur district near Aljapur village of the Karmala tehsil. It is largest left bank feeder of the Bhima. It runs South east through Ahamadnagar and Solapur districts and meets with the river Bhima near Kudal about 25 kilometer South of Solapur City. It has 180 kilometer total length within the district of Solapur. The river Sina receives the river Bhogawati on its left bank near Mohol about a distance of 7 kilometer. The channel of river Sina is about 100 to 200 meters broad in Solapur district and it has very steep bank throughout its flow in the Solapur district.

v) The River Bhogawati -

It is the fifth major river of Solapur district. It rises in the south facing scarps of Bhalaghat in the North east part of Barshi tahsil. It flows initially south west direction for a distance of about 65 kilometer in the Barshi and Madha tahsils in Solapur district. The Bhogawati joins Sina about 7 kilometer North of Mohol tahsil. It is the largest tributary of river Sina. The major sources of streams of the Bhogawati are the Bodaki, the Nagzari and the Sina, which rise in Bhalaghat hill and run South West direction.

vi) The river Bori -

The river Bori rises on the South facing scarp land of Osmanabad Plateau near Tuljapur. It is a small left bank feeder of river Bhima. It flows south wards direction in the eastern parts of

Akkalkot tahsil. Its tributary is river Harni, which flows about 50 kilometer through the Akkalkot tahsil in Solapur district.

2.1.4 GEOLOGY -

The region under study is a relatively small in area; hence, the prominent features associated with the geology are not expected. The region is remarkably free from a by structural complexity. There are no evidences of any structural disturbances like folding and faulting. The trap basaltic Lava flows, which are covered by thin mental of soil almost everywhere in the district.

These lavas flow on account of differential weathering give rise to undulating relief. There are no prominent mountains and hill ranges in the district, hence, the region is characterized by typical Deccan trap geomorphologically.

The fine materials constitute the high country side, while weathered vesicular and zeolitic basalt generally constitute the river valleys in the region. Basaltic trap of the region is a just a part of the vast expanse of deccan lava flows. The traps in the district most probably represent the middle trap in the three fold classification, of the lower trap and the upper trap being the other two classes. The geological sequence in the district of Solapur is divided into two main categories.

Recent Alluvium and soil covering horizons of calcareous pebble (KANKAR) gravel, pebble and silt like materials, are of the recent-origin.

Volcanic flows are fissures eruption of basalt. This lava flow of basalt belonging to Deccan trap is infact, of volcanic episode. This is of the cretaceo - Eocene period. The geological survey carried out in the past clearly reveals that the fragments of

basalt do not show any sign of volcanic activity in historical past. However, there, are structural variations within the same flow both laterally and vertically.

2.1.5 CLIMATE -

The term climate is a geographical term denoting a spatial distribution of the average atmospheric conditions near the surface of the earth. Average conditions of wind, temperature, pressure rainfall is known as climate. Climate is the principal aspect of the physical environment influencing the economic activities of man. It almost determines the land use and crop patterns of the particular region. Unquestionably, it has a considerable influence on the health of the people. As matter of fact, climate has a great bearing upon the flora and fauna of a region, which in turn affects the soil condition of a particular region. Apart from this, it influences the transportation and communication systems and also on the settlement pattern.

CLIMATIC CONDITIONS OF THE REGION-

Broadly, the climate of the Solapur district is monsoonal in nature. The year can be divided into four seasons

1) The cold weather season (Mid December to February)
2) The hot weather season (March to May).
3) The South West Monsoon Season (June to September)
4) The post Monsoon season (October. to Mid December)

In order to understand the chief characteristics of climatic conditions, it is necessary to discuss in detail, the each season of Solapur district.

i) The cold weather season -

As expected, mid December to February is the cold season in the Solapur district. There are regional variations in temperature in the district, due to physical constraints. From November, the temperature begins to fall gradually and become the lowest in the month of December. It is clear from the fact that the lowest temperature in the district is 14.8^{o}C December is generally the coldest month.

The district of Solapur is some time influenced by the cold waves coming from North India, and on such occasions the temperature falls below 10^{0}C.

ii) The Hot Weather Season -

This season is found during the period between March to May, there is continuous rise in temperature both in day and night temperatures. The month of May is generally the hottest month of the year, with mean daily maximum temperature of about 40^{0}C. Sometimes the temperature is recorded more than 44^{0}C.

iii) The south west Monsoon season -

This season is found in the district during the period from June to September. Towards the end of the May when weather is at its hottest in India, the south east monsoon winds start blowing towards the interior of the country from the Indian Ocean bringing along with the moisture captured while crossing the thousands of kilometers, over the ocean. The month of the September, surprisingly is the most-wettest

month of the year. The regions under study receive most of its total amount of rainfall during this season.

iv) The post monsoon season -

This season is found in the district during October to mid December. The South-West monsoon withdraws from the district during the earlier half of the October. The north east trade winds set in thereafter. This is also known as a retreating monsoon period. Occasionally very little rain occurs during this season as well.

1) TEMPERATURE -

Among the various elements of climate, the temperature is the most important as it has the greatest impact upon the health and economic activities on the earth. Temperature varies from place to place due to physical constraints as well as geographical location in terms of latitudes. Solapur region belongs to the tropical areas which receive the maximum amount of temperature throughout the year.

In Solapur district, there are two meteorological observatories, one located at Solapur and the other at Jeur. The data and information recorded from these two observatories are taken as representative of the climatic conditions for the entire district in general.

Table 2.1

Mean daily Maximum and Minimum temperature in Solapur and Jeur Station (2001)

Sr. No.	Months	Solapur		Jeur	
		Mean daily maximum Temp 0c	Mean daily Minimum Temp 0c	Mean daily Maximum Temp 0c	Mean daily Minimum Temp 0c
1.	January	30.4	15.3	30.6	13.4
2.	February	33.2	17.7	33.6	14.7
3.	March	36.8	20.8	36.9	18.4
4.	April	39.3	24.2	38.9	22.8
5.	May	39.9	25.1	39.7	24.2
6.	June	34.7	23.3	34.9	23.0
7.	July	31.3	22.3	31.3	21.8
8.	August	31.2	21.8	30.7	21.0
9.	September	31.1	21.6	31.4	20.9
10.	October	32.1	20.4	31.8	19.6
11.	November	30.4	17.2	30.9	15.1
12.	December	29.3	14.8	30.1	12.9
District annual		33.3	20.3	33.4	19.0

Source: Socio-economic Abstract for Solapur District. (2007)

The winter season begins by about the end of November, when temperatures rapidly fall particularly in the nights. December is the coolest month with mean daily maximum temperature of 29.39^0C centigrade and the mean daily minimum temperature of 14.8^0C. The minimum temperature of Solapur may occasionally dropdown to 4^0C or sometimes 5^0c.

The period from the mid February to the end of May is the summer season of continuous increase of temperature is the chief characteristics. May is the hottest month with the mean daily maximum temperature of 39.9^0C and the mean daily minimum temperature of about 25.2^0C. The heat during the summer season is very intense and the maximum temperature may sometimes go up to 44^0C.

By the end of summer season the land of Indian subcontinent becomes hottest. Consequently, the low pressure belt is developed over land masses. The mechanism of monsoon is developed due to rising of the air masses having behind the vacuum. The high pressure belt is found over the Indian Ocean. Hence, the air start moving from the Indian ocean towards the sub continent of India. While winds traveling (blowing) over thousands of Kilometers over the sea, capture moisture and subsequently filled the vacuum over the land masses. After, the condensation, along with the thunder showers brings welcome relief from the heat. The onset of the South West monsoon by about the first week of the June brings down the temperatures appreciably.

After the withdrawal of the South West monsoon early in October, the day temperatures further increase slightly, but night temperatures continuously decreases. After mid December both day and night temperature start falling rapidly. Except during the south west monsoon the daily range of temperature is large, which is of the order of 12^0C to 16^0C at Solapur.

2) RAINFALL -

Though, the region comes under rain shadow area, yet the average annual rainfall of the district is about 584.3 mm. The South eastern part of the district gets slightly more rainfall then the rest of the district. Most of the rainfall is received during the south west monsoon in the months from June to September. This rainfall account for about 75 percent of the normal annual rainfall and about 17 percent of the rainfall in the district is received during post monsoon or retreating monsoon season of October and November. The rest 8 percent annual rainfall is received during the pre-monsoon along with thunder storm. (Fig. 2.5)

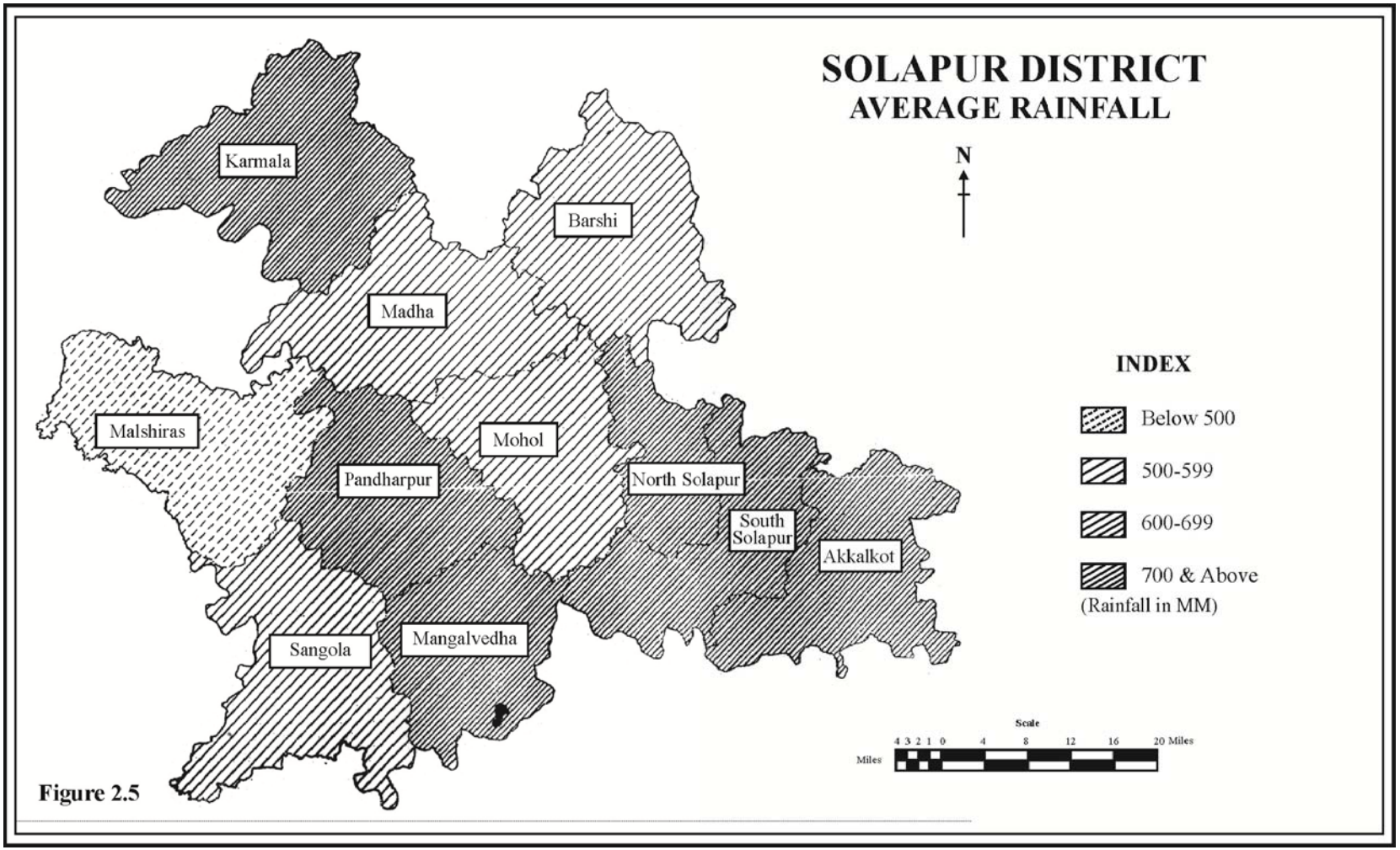

SOLAPUR DISTRICT
AVERAGE RAINFALL
N
Karmala
Barshi
Madha
Malshiras
Mohol
Pandharpur
North Solapur
South Solapur
Akkalkot
Sangola
Mangalvedha
INDEX
Below 500
500-599
600-699
700 & Above
(Rainfall in MM)
Scale
4 3 2 1 0 4 8 12 16 20 Miles
Miles

Figure 2.5

There are wide variations in the amount of rainfall through time and space. The maximum rainfall is about 690 mm at Akkalkot in the South eastern border of the district while the minimum amount of rainfall is recorded about 448.8 mm at Akluj near the western border of the district. Some rainfall in the form of thunder shower occurs during the months of April and May. The variation in the annual rainfall from year to year is quite large due to un-predictable and erroneous nature of monsoon.

Table 2.2

Normal Rainfall from various stations in the Solapur Districts. (2001)

SR. NO.	NAME OF THE STATIONS	RAINFALL IN MM	RAINF ALL IN INCHES
1.	Solapur	677.7	41.4
2.	Barshi	657.4	42.5
3.	Madha	581.7	36.5
4.	Karmala	540.6	34.9
5.	Pandharpur	611.1	37.2
6.	Sangola	537.6	33.2
7.	Malshiras	514.6	32.6
8.	Akluj	448.8	30.4
9.	Akkalkot	689.2	44.7
	Solapur District Average	548.3	37.0

Source: Socio- Economic review of Solapur district. 2007

In order to understand spatial pattern of rainfall distribution in the Solapur district, on the basis of the amount of rainfall the region may be demarcated in various zones such as eastern zone, comprising Barshi, North Solapur, South Solapur and Akkalkot tehsils. This zone has more or less 60 rainy days in a year. The annual average rainfall is in between 650 to 700mm. The central zone comprising Mohol, Mangalwedha, eastern part of Pandharpur and Madha tehsils has about 49 rainy days per year and annual rainfall is in between 550 to 650 mm. The Western Zone consists of Karmala, Sangola Malshiras and Western parts of Madha and Pandharpur, has scanty rainfall below 550 mm. This zone has less than 40 rainy days in a year. (Fig. 2.6)

3) HUMIDITY -

As expected the air is highly humid during South-West monsoon season from June to September, when it records more than 70 percent. During the rest of the year the humidity is below 25 percent, on an average in the afternoon. The driest part of the year is the summer season during April and May the humidity is below 17 percent.

4) CLOUDINESS -

During the rainy season starting from June till September the skies are heavily clouded or overcast. But during the period between November to March skies are generally clear with slight fluctuation. Thereafter, cloudiness increases progressively from May onward.

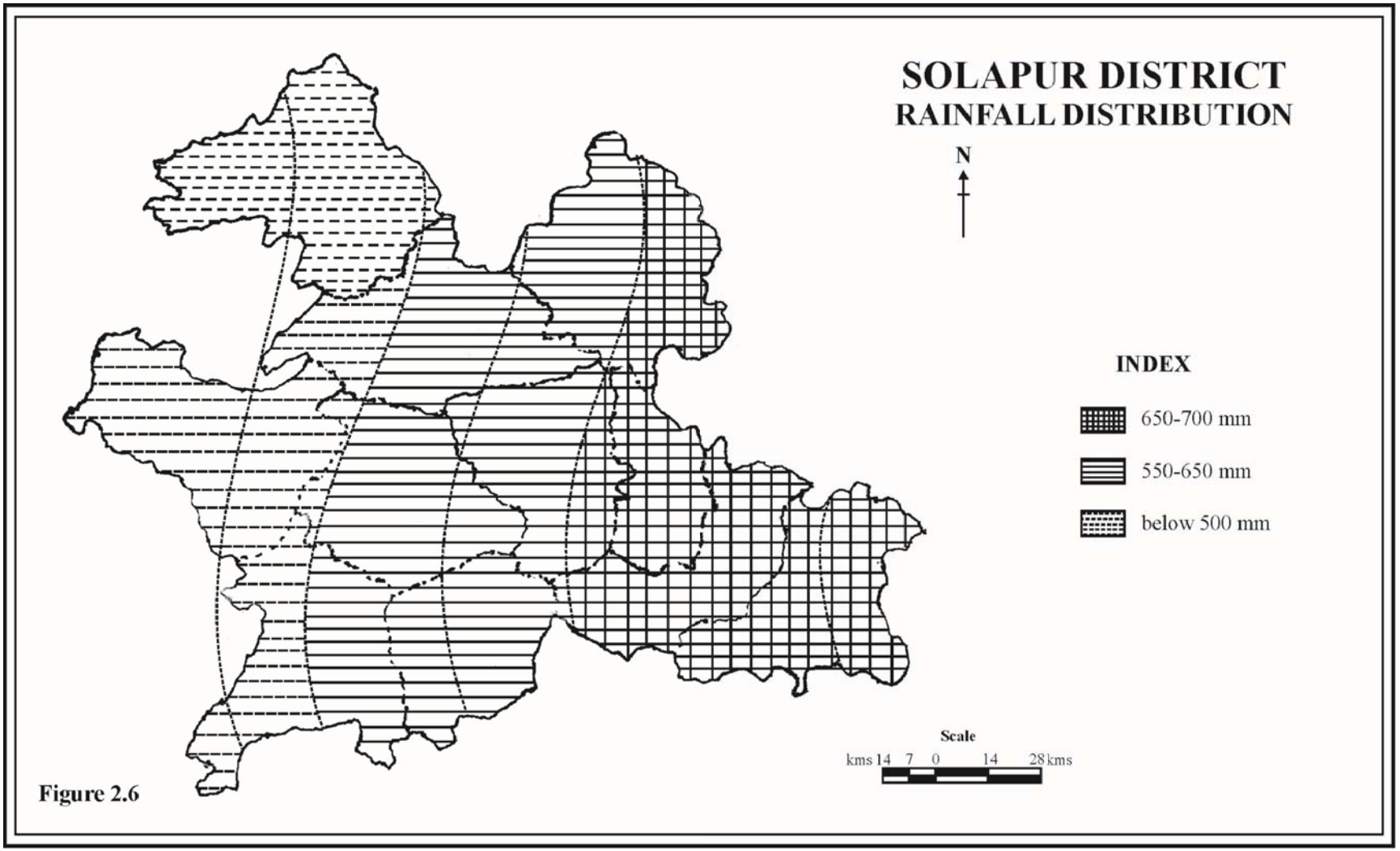

SOLAPUR DISTRICT
RAINFALL DISTRICTION
N
INDEX
650-700 mm
550-650 mm
below 500 mm
Scale
kms 14 7 0 14 28 kms

Figure 2.6

5) WINDS -

Winds are light to moderate in force with some strengthening during the period May to August. In the south west monsoon season winds are mainly from directions between south west to north east. During the period October to December winds blow from North-East to South-West direction. In the next four month winds are variable in direction, in the month of May winds are mostly blowing from North-East to South-West direction. In the month of June winds are mostly blowing from West to east direction. During summer season, dust incidence being the highest. Therefore, in June and September, the winds are very effective laden with moisture.

2.1.6 SOILS -

Soil forms an important part of physical landscape of any geographical region and it is inseparable associated with other components such as landforms, natural vegetation and climate. Soils of the district are essentially derived from the Deccan trap, which is of the predominant rock formation. In the district calcareous Kankar and nodules are commonly associated with these soils. (Fig. 2.7)

Soils of the district can be broadly classified into three types.

1) Shallow soils 2) Medium deep soils 3) Deep Black soils

Over all the spatial pattern of the soil in district is very complex due to the uneven relief structure and number of streams and rivers are flowing through the district. In the hilly regions, soils are shallow and not very much agriculturally fertile.

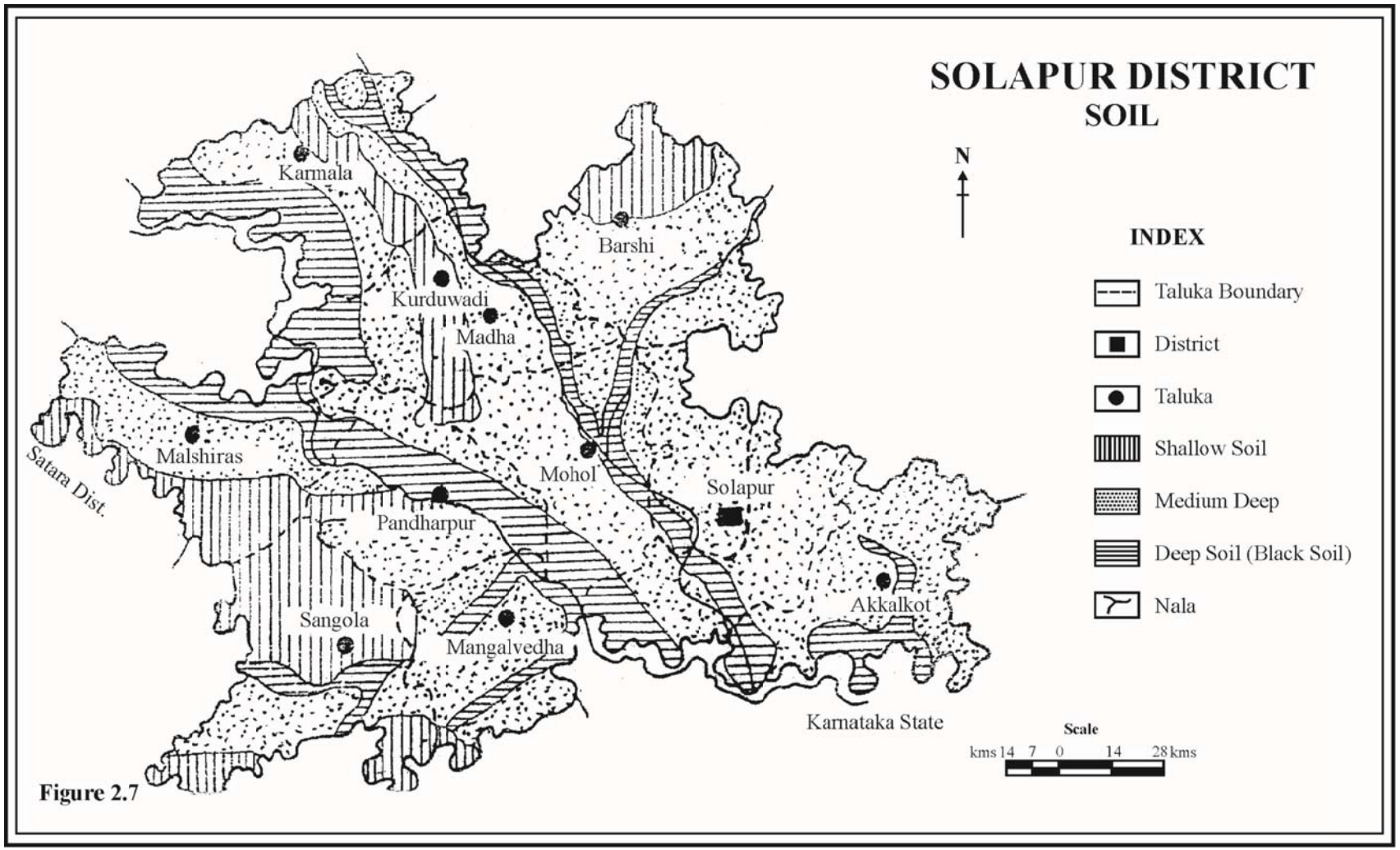

SOLAPUR DISTRICT
SOIL
N
INDEX
Taluka Boundary
District
Taluka
Shallow Soil
Medium Deep
Deep Soil (Black Soil)
Nala
Karmala
Barshi
Kurduwadi
Madha
Malshiras
Satara Dist.
Mohol
Solapur
Pandharpur
Akkalkot
Sangola
Mangalvedha
Karnataka State
Scale
kms 14 7 0 14 28 kms

Figure 2.7

Medium deep soils cover most of the areas of the district since; it belongs to plateau and plain region of the district. In order of importance the deep black soils cover more than 25 percent areas of the district along with the river valleys.

2.1.7 NATURAL VEGETATION -

All the plants which grow together in any area form its vegetation. The vegetation of any region is composed of a collection of number plants belonging to a few or many different species. The natural vegetation is commonly used to describe the natural plant growth as distinct from the cultivated plant growth.

The natural vegetation is consist of three forth division of forest, grass land and desert. In the region under study the forest cover is very poor. The forest of Solapur districts occupy 357.9 square kilometer in which 345 square kilometer forest area and 12 square kilometer is unclassified forest. In other words, 157 square kilometer km is under revenue department, 188 square kilometer under forest department, average 12 square kilometer unclassified reserved and unclaimed forests. Surprisingly, these, scattered poor forests constitute only 0.94 percent of the total areas of the district. In the past, the forest was comparatively dense of predominant of scurbs forest on the hill and with growth of Babul and Neem, lower down in the plains. However, at present most of these forest have disappeared, what remain today are poor stunted and malformed trees and scrubs in a scattered patches. Before, the independence of our country the forest areas were under the

administration of forest division in Solapur district. But due to the growing pressure of population, some forest lands were converted into agricultural land and some were denuded of vegetation and soil.

At present, forests are mainly observed in patches in Malshiras, Sangola and Barshi tahsils on hills slopes and low lying areas. Most of the forest produce of the district is consumed by the local people.

In fact, the forest produce falls short of the total demand and the requirements have to be imported from other places of Maharashtra and India. The important collections of forest produce in the district are Barshi and Solapur. (Fig.2.8)

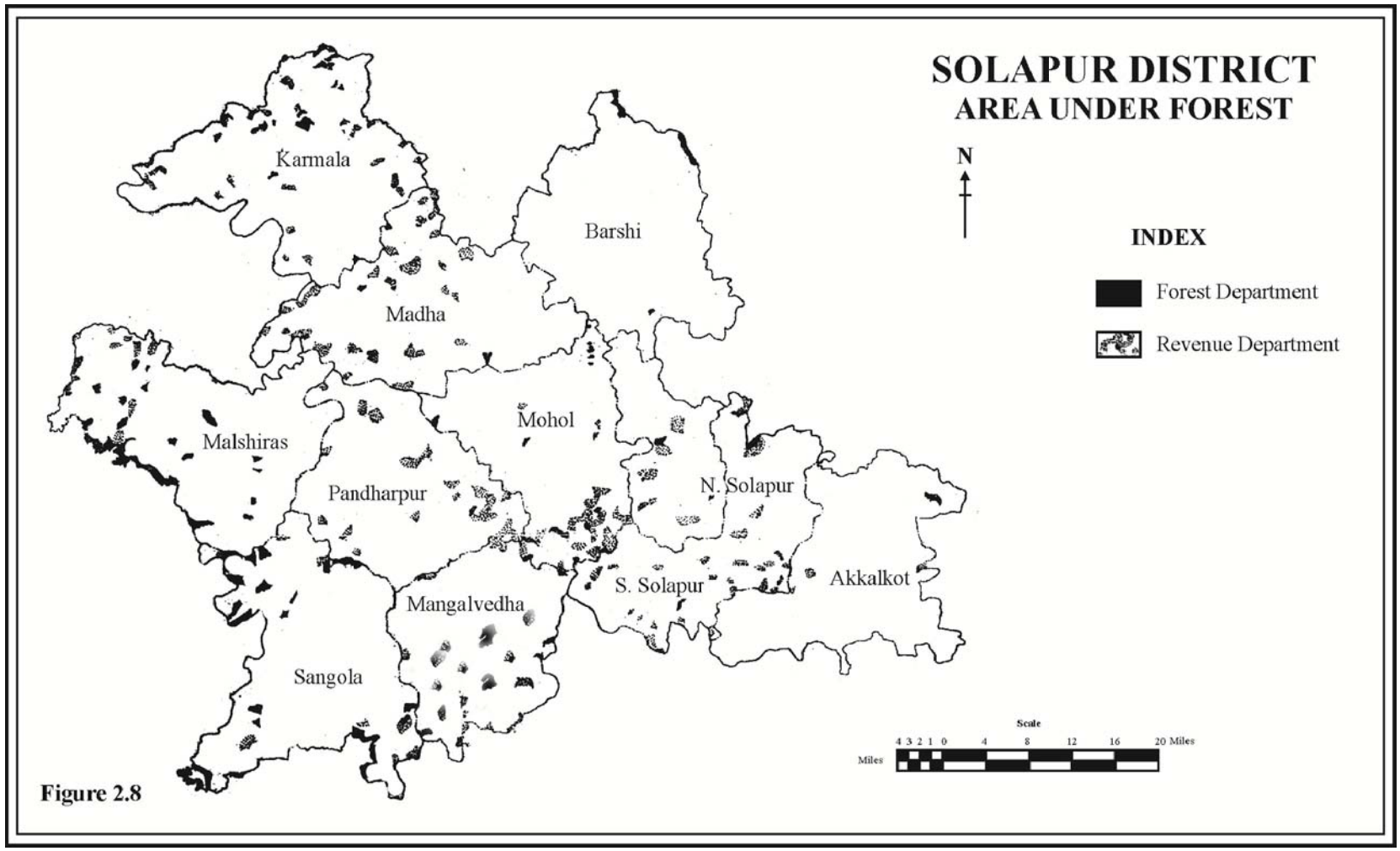

SOLAPUR DISTRICT
AREA UNDER FOREST
N
INDEX
Forest Department
Revenue Department
Karmala
Barshi
Madha
Mohol
Malshiras
Pandharpur
N. Solapur
S. Solapur
Akkalkot
Mangalvedha
Sangola
Scale
4 3 2 1 0 4 8 12 16 20 Miles
Miles

Figure 2.8

2.2 HISTORICAL BACKGROUND -

The district of Solapur earlier formed the parts of Ahamdnagar Pune and Satara districts. The district of Solapur was formed in the year 1838 A.D. and consisted of eight subdivisions with the reorganization of the states in the year 1956, the district was included in Bombay state, since the year 1960, it forms the part of Maharashtra. At the time of 1961 census, the district comprised of eleven tehsils and ten towns. However, there have been certain changes as to the number of villages during last decade but the number of towns in the district remains as the same.

The history of Solapur can be traced back to the early centuries of the Christian era (BC-90 to AD-300). Solapur most probably formed parts of the territory of the Shatakrni or Andhrabhritya dynesty. Whose capital was Paithan on the river Godavari. A Sanskrit inscription dated Shaka 1238 after the downfall of Yadavas this town was known as a Sonalipur. Later on it was called as Sonalapur, hence, it is probable that during census time, the name Solapur was involved by dropping ‘na’ from the original name Sonalapur. During the period of 900 years ending with Muslim by over throwing of the Devgiri Yadavas in the beginning of the fourteenth century. Solapur lies in the neighboring district of Ahmadnagar, Bijapur and Pune held by the early western Chalukyas from 550 to 760 by the Rashtrukutas to 973, by the revived or western Chalukyas to 1184 and by the Devgiri Yadavas till the Muslims conquest of the Deccan in about 1300 A.D.

The Muslim ruled during the period, 1294-1720 before the advent of Britishers in 1818. After the victory of General Smith

over the Peshwas during the battle of 19th February 1818. The British ruled Solapur and appointed Maratha kings rajas as a administrators.

At Solapur, there is an important temple in honour of Siddheshwar, a twelfth century devotee of Lord Shiva and it has become a sacred centre of Lingayat faith and also of Hindus. There is annual pilgrimages known as “Gudd” on Makarsankrat day and procession is held known as “procession of Kathies”.

In fact, this whole area is a meeting ground for Bhagawants from all over Maharashtra and lingayat from Karnataka.

The Solapur district was formed in 1838 and although, it was abolished in 1864, it was revived in 1869. As a result of the merging of the states in 1949 to new tehsils namely Akkalkot and Malshiras were formed and added to Solapur district.

With the reorganization of the states in 1956, the Solapur district was included in the larger bilingual State of Bombay. Since 1st May 1960, it forms a part of Maharashtra of Uni-lingual State. In 1981, the district comprised of eleven tehsils and ten towns. Till today (2009) the district has eleven tehsils and eleven towns.

2.3 SOCIAL BACKGROUND -

The region under study is situated on the borders of Maharashtra and Karnataka. Andhra Pradesh is the nearby State which has also much influence upon the region under study. The district of Solapur is influenced by different social aspects such as language and traditions. The social structure of the district is made up of various religious communities like Hindu, Muslims, Buddhists, Christians, Jains and others.

Table 2.3 :

Percentage of religious population in Solapur district.(2001)

RELIGION	1971	2001
Buddhists	1.76	2.01
Christians	0.29	0.35
Hindus	87.65	87.30
Jains	0.93	00.94
Muslims	9.33	9.35
Others	0.04	0.05
Total	**100.00**	**100.00**

Source : Socio-Economic abstract of Solapur district-2001.

The table concerned, clearly reveals the proportion of religious communities in order of importance, they are Hindus, Muslims, Buddhists, Jain, Christians and Others.

Though, majority of the people speak Marathi, the language is at certain extent mixed with the language of adjacent states, and tone in which their speak is also influenced and that is the reason, people from this area can easily be identified. There is a considerable in-migration of people from the neighboring states particularly, from south. Sizable proportions of the people are staunch shivite and follow lingayat sect.

Among the Hindus Niraties and Rangaris are found comparatively more in number as a distinct is known for textile products. Noteworthy, characteristics of such peoples of area is that traditionally they do not dye black and is tabooed.

Among the Muslim which constitutes the second largest population in the study region, are sub grouped in 47 classes, 17

are of foreigners origin and rest are local converted Hindus. As the region was continuously under Muslim rule, after Yadavas, large number of local converts and foreigners settled in the Solapur. Many of them claimed that they came along with General Wellesdey's Army in 1803 and settled here. Bohara and Momin traders have come from Gujarat and Kutch. They came from cities and speak Urdu but from Villages speak Marathi or Kanadi. Man of Shaikh and sayyed Classes wear a head craft or duppatta. The Muslim women wear same cloth as the Hindu woman wear.

Jains are of considerable number they are the followers of digamber sect and followers of Shvetambara are also found. Along with local there are many Marwadi, Gujarati, and Jain.

The most of Buddhists in the region under study are newly converted Hindus from the lower strata. In fact they also practice tradition and culture of Hindus. In other religious community most probably are parsis in the town of Solapur. They are mainly traders. Similarly there are number of Sindhis, who are engaged in trade and business in the Solapur City.

2.3.1. POPULATION -

Though, the growths of population aspects are out of the scope of geography yet indirectly have great bearing upon the composition, distribution pattern of population in Solapur District. Hence, briefly, the account of it is given as under:

Table No. 2.4

Growth of population in Solapur district. (1901-2001)

Year	Total Population	Decadal Variation Percentage
1901	875368	-
1911	946761	+8.16
1921	900267	-4.19
1931	1058959	+17.63
1941	1215953	+14.83
1951	1490446	+22.57
1961	1843102	+23.66
1971	2233369	+21.17
1981	2588139	+15.88
1991	2131057	+24.84
2001	3855383	+16.21

Source : Socio-economic abstract of Solapur District. 2004-05

The growth of population for the district as a whole is represented in the Table 2.4. Since the beginning of the 20th century it was less than 8 percent, for the decade, 1901-11. During the period 1911-21 the growth rate was extremely low, due to the impact of a epidemic diseases. During 1931-51, the growth rate was maximum which increased to more than 22 percent than again it started declining gradually and became 16.21 in 2001. This is due to the awareness among the people about the rapid growth of population and its negative consequences.

Table 2.5 reveals the total, rural and urban growth rate during the 1901-2001. During the period 1901-1921 due to severe epidemics diseases the growth rate of population declined particularly for rural areas. While during the period 1921-1991 it went on increasing for all the sectors of Solapur district.

Table No. 2.5

Decadal Growth rate of population since (1901-2001)

Sr. No.	Decade	General	Urban	Rural
1	1901-1911	+8.16	-12.12	+13.44
2	1911-1921	-4.19	+41.64	-14.31
3	1921-1931	+17.63	+21.71	+16.26
4	1931-1941	+14.83	+31.44	+9.02
5	1941-1951	+22.57	+30.50	+19.24
6	1951-1961	+23.66	+10.56	+29.70
7	1961-1971	+21.17	+18.60	+22.19
8	1971-1981	+15.88	+24.48	+12.61
9	1981-1991	+24.84	+21.11	+26.41
10	1991-2001	+16.21	+7.69	+8.52

Source - Socio-economic abstract of Solapur District. 2004-05

Now the impact made by education and high level of literacy on the one hand and improved medical facilities, on the other the growth rate of population was brought under control due to family planning program and consequently it declined substantially all over the region within the district of Solapur.

POPULATION DENSITY -

The table 2.6 depicts the percentage of population in each tahsil of the district and its density per square kilometer. The highest percentage of 24.96 was recorded for North Solapur tahsil and similarly the density of population was the highest for north Solapur tahsil in 2001. On the other hand the lowest population density was recorded for Karmala.

Table 2.6

Population Density in Solapur district (2001).

Sr. No.	Talsil	Total Area in Sq. Km.	Total Population	Percentage of Population of the district	Density per sq. km.
1	Karmala	1609.70	233316	6.76	145
2	Madha	144.90	292611	7.50	189
3	Barshi	1483.10	240831	8.35	230
4	North Solapur	746.30	960803	24.96	1287
5	Mohol	1408.40	25526	6.56	179
6	Pandharpur	1303.60	402707	13.46	309
7	Malshiras	1522.20	422600	13.97	278
8	Sangola	1550.70	272077	7.07	175
9	Mangalwedha	1140.20	171261	4.44	150
10	South Solapur	1195.30	210774	5.47	176
11	Akkalkot	1390.30	290037	7.53	209
12	Solapur District	14878.40	3849543	100%	258

Among the various parameters, the anthropogenic factors are most dynamic to change the natural environment or may sometime destroy life of the plant kingdom within no time by his distractive mode of nature. Population aspects like the growth of population, the density of population are essential to include in the introducing subject, to understand overall nature of the region, due to interrelated impacts, of physical, social and economic aspects to one another. Taking into consideration the demographic aspects which will enable us to interpret the manifold aspects of Birth rate, death rate, infant mortality rate and migration pattern in Solapur district.

2.4 ECONOMIC BACKGROUND -

Among the various backgrounds of the region, economic background of the region occupies a significant position, since many other sectors are influenced by the level of economy. Natural landscape may be modified by the economic man to a greater extent. It is directly associated to the per capita income and standard of living of the people. Hence, it is necessary to give a general idea of the economic background of the Solapur district at a glance, in order to understand various facts of the region.

2.4.1. LAND USE PATTERN -

The total geographical area of the district is 14878 sq. km, which is about 4.88 percent area of the Maharashtra State. The data regarding the classification of the total area of the district according to various needs of land utilization not only reflect the extent of development of agricultural activiies in the district but also represents the cultivation potential of the region. The picture of any region becomes clearer to an analyst to distinguish between physical and cultural landscape. This is essential to know about the various proportions of the land under different uses because their proportion gives an idea to understand the magnitude of land utilization. If the percentage of land is comparatively more under agricultural, then the economy of the region may be considered better off, while on the other hand, if the land under other category is relatively more which open the way for economic activities other than agriculture. Inshort, land utilization of the Solapur district has given an idea about the natural landscape which is directly correlated with cultural Landscape.

As stated earlier, the total geographical area of the district is about 14878 sq. km. The area under forest is only 2.14 percent of the total geographical area. This is an index to understand the place of Solapur district within Maharashtra and India. In India forest cover of total geographical area is about 20.2 percent, in which 6.8 area is covered by good forest and 13.4 percent area is covered by open degraded forest. Ecologically required forest cover is 33 percent of the total geographical area. Net required forest cover is 12.6 percent of the total geographical area in our country. The Solapur district has much less percentage of forest than that of the country; partly due to the fact that Solapur belong to drought prone area of Maharashtra. Land used for non agricultural purposes in the Solapur district is below one percent, land which is under fallow category, is 4.0 percent of the total geographical area, while pastures land is about 2.74 percent of the total geographical area.

Table No. 2.7
Land Use in Sq. Km, and Percentage. (2001)

Land use category	Total Area	Percent of Land use
Total Area	14878	100
Land under forest	319	2.14
Land use for not Agricultural purpose	788	0.92
Fallow land	674	4.53
Cultivable land but fallow	321	2.15
Pastures	408	2.74
Used for horticulture trees etc.	771	5.16
Current fallow	3353	22.53
Other fallow	921	6.19
Not cultivable land	9907	165.24
One shown	903	6.06
Under cultivation	10610	71.30
Total Cultivable Land	**13342**	**89.67**

Source : Socio-Economic abstract of Solapur District-2000-01.

The percentage of total cultivable land is quite impressive which is about 89.07 percent of the total geographical area. This shows that the

district of Solapur has been modified from natural landscape into cultural landscape on a large scale.

2.4.2 IRRIGATION -

Solapur district is still depend on the vagaries of monsoon. Irrigation aims to fulfill the deficiencies of rainfall thereby bring more land under plough, which otherwise would have remain uncultivated for want of water. In short, the object of irrigation is to arrangement for farm produce. At present, wells, Bhandaras tanks and canals are main sources of irrigation. Installations of oil engines, electric pump sets have benefited agriculture to a large extent in Solapur district.

Table 2.8

Types of irrigation in Solapur District in hectare and percentage. (2001)

Net area irrigated	area in '00' Hectors	Percentage
Surface Irrigation	341	3.21
Well irrigation	765	7.21
Total irrigated area	1298	11.58
Total Gross area irrigation	1298	12.23
Net irrigated area	1106	9.86

The table concerned gives the percentage of irrigated land to total cultivated land in Solapur district. The proportion of irrigated land is relatively poor due to physical constrain and scarcity of water. The surface irrigation shows only 3.21 percent area, while the well irrigation is as high as 7.21 percent of the total cultivated land in Solapur district. Total grossed area irrigated is 12.23 percent of the total cultivated area of the district, which includes

the irrigated land more than once in a year. Net irrigated area is 9.86 percent of the total cultivated land and total irrigated land is about 11.58 percent of the total cultivated land of the district.

2.4.3 TRANSPORTATION -

Transportation and communication is an index of social and economic development in a particular region, because most of the economic and social activities are positively influenced by the network system available in the region. (Fig. 2.9)

In terms of railway, the Solapur district is quite fortunate to have sizable length of total railway lines.

At present the district has the total length of railway line 452.60 kilometer. Within the district, yet, 126.90 kilometer is under construction from narrow gauge to Broad gauge.

The road is another important means of transportation for the social and economic development in a particular region. Unlike railway, roads provide door to door service. In terms of roads transportation, the Solapur district is better off since it has total length of road ways 14108 kilometer, out of this, 188 kilometer belongs to National Highway, 173 kilometer major state highway, while 1332 kilometer state highway. Apart from this, the major district road have the length of 3039 kilometer while other district roads, occupy 2238 kilometer.

The village roads are comparatively having a sizable distance in km comprising which is 7238 kilometer length with the district connecting all the village in the district.

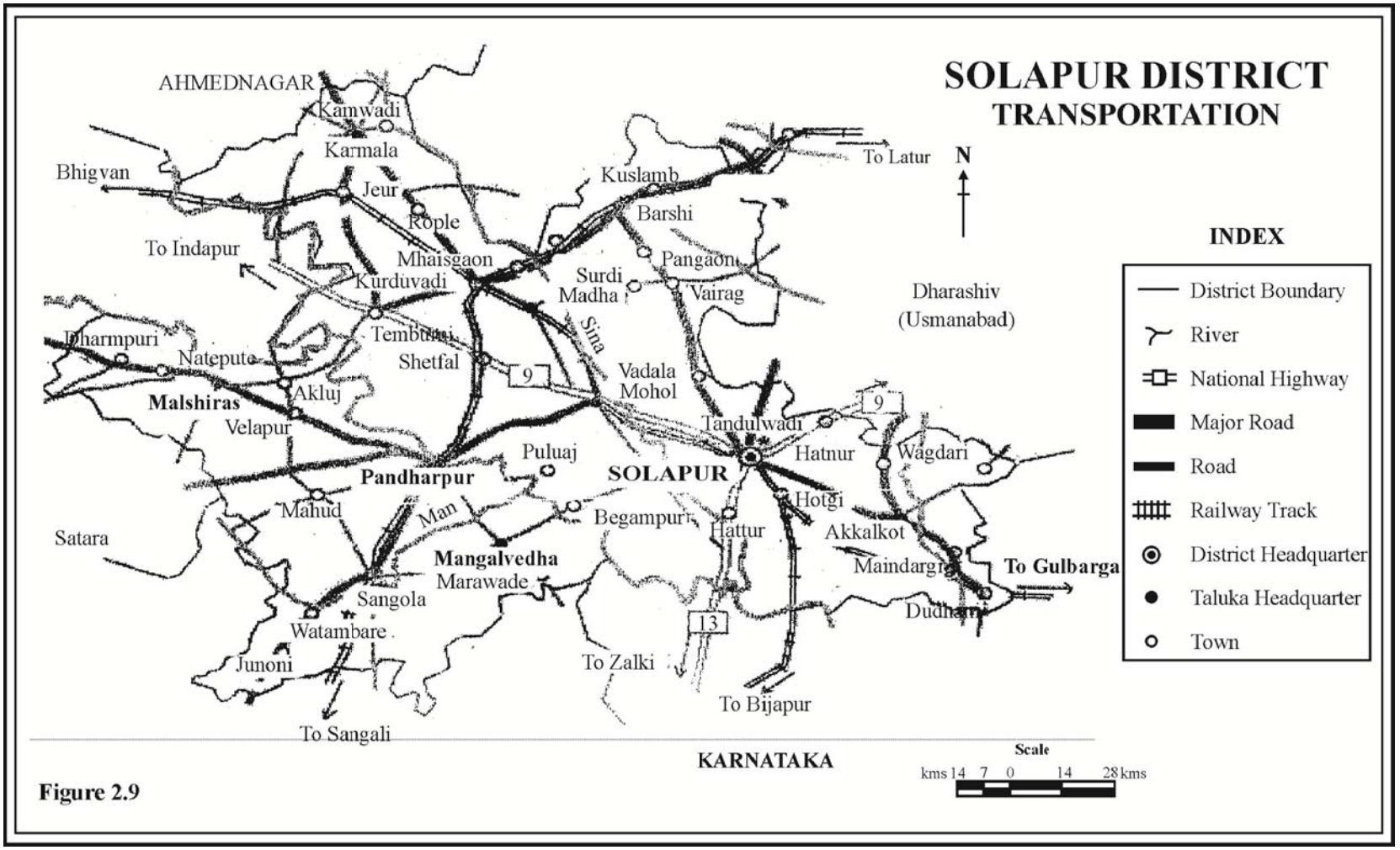

SOLAPUR DISTRICT
TRANSPORTATION
N
INDEX
District Boundary
River
National Highway
Major Road
Road
Railway Track
District Headquarter
Taluka Headquarter
Town
AHMEDNAGAR
Kamwadi
Karmala
Bhigvan
Jeur
Kuslamb
To Latur
Barshi
Rople
To Indapur
Mhaisgaon
Pangaon
Surdi
Madha
Kurduvadi
Vairag
Dharashiv
(Usmanabad)
Sina
Dharmpuri
Tembhurni
Natepute
Shetfal
9
Vadala
Mohol
Akluj
Malshiras
Velapur
Tandulwadi
9
Hatnur
Wagdari
Puluaj
Pandharpur
SOLAPUR
Hotgi
Mahud
Man
Begampur
Hattur
Akkalkot
Satara
Mangalvedha
Maindargi
To Gulbarga
Marawade
Sangola
Dudhani
13
Watambare
Junoni
To Zalki
To Bijapur
To Sangali
KARNATAKA
Scale
kms 14 7 0 14 28 kms

Figure 2.9

Table 2.9

Types of Roads in km and its percentage. (2001)

Types of Roads	Length in Km	Percent
National Highway	188	1.33
Major state Highway	173	2.35
State Highway	1332	9.44
Major District Roads	3039	21.54
District Roads	2238	15.14
Village Roads	7238	51.29
Total Length	**14108**	**100.00**

In order of importance, the table concerned reveals, village roads which accounts more than half of the total length of the district. It is followed by the major district road which is slightly less than one fourth of the total length of the district. It is further followed by other district road in order of importance which is one sixth of the total length of the district. The state high way occupies less than 10 percent of the total length of the district.

While major state highways, have little more than two percent of the total length of the district, while national highway have little more than one percent length of the district. The transportation network is directly correlated with the exploitation of the natural, economic and human resources.

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CHAPTER- III

GROWTH OF POPULATION IN SOLAPUR DISTRICT

3.1 INTRODUCTION

3.2 THE GROWTH OF POPULATION SINCE 1901

3.3 RURAL URBAN DIFFERENTIALS IN GROWTH RATES

3.4 POPULATION GROWTH DURING POST INDEPENDENCE PERIOD

3.5 SPATIAL PATTERN OF GROWTH OF POPULATION IN SOLAPUR DISTRICT

3.6 BIRTH RATES IN SOLAPUR DISTRICT

3.7 BIRTH RATE FOR RURAL AND URBAN AREAS

- 3.7.1 Birth rate for rural areas
- 3.7.2 Birth rate for urban areas

3.8 DEATH RATE IN SOLAPUR DISTRICT

3.9 DEATH RATE FOR RURAL AND URBAN AREAS :

- 3.9.1 Death rate for rural areas
- 3.9.2 Death rate for urban areas

3.10 INFANT MORTALITY RATE IN SOLAPUR DISTRICT

CHAPTER- III

GROWTH OF POPULATION IN SOLAPUR DISTRICT

3.1 INTRODUCTION :

This chapter is associated with various aspects of population growth in Solapur district. Growth rates since 1901, till 2001, have been discussed in detail. Birth rates, death rates and infant mortality rates have been also taken in to account.

The most important problem before the country today is the one created by population explosion. All attempts to improve economic condition of the people are thrown out of country, which increased from 238 million is 1901 to 1002 million in 2001. Solapur district also during the same period experienced enormous increase in total population which increased from 0.87 million to 3.8 million in 2001.

Infact, the growth of population in any area is an index of its economic development, social awakening and many other characters. The growth of population is one of the significant factors associated with mans occupancy. In other words, it flows in size from time to time and people migrate temporarily or permanently both within the administrative boundaries and across them. The growth of population in any area is determined by three basic factors namely, human fertility, human mortality and human mobility. The difference between human fertility and mortality is called natural increase of population. There are many factors which are responsible for increasing, the natural growths of population. The demographic factors, social factors influence the growth rate of population. The present pattern of population growth is simply the latest phase of census, of growth trend in the past. The trends of

population growth are basic to the change in the overall geographic personality of any area.

The purpose of this topic is to examine the dynamic of population numbers in the study region during the period 1901-2001 along with their broad implications, such analysis will yield not only an understanding of the contemporary demographic situation in the study region but will also provide clues about the likely trend in this regard in the years to come. This in turn, will give a measure of social problems with the district and its reasons will be called upon to solve the problems. The growth of population means any change in population numbers. If this change is in negative direction, then population decreases. When, it is in positive direction then population increases. In the present chapter, we are discussing about the growth of population since 1901 in the whole district. Then we will discuss the taluka-wise population growth during 1901-2001, and will determine the sub-regions of population growth-rates such as, high population growth-rate region, medium population growth rates region and low population growth-rate region.

3.2 THE GROWTH OF POPULATION SINCE 1901

The growth of population may be approached just by taking into consideration the next growth of population over the basic year. The growth rate assumes special significance, when viewed in temporal perspective. The growth of population has been taken in to consideration for the last ten decades that is for 1901-2001. The growth rate of population has a great significance for the geographer. The growth of population of the study region since 1901 is shown in the following table. (table 3.1)

GROWTH RATE:-

The actual growth rate of specific decade is obtained by dividing the difference between the populations of two dates and multiplying it with 100 as under:

$$r = \frac{Pn-Po}{Po} \times 100$$

Where – r = Growth rate.

Pn = Population of next year.

Po = Population of base year.

100 is for percentage value.

Table No. 3.1

Growth Rate of Population Since 1901

Sr. No	Decade	Growth Rate (%)		
		Total General	Rural	Urban
1	1901-1911	+ 8.16	+ 13.44	- 12.12
2	1911-1921	- 4.91	- 14.31	+ 41.64
3	1921-1931	+ 17.63	+ 16.26	+ 21.71
4	1931-1941	+ 14.83	+ 9.02	+ 31.44
5	1941-1951	+ 22.57	+ 19.24	+ 30.50
6	1951-1961	+ 23.66	+ 29.70	+ 10.56
7	1961-1971	+ 21.17	+ 22.19	+ 18.60
8	1971-1981	+ 15.88	+ 12.61	+ 24.48
9	1981-1991	+ 24.84	+ 26.41	+ 21.11
10	1991-2001	+ 19.14	+ 13.99	+ 29.99

Source : Socio-economic abstract of Solapur district.

The table reveals that the trends of general rural and urban population growth rate vary from rural to urban areas during the span of 100 years (1901-2001). The trend of general population growth rate and rural population growth rate by and large are lower than the urban growth rate, except, during 1951-1971 periods. But there are remarkable ups and downs in the urban population growth rate during the span of hundred years (1901-2001)

The general population growth rate and rural population growth rate have gradually increased up to the year 1961. Only 1911-1921 and 1931-1941 decades showed reveres trends. There was severe toll of life due to influenza epidemic (1918) and other severe diseases. During the 1911-1921 decade there were 93,766 deaths (out of 96,961 births) due to plague, cholera, fevers, bowel complaints and other causes. Same case was recurred in 1931-1941 decade, where 89,008 deaths (out of 115520 births) occurred. The heavy toll of life was experienced in the rural areas as compared to the urban areas. After the independence of India huge medical facilities have been provided to rural areas, which helped in controlling the epidemics and other diseases in the study region of Solapur district.

There were remarkable ups and downs in the trend of urban population. The growth rate sharply declined during 1901-1911 and 1951-1961 decades, while it suddenly increased during 1911-1921 decade. The growth rate decreased by -12.12 percent during 1901-1911 and + 10.56 during 1951-1961 decades, while it increased by + 41.61 during 1911-1921 decade. The growth rate declined during 1901-1911 decade due to heavy toll of life due to fevers and due to respiratory deceases in urban areas, it recorded was 51.50 percent and 40.05 percent respectively. In the case of 1951-1961 decade, the urban definition was changed and there was consequent reclassification of four towns in the village, viz Mohol, Madha, Akluj and Malshiras. There was sudden growth in urban population during 1911-1921 due to the emergence of three urban centres and control of fevers and respiratory diseases in urban areas.

i) 1901-1931:-

In this period population grew by 1,85,423 for region as a whole. In this, net increase for urban population was 93,182 (i.e.

50.25 percent), while for rural areas was 92,814 (i.e. 49.75 percent) increase. During this period birth rate was 27.43 percent in 1901 and 46.52 percent in 1931. While these figures are taken into consideration, it shows that the population grew due to high fertility rate than that of the mortality rates.

ii) 1931-1961

In this period, population enhanced by 79,525. In this, net increase of population for urban areas was 245748 (i.e.30 percent), and 544777 (i.e. 70 percent) increase was for rural population. During this period, the birth rate was 46.52 percent in 1931 and 35.40 percent in 1961, while death rate was 39.90 percent and 16.30 percent respectively. These figures show that the birth rates and death rates both declined. But there was an interesting observation that the birth rates did not decline in proportion to death rates. It was, therefore, the major cause for population increase.

iii) 1961-1991

In this period the population grew by 1365915. In this net increase of population, was 409025 (i.e. 29.96 percent) contributed by urban population, while 954890 (i.e.70.04 percent) was increased by rural population. The birth rates were 35.4 in 1961 and 28.00 percent respectively. These figures show that the population grew in this period due to gradual decline in births and sudden decline in the deaths. Rapid decline in mortality rate was a major cause for the population increase.

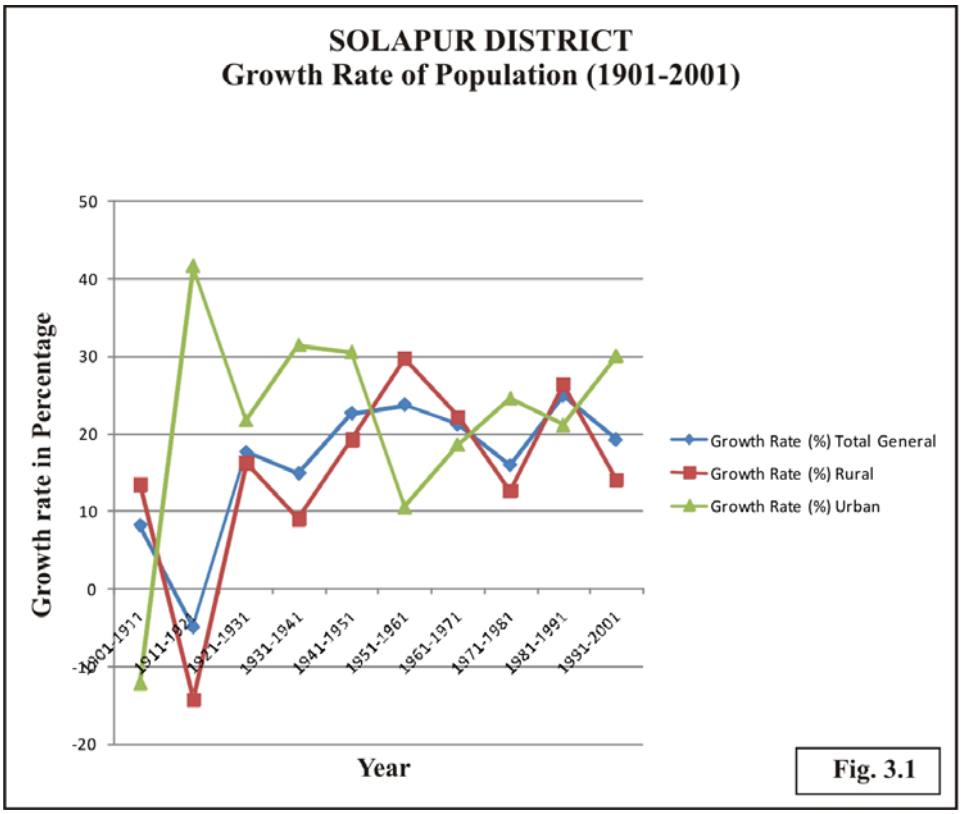
iv) 1991-2001 :-

During this period the population grew by 625486 for the district as a whole. The increase in percentage was of the order of 19.14 percent for total population, 13.99 percentage for rural and

29.99 percent for urban areas of the district, the total increase was of 296801, which is about 29.99 percent, while for rural areas of the district, contributed 328685, percent which is 13.99 percent in rural areas. The birth rate was 22.61 percent in 1991, while it declined to 20.68 in 2001. The death rates during the same period were recorded to 5.08 percent and 5.35 percent respectively. From this, it can be concluded that the growth rate of population though, declined, but due to better food supply, the death by and large, remain the same. Hence, there is a growth of actual and natural increase of population.

From the preceding discussion, it can be concluded that the population increased due to higher fertility rates as compared to the mortality rates during first three decades (1901-1931). During the next three decades (1931-1961), it increased due to rapid decline in death rates than that of the birth rates. While during the last four decades, it increased, because of sharp decline in death rates. In brief, the fertility is the major cause for the first three decades (1901-1931) while the mortality is a major cause for next three decades (1931-1961). Mortality and mobility both are the causes for high increase in population for last four decades that is for 1961-2001. It emerges from the above discussion that the history of population growth in the study region, thus, has been mainly a faction of the changing pattern of the death rates in the years to come. On the other hand, even under favourable conditions, births rates have taken a comparatively long time to decline. It is most likely, therefore, that with the current trend, population of the study region will continue to grow at accelerated rates even during coming decades.

It is obvious from the points discussed above that the accelerated growth of population during the post independence period has not retarded the socio-economic development which otherwise has been substantial, but it seems sure to be the main stumbling block in study region. If the same demographic trend continuous, it will produce adverse effects on the environmental conditions of the land as well as the Psychology of the people in the long run. (fig.3.1)



3.3 RURAL URBAN DIFFERENTIALS IN GROWTH RATES:

An understanding of the dynamics of population will be neither complete nor clear unless making a reference of the differentials in the growth rates of its two vital components that is rural and urban. Although, the general population in the study region has experienced consistent acceleration in growth rate since 1921, the increase in rural and urban population reveals differing trends, while during 1921-1951, the rural

population was increasing at practically uniform medium rates of about 16 to 19 percent. Its urban counter part grew at higher rates which were rising regularly that are 21.75% during 1921-1931, while 31.44% during 1931-1941 and 30.50% during 1941-1951 period. The urban growth rate, however, slackened during 1951-1961 (10.56%), in the sharp contract of the rural rate, which increased by 29.48 percent in same period due to change in the urban definition and consequent reclassification of urban places. During 1961-2001 decades, the rural and urban growth rates slightly declined with slight fluctuation on the growth rate of population for rural as well as for urban areas in the district. This declined due to the impact made by family planning programs and increase in literacy rate. Though, these have continuously increased in total population in the post independence period of India. (Fig. 3.1)

3.4 POPULATION GROWTH DURING POST INDEPENDENCE PERIOD. :

We have already taken into consideration, the population growth since 1901, for the entire study region. It is not sufficient to determine the sub-regions of population growth rate within the study region. For this purpose, we take into consideration, talukawise growth of population in the study region. To examine the population growth at taluka levels, we take into consideration the period from 1961 and 2001. We have selected this period to study for following reasons.

i) After 1961, there has been an improvement in the industrialization and agriculture activities through out the country. The introduction of five year plan started showing its impact during post independence periods, throughout the country including the study region.

ii) During second, five year plan, there has been heavy emphasis on agriculture development, when Government realised that the agriculture is the back bone of the economy. Hence, it initiated heavy investments in agriculture activity. After 1961, the region under study, achieved remarkable progress in agro-based industries especially on sugar industry. There are ten sugar factories in Solapur district, out of these eight sugar factories and three cotton mills have been established after the independence of country.

iii) Bhima irrigation project, started showing its impact on the agriculture transformation from traditional cropping pattern to advanced cropping pattern. This project is the major irrigation scheme in the study region seven talukas of the study region are under the command area of this project. There is, 112940 hectares of land under the irrigation of Bhima irrigation project, after the construction of Ujani dam across the river Bhima in the Solapur district.

3.5 SPATIAL PATTERN OF GROWTH OF POPULATION IN SOLAPUR DISTRICT :

The table 3.2 indicates that Solapur district had 93.50 percent of growth rate of population growth during 1961-2001. Thus, spatial pattern of growth rate of population varies enormously within the district. The Barshi taluka recorded highest growth rate while Pandharpur taluka recorded lowest growth rate during 1961-2001. The entire region is classified into three sub-region of population growth. These are (i) High population growth region (ii) Medium population growth region and (iii) Low population growth region. This classification of sub-regions of population growth is based on the district average growth rate of 93.50. (Table 3.2)

Table 3.2

Tahsilwise growth of population during 1961-2001.

Sr. No.	Tahsil	Population		Growth rate 1961-2001
		1961	2001	
1	Barshi	220815	340831	183.99
2	Akkalkot	175333	290037	152.85
3	Karmala	128345	233316	122.27
4	Madha	156511	292611	114.99
5	South Solapur	122504	210774	114.48
6	Mangalwedha	89172	171261	108.62
7	Mohol	123078	252526	95.08
8	Sangola	128012	272077	88.86
9	North Solapur	405833	960803	73.12
10	Malshiras	166521	422600	65.03
11	Pandharpur	153915	402717	61.86
	District Total	**1860119**	**3849543**	**93.50**

Source : Socio-economic abstract of Solapur district. (1961-2001)

i) High Population Growth Rate :

Within the district, the Barshi, Akkalkot and Karmala talukas have recorded the growth of population above the average for the region. Talukas, which have recorded higher growth rate of population, are infact are of the order of 183.99, 152.85 and 122.27 percent.

ii) Medium Population Growth Rate :

The Madha, Mangalwedha South Solapur and Mohol talukas of the study region fall in this category. Madha had 114.99 percent population growth, Mangalwedha 108.62 percent, South Solapur 114.48 percent while Mohol taluka had 95.08 percent growth of population during 1961-2001. Mangalwedha and South Solapur talukas are located extreme south

of the Solapur district on the border between Maharashtra and Karnataka states. (Fig.3.2) While Mohol taluka is located in the western side of Solapur city in the central part of the study region.

iii) Low Population Growth Rate :

Sangola, North Solapur, Malshiras and Pandharpur talukas belong to this category. Sangola represents 88.86 percent of population growth rate while Malshiras shows 65.03 percent growth rate and Pandharpur depicts 61.86 percent of growth rate respectively during 1961-2001 period. North Solapur represents 73.12 percent growth rate of population. Malshiras, Pandharpur and Sangola are located in western side of the district while North Solapur belongs to eastern part of the district bordering Karnataka state. (fig. 3.2)

3.6 BIRTH RATES IN SOLAPUR DISTRICT:-

Birth rate is the most important factors influencing growth of population in any particular region. In early days, birth rate was very high only on account of high death rate. This was, due to the security point of view for parents in old age. Since, children become the only supporting means for parents. In ancient period both births as well as death rates were high due to insufficient medical facilities as well as insufficient availability of nutriticious food.

Now a day, both birth as well as death rates have come down due to improvement in better medical facilities and improved food supply. If, there, is a close region, than the birth rates becomes the only factor influencing the growth of population. In order to understand the contribution made by birth rate in Solapur district towards growth of population. The birth rates for different period and for various talukas have been calculated for the year 1981, 1991, 2001.

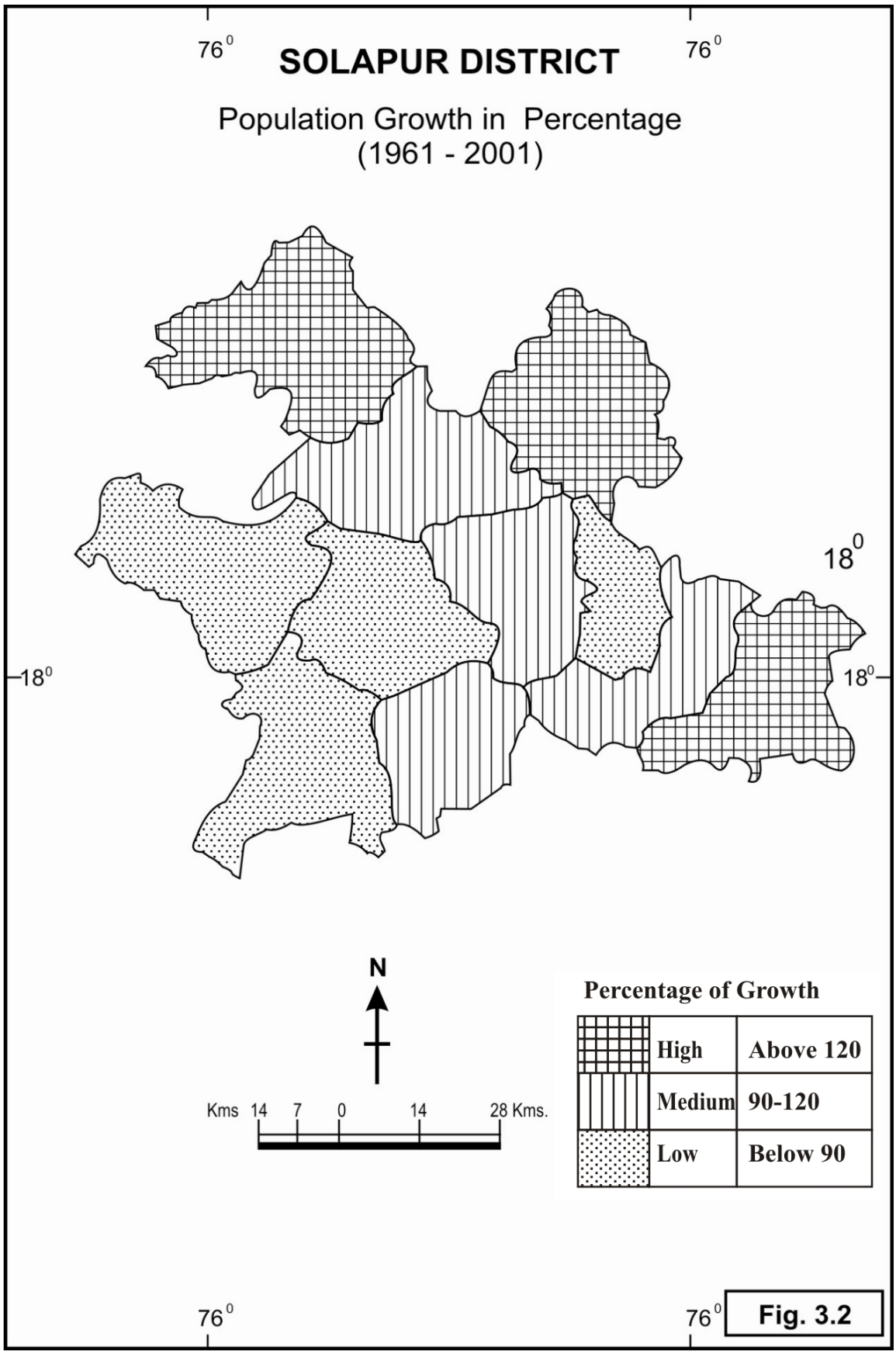

SOLAPUR DISTRICT
Population Growth in Percentage
(1961 - 2001)
76°
76°
18°
18°
18°
N
Kms 14 7 0 14 28 Kms.
Percentage of Growth
High
Above 120
Medium
90-120
Low
Below 90
76°
76°

Fig. 3.2

In 1981, birth rates for Solapur district was 22.64 percent, which slightly declined and became 22.61 percent in 1991. During 2000-01 periods, it substantially declined and became as low as 20.58 percent. This decline may be attributed to increase in literacy rate and impact of family planning programmes, such as the age at marriage has been increased both for male and female during the recent period, as well as the awareness, among the people created by the Government, planners and local reformers. (Fig 3.3)

Similarly, the birth rates were calculated for the all talukas of Solapur district. The birth rates within the Solapur district varies enormously within the district, the highest birth rate was for the North Solapur tahsil during the last three decades. It may be due to the availability of maternity hospital in the Solapur city while from other talukas, generally, people come to the city, of Solapur for delivery, in order to avoid any complications during the delivery period. Due to this reason, the highest birth rates for the North Solapur have been recorded for 1981, 1991, 2001 period.(Table-3.3)

Table 3.3
Taluka wise Birth Rates in Solapur district

Sr. No.	Taluka	1981	1991	2001
1	Karmala	16.96	18.07	15.71
2	Madha	18.34	21.40	16.61
3	Barshi	25.10	23.72	22.39
4	North Solapur	31.76	31.31	24.48
5	Mohol	19.81	16.73	18.40
6	Pandharpur	23.30	20.05	19.05
7	Malshiras	15.81	14.42	23.11
8	Sangola	18.84	17.79	22.29
9	Mangalwedha	17.20	19.85	23.08
10	South Solapur	19.38	16.23	14.22
11	Akkalkot	22.42	18.19	15.36
	Dist. Total	**22.64**	**22.61**	**20.58**

Source : Socio-economic abstract of Solapur district. (1981-2001)

SOLAPUR DISTRICT

Talukawise Birth Rate in Solapur District
(1981 - 2001)

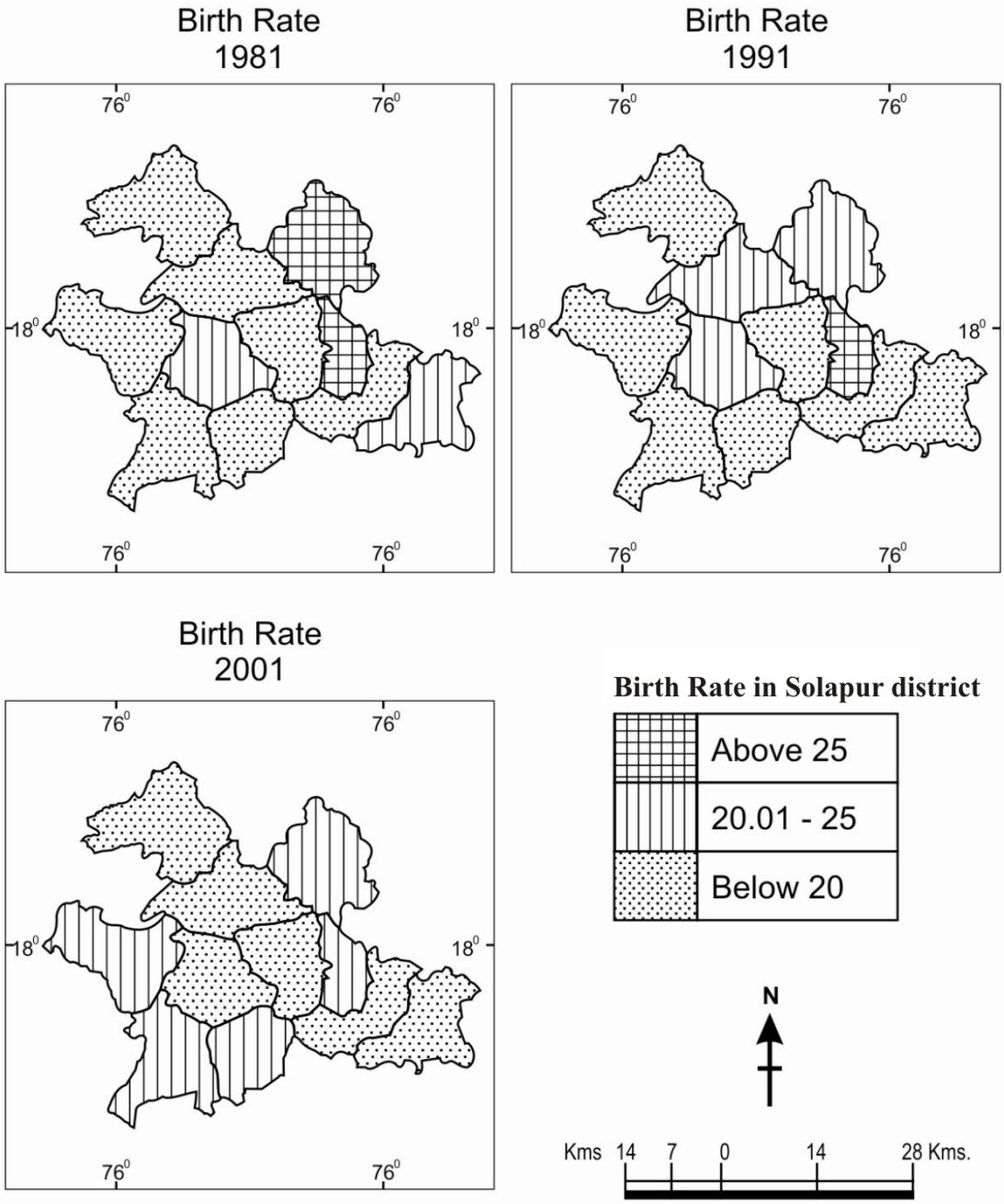


Fig. 3.3

On the other hand, the lowest birth rate was calculated for Malshiras taluka, due to entirely rural region. The number of maternity hospital and lack of other medical facilities the birth rate were recorded lower for this taluka during 1981-1991. But it increased substaintially during the 2000-01 period, the reason behind it may be, the increase in the medical facilities and number of maternity hospitals.

The average birth rate for the Solapur district was 22.61 percent in the year 1981, and Karmala, Madha, Mohol, Malshiras, Sangola, Magalwedha and South Solapur have shown, birth rates below from the district average. While, North Solapur, Barshi and Pandharpur have shown, birth rates above the district average. It clearly reveals that the urban places like Solapur, Barshi, and Pandharpur have better maternity facilities. During the 1981-1991 periods, the birth rate remains by and large the same for the district and there has been slight fluctuations, in birth rates within the district. Again, north Solapur tahsil was on the first rank and Malshiras in the last as per as the birth rates are concerned.

It is a matter of surprise, that cumulative effect made by the Government, planners, and social workers have reflected in the awaking the people in the 2000-01 period. It is clear form fact, that the birth rate for the district as a whole was as low as 20.58 percent in 2001. For the similar reasons, again, North Solapur recorded the highest birth rates. While on the other hand, South Solapur recorded lowest birth rate. Most of the people from South Solapur use the medical facilities from the Solapur city which is in close proximity. Hence, most of the birth rates are recorded from the South Solapur in the city of Solapur. The tahsils which have recorded birth rates lower than the district average are Karmala, Madha, Mohol, Pandharpur, South Solapur and Akkalkot. On the other hand, tahsil which have shown higher birth rate than the region average are North Solapur, Barshi, Malshiras, Sangola and Mangalwedha.

It might be due to wide spread, of medical facilities in different parts of the district by the government.

3.7 BIRTH RATE FOR RURAL AND URBAN AREAS:

3.7.1 Rural Birth Rate : The rural and urban pattern of birth rates are different, as the nature of living, occupation structure, literacy pattern, per capita income are also different within the two areas. India is a predominently agriculture country, where more than 70 percent people are still engaged in primary activities. Hence, the mode of life, actually differ from rural to urban areas. It is generally, expected, that the birth rates are higher in the rural areas on one hand and lower in urban areas on the other due to relatively developed society. In order to understand, the contribution male by rural and urban areas towards the growth of population in Solapur district, the birth rates were calculated for both rural as well as urban sectors for different tahsil during 1991-2001 period.(Table 3.4)

Table 3.4
Rural Urban Birth Rate (1991-2001)

Sr.	Taluka	Birth rate for rural areas		Birth rate for Urban areas	
		1991	2001	1991	2001
1	Karmala	15.22	9.95	43.69	71.23
2	Madha	18.22	13.37	38.57	55.09
3	Barshi	17.79	12.03	37.97	45.72
4	N. Solapur	9.71	5.47	37.00	25.69
5	Mohol	16.73	18.40	-	-
6	Pandharpur	12.41	11.84	42.78	43.63
7	Malshiras	4.42	23.11	-	-
8	Sangola	17.03	20.22	25.02	40.19
9	Magalwedha	23.21	15.48	24.51	43.21
10	S. Solapur	16.39	14.22	-	-
11	Akkalkot	16.40	11.76	26.31	28.54
	District Total	16.82	15.50	36.95	31.46

Source : Socio-economic abstract of Solapur district. (1991-2001)

Contrary to expectation, surprisingly, the birth rates for urban areas were found much higher than the rurals areas for 1991-2001 periods for region as a whole. If we compare the birth rate for rural areas with that of urban areas then we find, that there is a tremendous difference as regard to birth rate. For 1991, the comparison between rural and urban areas clearly indicates that for urban it is more that two times than the rural areas. In 1991, the birth rate for rural areas for district as a whole was 16.82 percent and for the urban areas it was 36.95 percent during the same period and same year. The highest birth rate for rural sector was for the Mangalwedha tahsil while the lowest was for the Malshiras tahsil. Other than this two extremes tahsils, the birth rate varies from tansil to tahsil the birth which have recorded lower birth rate than average for the region are the Karmala, North Solapur, Pandharpur, Malshiras, South Solapur and Akkalkot. On the other hand tehsils, which have shown higher birth rate, are Mangalwedha and Barshi tahsils. These fluctuations in the birth rate, for rural areas within the various talukas are due to recording of the birth rate in non-authentic way. It shows that the birth rates are not recorded properly in Solapur district. (fig 3.4)

For 2001, the average birth rate was 15.50 percent the highest for Malshiras, while the lowest for North Solapur. North Solapur tahsil is dominated by the city of Solapur and Malshiras is entirely rural tahsil in Solapur district. More or less the year 2001, also represent the same picture as 1991.

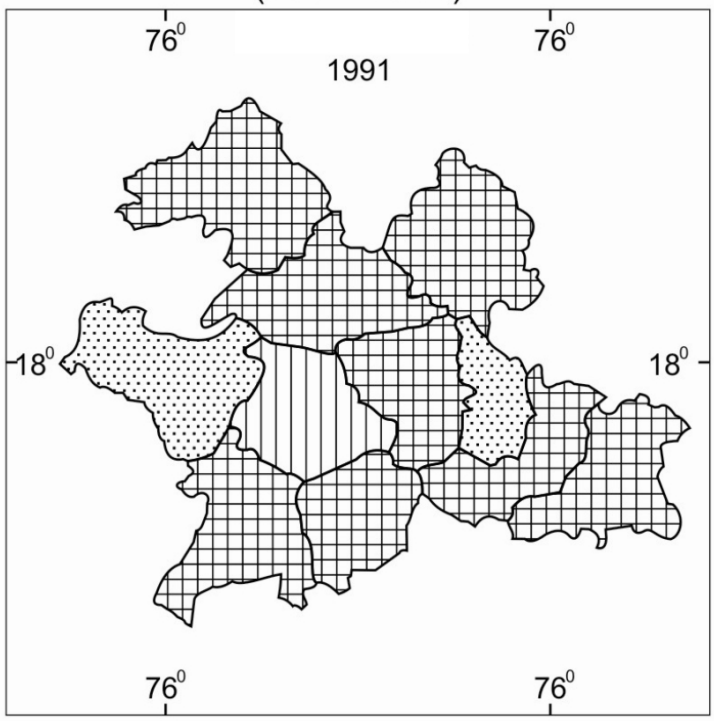
3.7.2 Urban Birth Rate:-

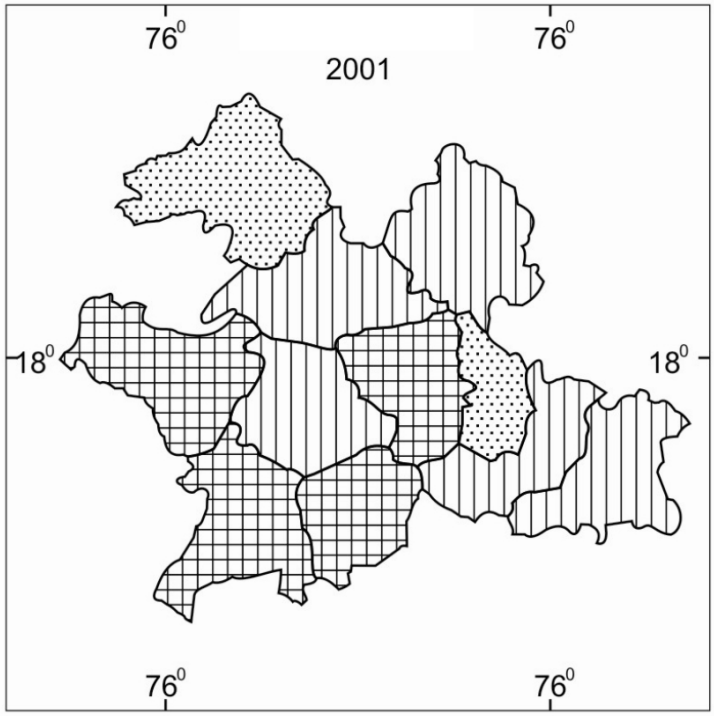
As a matter of fact, the birth rate for urban areas are lower than, the birth rate of rural areas as in general. This is, because that the urban areas have better educational, medical and employment opportunities. Apart from this, the recreational facilities, are also much more in urban areas than the rural sectors. However, it is a matter of astonishment

SOLAPUR DISTRICT

Birth Rate for Rural Areas

(1991 - 2001)





Birth Rate for Rural areas

	Above 15
	10.01 - 15
	Below 10

N

Kms 14 7 0 14 28Kms.

Fig. 3.4

that the maintenance of proper records of the birth rate is not maintained in rural sectors properly. This has resulted in against expectation, higher birth rate in all the talukas in Solapur district. In urban areas, the records of birth rate are properly maintained. (Fig 3.5)

For the year 1991, the birth rate for urban areas was calculated for Solapur district as a whole, of 36.95 percent. And it was highest for the Karmala and lowest for the Mangalwedha tehsil. The birth rate varies from tahsil to tahsil enormously in the year 1991. Pandharpur, North Solapur, Barshi, Madha and Karmala have shown birth rate much higher than the district average. On the other hand, Sangola, Maganwedha and Akkalkot have recorded much lower than the region as a whole

In the year 2001, the urban birth rate was 31.46 percent for district as a whole, the highest for the Karmala and lowest for the North Solapur. The North Solapur tehsil is predominantly occupied by the Solapur city. Taking into consideration all the dimensions of development, the birth rate is lowest for Solapur city, as it is expected. Except, Akkalkot and North Solapur tehsils, all other tahsils in the Solapur district have shown substantially higher birth rate in 2001 period.

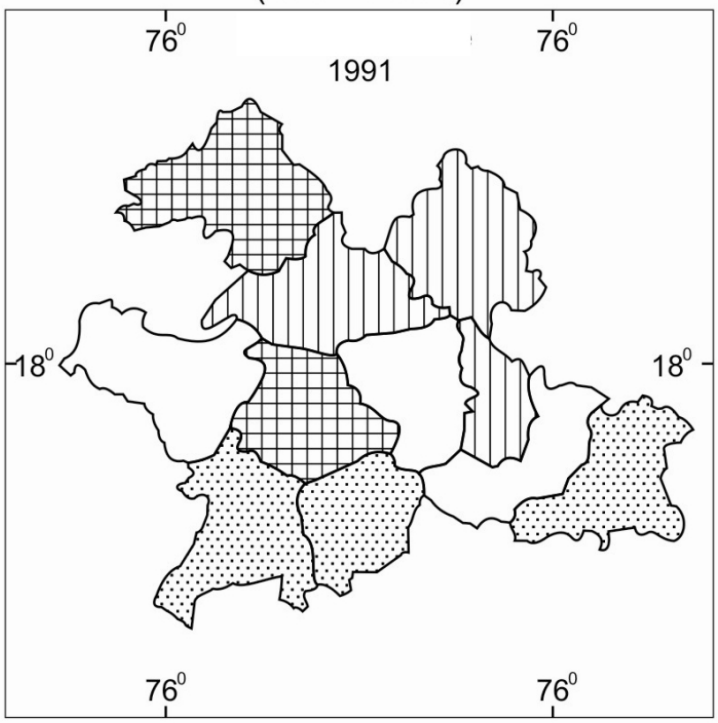
3.8 DEATH RATE IN SOLAPUR DISTRICT:-

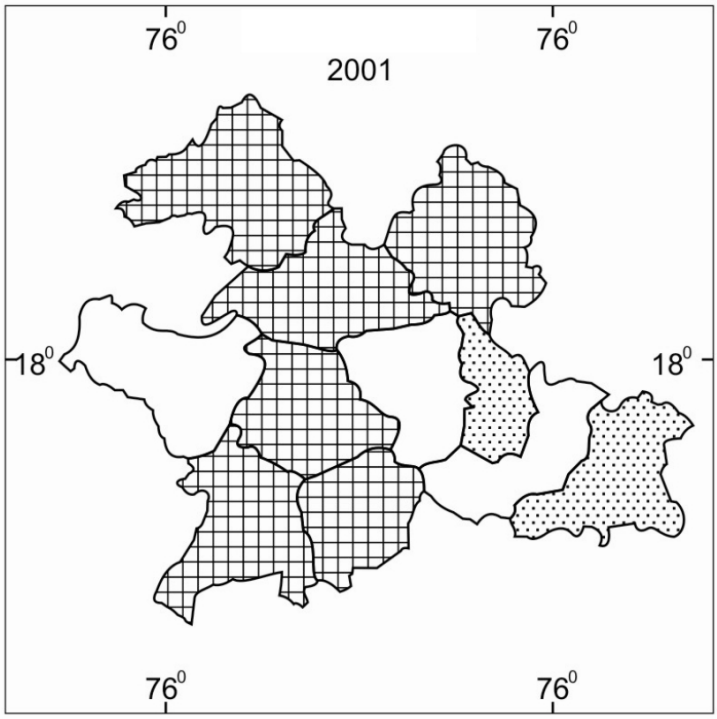
Death rate is another important factor, influencing the growth of population in a particular region. If, death rates are higher in a region, it results in the lower growth rate. If the net migrant are not taken into consideration then death rate becomes most important component in the decreasing of the growth rate of population. In view of this, an attempt has been made to understand, the impact made by death rate on the population growth. For this analysis, the death rates have been calculated per thousands of population for the year 1981, 1991 and 2001. (Table 3.5)

SOLAPUR DISTRICT

Birth Rate for Urban Areas

(1991 - 2001)





Birth Rate for Urban areas

	Above 40
	30.01 - 40
	Below 30

N

Kms 14 7 0 14 28Kms.

Fig. 3.5

Table 3.5
Taluka wise Death Rates in Solapur district.

Sr.No.	Taluka	1981	1991	2001
1	Karmala	5.27	3.19	3.68
2	Madha	5.59	4.10	4.69
3	Barshi	7.44	6.02	6.77
4	North Solapur	6.99	7.18	6.78
5	Mohol	5.88	3.98	4.31
6	Pandharpur	4.77	4.80	4.23
7	Malshiras	3.94	1.35	4.09
8	Sangola	6.11	4.09	5.04
9	Mangalwedha	5.55	8.24	4.89
10	South Solapur	6.55	4.87	5.31
11	Akkalkot	6.96	5.07	5.31
	Dist. Total	**6.22**	**5.08**	**5.35**

Source : Socio-economic abstract of Solapur district. (1981-2001)

For the district of Solapur as a whole, the death rate was calculated to 6.22 percent per thousand populations. At the same time, the death rate calculated for various tahsils for the same period. It is here, worth mentioning that the highest death rate was recorded for Barshi on one hand and lowest 3.94 percent for the Malshiras tahsil on the other. Except, four tahsils namely Barshi, North Solapur, South Solapur and Akkalkot, rest other tahsils have shown death rates lower than the district average in the year 1981.

Similarly, in the year 1991, the death rates were calculated for all the tahsils in Solapur district average was 5.08 percent for the region as a whole while, highest death rate was recorded for Mangalwedha and lowest for Malshiras tahsil. Except, North Solapur, Barshi and Mangalwedha tahsils all other tahsils have shown death rate much lower than the region average. Though, the death rate varies enormously within the region during 1991 period. (fig. 3.6)

SOLAPUR DISTRICT

Talukawise Death Rate in Solapur District
(1981 - 2001)

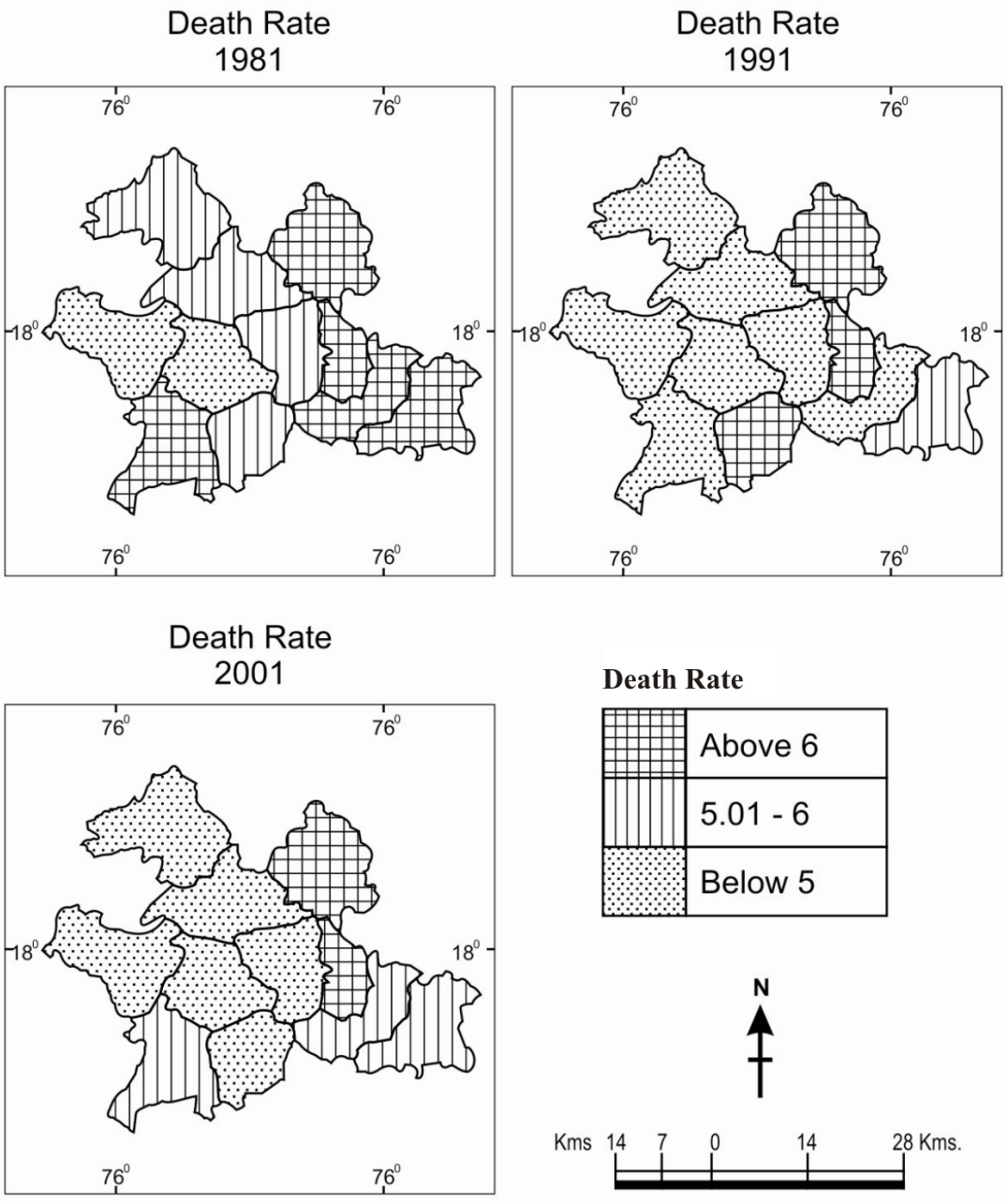


Fig. 3.6

Likewise, tahsil wise death rate also calculated for the year 2001 for all the tahsils in the Solapur district. The average death rate was found 5.35 percent for the region as a whole. In comparison to previous two decades of 1981 and 1991, the year 2001, does not show a much significant variation in death rate within various tahsils in Solapur district. The highest death rate was recorded to 6.78 percent for North Solapur tahsil and the lowest death rate of 3.68 percent was observed in Karmala Tahsils. Except, Akkalkot, North Solapur, and Barshi tahsils all the other tahsils have shown death rate much lower than the region average. The causes for this variation may be the same as mentioned earlier.

3.9 DEATH RATE FOR RURAL AND URBAN AREAS:

3.9.1 DEATH RATE FOR RURAL AREAS:

Death rates are responsible for loosing as well as for gaining the population, affecting the positive and negative growth rate. Rural as well as Urban death rates are different due to the variation in medical facilities. Urban and rural areas also vary in occupation, per capita income and illiteracy. These variation in standard of living of the people, which is responsible for good health of the people directly. For the year 1991 and 2001, the rural death rates differ enormously in the different tahsils in Solapur district. These were calculated to understand the spatial pattern of death rate, which in turn reflect the growth of population in a particularly region. For the year 1991, the average death rate for the districts as whole, was 3.88 percent per 1000 of population. Surprisingly, it increased to 24.38 percent for the year 2001 in rural areas of Solapur district. The spatial pattern of rural death rate varies enormously for the year 1991. The high death rate was for the Mangalwdha tahsil, while,

lowest for Malshiras tahsil in the south western part of the Solapur district. Tahsils, which have recorded death rate lower than the district average, are Karmala, Madha, North Solapur, Pandharpur and Malshiras. Rest, another tahsils have shown death rate higher than district average. (fig.3.7)

For the year 2001, as stated earlier, the average death for the district as a whole, was 4.38 percent per 1000 of population. The highest death rate was found in Akkalkot tahsil, while it was lowest for Karmala tahsil within district of Solapur. It also varies from one tahsil to another due to different socio-economic reasons. (Table 3.6)

Table 3.6
Taluka wise Percentage Rural Urban Death Rate
(1991-2001)

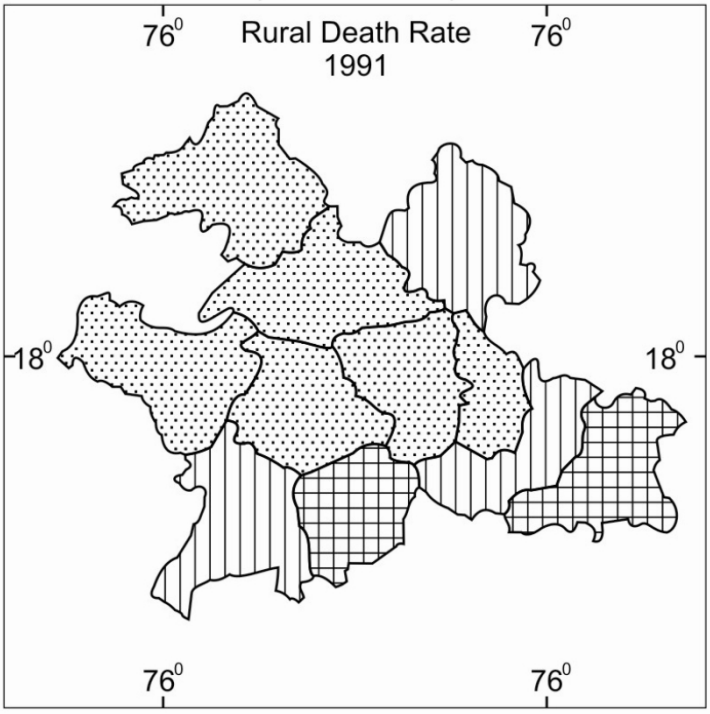
Sr.	Taluka	Death rate for rural areas		Death rate for Urban areas	
		1991	2001	1991	2001
1	Karmala	3.05	3.21	4.45	8.20
2	Madha	3.67	4.08	11.90	11.94
3	Barshi	4.95	5.18	8.58	10.34
4	N. Solapur	3.20	4.37	8.22	7.03
5	Mohol	3.98	4.31	-	-
6	Pandharpur	3.25	3.29	9.42	7.40
7	Malshiras	1.35	4.09	-	-
8	Sangola	4.18	5.07	3.21	4.80
9	Magalwedha	8.44	4.27	6.91	9.21
10	S. Solapur	4.87	5.31	-	-
11	Akkalkot	5.09	5.56	5.50	6.84
	District Total	**3.88**	**4.38**	**8.06**	**7.43**

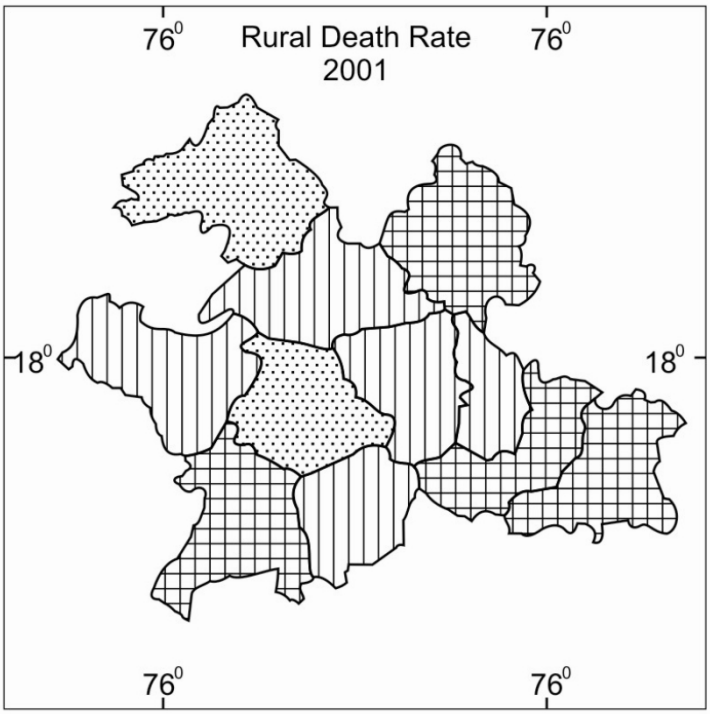
Source : Socio-economic abstract of Solapur district. (1991-2001)

SOLAPUR DISTRICT

Death Rate for Rural Areas

(1991 - 2001)





28 Kms.

Death Rate for Rural Areas

	Above 5
	4.01 - 5
	Below 4

N

Kms 14 7 0 14 28Kms.

Fig. 3.7

3.9.2 DEATH RATE FOR URBAN AREAS:

The rural urban differential for the death rate is obvious from the higher of death rate in different areas of Solapur. It is a matter of surprise, that in spite of, influencing availability of medical facilities, the death rate for urban areas has been higher subsequently, for the year 1991 and 2001. It is clear from the facts, that it was 8.06 percent in 1991 for the Solapur district as a whole. There are three tahsils namely Mohol, Malshiras and south Solapur where there are no urban settlements. The highest death rate for urban areas was recorded for Madha tahsil, while the lowest was for the Sangola tahsil. There are four tahsils, constiting of Karmala, Sangola, Mangalwedha and Akkalkot, where the death rate for urban areas was much lower than the district average. Remaining other tahsils namely Madha, Barshi, North Solapur and Pandharpur have recorded the death rate for urban area, higher than the district average. This variation may be attributed, to various social-economic and geographical reasons within the tahsils.

Similarly, the death rates for urban areas were also calculated for the year 2001. The average death rate of Solapur district as a whole was 7.43 per 1000 of population. Due to improvement in better medical facilities and secured food supply, has resulted in decline death rate in 2001. The highest death rate was recorded for Madha tahsil, while the lowest for Sangola in year 2001. There are number of tahsils which have shown death rate above the region average. These are Karmala, Madha, Barshi and Mangalwedha, while rest of tahsils in Solapur district have shown death rate below average. The causes behind this may be, deficiency in the standard of living of the people and difference in the medical facilities. (fig.3.8)

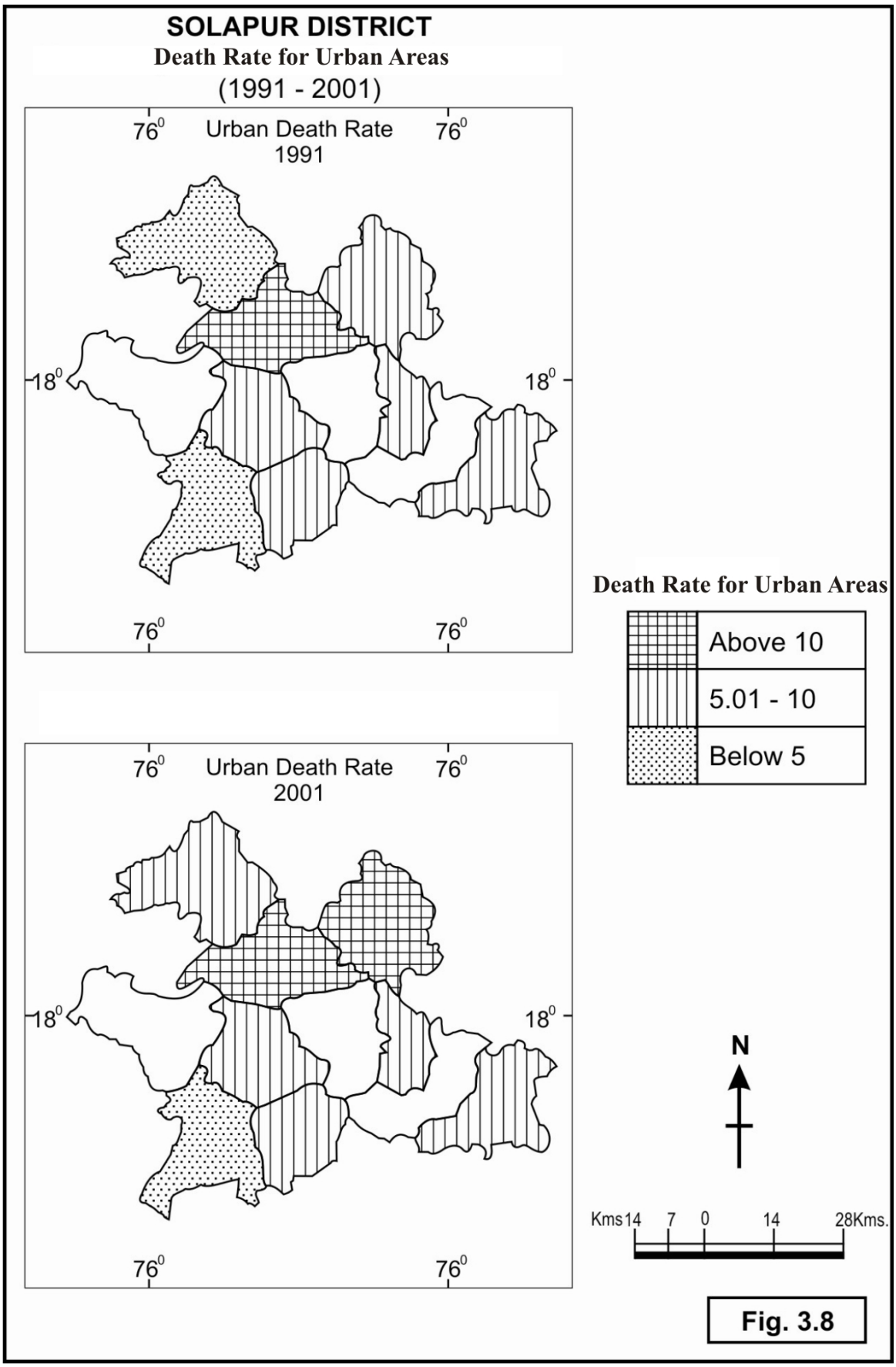

SOLAPUR DISTRICT
Death Rate for Urban Areas
(1991 - 2001)
Urban Death Rate
1991
Urban Death Rate
2001
76°
18°
Death Rate for Urban Areas
Above 10
5.01 - 10
Below 5
N
Kms 14 7 0 14 28Kms.

Fig. 3.8

3.10 INFANT MORTALITY RATE IN SOLAPUR DISTRICT :

Infant mortality rate, may be considered as an index of the developing society. In a country like India, still the priority is gave to male child. Female children are considered as a burden on the society. This is because India is a still male dominated society. The infant mortality rate which is death of children below the age of one year. In other words, the infant mortality rate is death of sucking children. This is calculated as the death of children below one year to the total death in a particular year.

The higher infant mortality rate means poor and backward society. The lower infant mortality rate, is associated with the developed rich and advance society. Because of high literacy rate, high production and high per capita income result in least differential male and female children.

The infant mortality rates have been calculated for the year 1981, 1991, 2001 for different tahsils of Solapur district. As expected, the infant mortality have declined gradually, for the last three decades. In 1981, the infant mortality rate was for the Solapur district as a whole 0.81 which declined to 0.28 in the year 2001. (Table 3.7)

Table 3.7
Taluka wise Infant Mortality Rate in Solapur district

Sr.No.	Taluka	1981	1991	2001
1	Karmala	0.60	0.21	0.07
2	Madha	0.70	0.41	0.12
3	Barshi	1.17	0.50	0.24
4	North Solapur	1.05	0.84	0.78
5	Mohol	0.73	0.17	0.09
6	Pandharpur	1.27	0.50	0.09
7	Malshiras	0.29	0.05	0.05
8	Sangola	0.58	0.18	0.08
9	Mangalwedha	0.69	0.37	0.04
10	South Solapur	0.74	0.33	0.13
11	Akkalkot	0.53	0.28	0.14
	Dist. Total	**0.81**	**0.36**	**0.28**

Source : Socio-economic abstract of Solapur district. (1981-2001)

Spatial pattern of infant mortality rate varies within the district from one tahsils to another. It was higher for Barshi tahsil, on the one hand, and lowest for Malshiras tahsils on the other. Except, three tahsils namely Pandharpur, North-Solapur and Barshi, all other tahsils have shown the infant mortality rate, below the district average.

For the year 1991 and 2001, the infant mortality rates have declined slowly to a certain extent. For the year 1991 the average infant mortality for the district was 0.36. The tahsils consist, Madha, Barshi, North Solapur, Pandharpur and Mangalwedha, have shown infant mortality rate above the region, while remaining other tahsils have shown infant mortality rate below the region average. Similarly, it may be expected the highest infant mortality rate for North Solapur tahsils while the lowest for Malshiras tahsil.

For the year 2001, the average infant mortality rate was calculated to 0.28. The highest for North Solapur and lowest for Manglwedha tahsil with slight, fluctuation, the infant mortality rate was recorded below 0.5 for almost, for all tahsils except for North Solapur. (fig. 3.9)

SOLAPUR DISTRICT

Infant Mortality Rate in Solapur District

(1981 - 2001)

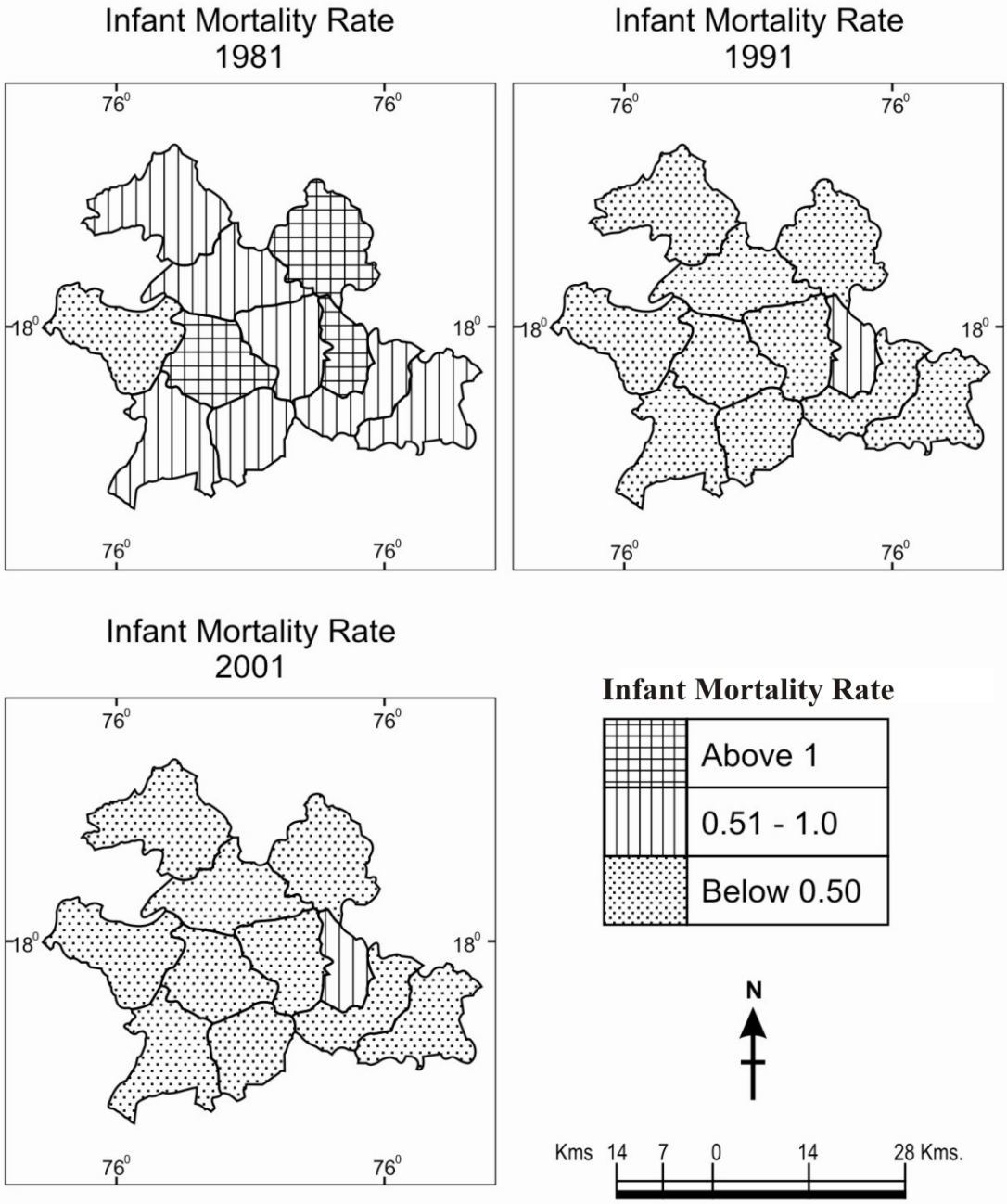


Fig. 3.9

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CHAPTER-IV

DENSITY AND DISTRIBUTION OF POPULATION

Introduction

4.1 Spatial Variation in the Density of Population within the Region

- 4.1.1 The density of population in rural areas of Solapur district.
- 4.1.2 The density of population in urban areas of Solapur district.

4.2 Regional Variations in Different Densities

- 4.2.1 Physiological density
- 4.2.2 Agricultural density
- 4.2.3 Critical density
- 4.2.4 Economic density

4.3 Distribution of Population in Solapur district

- 4.3.1 Tahsilwise percentage of total population

4.4 Percentage of Area and Population and its Cumulative Percentage

4.5 Area per Village, Number of Villages per Square kilometer and Population per Village in each Tahsil of Solapur district

CHAPTER- IV

DENSITY AND DISTRIBUTION OF POPULATION

INTRODUCTION:

The concept of distribution and density as applied to population are not identical, but are closely interrelated and hence, can be discussed simultaneously. Distribution of population is very commonly represented by two types of maps, one using dots for numbers and the other using different density categories based on ratios of number of people to area.

The dot map is very effective in representing spatial distribution pattern that cannot be clearly shown on density maps. But the dot map is not quantitative; it shows only relative degrees of crowding not expressed quantitatively.

The term density of population on the other hand; 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. However, the density of population is expressed in different ways to understand the population resource relationship. These ratios have been designated as arithmetic density, physiological density, nutrition density, agricultural density and economic density. However, most of these ratios suffer from certain, handicaps, particularly when an international comparison is sought for.

Land and people constitute two vital elements of an area. Hence, the ratio between the two is of fundamental importance in all population studies. Arithmatic density is a ratio between total population and total area and is expressed in terms of persons per square mile or kilometer of the area. The data for such a calculation are readily available for most parts of the world. Hence, such a ratio is

frequently employed by geographers and other social scientists. It reveals simple man-land relationships. However, it cannot be used as a measure of population pressure on land because it merely gives a simple quantitative relationship between man and land.

Compared to arithmetic density, physiological density is a more refined method of calculating man and land ration. It is a ratio between total population and total cultivated or cropped area. It is expressed in terms of numbers of persons per square mile of kilometer of cultivated area. Sometimes, it is also called as nutritional density. It is an attempt to reach at a better man-land relationship by excluding the uncultivated area. Such ratios are of special significance for the regions, which are primarily agricultural. However, the most serious shortcoming of such a ratio is that assumes all non-arable areas to be unproductive. Non-cultivated areas have diverse uses, which in many cases, yield considerable economic returns. Apart from that, there is an implicit assumption in such a calculation that all cultivated areas are of equal quality, which obviously is untenable.

Another measure of man-land ratio, devised quite frequently is what is known as agricultural density. In this measure only agricultural population is correlated with the total area under cultivation. It is expressed as agricultural population per square miles or kilometers of the cultivated area.

In addition to agricultural resources, land is endowed with many other economic resources, which are used by the people to earn a living. The relationship between man and land is, therefore, complex and intricate. Each one of the methods given above reveals only a particular aspect of man-land ratio.

Attempts have been made, here to present a more realistic picture of the relationship between man and land by working out an economic

density of population. Simon suggested, a more comprehensive ratio, which he has called as a general economic density. He took into account both, the idea of size of population and the index of production. Accordingly, the general economic density can be expressed as under:

Economic density (E.D.) = 100 P/p

Where 'P' is the index of population and 'p' is the index of production.

For instance, if Maharashtra in India share nine percent of countries population and contributes sixteen percent of the country's total production, the general economic density of Maharashtra would be:

E.D. of Maharashtra = 100 x 9/16 = 56.25

Economic density of Maharashtra, therefore is 56.25

Determinants of Population Distribution and Density:-

The factors which determine the pattern of population distribution and density are very complex and varied. These factors could be grouped into three broad categories.

1) Geographical factors, which include climate, landforms, soils, other physical resources and space relationships.
2) Economic and social factors, which include the attitude and the aims of the people, their economic activities and techniques and their form a social organization.
3) Demographic factors, which include the birth and death rates for various areas and the volume and nature of migration.

These factors interact in a highly complex manner and their influence upon the distribution of population is brought about by a slow process of adaptation.

1) Geographical Factors:

The pattern of population distribution is influenced by the physical conditions, such as, nature and degree of fertility of the soil, the nature of

surface, climatic conditions and spatial relations. Excessively, high or low temperature or precipitation influences the degree of soil erosion, vegetative growth and in turn, nature of economic activities, particularly agriculture, which influences pattern of population distribution. The region of difficult terrain and high altitude due to limitations put by these on nature of economic activities, have generally low population densities. Nature of soil affects use of land in an area. This has a bearing on nature of economic activities possible in the region, which affects the distribution of population. Availability of certain important economic minerals also exerts a pull on population.

2) Economic and Social Factors:-

The influence of the physical factors on distribution of population also depends on the ways of life of the people. According to James, "The significance to man of the physical features of the land is determined by culture and therefore, any change in the attitudes, objectives and technical abilities of the people inhabiting an area requires a revaluation of the significance of the land. The more complex a society becomes the less directly physical factors, influence the distribution of its population. For obvious reasons, the pattern of spatial distribution of an agricultural population is totally different from that of a population engaged primarily in non-agricultural activities. The techniques of productions are intimately related to the types of economic activities, which inturn, influence the distribution of population. The steps taken to implement social policies related to the distribution of population also depend in part upon the existing form of social organization.

3) Demographic Factors:-

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.

4.1 Variation in density of population for Solapur district:

For district as a whole and tahsil level density of population were calculated for the decadal years of 1971, 1981, 1991 and 2001. In the year 2001, the total density of population for the region as a whole was 258 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 person and became as high as 217 persons per square kilometer. This trend of density clearly reveals that during last four decades, there has been consistant 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.

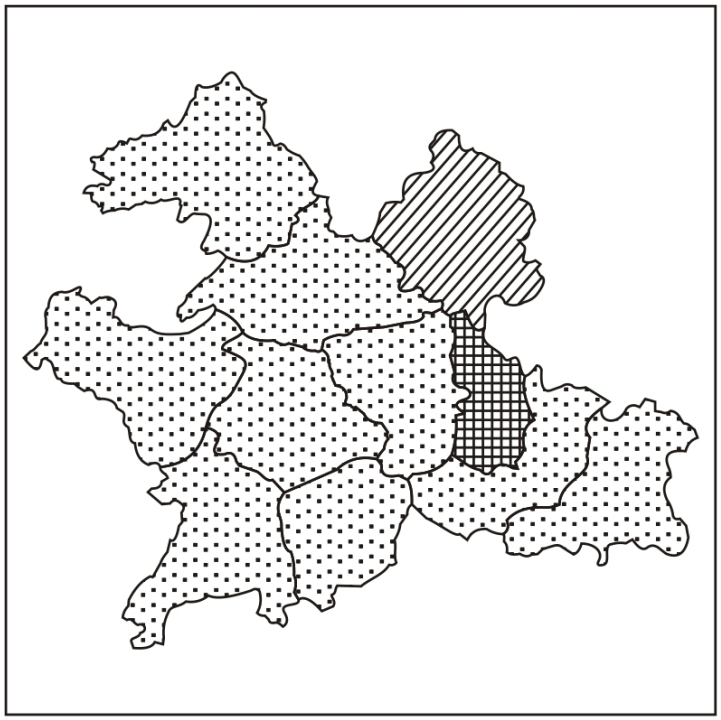
4.1.1 Spatial variations in the density of population within the region:-

The table concerned reveals, that the densities of population for various tahsils of Solapur district various enormously from one tahsil to another. In the year 1971, as expected, it was highest for the North Solapur tahsil 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 tahsil due to entirely rural tahsil in the Solapur district. The Barshi and North Solapur show higher density than the region average in the year 1971. Rest of other tahsils shows lower density than the region average.

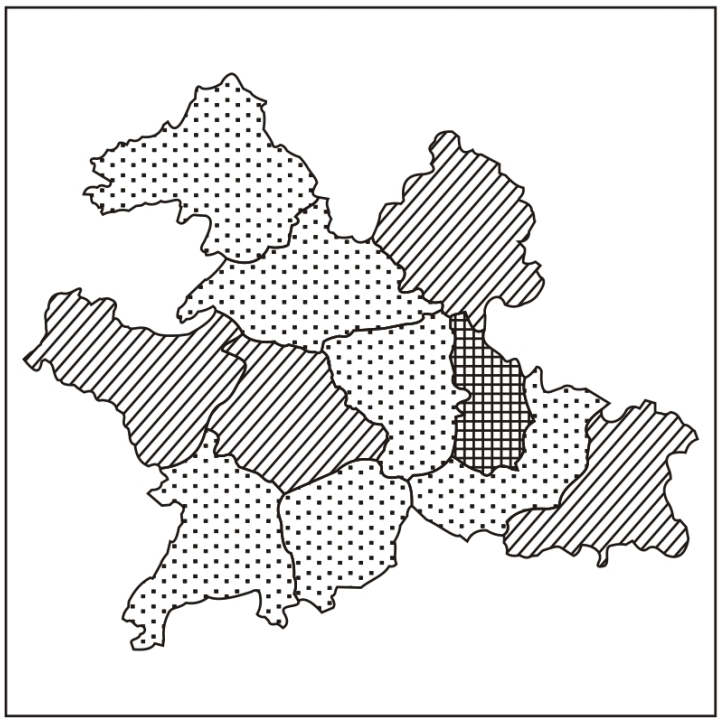
In the year 1981, the average density for region as a whole was 173 persons per square kilometer. Due to the present of Solapur city it was 825 persons for North Solapur tahsil. Besides Barshi, Pandharpur and Malshiras tahsils have also shown the density of population more than region average in the 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.

SOLAPUR DISTRICT

Density of Population (1971)



Density of Population (1981)



Persons per Sq.Km.

- Above 500
- 150 to 500
- Below 150

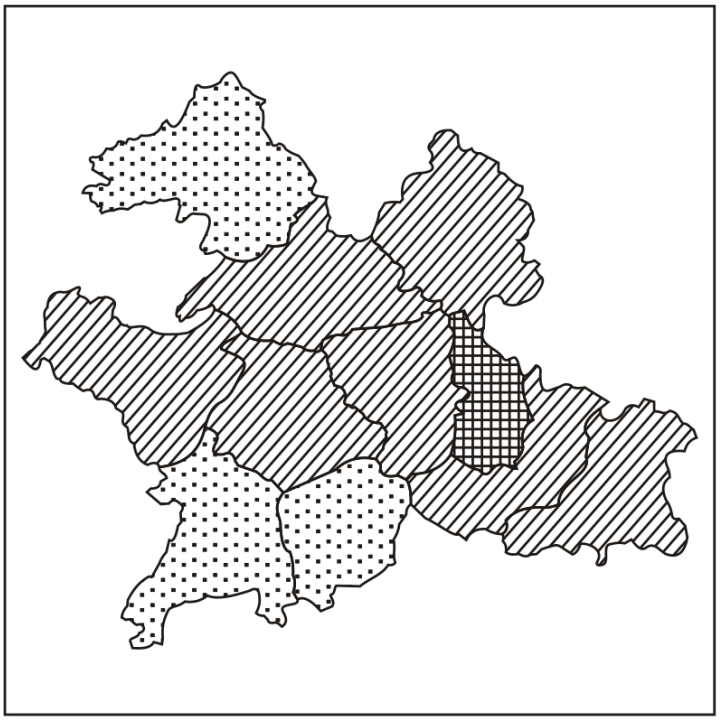
N

0 12 24 Km.

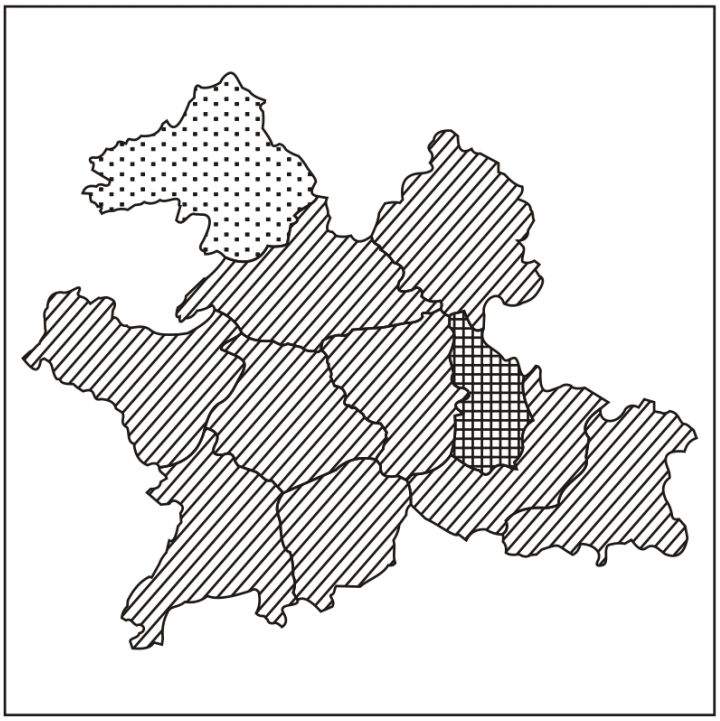
Fig. No.4.1

SOLAPUR DISTRICT

Density of Population (1991)



Density of Population (2001)



Persons per Sq.Km.

- Above 500
- 150 to 500
- Below 150

N

0 12 24 Km.

Fig. No.4.2

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 4.1

Tahsilwise Density of Population for Solapur district (1971-2001)

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

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. 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.

4.1.2 The density of population in rural areas of Solapur district (1971-2001):-

In order to understand, the densities of rural population for the region under study as well as for different tahsils, for the last four decades have been represented in the table 4.2 for different tahsils.

Table 4.2

Tahsilwise rural density of population in Solapur district (1971-2001)

Sr. No.	Tahsil	Density of Population (Sq.Km.)			
		1971	1981	1991	2001
1.	Karmala	87	94	111	134
2.	Madha	117	122	149	175
3.	Barshi	126	118	137	163
4.	North Solapur	124	151	196	124
5.	Mohol	101	119	153	179
6.	Pandharpur	104	134	185	241

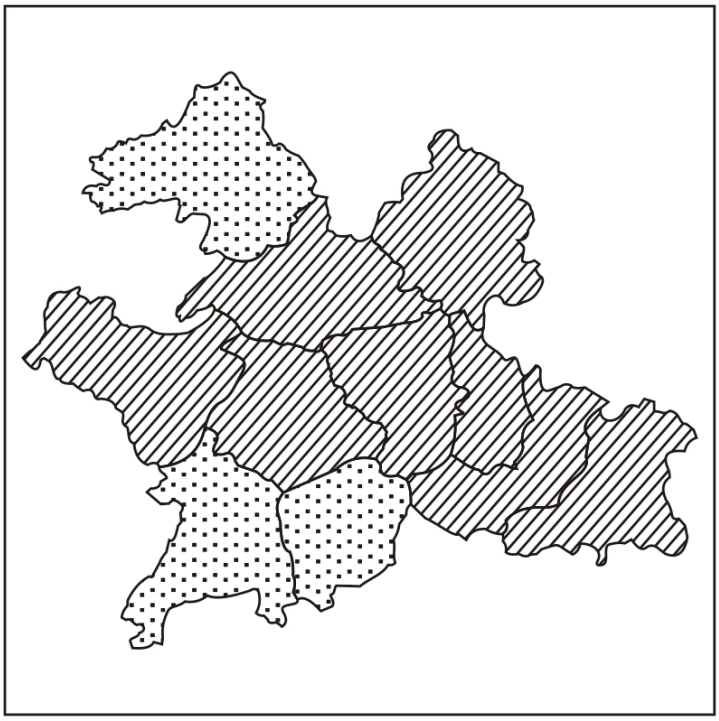
7.	Malshiras	149	175	218	278
8.	Sangola	96	110	141	165
9.	Mangalwedha	94	88	113	151
10.	South Solapur	112	124	155	176
11.	Akkalkot	121	119	146	165
	District Total	**112**	**123**	**156**	**180**

The rural density of population for the year 1971, was 112 persons per square kilometer, which is much lower than the total density of the region as a whole. The lowest rural density was observed for the Karmala tahsil, while the highest for the Malshiras tahsil. There are wide variations in the density of population within the tahsil of the Solapur district, which ranges 87 for Karmala, and 149 for Malshiras in the year 1971. There are five tahsils within the Solapur district consisting of Mangalwedha, Sangola, Pandharpur, Mohol and Karmala, representing much lower density than the average for the district as a whole. While rest of other six tahsils, have rural density of population above the region as a whole.

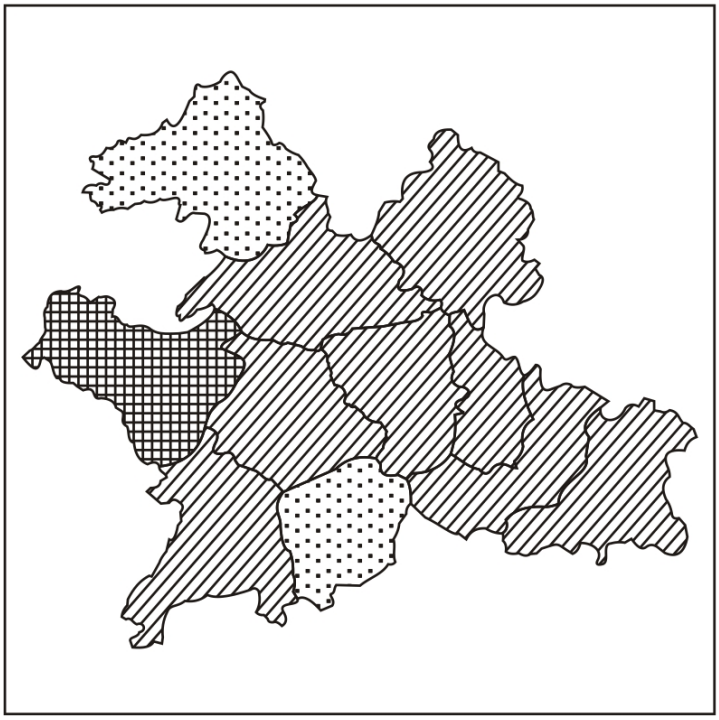
In the year 1981, the rural density of population for region as a whole, was 123 persons per square kilometer. More or less, the similar pattern as was for the year 1971 was also found for the spatial variation in the rural density of population in 1981. It was highest of 175 for Malshiras tahsil and lowest of 94 for Mangalwedha tahsils. In the year 1981, seven tahsils consisting of Karmala, Madha, Barshi, Mohol, Sangola, Mangalwedha and Akkalkot have shown rural density of population below the region as a whole. On the other hand, remaining tahsils consist of North Solapur, Pandharpur, Malshiras and South Solapur have shown rural density above the region as a whole.

SOLAPUR DISTRICT

Rural Density of Population (1971)



Rural Density of Population (1981)



Persons per Sq.Km.

- Above 150
- 100 to 150
- Below 100

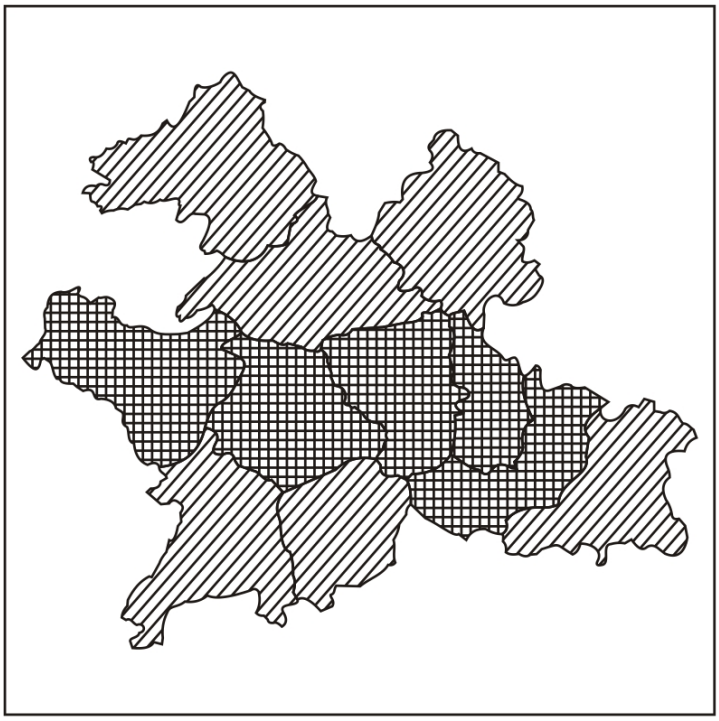
N

0 12 24 Km.

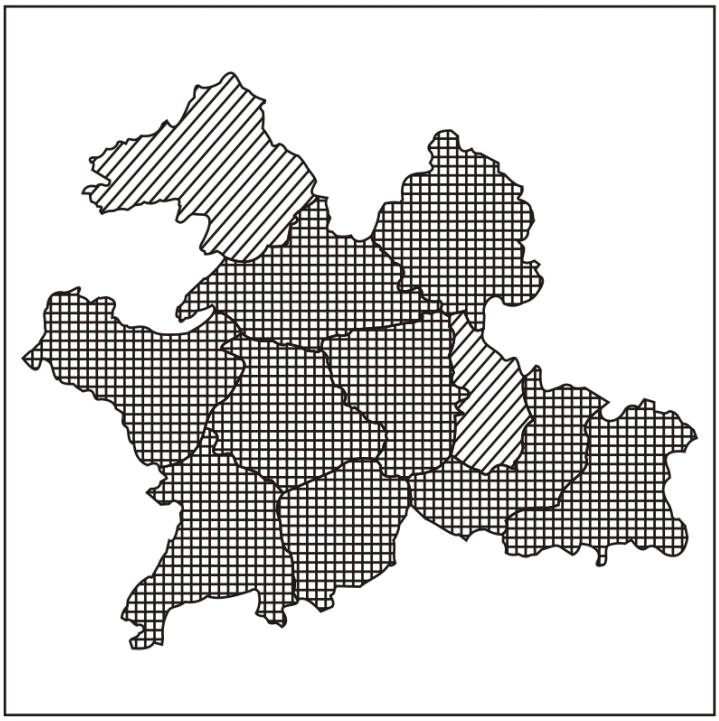
Fig. No.4.3

SOLAPUR DISTRICT

Rural Density of Population (1991)



Rural Density of Population (2001)



Persons per Sq.Km.

- Above 150
- 100 to 150
- Below 100

N

0 12 24 Km.

Fig. No.4.4

In the year 1991, the rural density of population for the region as a whole was 156 persons per square kilometer as against 217 persons for the total density of population. This shows that there is much increase in density of rural population during the last two decades. Further, rural density is highest for Malshiras tahsil, while the lowest for the Karmala tahsil in the year 1991. The agricultural prosperity and other economic alied economic activities are responsible for the high rural density of population for different tahsils of the Solapur district. However, there are wide variations in rural density of population within the various tahsils of Solapur district. Seven tahsils show higher rural density, while rest of four tahsils show lower rural density than the region as a whole.

For the year 2001, the rural density of population is 180 persons per square kilometer, while it was 156 persons per square kilometer in 1991. By and large similar trend was also observed for the year 2001, highest being for Malshiras and lowest for the Karmala. The reasons behind it are the higher geographical area for Karmala and lower development of secondary and tertiary sectors. Here, for Malshiras tahsil, the reasons for higher rural density are attributed to entire rural population of Malshiras tahsils is treated, inspite of more than one lakh population of Akluj. Since, it is divided into several gramphanchayats. It is a matter of surprised except Malshiras and Pandharpur, all other tahsils of Solapur district have shown the lower rural density of population than region as a whole. (fig. 4.2)

4.1.3 Urban Density of Population for Solapur district (1971-2001):-

Further, an attempt has been made to understand variations in the urban density for region as a whole, as well as for different tahsils, during the last four decades. The urban density for district as a whole was 1767, which was much higher than the rural and total density of population. It

has increased consistently due to various social and economic activities and became 2200 in the year 1981, and further increased to 2664 persons per square kilometer for the year 1991. Rapid industrialization and consequent urbanization has reflected in the high urban density of population in 2001, when it increased to 3512 persons per square kilometer. During the period 1971-2001, urban population has doubled for the district as a whole.

Table No. 4.3

Tahsilwise urban density of population in Solapur district (1971-2001)

Sr. No.	Tahsil	Density of Population (Sq.Km.)			
		1971	**1981**	**1991**	**2001**
1.	Karmala	2964	3529	4118	4626
2.	Madha	2977	3259	3598	3796
3.	Barshi	1720	1999	2449	2887
4.	North Solapur	13918	14710	18751	24716
5.	Mohol	-	-	-	-
6.	Pandharpur	4462	5378	6675	7552
7.	Malshiras	-	-	-	-
8.	Sangola	1594	2122	2979	4016
9.	Mangalwedha	1630	1852	1982	2042
10.	South Solapur	-	-	-	-
11.	Akkalkot	1050	6029	7361	9271
	District Total	**1767**	**2200**	**2664**	**3512**

Similarly, urban density of population has been calculated for different tahsils of the district, for the same period. At the very outset, it should be mentioned that three tahsils namely Mohol, Malshiras and

south Solapur have no urban settlement throughout the period, under consideration. Hence, no urban population was found in such tahsils. This has resulted, in the nil urban density of population for the period concerned.

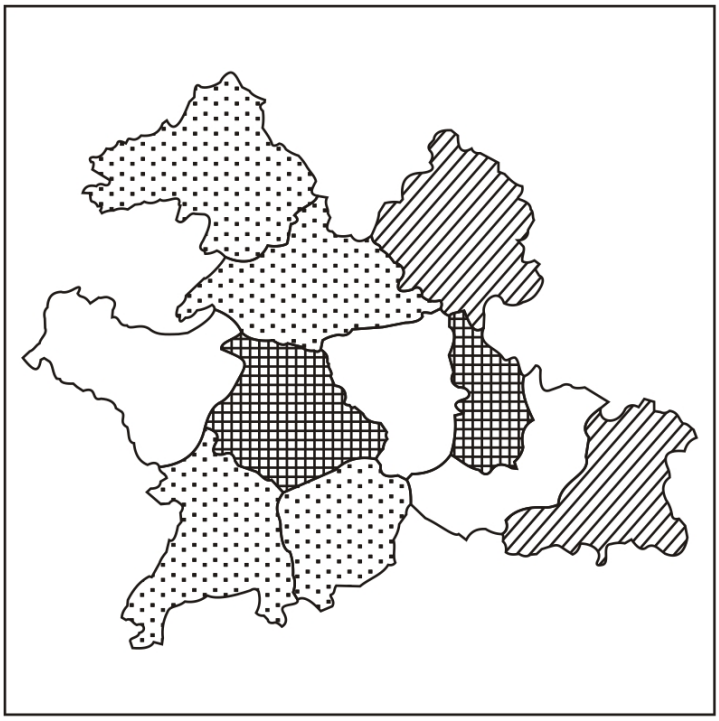
In the year 1971, among the various tahsils of Solapur district, North Solapur tahsils occupies the first position as regard to urban density of population while it is followed by Pandharpur and Barshi on the one hand, and the lowest urban density was recorded for Mangalwedha and followed by Sangola and Madha tahsil on the other. North Solapur and Pandharpur are only two tahsils having urban density of population above the region average, while rest of tahsils fall as regard to urban density below the region average. There are wide variations as regard to urban density within the different tahsils of Solapur district ranging between 1594 for Sangola and 24716 for North Solapur. These variations in the density of urban population varies due to the presence of Solapur city in North Solapur tahsil and low degree of industrialization and concequent urbanization in tahsils like Sangola and Mangalwedha.

For the year 1991, similar trend was observed, highest for the North Solapur tahsil as for as urban density of population is concerned, while lowest for the Mangalwedha tahsil. Apart from North Solapur, there are two tahsils namely Pandharpur and Akkalkot, where urban density of population is more than average for the region under study.

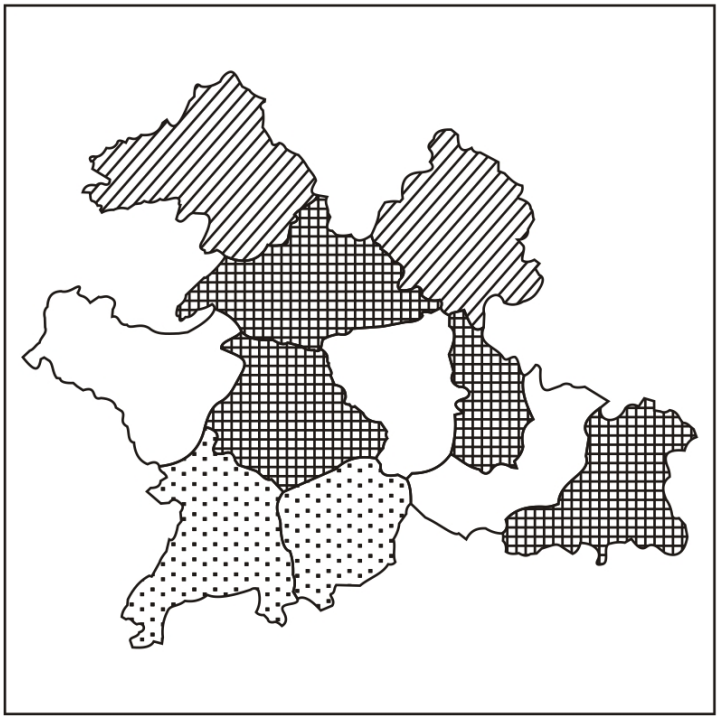
For the year 2001, the average urban density of the region was 3512, which was doubled during the last four decades. The density of urban population varies within the region from 2042 in Mangalwedha and 24716 for North Solapur tahsil. Madha, Barshi and Mangalwedha tahsil represents low urban density than the region as a whole. Due to low degree of urbanization in such region while rest other tahsils have density of urban population much higher than district as a whole.

SOLAPUR DISTRICT

Urban Density of Population (1971)



Urban Density of Population (1981)



Persons per Sq.Km.

- Above 2000
- 500 - 2000
- Below 500

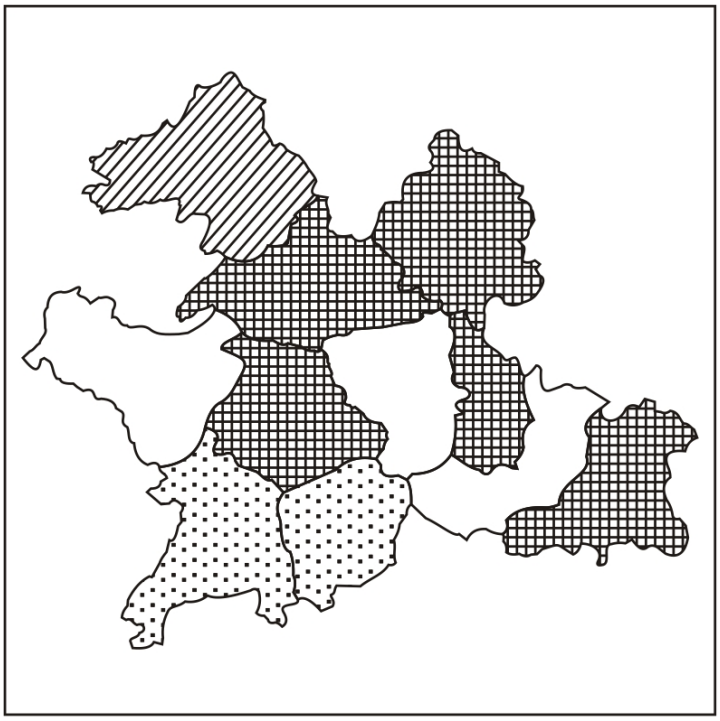
N

0 12 24 Km.

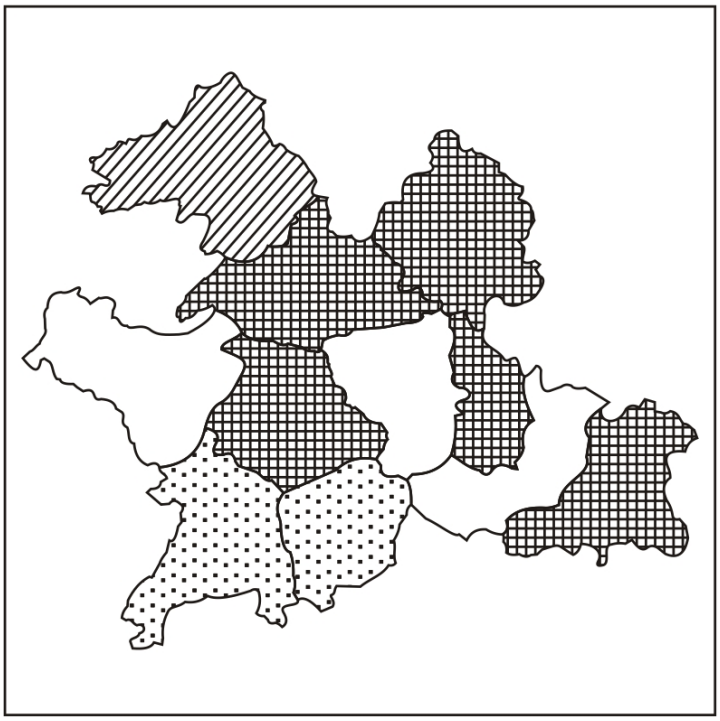
Fig. No.4.5

SOLAPUR DISTRICT

Urban Density of Population (1991)



Urban Density of Population (2001)



Persons per Sq.Km.

- Above 2000
- 500 - 2000
- Below 500

N

0 12 24 Km.

Fig. No.4.6

4.2 Regional Variations in Physiological Density :

The simple density of population which is also known as arthmatic density gives a simple quantitative relationship between man and land, many times it does not give correct impression regarding pressure of population on land. Different ratios have been used to represent it in clearer manner. One such ratio is a physiological density, which is ratio between total population of the region and the total cultivated or cropped area of the region.

4.2.1 Physiological Density:-

The physiological density is also known as nutritional density, which is high for industrialized and urbanized region of North Solapur tahsils, while lowest for the Karmala tahsil. There are six tahsils consisting of Karmala, Madha, Mohol, Mangalwedha, South Solapur and Akkalkot having lower physiological density than the region as a whole. While rest of five tahsils consisting of Barshi, North Solapur, Pandharpur, Malshiras and Sangola, have recorded higher physiological density than the region as a whole. The physiological density represents the relationship between man and actual cultivated area, this shows that the low physiological density have much cultivated area per person. While higher the physiological density, lower is the cropped area per person in the district of Solapur.

4.2.2 Agricultural Density:

Another interesting ratio between man and land, which gives clearer picture regarding pressure of population on land is agricultural density. In Solapur district, the region under study, the population, though largely depend on agriculture but does not depend entirely on agriculture. The working population has been grouped into various primary, secondary and tertiary workers. Of these the primary workers particularly engaged in cultivation and agricultural laboures or the workers concerned

in agricultural activity, since they are entirely depend on agriculture. The sum of these two types of workers is taken as an agricultural population of the region. The ratio of agricultural population thus, and area under agriculture is called as agricultural density. This gives a clearer and relative realistic picture of the pressure of population on land. For the year 2001, the average agricultural density for a region as a whole was calculated 100 g. The North Solapur tahsil represents the highest value of agricultural density due to relatively low percentage of people engaged in the cultivation. The regions which show higher agricultural density than the region average are Akkalkot, South Solapur, Mangalwedha, Mohol and North Solapur. This clearly shows that in such tahsils, the ratio between man and land is higher due to enough availability of land for agriculture. Besides, the region showing lower agricultural density than the region average, where the proportion of the agricultural land due to physical constraint is relatively low, such tahsils are namely Sangola, Malshiras, Pandharpur, Barhsi, Madha and Karmala. In such regions, the proportion of waste land and in other category of land, which is not suitable for cultivation, is higher. Hence the ratio of agricultural land is lower than the district average.

Table 4.4

Different types of densities in Solapur district 2001.

Sr. No.	Tahsil	Physiological Density	Agricultural Density	Critical Density	Economic Density
1.	Karmala	214	769	4.19	4.36
2.	Madha	269	828	6.18	4.90
3.	Barshi	812	973	0.80	4.24
4.	North Solapur	2160	1588	1.17	4.48
5.	Mohol	257	1101	24.27	4.71

6.	Pandharpur	436	953	20.40	4.51
7.	Malshiras	463	807	8.54	4.30
8.	Sangola	342	821	8.10	4.35
9.	Mangalwedha	221	1098	27.98	3.84
10.	South Solapur	254	1123	14.56	3.93
11.	Akkalkot	295	1079	3.39	4.06
	District Total	**309**	**1009**	**10.87**	**4.33**

4.2.3 Critical Density:

Critical density has also been calculated for year 2001 with the help of following formula:

C.D. = 100 (C/F) x A/L

C = Cultivated Area

F = Fallow land

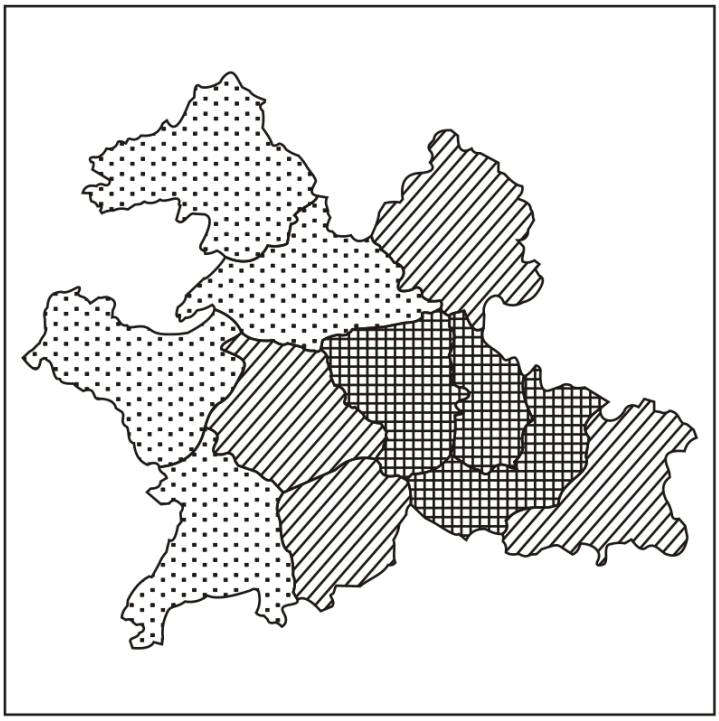
A = Per capita planted acreage

L = Percentage of cultivable land

The critical density is another method to understand man land ratio. The ratio between cultivated area and fallow land on the one hand and per capita planted acreage and percentage of cultivable land on the other. From the values calculated for different tahsils we get an idea of the critical density. For the district as a whole the critical density was 10.87. It was found higher for the Mangalwedha region in the south of the district and followed by Mohol and Pandharpur tahsil. Apart from these tahsil the south Solapur also depict higher critical density than the region average, while rest of other tahsils have much lower critical density than the region average. Due to various socio-economic reasons, it was lowest for Barshi and North Solapur tahsil. It may be due to the higher percentage of people belonging to urban sectors. Akkalkot, Malshras and Sangola tahsils along with the Karmala and Madha have much lower critical density than the region as a whole.

SOLAPUR DISTRICT

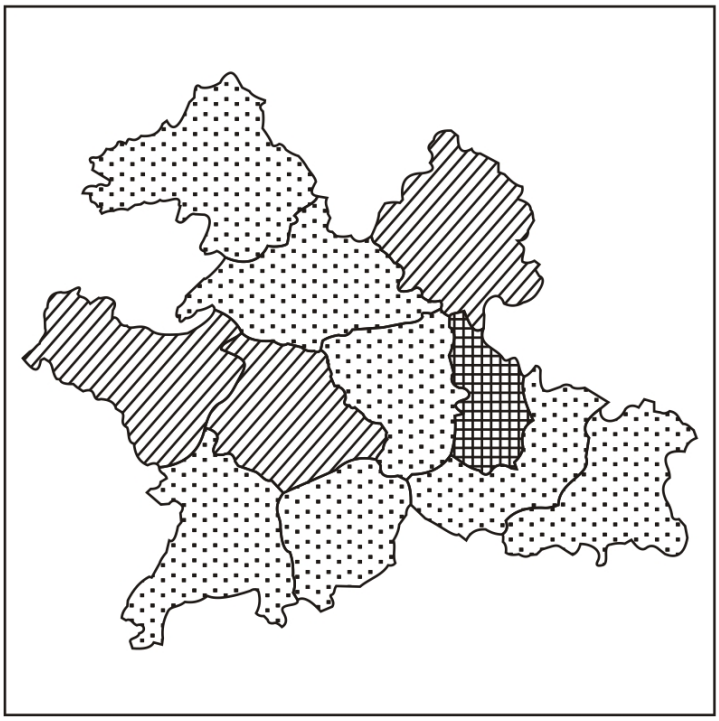
Agricultural Density (2001)



Agricultural Population per Sq.Km.

- Above 1100
- 900 - 1100
- Below 900

Physiological Density (2001)



Persons per Sq.Km.

- Above 1000
- 400 - 1000
- Below 400

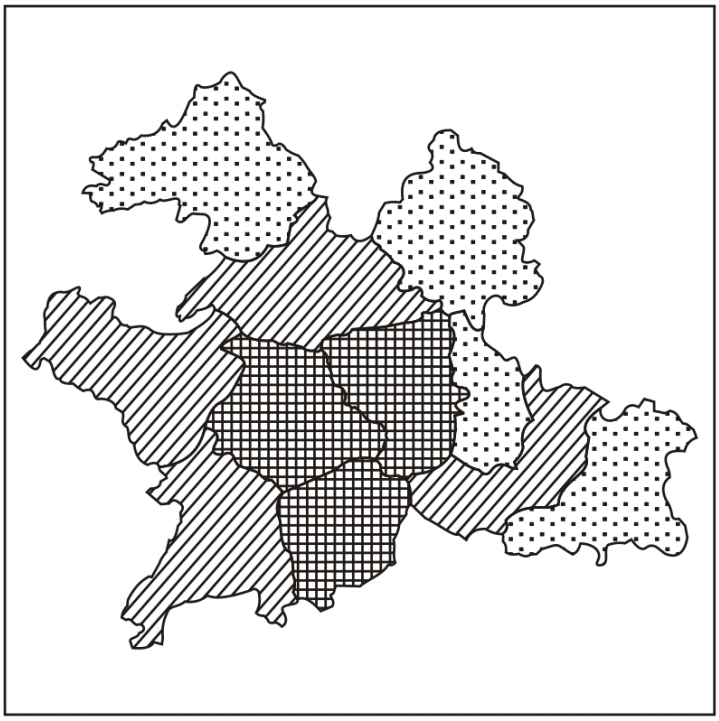
N

0 12 24 Km.

Fig. No.4.7

SOLAPUR DISTRICT

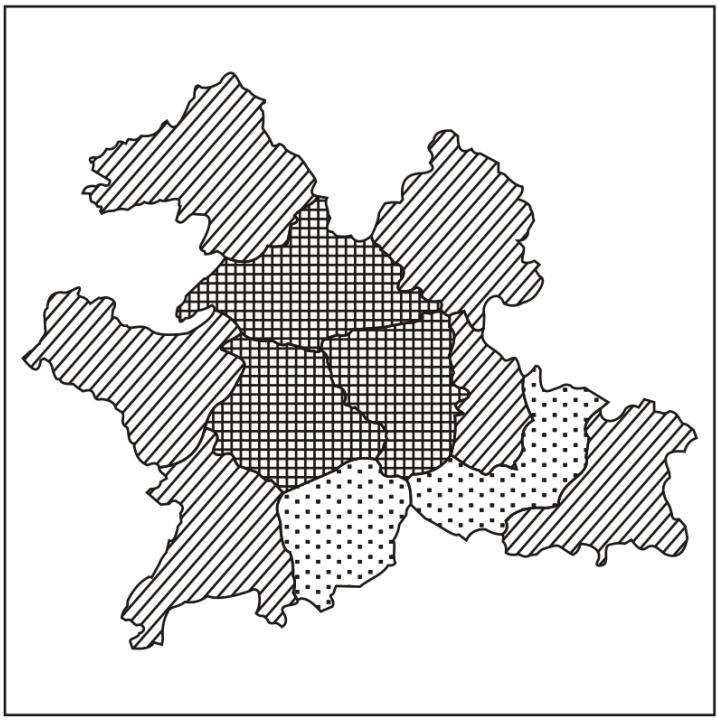
Critical Density (2001)



Persons per Sq.Km.

- Above - 20
- 5.1 - 19.9
- Below - 5

Economic Density (2001)



Persons per Sq.Km.

- Above - 4.5
- 4.1 - 4.4
- Below 4.0

N

0 12 24 Km.

Fig. No.4.8

4.2.4 Economic Density:

Each one of the various methods given above reveals only particular aspects of man-land ratio. The relationship between man and land however, is very complex. This shows because in addition to agricultural resources, the region under study is endowed, with many other economic resources, which are used by the people to earn living for the day to life. Here, an attempt has been made to present a more realistic picture of the relationship between man and economic production by working out the total resources and peoples which is known as economic density.

This more comprehensive ratio called a general economic density has been suggested by Simon. He took into account both the index of soil and population, and index of production. Thus economic density can be expressed as under:

economic density = 100 x P/p

where, P- is an index of population and p is an index of production.

When this method was applied to different tahsils of Solapur district, there emerged a central belt running in the heart of the Solapur district consisting of the tahsil Madha, Pandharpur and Mohol, where it has the economic density more than 4.5. It means that in such tahsils, the indices of population are high in relation to indices of production. And several tahsils in the peripheral of the Solapur district consisting of Akkalkot, Barshi, Karmala, Malshiras and Sangola as well as North Solapur tahsils, where indices of population were lower in relation to indices of production and of an intermediate. The third category represented by the Mangalwedha and South Solapur tahsil, where the value of economic density was lowest. It may be concluded that the degree of industrialization and other allied secondary activities do not permit to high indices of production. The higher economic density means the overall exploitation of the natural resources in relation to population

in that particular region. Lower the economic density, poor is the exploitation of natural resources by the people and high economic density means the maximum utilization of resources in such concerned region. (fig. 4.4)

4.3 Distribution of Population In Solapur District:

In Solapur district, where according 2001 census, 4.25 percent of the people live of the state of Maharashtra. There is close correlation between relief, usability of land, patterns of transportation network, nature of economic activities and spatial distribution of population. Due to the impact of relief, the population is very thin along the hilly regions and along the foothills of Solapur district. While the valleyes of the major river like Bhima, Nira, Bhogavati and Maan, have relatively thicker population. The usability of land, which inturn influence by the nature of relief has enhanced this pattern further.

Table 4.5

Distribution of Population in Solapur district (1971-2001)

Sr. No.	Tahsil	1971	1981	1991	2001
1.	Karmala	151493	165714	194600	233316
2.	Madha	192710	207550	250176	292611
3.	Barshi	262716	276757	302158	340831
4.	North Solapur	487134	615608	784361	960803
5.	Mohol	142334	158630	202900	252526
6.	Pandharpur	187613	237680	317348	402707
7.	Malshiras	226480	282300	350346	422600
8.	Sangola	155516	182063	230246	272077
9.	Mangalwedha	107823	117301	148893	171261
10.	South Solapur	133343	151031	187157	210774
11.	Akkalkot	206678	205510	262872	290037
	District Total	**2253840**	**2610144**	**3231057**	**3849543**

Table 4.6

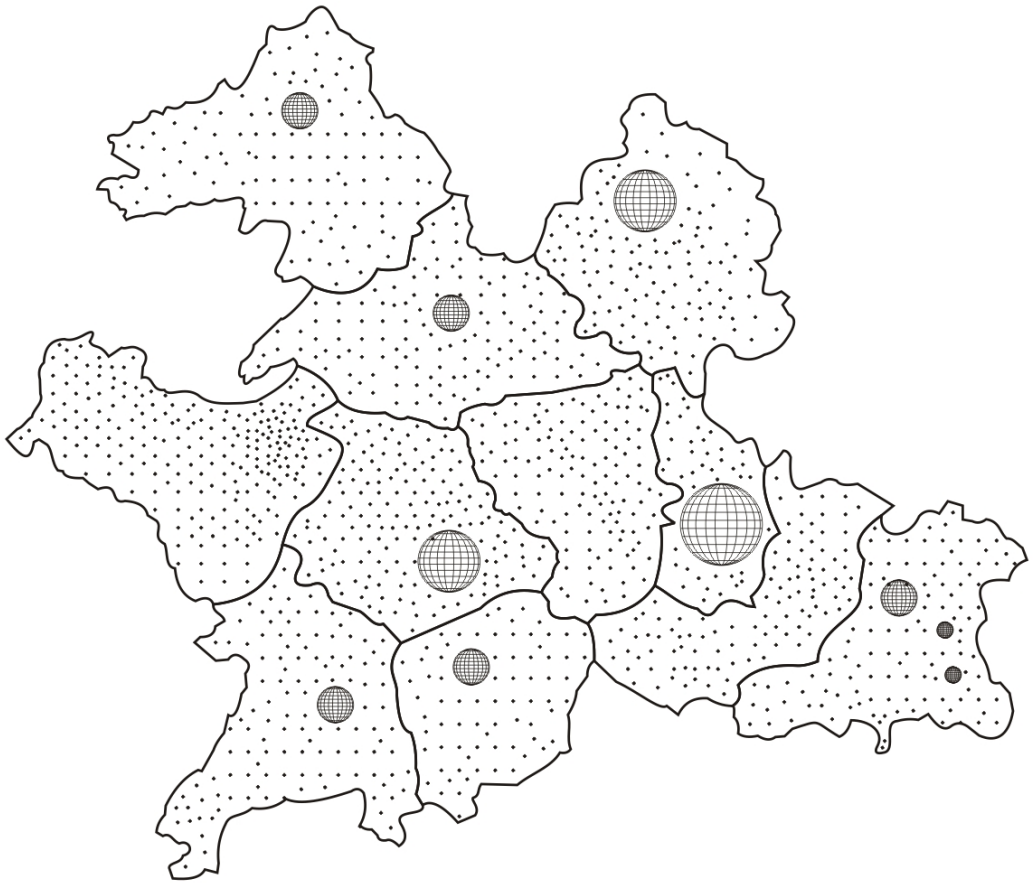
Percentage of Population of the district in each Tahsils (1971-2001)

Sr. No.	Tahsil	1971	1981	1991	2001
1.	Karmala	6.72	6.35	6.02	6.06
2.	Madha	8.55	7.95	7.74	7.60
3.	Barshi	11.66	10.60	9.35	8.85
4.	North Solapur	21.61	23.59	24.28	24.66
5.	Mohol	6.31	6.08	6.28	6.56
6.	Pandharpur	8.32	9.11	9.82	10.86
7.	Malshiras	10.05	10.82	10.84	10.90
8.	Sangola	6.91	6.98	7.13	7.07
9.	Mangalwedha	4.78	4.86	4.61	4.45
10.	South Solapur	5.92	5.79	5.79	5.48
11.	Akkalkot	9.17	7.87	8.14	7.53
	District Total	**100**	**100**	**100**	**100**

The impact of industrialization and consequent of urbanization on the distribution of population clearly reveals, so that the urbanized area like North Solapur tahsil, Barshi, Pandharpur and Akkalkot have much thick population. It shows that the distribution of population is directly influenced by the accessibility and the pattern of transportation network. The railway line passing through Solapur, Akkalkot, Mohol towards Bijapur and Chennai on the one hand and Kurduwadi towards Mumbai on the other, is responsible for the highly thick population in Solapur district. Similarly, along the national highway number nine and national highway number thirteen going to Pune-Solapur-Hyderabad and second Solapur-Bijapur have much thicker population in the district of Solapur. (fig.3.5)

SOLAPUR DISTRICT

Population Distribution (2001)



INDEX
Distribution Population in Thousand

- 872 Thousand
- Above 50
- 25 - 50
- Below 25
- One dot represents 2000 of rural population

N

0 12 24 Km.

Fig. No.4.9

4.3.1 Tahsilwise percentage of total population (1971-2001)

The nature of distribution of population in Solapur district has been studied with the help of location quotients. The table 3.6 represents the location quotients for the year 1981 and 2001 for the district as a whole as well as for each tahsil. The highest value of location quotient is for North Solapur tahsil. Which is highly urbanized represent values of 4.72 for the year 1981 and 4.99 for the year 2001. It shows, that there is high concentration of population is found in North Solapur tahsil for the last two decades. On the other hand, the Karmala tahsil represent minimum lowest values of location quotients, shows the extent of low concentration of population. During two last decades the values varies from tahsil to tahsil depending upon the economic activities. The higher values of location quotients concentrate the high degree of economic activities and lower the values of location quotients, represent the least concentration of economic activities in such tahsils.

Table 4.7

Location quotients for Solapur district for 1981 and 2001

Sr. No.	Tahsil	% of Population in each tahsil 1981	% of Population in each tahsil 2001	% of area to total area of the district	Location quotient 1981	Location quotient 2001	Difference between 1981-2001
1.	Karmala	6.35	6.06	10.80	0.59	0.56	-0.03
2.	Madha	7.95	7.60	10.36	0.77	0.73	-0.04
3.	Barshi	10.60	8.85	9.96	1.06	0.89	-0.17
4.	N. Solapur	23.58	24.96	5.00	4.72	4.99	0.27
5.	Mohol	6.08	6.56	9.45	0.64	0.69	0.05
6.	Pandharpur	9.50	10.46	8.75	1.04	1.20	0.16
7.	Malshiras	10.81	10.98	10.22	1.06	1.07	0.01
8.	Sangola	6.98	7.07	10.41	0.67	0.68	0.01

9.	Mangalwedha	4.49	4.51	7.71	0.59	0.58	-0.01
10.	S. Solapur	5.79	5.48	8.02	0.72	0.68	-0.04
11.	Akkalkot	7.87	7.47	9.32	0.84	0.81	-0.03
	District Total	**100**	**100**	**100**	**1.15**	**1.17**	**0.02**

4.4 Percentage of Area and Population and Its Cumulative Percentage:

The table 4.7 indicates the percentage of population in each tahsil of the district total. Similarly the percentage of area shared by each tahsil of the total district is represented for the year 2001. Accordingly, the percentage of cumulative population and percentage of cumulative area also is represented in the same period. In order to understand, the relationship between the percentage of area and the population, a lornze curve has been prepared by taking the percentage of cumulative area on the 'x' axis and percentage of cumulative population on 'y' axis, the graph (fig. 4.10) clearly indicates that in the district of Solapur 5 percent of area possess almost 25 percent population of the district. On the contrary, fifteen percent area contains 36 percent of population. Besides, almost 25 percent of area of district contain almost 50 percent of population contain of the district. And almost 50 percent population has above 75 percent of area. Apart from this, almost 75 percent area has 85 percent of population.

This shows that the cumulative of each tahsil with the area and population gives an idea of the total geographical area in percentage on one hand and percentage of population on the other. The variability in area and population is represented by a lorenze curve, which represents the graph deviating form the line, which shows uniform distribution to a percent on 'y' axis. Due to the existence of Solapur city in the North

Solapur tahsil the area is only 5 percent while the population above 25 percent of the district. The ratio between area and population though, is quite disturbed but not as in the case of North Solapur tahsil.

Table 4.8

Percentage of area and Population and its cumulative percentages

Sr. No.	Tahsil	% of population	% of area	% of cumulative population	% of cumulative area
1.	North Solapur	24.96	5.00	24.96	5.00
2.	Malshiras	10.98	10.22	35.94	15.22
3.	Pandharpur	10.40	8.75	46.34	23.97
4.	Barshi	8.85	9.96	55.19	33.93
5.	Madha	7.60	10.36	62.79	44.29
6.	Akkalkot	7.53	9.33	70.32	53.62
7.	Sangola	7.07	10.41	77.39	64.03
8.	Mohol	6.56	9.45	83.85	73.48
9.	Karmala	6.06	10.80	90.01	84.28
10.	South Solapur	5.48	8.02	95.49	92.30
11.	Mangalwedha	4.51	7.70	100	100
	District Total	**100**	**100**		

Lorenze Curve
showing the relationship between cumulative
area and population in Solapur district (2001)

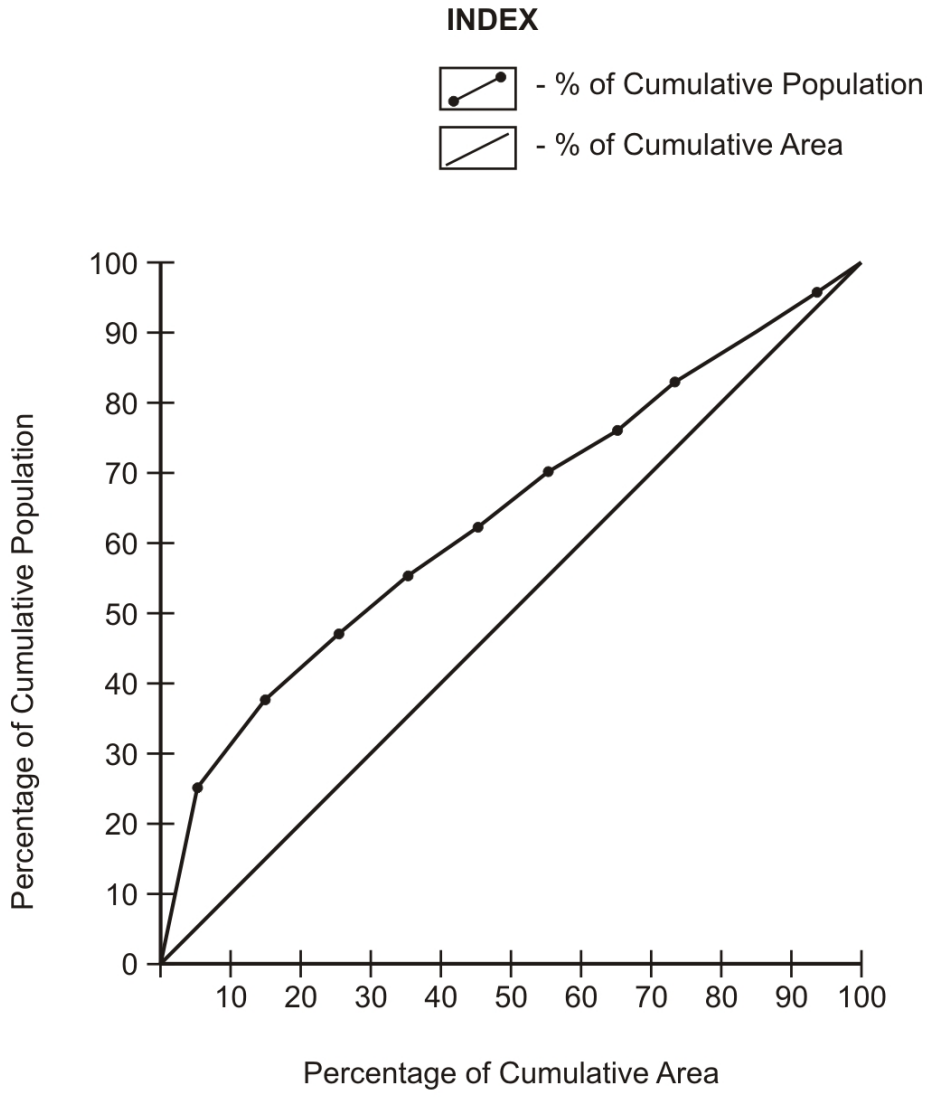


Fig. No.4.10

4.5 Area per village, number of villages per 100 square kilometer and population per village in each tahsil of Solapur district.

The table 4.8 gives information about the average area per village and average number of villages per 100 square kilometer area. At the same time, table also contains information about average population per village in each tahsil of Solapur district.

For the district as a whole, an average area per village in square kilometer is estimated to 7.82 square kilometer for the district as a whole. Owing to the existence of city of Solapur, in North Solapur tahsil, the lowest area of 5.62 square kilometer has been computed per village on the one hand, and 9.76 square kilometer area per village was found for the Akkalkot tahsil. There are number of tahsils consisting of Karmala, Madha, Mohol, Pandharpur, Malshiras, South Solapur which have lower area than the average for the district as a whole. On the other hand Barshi, Mangalwedha and Akkalkot have average area per village in a square kilometer which is higher than the district as a whole.

This clearly indicates that larger the area per village, lower is the concentration of the village. Similarly it also has close relationship with the analysis of nearest neighbor. The close proximity of the villages means high concentration of the population.

Likewise number of village per 100 square kilometer area, were also calculated which is an index of concentration of villages per unit of area. For district as a whole, the numbers of villages per 100 square kilometer area were calculated. The highest number of villages varies enormously from tahsil to tahsil it is highest for Akkalkot tahsil, while lowest number of villages for the North Solapur tahsil. This shows that the North Solapur tahsil is occupied by the Solapur city having more urban population and the villages are very much influenced by the

Table 4.9

Area per village in square kilometers, number of villages per 100 square kilometer and population per village in Solapur district

Sr. No.	Tahsils	Average area per village in sq.km.	No.of villages per 100 sq.km.	Average population per village
1.	Karmala	7.48	7	1791
2.	Madha	7.54	8	2326
3.	Barshi	9.47	9	1723
4.	N. Solapur	5.62	6	2208
5.	Mohol	7.17	7	2500
6.	Pandharpur	7.74	8	3113
7.	Malshiras	7.69	8	3612
8.	Sangola	6.89	7	2392
9.	Mangalwedha	8.20	8	1846
10.	S. Solapur	7.62	8	2316
11.	Akkalkot	9.76	10	1688
	District Total	**7.82**	**8**	**2306**

impact made by Solapur city. Hence, the city of Solapur has adversely affected the total number of villages in the district. There are numbers of tahsils having the number of villages per 100 square kilometer area equal to the number of villages for the region as a whole. These are Madha, Pandharpur, Malshiras, Mangalwedha and South Solapur tahsils. Barshi and Akkalkot are the two tahsils having number of village higher than the district average, while rest of the tahsil consisting of Sangola, Mohol, Karmala and North Solapur depict low number of villages in Solpaur. It may be concluded, from this discussion that lower the number of villages

per 100 square kilometer of area, higher the social and economic development as in case of North Solapur tahsil.

Average population per village is also calculated for the year 2001. This represents the size of village in each tahsil of Solapur district. The average population for the district as a whole was 2306. It is a matter of surprise that the entirely rural tahsil like Malshiras has the highest population per village. As a matter of fact, Malshiras though entirely rural Akluj having population more than 50,000 hence, positively influencing the size of population per village. Tahsils like Pandharpur, South Solapur, Sangola, Mohol and Madha have higher population than the region as a whole. On the other hand, Karmala, Barshi, Mangalwedha and Akkalkot have lower population than the region as a whole. Higher the population per village represents, high density of population, since, there is close correspondence between geographical area and total number of people. For instance Karmala has the lowest population per village, infact have higher geographical area than many tahsils of Solapur district. Therefore, the ratios between population and area have less for Karmala tahsil.

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CHAPTER- V

AGE AND SEX COMPOSITION OF POPULATION IN SOLAPUR DISTRICT

Introduction

5.1 Sex Ratio For Solapur district and Maharashtra

5.2 Spatial Variations in Sex ratio in Solapur district

5.3 Tahsilwise Sex Ratio in Solapur district

5.4 Decadal Variations in Rural-Urban Sex Ratio

5.5 Age Composition of Solapur district.

5.5.1 Agewise percentage of population

5.6 Dependency Ratio for Solapur district.

CHAPTER - V

AGE AND SEX COMPOSITION

INTRODUCTION:

Of the demographic characteristics, the sex composition of a population is the most basic, since it influences, the marriage and growth rate of population. Some other important population characteristics, like migration, occupation structure etc are also influenced by the ratio between the sexes. Since, the roles of the two sexes are partly contrasting and partly complementary, the study of their ratio is of considerable interest to the population geographers. "Sex ratio is an index of socio-economic conditions, revealing in an area and is useful tool for regional analysis". Sex ratio also influences the volume and nature of social need and employment and consumption pattern. Due to the considerable influence on many other demographic elements, the sex ratios are fundamental to geographical analysis of any region. Sex composition also influences fertility potential of the population, the labour participation and the types of jobs. In India, sex ratio is generally expressed in terms of number of females per 1000 males. Sex composition varies both in time and space. The variations in sex ratio are to a large extent determined by three factors such as, sex ratio at birth, differentials in mortality rate in two sexes and sex selectivity among migrants.

4.1 Sex ratio for Solapur district and Maharashtra :

According to 2001 census, the population of Solapur district was, 3849543 out of this, 1989623 were male and 1859920 were females. The sex-ratio works out to 935 per thousand males. This imbalance in sex ratio probably is due to relatively high mortality among the females and in migration of males on a large scale from other parts of the state of Maharashtra, which is generally dominated by males. Due to the influence of sex selective migration, the sex ratio for Solapur district as

compared to the state of Maharashtra was significantly higher than that for state of Maharashtra in the year 2001. In the year 1901 the sex ratio for Solapur district was estimated to 985, which was relatively higher than the state of Maharashtra. Same trend was also observed for the year 1911. For the next three decades particularly during 1921-1941, the sex ratio was recorded lower than the state of Maharashtra probably due to functioning of cotton textile mills in the Solapr city. Which have attracted only male workers to the Solapur city? In 1951, after the independence of country, the rapid industrialization in other parts of the state resulted higher sex ratio for Solapur district than the state of Maharashtra. In the next decade of 1961 the sex-ratios were equal for the state of Maharashtra and Solapur district, though these were substantially lower than the balanced sex-ratios. In the year 1971, the sex ratio was 933, slightly higher than the Maharashtra state. For the year 1981, further, it increased and became 943 for the region under study, while for Maharashtra it was lower than the district average. In the year 1991, more or less the sex ratio was equal for the both regions. In the year 2001, it slightly increased and became 936 as compared to Maharashtra when it was only 922 females per 1000 males.

Table 5.1

Sex Ratio for Solapur district and Maharashtra (1901-2001)

Sr.No.	Year	Solapur District	Maharashtra State
1.	1901	985	978
2.	1911	967	966
3.	1921	943	950
4.	1931	934	947
5.	1941	942	949
6.	1951	945	941
7.	1961	936	936
8.	1971	933	930
9.	1981	943	938
10.	1991	934	935
11.	2001	936	922

In short, it may be concluded that there have been wide variations in sex ratios during last ten decades, because in the year 1901, it was not much disturbed when it was 985 per thousand male for the district of Solapur, while in the most recent decade in 2001, the sex ratio declined substantially, and became as low as 936 respectively for the region under study. While for the state of Maharashtra, the sex ratio declined from 978 in the year 1901 to 922 in the year 2001. This imbalance in sex ratio may be attributed to high female mortality particularly of infant females. Secondly, the male selective migration for the better employment opportunities in the state of Maharashtra in general and Solapur district in particular. The reasons for the lowering of the sex ratio during the last 10 decades is due to improvement in medical facilities, the choice preference for male children, the impact of sonography adversely affected birth rate of female children because before birth number of female children are terminated from their birth.

5.2 Spatial Variation in Sex Ratio in Solapur district (1971-2001) :

In order to understand, spatial variations in sex ratios in Solapur district, for the period 1971-2001, it was calculated for each tahsil of the region under study.

For the year 1971, the sex ratio for the district was 933. There were four tahsils namely North Solapur, Malshiras, Sangola and South Solapur where it was lower than the region under study, while rest other tahsils have recorded sex ratios much higher than the district as a whole. It was highest for the Pandharpur tahsil while, lowest for North Solapur tahsil. It is higher for the tahsils which are having higher percentage of out migrants particularly of males to the city like Solapur and lower for the region, which have higher percentage of rural population. Similarly for the year 1981, the same trend was observed as for as the sex ratio is concerned. During 1981 year, it was 942 for the district as a whole. There

were six tahsils namely North Solapur, Mohol, Malshiras, Sangola, Mangalwedha and South Solapur where sex ratio was lower than the region as a whole, while rest of five tahsils recorded high sex ratio than the region as a whole. Again, Pandharpur represented higher sex ratio while North Solapur tahsil recorded lower sex ratio.

Table 5.2

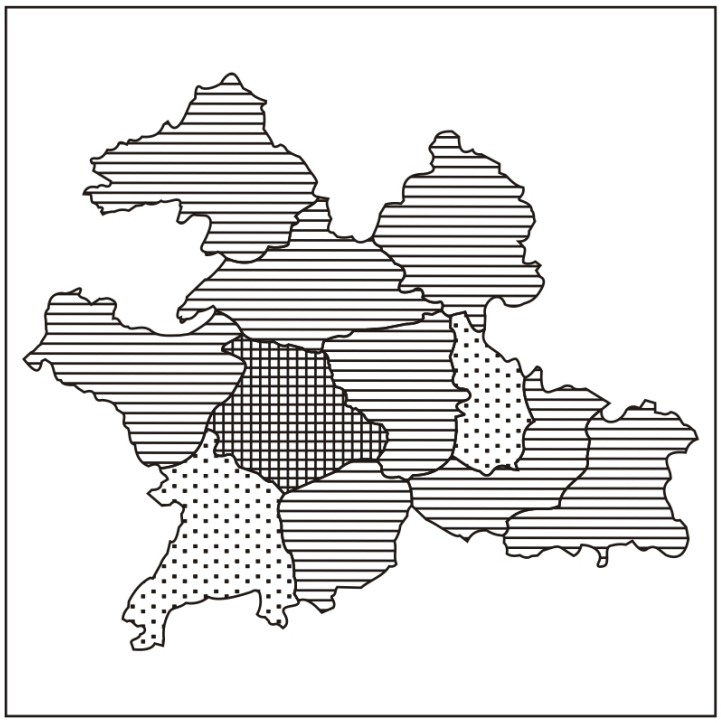
Spatial variation in sex-ratio in Solapur district (1971-2001)

Sr. No.	Tahsil	Year			
		1971	**1981**	**1991**	**2001**
1.	Karmala	940	950	933	925
2.	Madha	935	942	925	922
3.	Barshi	937	946	942	929
4.	North Solapur	915	933	941	958
5.	Mohol	935	937	927	920
6.	Pandharpur	960	975	944	917
7.	Malshiras	931	936	924	923
8.	Sangola	928	934	927	936
9.	Mangalwedha	939	941	915	917
10	South Solapur	932	917	929	933
11.	Akkalkot	949	964	948	953
	District Total	**933**	**942**	**934**	**936**

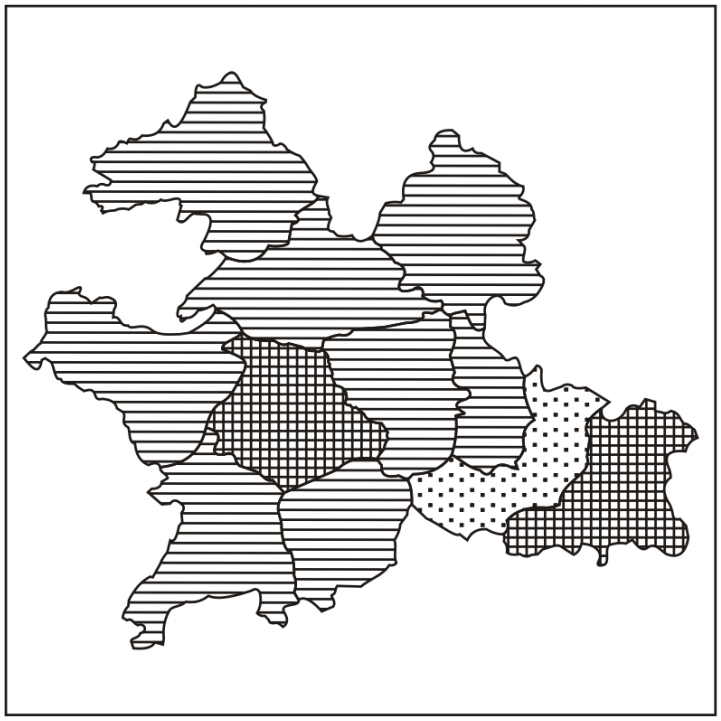
In the year 1991, the situation was totally different as the sex ratio declined substantially for certain regions, for example in Mangalwedha tahsil it came down to 915 as against 934 for the region under study. Except North and South Solapur tahsils, it has declined for all the tahsils of the district. It may be probably due to the improvement in decentralization of industries and spread of urban population in different parts of the region. This has also been due to decline in the rural urban migration in various parts of Solapur district.

SOLAPUR DISTRICT

Sex-Ratio in Solapur District (1971)



Sex-Ratio in Solapur District (1981)



Females per 1000 Males

- Above - 951
- 931 - 950
- Below - 930

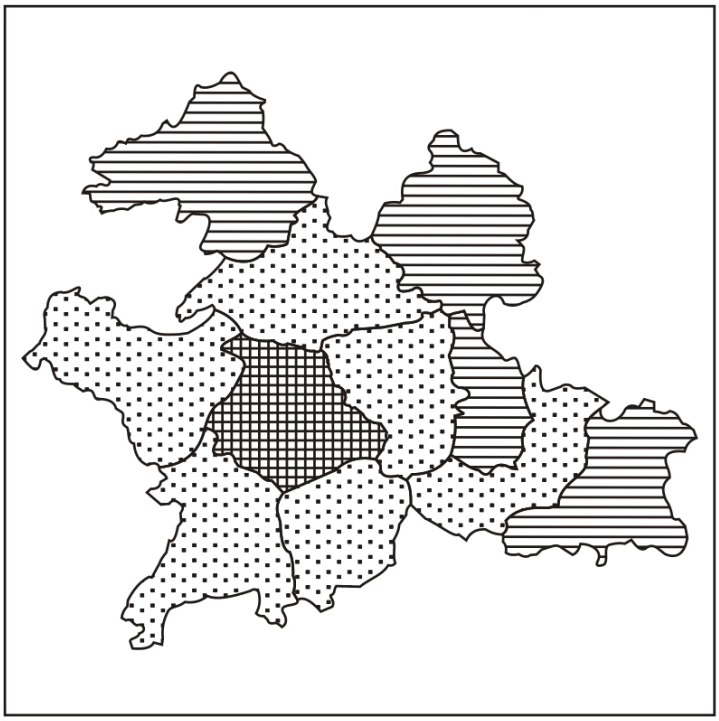
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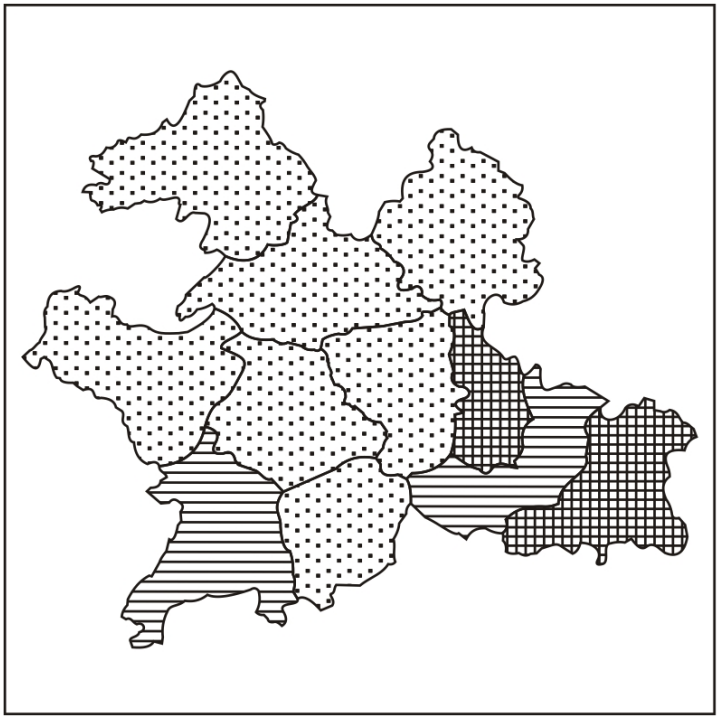
Fig. No.5.1

SOLAPUR DISTRICT

Sex-Ratio in Solapur District (1991)



Sex-Ratio in Solapur District (2001)



Females per 1000 Males

- Above - 951
- 931 - 950
- Below - 930

N

0 12 24 Km.

Fig. No.5.2

In the year 2001, the sex ratio for the district as a whole was 936 per thousand males which slightly increased from the year 1991. The North Solapur tahsil represented the higher sex ratio in the region under study, while lowest for Pandharpur and Mangalwedha tahsils. Sangola represented the same sex ratio as it was for rest tahsils of the district has shown lower sex ratio than the region average. In short, it may be stated that there are wide variations as regard to sex ratio within the region under study. Likewise, through time, sex ratios are substantially declining due to high percentage of female infant mortality in the region under study.

5.3 Tahsilwise sex ratio in Solapur District (2001):-

In Solapur district, the rural and urban sex ratio differs considerably in the year 2001. The rural sex ratio was 925 for the district as a whole in the year 2001. However, there are wide variations within the district, as it was highest for the Akkalkot and lowest for the Pandharpur tahsil for rural areas. Overall rural sex-ratio is lower than the urban sex ratio except Sangola tahsil within the region under study. It is against expectation because rural urban migration dominated by male, should reduced the urban sex ratio than the rural sex ratio.

For the lower rural sex ratio in different tahsils of the Solapur district may be attributed to the high infant mortality among the females as a result of less availability of medical facilities and very much negligence of female children as regard to medical facilities in rural areas of the Solapur district. Another important reason may be high rate of maternal death in rural areas of Solapur district and also partly due to illiterate DAIS (Nurses) who look after delivery.

Table 5.3

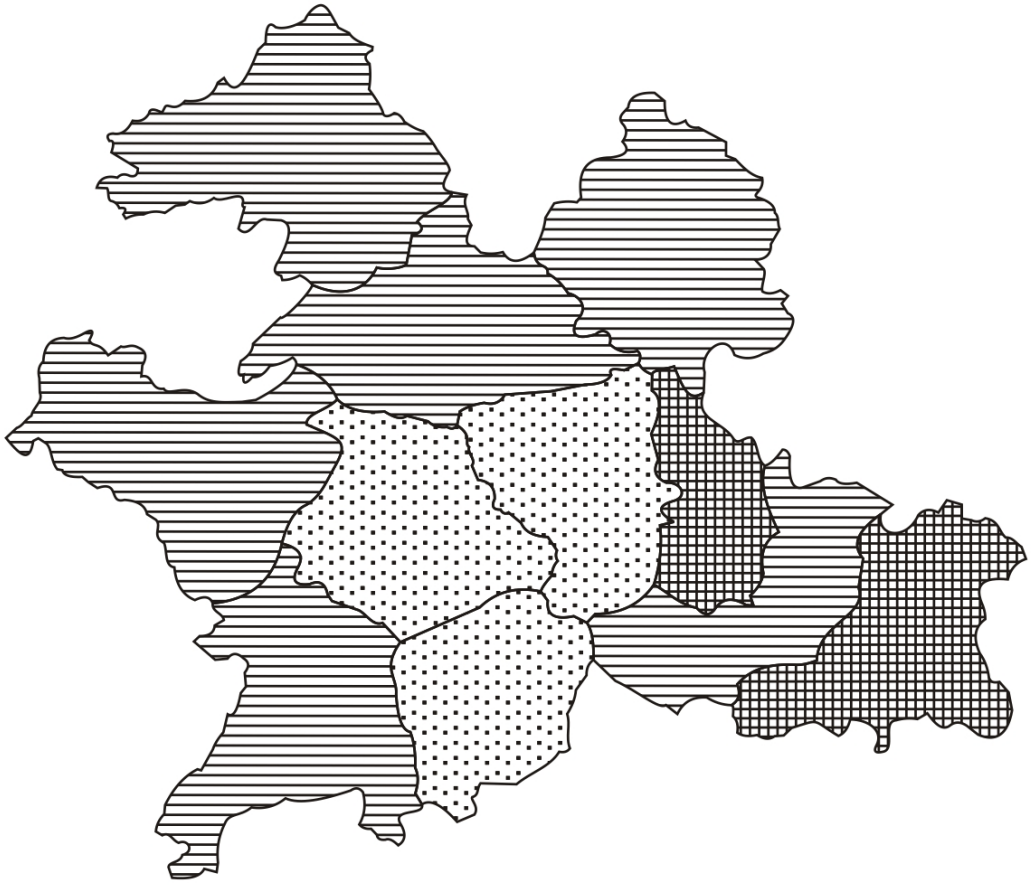
Tahsil wise sex ratio in Solapur district (2001)

Sr. No	Tahsil	Total	Rural	Urban
1.	Karmala	925	924	934
2.	Madha	922	920	936
3.	Barshi	929	921	946
4.	North Solapur	958	925	962
5.	Mohol	920	920	-
6.	Pandharpur	917	912	933
7.	Malshiras	923	923	-
8.	Sangola	936	937	930
9.	Mangalwedha	917	915	929
10.	South Solapur	933	933	-
11.	Akkalkot	953	946	975
District Total		**936**	**927**	**957**

On the contrary, the urban sex ratio for the district was 957 which is substantial higher than the rural sex ratio. For the Akkalkot tahsil, it was highest and for Mangalwedha tahsil it was lowest. North Solapur tahsil occupies second position as regard to urban sex ratio, among various tahsils of Solapur district. Mohol, Malshiras and South Solapur tahsils are entirely rural hence; the urban sex ratio is absent. Other rest tahsils of the district have lower sex ratio than the region under study. It is necessary to justify the high sex ratio in urban areas of the district. The medical facilities are much better in urban areas resulting in the low infant death. As a result, it is reflected in high sex ratio in district of Solapur. Secondly, the high percentage of literate people gives equal attention towards both male and female children. This also is responsible for high sex ratio in urban areas than that of rural areas.

SOLAPUR DISTRICT

Sex-Ratio 2001



N

0 12 24 Km.

INDEX

Females per 1000 Males

- 940 - 960
- 921 - 940
- 900 - 920

Fig. No.5.3

5.4 Decadal variations in Rural Urban sex ratio (1901-2001):-

The temporal variations in rural-urban sex ratios for the Solapur district as a whole have been taken into consideration for the lost ten decades. As expected, the rural sex ratios, are higher than the urban sex ratios except the year 1991 and 2001. This may be probably due to rural urban migration for the better employment oppurnities, available in the urban areas, particularly for the working males, who leave their families behind at home in rural areas.

Table 5.4

Decadal variation in Rural-Urban sex ratio (1901-2001) :-

Sr. No	Year	Rural Sex Ratio	Urban Sex Ratio
1.	1901	992	958
2.	1911	971	947
3.	1921	949	924
4.	1931	944	908
5.	1941	947	929
6.	1951	951	932
7.	1961	945	914
8.	1971	940	914
9.	1981	948	931
10.	1991	933	945
11.	2001	925	957

As a result of it, the rural sex ratios though, were higher than the urban sex ratios during the period 1901 to 1981. During the year 1991 to 2001, the urban sex ratio were recorded higher than the rural sex ratios perhaps due to better medical facilities and lower infant death rate of female in urban areas. Now days, due to social awareness and high rate of literacy in urban areas of Solapur district, might have resulted in the higher sex ratios in urban areas of the district of Solapur.

SOLAPUR DISTRICT

Rural - Urban Sex-Ratio of Solapur District
(1971-2001)

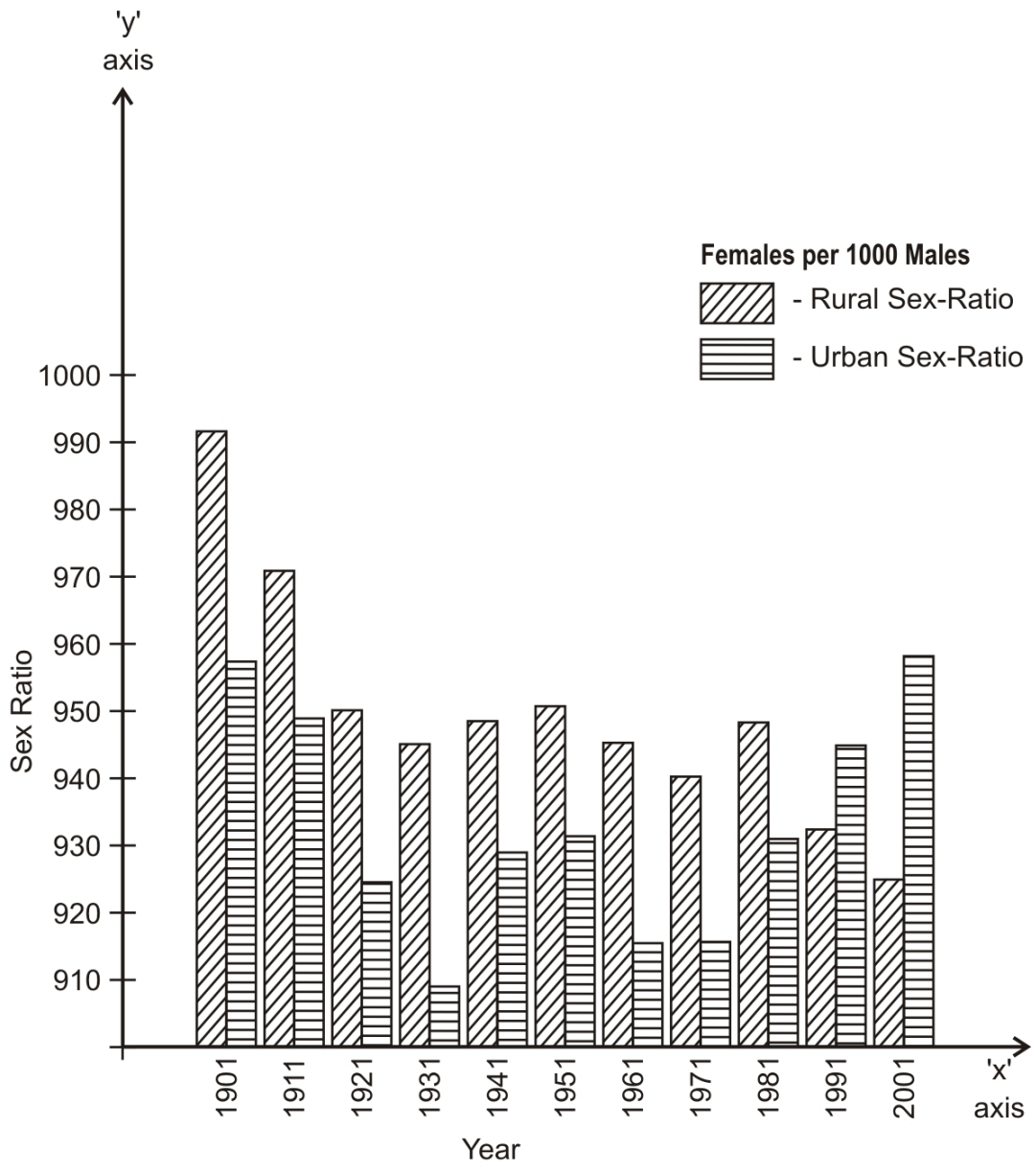


Fig. No.5.4

5.5 Age Composition of Solapur district:-

Age composition is one of the most basic characteristics of a population. To a certain extent, the age of a person's decides, what he needs, does and thinks. Age composition influences many important aspects of community life, such as social attitudes, economic activities, mobility of people and political set up. Age composition is an important consideration in planning the educational, military and welfare programme of a region.

Age structure of a population is a productive of the post trends in fertility, mortality and migration, change in any one of them influences age composition of these changes fertility has a much greater impact on the age composition than the changes in mortality. This is because change in mortality influences all age group, while changes in fertility affect the base of the age structure. Three variables mentioned above or not completely independent, changes in any one of them, are reflected in the remaining to proportions of the people in different age groups are influenced by fertility rate. In economically backward region, fertility rate is generally high, and hence the proportions of younger age group are sizable. In such a region, expectancy of life is low and therefore, proportions of the people of old age group is a small on the other hand in economically developed regions fertility rates are low and expectancy of life is high. In such a region, fertility rates are law hence, the proportion of people in young age group is small and that in old age is relatively large.

Age composition is also influenced by age specific mortality rate. In economically developed region, morality is low for younger as well as older age groups. This results in high and continuously increasing proportion of people in higher age group. On the other hand, in

economically backward region, mortality is generally declining. This results in higher proportion of people in younger groups.

To some extent, migration also influences age composition of the population which is generally age and sex selective. Hence, age and sex composition of both at sources as well as at destination regions are altered. People in the working age groups are generally more mobile hence; migration that occurs due to economic reasons is more age selective. This result in increase in proportions of people in the working age group in the destination regions, while there is corresponding decrease of the people in the working age group in the source region.

Thus, age composition of a region influenced by fertility, mortality and the pattern of migration to a significant extent. In addition to these, wars, natural calamities and Government population policies also influence age composition of a population of a region to a certain extent.

5.5.1 Age wise percentage of population:-

The age group population gives an idea about the working and non-working population for Solapur district, the percentage of population belonging to 0-14 years which are not working, and 15 – 59 age group are economically working population, as well as above 60 age group, it is also economically non working population have been calculated for total, rural and urban areas of the Solapur district for the last four decades. In the year 1971, the proportions of children below 14 years were 42.96 percent of the total population and 6.02 percent were old people, rest 51.96 percent were young and matured persons, who were engaged in economic activities. It is interesting to note that in comparison to urban areas, the rural area of district, the proportions of children below 14 years was high due to high birth rate in rural areas low literacy rate, whereas the working population between 15-59 age group was much lower in the rural areas of the Solapur district, perhaps, due to rural urban migration

for the better employment opportunities. Similarly, the proportion of aged and old person was high for rural areas, probably due to returning at the working population after the retirement from urban areas to rural areas.

Table: 5.5

Age wise percentage of population

Sr. No	Age Group	1971			1981			1991			2001		
		Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
1.	0-14	42.96	43.91	40.57	39.34	40.07	37.59	36.38	38.40	35.47	33.80	34.43	32.45
2.	15-59	50.91	49.81	54.08	53.75	52.77	56.10	56.02	53.47	57.85	56.63	55.25	59.61
3.	Above 60	6.02	6.28	5.35	6.91	7.16	6.31	7.59	8.12	6.68	9.56	10.32	7.94

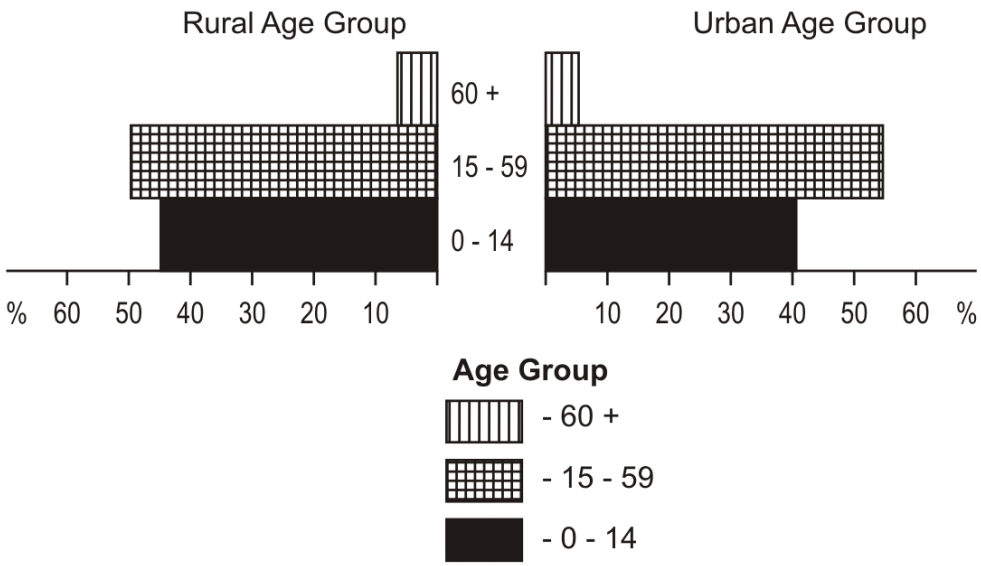
In the year 1991 the proportions of childrens have declined from the previous decades, while it increased for the working population as well as for the old people. This fluctuation in the proportions of children, young and matured as well as for old people is attributed to difference in the birth and death rate. When the three age groups population of children, mature and old was compared between rural and urban than the proportions of children was much higher than urban areas in rural sectors of Solapur district. Due to in migration of the rural working population to urban areas of the Solapur district, the proportions of working population for better employment opportunities was recorded, substantially, higher in urban areas of the Solapur district.

Further, in the year 1981, the proportion of old people was higher in rural areas. This is also because of migration of the retired people from urban to rural areas resulted in higher proportions of the old people in rural areas, as many times working population from the urban sectors go back to their native places in rural areas because of high cost of living in urban areas.

SOLAPUR DISTRICT

Age Structure

(1971)



SOLAPUR DISTRICT

Age Structure

(1981)

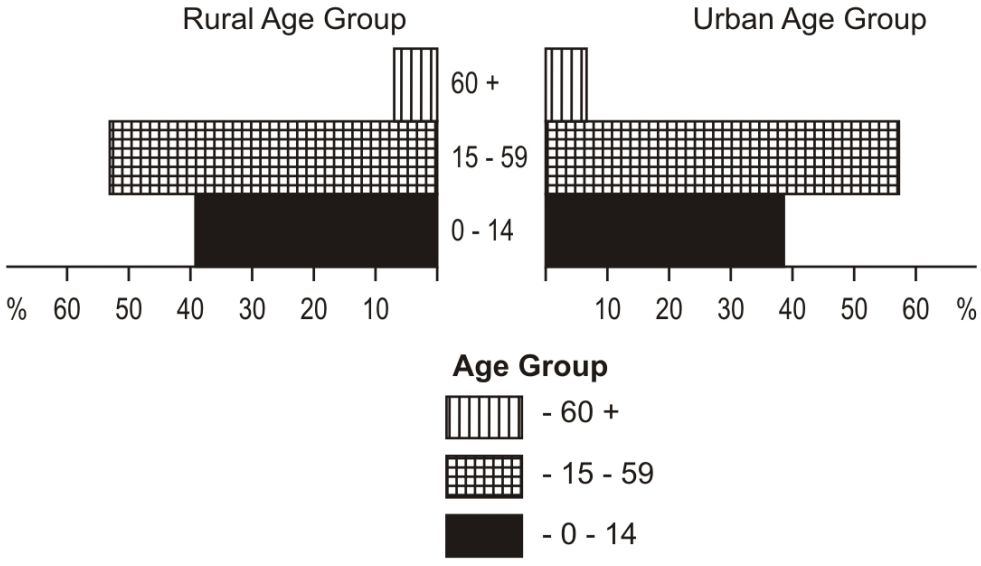
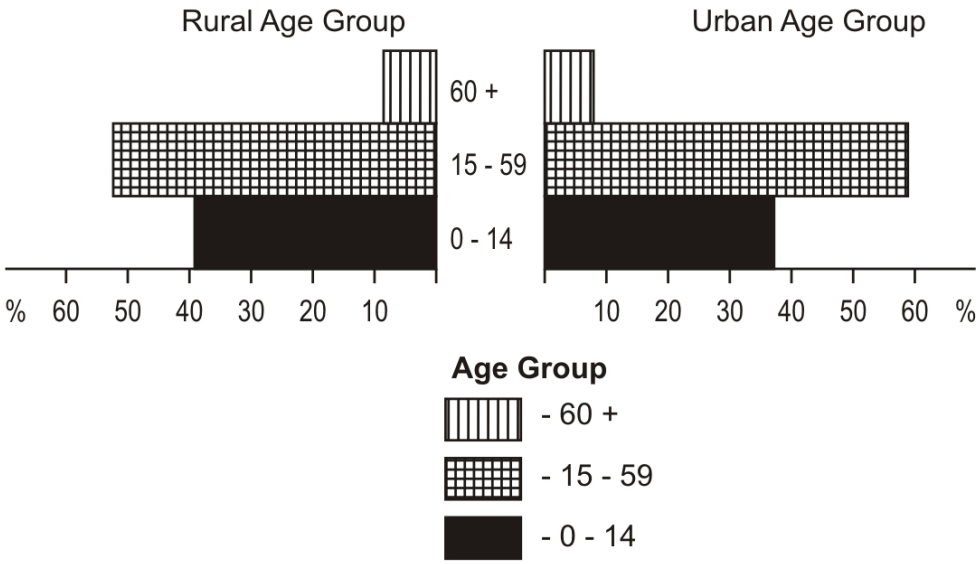


Fig. No.5.5

SOLAPUR DISTRICT

Age Structure

(1991)



SOLAPUR DISTRICT

Age Structure

(2001)

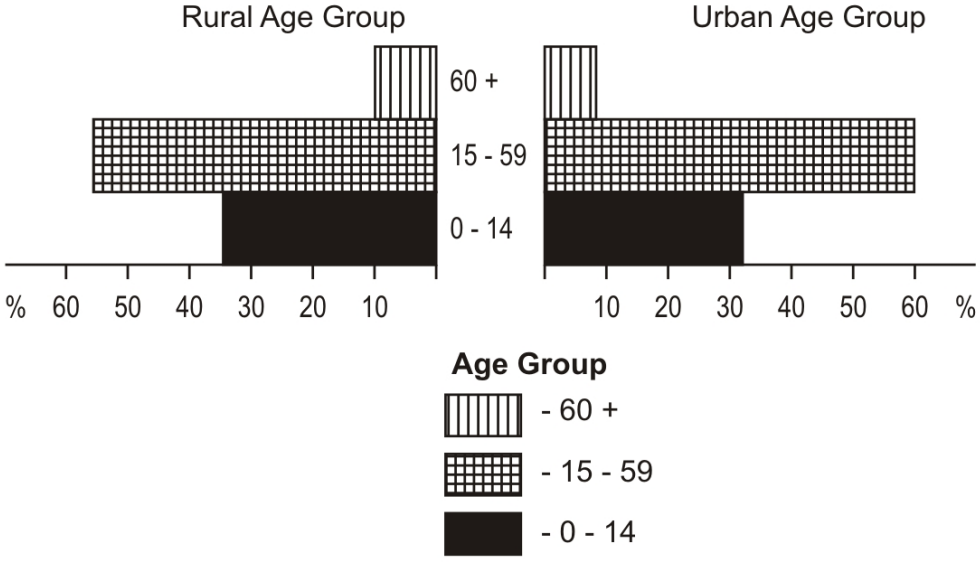


Fig. No. 5.6

In the year 1991, the pattern of population belonging to different three age groups was of the magnitude of 36.38 for children, below 14 age, and 56.02 percent for young and matured and 7.59 percent for old people for the district as a whole. The comparison between rural and urban areas as regard to age group was higher for rural areas both for children and old people, while it was lower for rural areas than the urban areas for working age group. The reason being higher percentage of children and old people in rural areas is the same as mentioned in the preceding discussion of 1971, 1981 decades.

For the year 2001, the percentage of children has declined for children tremendously from 42.96 percent in 1971 to 33.80 percent in the year 2001. This is probably due to decline in birth rate due to social awareness and the implimentation of family planning programs. On the contrary for the total, the percentage of working population has substantially increased from 50.91 percent in 1971 to 56.30 percent in the year 2001. Due to improvement in medical facilities, the expectancy of life has increased, both for rural and urban areas. As a result of it, the proportion of old people has remarkably increased from 6.02 percent in the year 1971, to 9.65 percent in the year 2001. The comparison between rural urban age group indicates the same pattern that is higher for children in rural areas and much higher for old age people of in rural areas. To a certain extent, the proportions of working population, the correspondingly increased form urban areas during the last four decades which became as high as 59.61 percent in the year 2001.

5.6 Dependency ratio for Solapur district:-

The dependency ratio gives the picture of the burden on the society. In order to understand, the dependency burden for the district of Solapur as a whole, the dependency ratios were calculated for the total

rural and urban areas for the years 1971, 1981, 1991 and 2001. In 1971, the dependency burden for Solapur district was 48.98 percent. As, anticipated, it is high for rural areas, when compared with urban areas of Solapur district. This is probably due to high birth rate in rural areas and the out migration of the rural population belonging to rural working population to urban area for better employment opportunities.

For the year 1981, the dependency burden was of the magnitude of 46.25 percent, which went on declining for the next two decades and became as low as 43.56 in the year 2001. When the dependency burden between rural and urban areas of Solapur district, were compared, it has been found higher for rural areas of the Solapur district for all the four decades.

Table 5.6

Dependency ratios for Solapur district (1971-2001):

Year	Total	Rural	Urban
1971	48.98	50.19	45.92
1981	46.25	47.26	43.90
1991	43.97	46.52	42.15
2001	43.56	44.75	40.39

One thing should be noted, that the dependency burden is continuously declinning both for rural and urban areas during the last four decades. For rural areas, in the year 1971, it was 50.19 and became as low as 44.75 in the year 2001. Similarly, for urban areas it declined from 45.92 in the year 1971 to 40.39 in the year 2001. Now the question arises while the dependency burden is continuously declinning for both rural and urban areas during last four decades. Probably, this may be because of declining trend in birth rate and death rate. Secondly, change in the definition of working population. Now a day, permanent worker, marginal workers,

SOLAPUR DISTRICT

Dependency Ratio for Solapur District
(1971-2001)

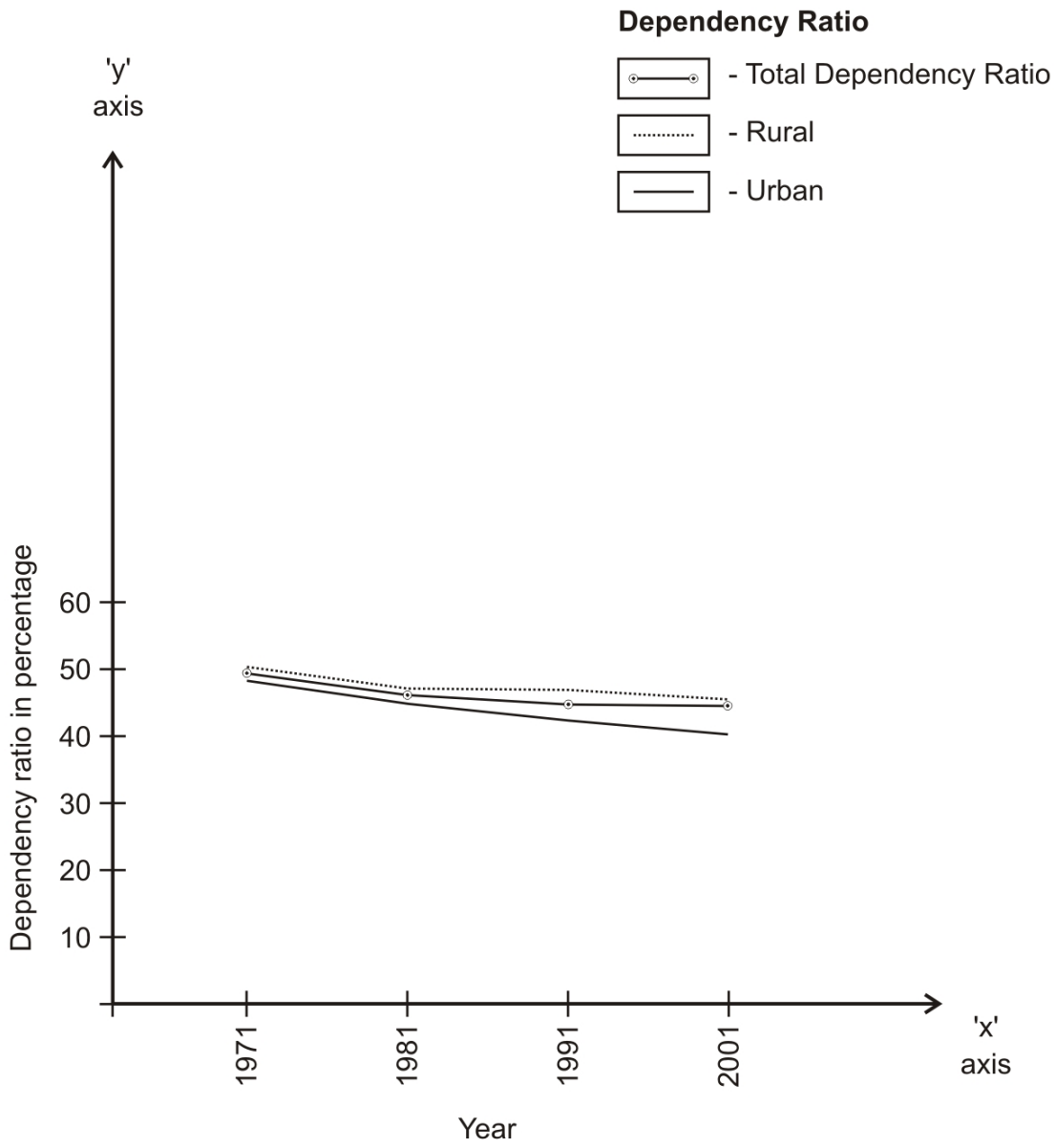


Fig. No. 5.7

temporary workers have affected positively the pattern of dependency ratios in the region under study. Many persons, even after retirement are engaged in economically active occupation. Even children below 15 are also engaged in economically gain activities in different sectors of the economy to a certain extent. All these factors are responsible for the declining ratio of the dependency burden in Solapur district.

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CHAPTER- VI

LITERACY AND OCCUPATIONAL STRUCTURE

Introduction

6.1 Proportions of Workers to Total Population in Solapur district

- 6.1.1 Primary workers
- 6.1.2 Secondary workers
- 6.1.3 Tertiary workers

6.2 Literacy Pattern in Solapur district

- 6.2.1 Tahsilwise literacy in Solapur district
- 6.2.2 Tahsilwise male literacy in Solapur district
- 6.2.3 Tahsilwise female literacy in Solapur district

CHAPTER - VI

OCCUPATIONAL STRUCTURE AND LITERACY PATTERN

INTRODUCTION:-

All persons consumer, goods and services, but only some of them are engaged in productions of goods and services. Some of the persons, do not participate in the work, because of age, either too old or too young or some other persons, because of physical or mental inability. The man power of a nation includes all such reasons, who could produce goods or services. More important than this is the economically active population called the working force which is that part of the manpower, which is actually engaged in productions, of economic goods and services. Several factors influence, the size of labor force, important among them is definitions of workers, age composition, life expectancy and availability of work. As, these factors vary in different regions and different periods of times for the same region. The size of work force varies, spatially for different regions and temporally for the same region.

Proportions of economically active population influence the nature and volume of production. Size and nature of economically active population is influenced by age composition, age of marriage, per capita income, size of family and the state of health. Due to high proportions of children in young age group and rapidly growing population of under developed regions, a proportion of active population is generally small. The dependency burden influences, the levels of saving, capital formations and consequently nature and volume of production. Size and nature of labor force indicates the levels of employment, already achieved. Rapid growth of population creates a higher supply of labor than its demand, leading to unemployment. Due to excessive population pressure, it is very difficult for underdeveloped regions like Solapur, to observe the increase in the labor force in gainful employment. According

to the needs of the economy, the working population of a region gets distributed in different professions, broadly, grouped into primary, secondary and tertiary sectors of the economy.

In the logical study of occupational structure of a region, it is essential to consider working population as the basic criterion because, working population is the active agency in the economic development of a region, through economic activities. The census authorities have classified workers in to nine industrial categories as under:

1. Cultivators
2. Agricultural Labors
3. Live stocks, forestry, fishing, hunting, plantation or chards and allied activities.
4. Mining and quarrying.
5. Manufacturing, processing servicing and repairs
   a) House hold industry
   b) Other than house hold industry.
6. Construction
7. Trade and commerce
8. Transport, storage and communication
9. Other services.

6.1 Proportions of workers to total population in Solapur district (1971 - 2001)

The table concerned gives the proportions of workers broadly grouped into primary, secondary and tertiary workers for the year 1971, 1981 1991 and 2001, for the district as a whole and for its various tahsils.

6.1.1 Primary workers:-

In the year 1971, there were 70.56 percent workers in the primary sectors, which declined substantially and became as low as 62.90 percent

in the year 2001. This decline in the proportions of primary worker may be attributed to the increase in the proportions of secondary and tertiary workers due to industrialization and consequent urbanization during the last four decades in the Solapur district. During the period 1971-81, the percentage of primary workers, declined by 6.56 percent due to the mechanization in agricultural sector, reducing the number of workers in agricultural activities. This has also been observed, that the degree of industrialization in the district of Solapur and other parts of Maharashtra, as well, has contributed to out-migration of people from the rural sector to urban areas for better employment opportunities either in the secondary and tertiary sectors. Surprisingly, during the period 1991, the primary worker has increased by 3.52 percent probably due to insecurity of workers in secondary and tertiary sectors and return of workers to their native places and excepting the primary work of agriculture. There after, the percentage of primary workers tremendously declined to 62.90 percentages in 2001. This may be, the reflection of least priority to primary sectors due to increase in the literacy and educational attainment, and better job opportunities in secondary sector.

Table : 6.1

Percentage of Primary Workers in Solapur district (1971-2001)

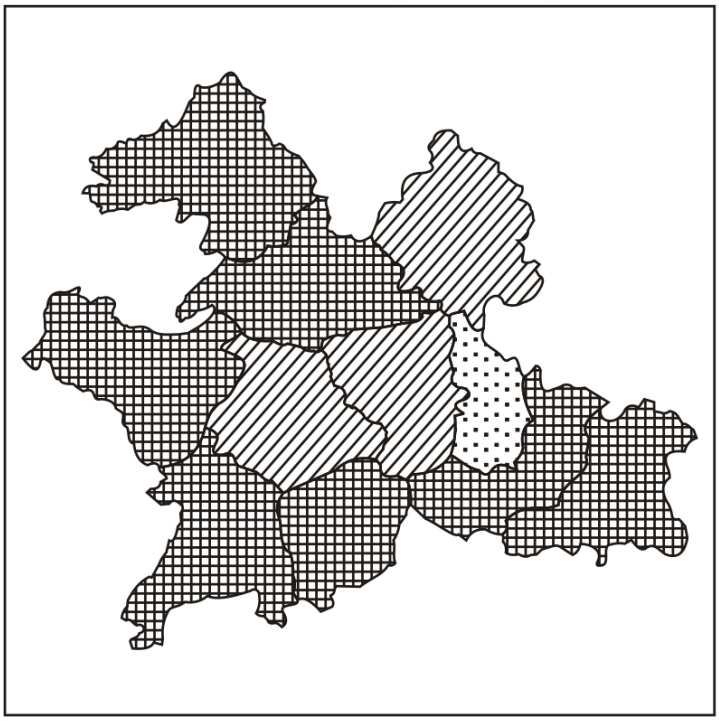
Sr. No.	Tahsil	Primary workers in percentage			
		1971	1981	1991	2001
1.	Karmala	84.60	82.43	85.68	84.58
2.	Madha	80.73	77.05	82.02	83.22
3.	Barshi	76.84	71.72	71.56	69.52
4.	North Solapur	19.09	14.85	15.58	15.76
5.	Mohol	89.28	78.57	85.94	87.20
6.	Pandharpur	72.63	70.75	74.74	73.80

7.	Malshiras	83.02	78.70	80.64	82.00
8.	Sangola	86.67	76.53	84.00	85.75
9.	Mangalwedha	90.95	76.34	86.30	86.80
10.	South Solapur	88.74	77.43	82.69	84.74
11.	Akkalkot	81.97	77.87	80.84	81.79
	District Total	**70.56**	**64.00**	**67.52**	**62.90**

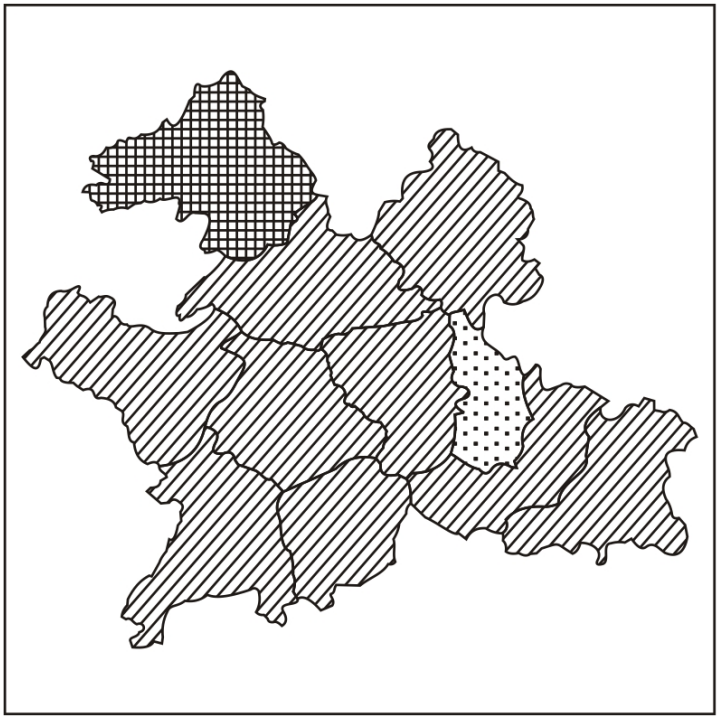
The spatial pattern of primary workers have shown, the tremendous variations ranging from 90.95 percent for Mangalwedha in the year 1971 to 19.09 percent for North Solapur tahsil. Within the district, the percentage of primary workers varies according to industrialization as well as urbanization. The tahsils, which are much urbanized, represent the low percentage of primary workers, where the proportion of urban population is higher, like North Solapur tahsils. Other tahsils, like Barshi and Pandharpur have also relatively low percentage of primary workers due to the economic activities in secondary and tertiary workers. In the year 1981, similar trend was also observed for various tahsils, the lowest percentage of primary workers was for North Solapur, while highest for the Karmala. With slight fluctuation the percentage of workers declined for most of the tasils of Solapur district in the year 1981, with exceptions of the year 1991; when, again the percentage of primary workers slightly increased for most of the tahsils, expect, Barshi and Pandharpur. In the year 2001, the similar trend was also observed for primary workers being lowest for the North Solapur and highest for Mohol. Though, the percentage of primary workers, fluctuate, with the degree of urbanization and industrialization in the district.

SOLAPUR DISTRICT

Percentage of Primary Workers (1971)



Percentage of Primary Workers(1981)



Percentage of Primary Workers

- Above - 80
- 40 - 80
- Below - 40

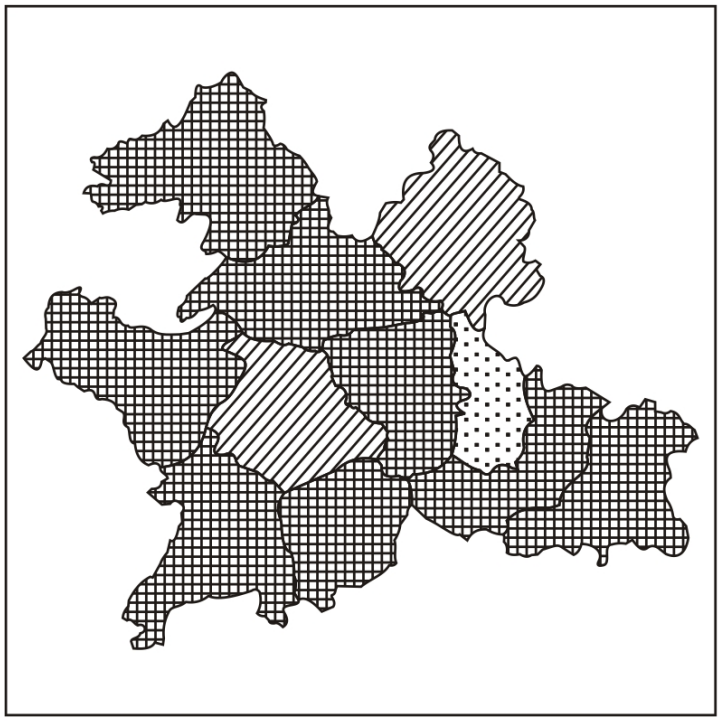
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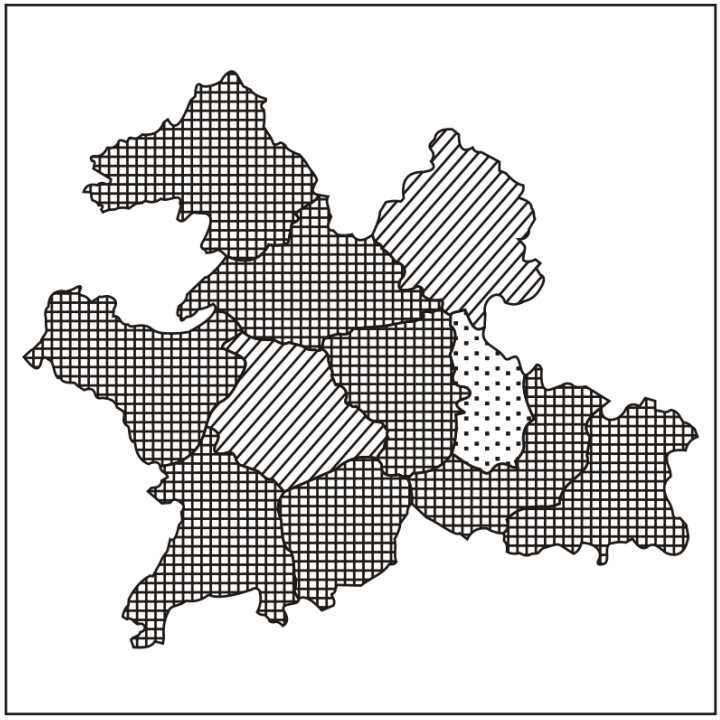
Fig. No.6.1

SOLAPUR DISTRICT

Percentage of Primary Workers (1991)



Percentage of Primary Workers (2001)



Percentage of Primary Workers

- Above - 80
- 40 - 80
- Below - 40

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Fig. No.6.2

6.1.2 Secondary Workers:-

The proportions of secondary workers have also been calculated for the years 1971, 1981, 1991 and 2001. The proportion of secondary workers was 12.97 percent, in 1971 for the region as a whole. As expected, it was highest for the North Solapur tahsil, due to the existence of Solapur city and lowest for the Mangalwedha for the year 1971. In the year 1981, the unbelievable decline in the percentage of secondary workers shows in North Solapur tahsil, when it declined from 43.68 percent in 1971 to 5.88 to 1981. This decline in secondary workers particularly in Nort Solapur tahsil during 1971 – 1981, may by probably due to the closing down of cotton textile mills and spinning mills in and around the Solapur city and secondly, the increase in the workers in the tertiary sectors like trade and transportation. There are wide fluctuations, in the workers of secondary sectors within the various tahsils of the Solapur district and lowest for South Solapur, while highest for the North Solapur tahsil.

During the next period of the year 1991, was quite remarkable in the increase of secondary workers, as the proportion was 41.06 percent in the year 1991 and it further increased to 42.26 percent in the year 2001. This increase in the proportion of the secondary workers in the North Solapur tahsil may be due to the rejuvenation of power handloom and spinning mills in and around the Solapur city. More or less, the percentage of secondary workers was the same during the period 1991 and 2001.

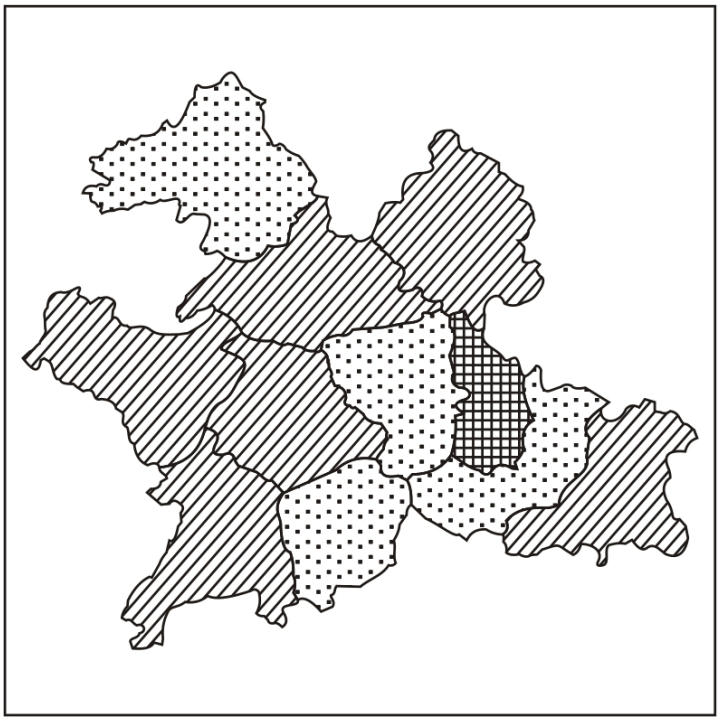
Table : 6.2

Percentage of Secondary Workers in Solapur district (1971-2001)

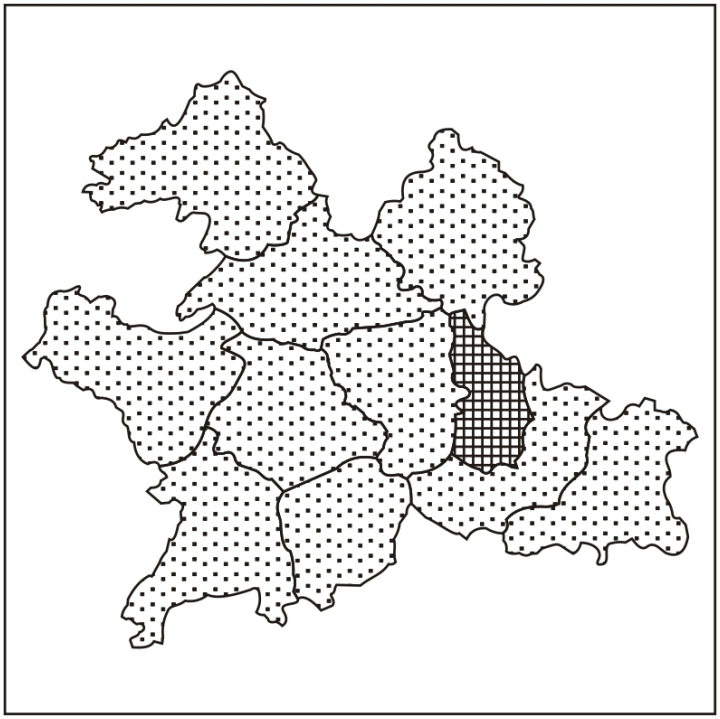
Sr. No.	Tahsil	Secondary workers in percentage			
		1971	**1981**	**1991**	**2001**
1.	Karmala	4.18	2.44	3.49	3.25
2.	Madha	5.21	2.23	3.99	4.32
3.	Barshi	7.92	2.36	7.52	8.48
4.	North Solapur	43.68	5.88	41.06	42.26
5.	Mohol	3.58	1.69	3.89	3.26
6.	Pandharpur	6.85	2.46	7.26	8.20
7.	Malshiras	7.70	2.30	6.71	6.92
8.	Sangola	5.06	3.20	4.92	5.00
9.	Mangalwedha	3.10	2.00	2.94	3.25
10.	South Solapur	4.11	1.30	7.01	6.55
11.	Akkalkot	6.47	3.34	4.91	5.85
	District Total	**12.97**	**3.08**	**12.70**	**14.80**

SOLAPUR DISTRICT

Percentage of Secondary Workers (1971)



Percentage of Secondary Workers (1981)



Percentage of Secondary Workers

- Above - 15
- 5 - 15
- Below - 5

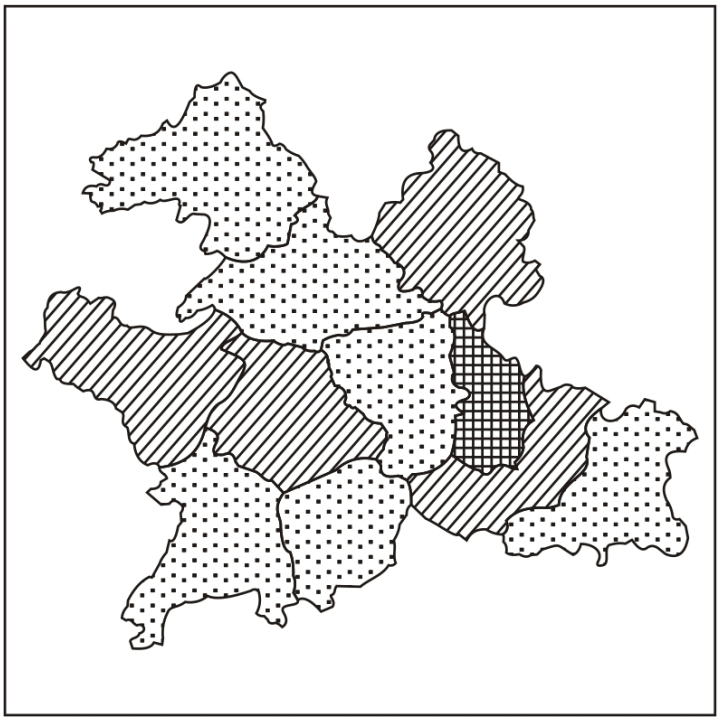
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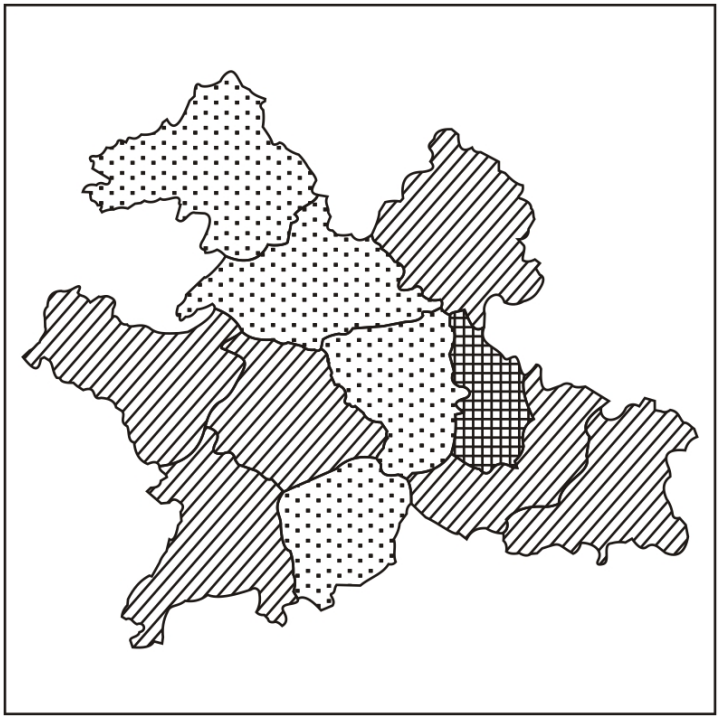
Fig. No.6.3

SOLAPUR DISTRICT

Percentage of Secondary Workers (1991)



Percentage of Secondary Workers (2001)



Percentage of Secondary Workers

- Above - 15
- 5 - 15
- Below - 5

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Fig. No.6.4

6.1.3 Tertiary Workers:-

The tertiary workers are those who are engaged in the services, trade, transportation and construction. For the year 1971, the percentage of tertiary workers for the Solapur district as a whole, was 16.46 percent, which has doubled in the year 1981. This tremendous increase in the proportion of tertiary workers may be partly due to the tremendous increase in the tertiary workers for North Solapur tahsil. Due to closing of the cotton textile mills, large number of people became unemployed, eventually, they moved out to work for services in the trade, transportation and various services resulting in the higher proportion in this sector. For the next decades of 1991, surprisingly, the proportion of the tertiary workers declined and became 19.77 for the district of the Solapur. This decline in tertiary workers may be attributed to the out migration of the people in other parts of Maharashtra and increase in the proportion of the secondary workers. Further, the year 2001, again experienced almost the same percentage of tertiary workers, as it was for the year 1981. Solapur is a large urban center in the district attracting people for different services, thus, enhancing the proportions of tertiary workers for the year 2001.

Table : 6.3

Percentage of Tertiary Workers in Solapur district (1971-2001)

Sr. No.	Tahsil	Tertiary workers in percentage			
		1971	1981	1991	2001
1.	Karmala	11.12	15.12	10.82	12.17
2.	Madha	14.05	20.71	13.97	12.46
3.	Barshi	15.22	25.91	20.90	22.00
4.	North Solapur	37.22	79.26	43.35	41.98

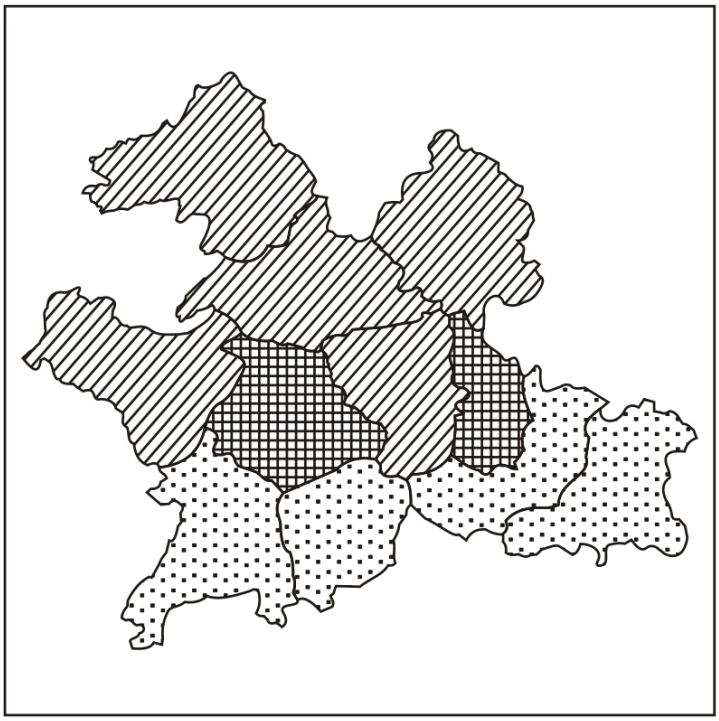
5.	Mohol	7.14	19.72	10.15	9.54
6.	Pandharpur	20.58	26.78	17.99	18.00
7.	Malshiras	9.26	18.98	12.64	11.80
8.	Sangola	8.25	20.26	11.06	9.25
9.	Mangalwedha	5.94	21.64	10.74	9.95
10.	South Solapur	7.14	21.26	10.29	8.71
11.	Akkalkot	11.54	18.78	14.24	12.36
	District Total	**16.46**	**32.92**	**19.77**	**32.27**

A spatial variation, during the 1971, was due to the variations in the economic activities depending upon the degree of urbanization. It was highest for the North Solapur, as a result of Solapur city, while lowest for Mohol and South Solapur tahsil. Likewise Mangalwedha tahsil has also recorded lowest proportion of tertiary workers. There are wide variations in various tahsils and more than seventy percent tahsils have lower proportions than the region under study. As for as, the proportion of the tertiary workers is concerned, due to pilgrimage centre in Pandharpur, the tertiary workers are quite sizable.

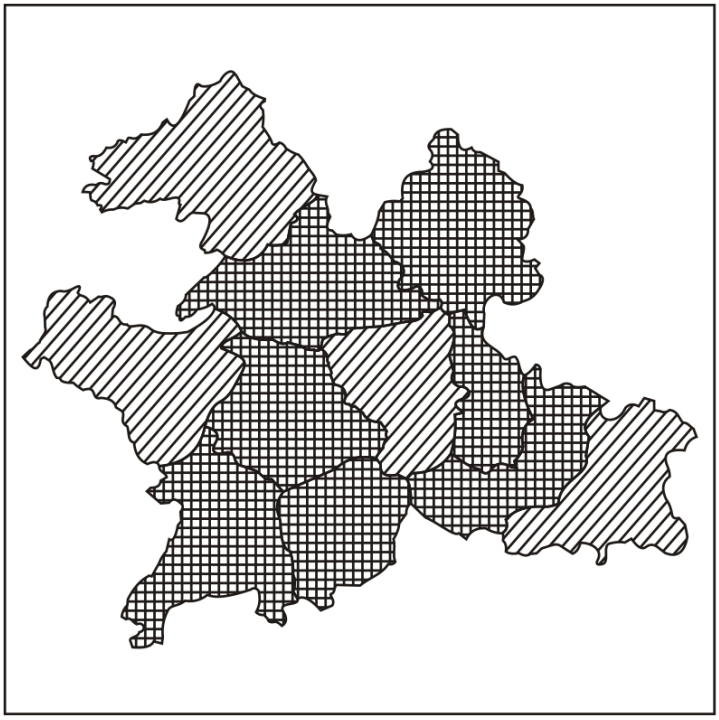
During the 1981, the North Solapur has shown 79.22 percentage of tertiary workers, which is most surprising expect for North Solapur tahsil, rest all other tahsils have shown lower percentage of tertiary workers than the region as a whole. Similar trend has also been observed, for the 1991. In this year also, no tahsils other than North Solapur has shown higher proportions than the region. Further, investigation of the tertiary workers in the year 2001, shows highest for the North Solapur, while lowest for South Solapur tahsil. Surprisingly, in this year also except, North Solapur tahsile, rest all other tahsils demonstrated much lower percentage of tertiary workers than the region under study.

SOLAPUR DISTRICT

Percentage of Tertiary Workers (1971)



Percentage of Tertiary Workers (1981)



Percentage of Tertiary Workers

- Above - 20
- 15 - 20
- Below - 15

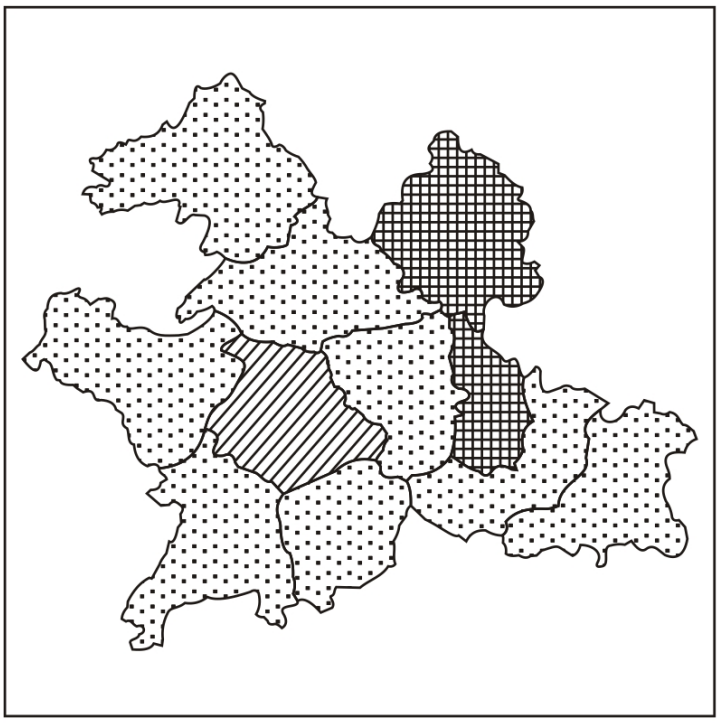
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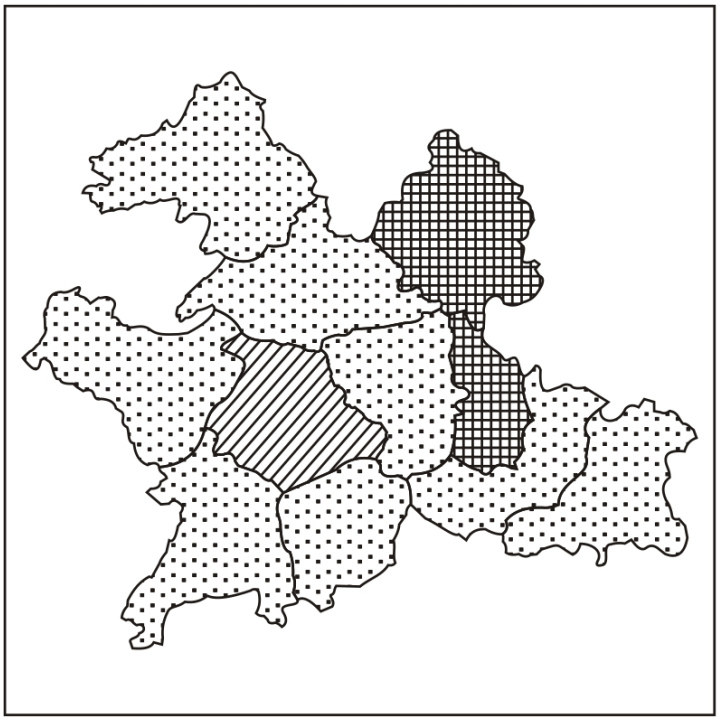
Fig. No.6.5

SOLAPUR DISTRICT

Percentage of Tertiary Workers (1991)



Percentage of Tertiary Workers (2001)



Percentage of Tertiary Workers

- Above - 20
- 15 - 20
- Below - 15

N

0 12 24 Km.

Fig. No.6.6

6.2 Literacy Pattern in Solapur District:

Literacy is many times considered as a fairly relevant index of the socio-economic development of a region. The variations in literacy, many times indicate, the place of which a society is getting transform. A level of literacy influences to a significant extent, the socio economic development of a region. Literacy also influences fertility, mortality, and economic composition of the population of a region. Without, an analysis of literacy pattern, therefore, a study of the population geography of a region is not complete.

Definitions of literacy vary from country to country. In India, all those persons who can read as well write in any language of the world are classified as literate. Levels of literacy vary enormously from one country to other. Even with the same country, the levels of literacy vary between urban and rural areas, among males and females and also different occupational and social groups. A large numbers of socio economic factors, such as nature of economy, levels of urbanization, standard of living, place of females in society, educational opportunities and levels of technological development influence the literacy pattern.

6.2.1 Spatial Literacy Pattern In Solapur District (1971-2001):-

The percentages of literates to the total population for the year 1971, 1981, 1991 and 2001 have been calculated for total rural and urban areas. In the year 1971, only 33.90 percent literate were recorded, while those for urban areas and rural areas were of the magnitude of 49.10 percent and 28.20 percent respectively. It is expected, that due to the availability of educational facilities in the urban areas, the proportions of literate are higher, while for the rural areas, due to lack of educational facilities, the percentage of literate was low. Similarly, in the year 1981, when the pattern of literacy was of the order of 40.69 percent for the total literacy of the Solapur district. While for urban area it was 54.60 percent,

and for rural area it was 34.90 percent. It must be noted that for all the concerned decades the total literacy, have been increasing consistently and became of the order of 56.39 percent and 71.25 percent for the 1991 and 2001, respectively. While for urban areas, the literacy pattern was of the order of 69.00 and 77.51 percent respectively. For rural areas of Solapur district, though, it was higher than the previous decades but was lower than total and urban literacy for 1991 and 2001.

Table: 6.4

Percentage of literates for Rural and Urban areas in Solapur District (1971 - 2001)

Sr. No	Year	Rural	Urban	Total
1.	1971	28.20	49.10	33.90
2.	1981	34.90	54.60	40.69
3.	1991	51.15	69.00	56.39
4.	2001	68.26	77.51	71.25

6.2.2 Tahsilwise Literacy in Solapur District:

For different tahsils of Solapur district, the percentage of literacy was also calculated for the last four decades. The average literacy for the region was 33.90 percent for the 1971, being highest for the North Solapur tahsil, while lowest was for Mangalwedha tahsil. There are only four tahsils that show higher percentage of literates than the region average, these are in order of importance, North Solapur, Pandharpur, Barshi and Mohol. Rest of other tahsils represents low percentage of literates than the region average in the year 1971.

For the year 1981, the total literacy for the district was 40.69 percent. North Solapur Tahsil again retained the first position as regard

SOLAPUR DISTRICT

Percentage of Literates
Rural-Urban in Solapur District
(1971-2001)

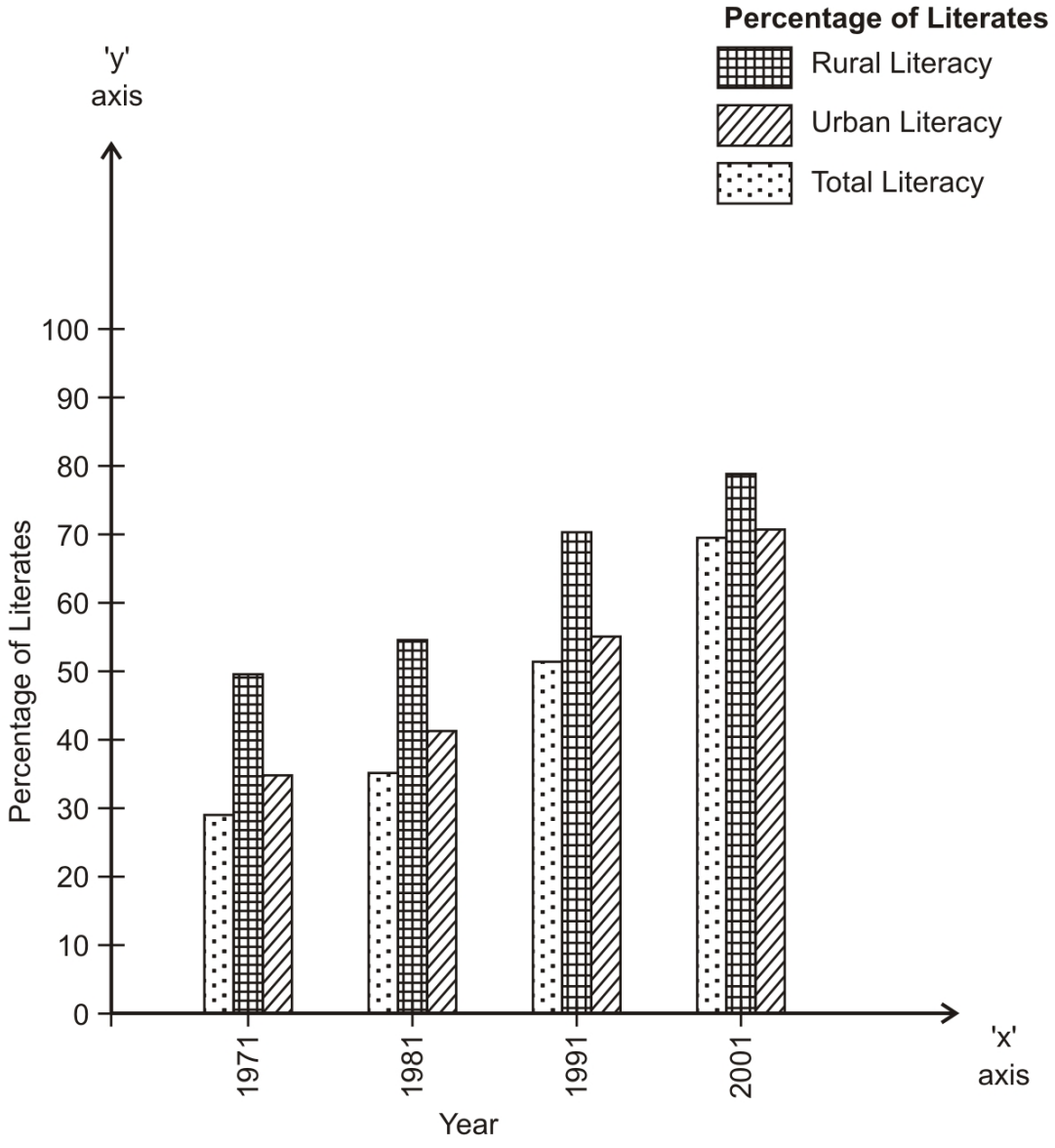


Fig. No.6.7

to percentage of literates, while lowest again for the Mongalwedha tahsil. In this year, there were only two tahsils namely North Solapur and Barshi which were above the region average for the literacy, while rest other tahsils represented much lower percentage of literates below the average for the region.

In the year 1991, the district total percentage for literates was estimated 56.39 percent; North Solapur has occupied the first position as far as the total literacy within the various tahsils concerned. In the year 1991, Akkalkot tahsil lagged behind than other tahsils of the district. There are wide variations in the percentage of literates within the district of Solapur. There are only two tahsils in the year 1991, having the higher proportion of literates than the region average and rest other tahsils were found below the region average.

Table : 6.5

Percent of literates to total population in each tahsil of solapur district (1971-2001)

Sr. No.	Tahsil	Percentage of literates			
		1971	1981	1991	2001
1.	Karmala	29.23	36.32	52.24	68.66
2.	Madha	30.86	40.58	57.02	70.14
3.	Barshi	35.47	44.19	61.67	74.09
4.	North Solapur	45.32	50.43	65.64	76.09
5.	Mohol	35.18	37.09	52.06	69.54
6.	Pandharpur	35.85	39.39	54.70	69.54
7.	Malshiras	28.39	36.49	54.09	71.67
8.	Sangola	25.85	33.52	49.73	66.28
9.	Mangalwedha	24.63	32.54	51.04	66.67
10.	South Solapur	28.77	33.61	49.45	67.37
11.	Akkalkot	28.78	35.00	46.39	67.74
	District Total	**33.90**	**4069**	**56.39**	**71.25**

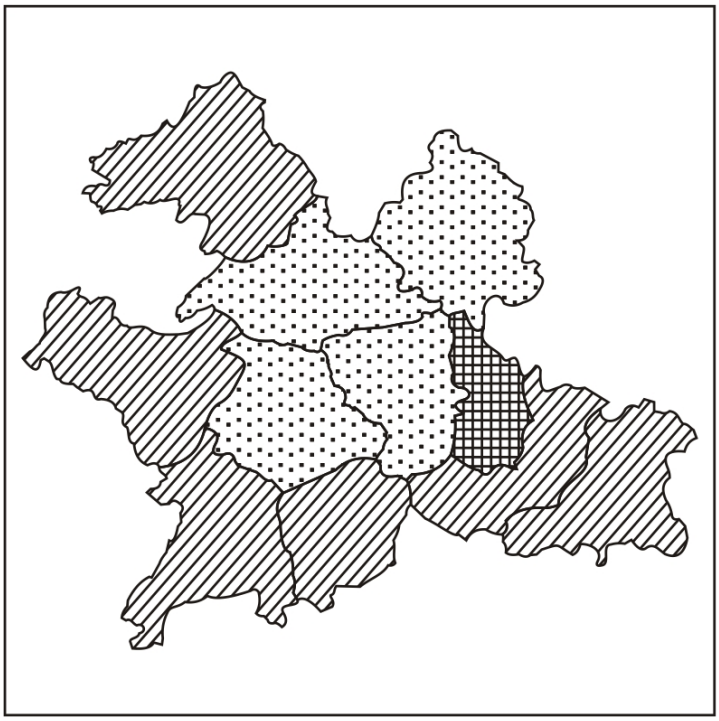
In the most recent decade for 2001, due to social awareness among the people, remarkable percentages of literate were recorded in the year 2001. For the district as a whole, the percentage of literate was observed 71.25 percent, being highest for the North Solapur tahsil while lowest for the Sangola tahsil. In the north Brashi and in the central part of region, the northern Solapur tahsil and in western part of district, Malshiras depict higher percentage than the region average. One more point to note that due to social awareness among the people, most of the tahsils of Solapur district have recorded very astonishing percentage of literate in most of the tahsils and as a result of this, there are not so wide variations in the literacy rate within the different tahsils of the Solapur district. It may be state that the primary education facilities are being made compulsory by the Government in order to improve the standard of living of the people. This has also been observed that now a day, parents living in the rural areas are taking increasing interest to teach their children without making distinction between male and female child.

6.2.3 Tahsilwise Male literacy in Solapur district (1971 - 2001):

In the year 1971, the percentage of male literacy was calculated to 46.40 percent. Within the district, the percentage of male literacy varies from one tahsil to another. The highest percentage of male literate was for North Solapur tahsil, while the lowest was recorded for Mangalwedha. North Solapur tahsil due to the existence of Solapur city and number of educational institutions might have resulted in the high percentage of male literate, while due to less educational facilities resulted, lower percentage for Mangalwedha. Barshi and Pandharpur tahsil relatively having higher urban population have also shown relatively higher percentage which is more than 48 percent for both tahsils. There are four tahsils, namely, Karmala, Madha, South Solapur and Akkalkot which shown the percentage of literate between 40 to45 percent of male

SOLAPUR DISTRICT

Percentage of Literates (1971)



Percentage of Literates (1981)

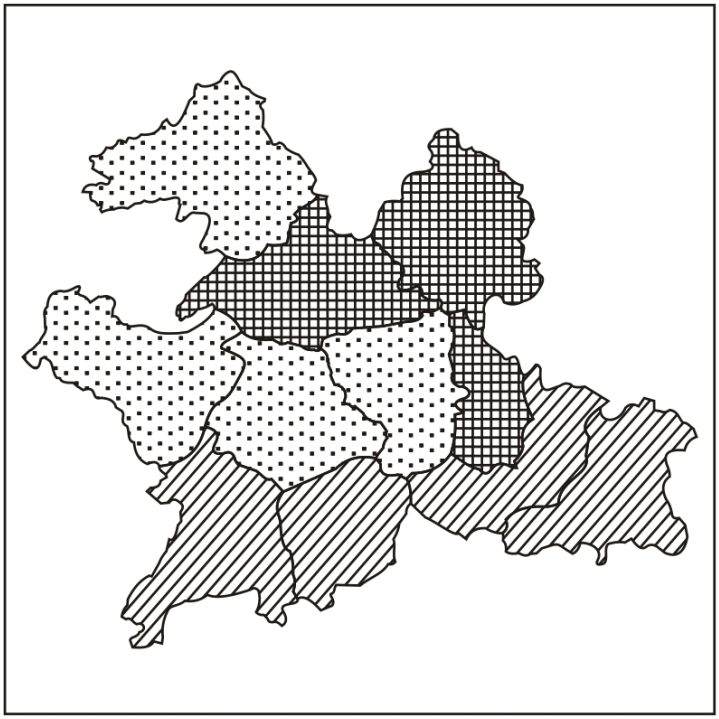
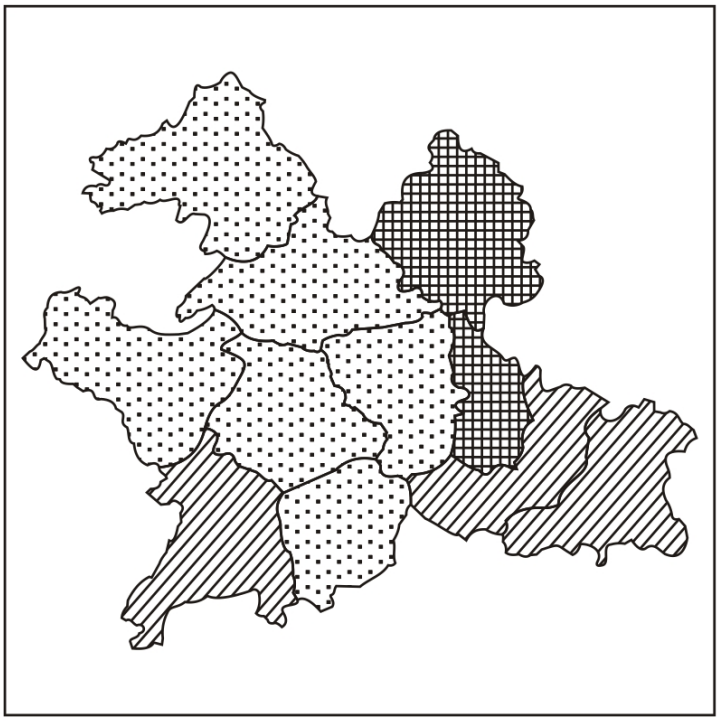


Fig. No.6.8

SOLAPUR DISTRICT

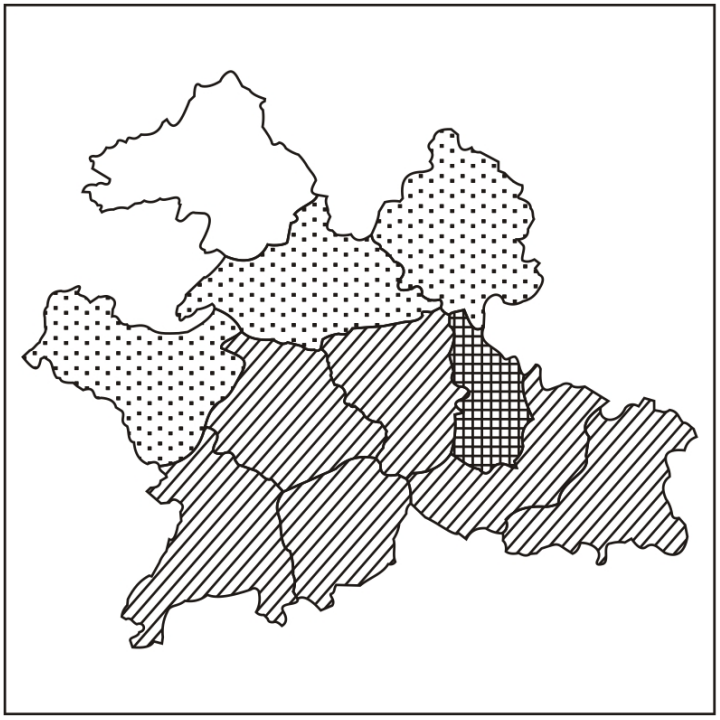
Percentage of Literates (1991)



Percentage of Literates

- Above - 60
- 50 - 60
- Below - 50

Percentage of Literates (2001)



Percentage of Literates

- Above - 75
- 70 - 75
- Below 70

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Fig. No.6.9

literates remaining tahsils of the district have except Mohol, the percentage of the male literate below 40 percent. This may be stated, that with the degree of urbanization and the percentage of secondary and tertiary workers, which have great bearing upon the male literacy rate in the year 1971.

Similarly, in the year 1981, North Solapur represented higher percentage, while Mangalwedha represented lower percentage of male literates. The tehsils, having more than fifty percent male literates, were Madha, Barshi and Pandharpur and between fourty five to fifty percent male literates were found in Karmala, Mohal, Malshiras, Sangola and Mangalwedha tahsils. There were only two tahsils namely North Solapur and Barshi, which have shown higher percentage than region as a whole, while rest of tahsils represented below percentage of male literate than the region under study.

There has been tremendous improvement in the rate of male literacy for the next two decade as the percent age of male literates became as high as 70.08 percent for the year 1991, for the district as a whole. Three tahsils namely North Solapur, Barshi and Madha have shown higher percentage than the district as a whole. As expected, North Solapur occupies first rank, followed by Barshi and lowest percentage of male literate was recorded for Akkalkot tahsil in the Sourthern parts of the district. Between 65 to 70 percent male literates were found in Karmala, Mohol, Pandharpur, Malshiras, Mangalwedha and South Solapur tahsils in the year 1991. And rest tahsils represented below 65 percent male literates in the year 1991.

Table 6.6

Percentage of male literates in each tahsil of Solapur district :

Sr. No.	Tahsil	Percentage of Male literacy			
		1971	1981	1991	2001
1.	Karmala	40.30	48.71	65.67	79.41
2.	Madha	42.08	52.86	70.59	80.40
3.	Barshi	48.46	57.58	75.58	84.50
4.	North Solapur	58.47	63.25	78.19	86.04
5.	Mohol	47.25	49.73	65.10	80.00
6.	Pandharpur	48.22	51.77	67.25	80.32
7.	Malshiras	38.42	48.97	67.26	81.95
8.	Sangola	38.43	46.15	64.89	78.47
9.	Mangalwedha	36.54	45.50	66.58	78.64
10.	South Solapur	41.98	47.49	66.40	79.69
11.	Akkalkot	42.83	49.47	62.59	80.23
	District Total	**46.40**	**53.56**	**70.08**	**81.99**

For the year 2001, due to improvement in educational facilities, there has been substaintial increase in most of the tahsils of the Solapur district as the percentage of male literates became as high as more than 82 percentages for the region as a whole. This impressive increase in male literacy was highest for the North Solapur tahsil, due to high concentration of urban population and industrial activities. It is followed by Barshi tahsil where the percentage of male literates was 84.50 percent. Except, these two tahsils, all other represented, percentage of male literates, below the region as a whole. More than 80 percent of male literates were found in the seven tahsils of the district namely Akkalkot, Malshiras, Pandharpur, Mohol and Madha; other than the two as mentioned above. And karmala, Sangola, Mangalwedha and South

Solapur tahsils have shown the percentage of male literates below 80 percent. It may be concluded, that there has been consistent increase in the percentage of male literates for the district of Solapur and its tahsils during the last four decades. The variation between one regions to another are influenced by the different economic activities, the degree of urbanization and industrialization in the region under study.

6.2.4 Female Literacy in Solapur District:

After the independence of India, the preference has been given to female literacy, number of facilities, have been provided by the Government to primary education both for male and female. At present, Government has furnished the scheme of free education for female till 12^{th} standard. Apart from this the free midday food supply to the children up to the seventh standard is also provided. This has resulted in the improvement of female literacy even in Solapur district. It is clear from the fact, that in the year 1971, the percentage of female literates was 20.49 percent for the district as a whole, which has consistently went on increasing for the next three decades and finally, it became 58.84 percent, in the year 2001. Again over all this trend of increase in the percentage of female literacy as also been observed for, all the tahsils, within the district for all four decades concerned.

India is a country of male dominated society, where all the major decisions are taken by male. Females are supposed to work at home and look after their children. But, now the situation is the changing very rapidly, because Government policies have provided, at least 33 percent reservation for services to females, in most of the sectors of the economy. As a result of it, females can also participate in the production of all economic activities. This has provided an opportunities to females, to stand on their own feet and economically they can become more independent from the table 6.7 it is clear that during the last four decades

SOLAPUR DISTRICT

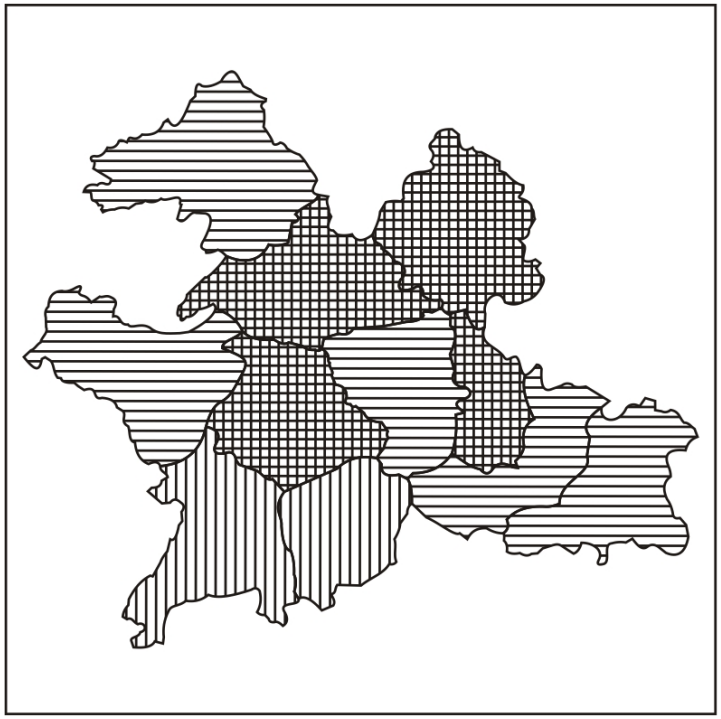
Percentage of Male Literates (1971)



Percentage of Male Literates

- Above - 45
- 40 - 45
- Below - 40

Percentage of Male Literates (1981)



Percentage of Male Literates

- Above - 50
- 47 - 50
- Below - 47

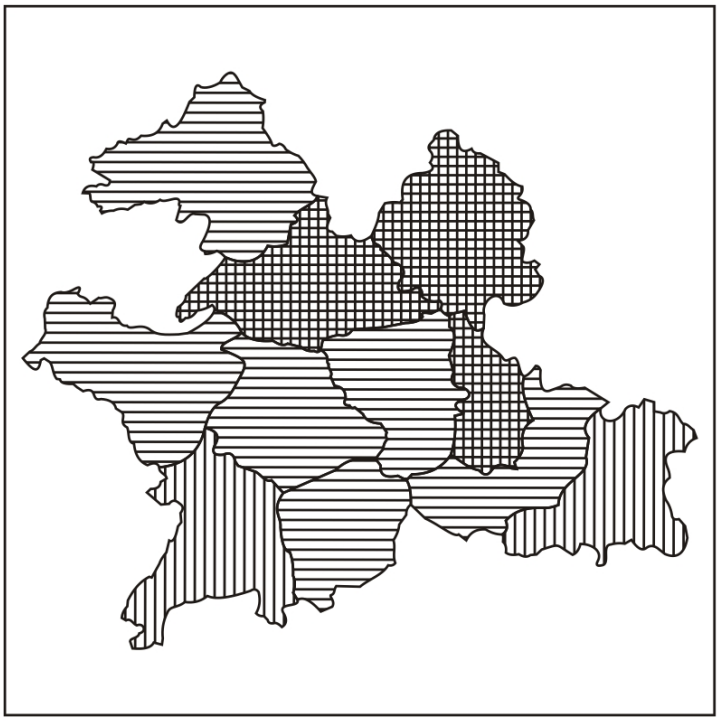
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Fig. No.6.10

SOLAPUR DISTRICT

Percentage of Male Literates (1991)



Percentage of Male Literates (2001)

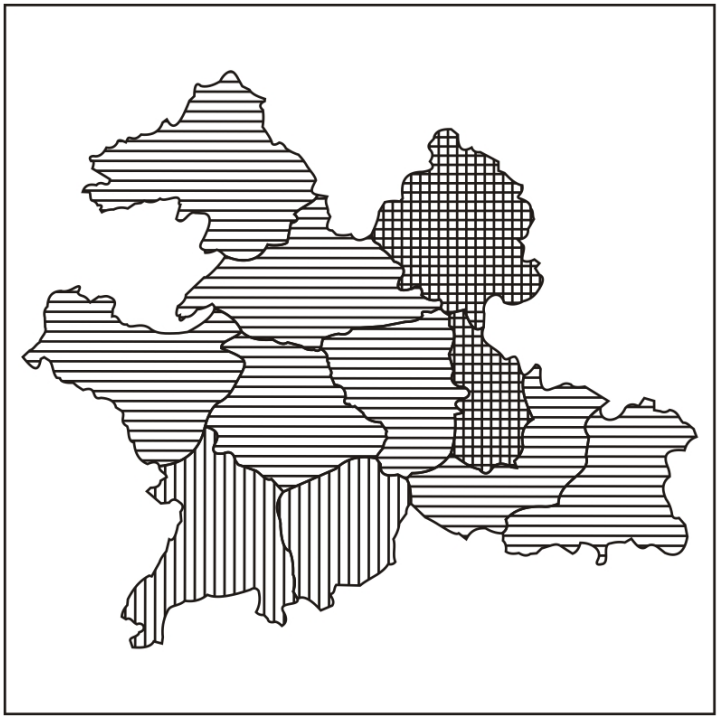


Fig. No.6.11

the percentage increase in female literacy was quite impressive, because almost in each tahsil the percentage has gone up many times during the period 1971-2001.

Table 6.7

Female Literacy in Solapur District

Sr. No.	Tahsil	Percentage of Female literacy			
		1971	**1981**	**1991**	**2001**
1.	Karmala	17.46	23.28	37.85	57.13
2.	Madha	18.85	27.56	42.35	59.11
3.	Barshi	21.62	36.60	47.36	63.04
4.	North Solapur	30.94	39.70	52.35	65.78
5.	Mohol	22.28	23.61	37.91	58.23
6.	Pandharpur	22.51	26.14	41.14	58.36
7.	Malshiras	16.55	23.16	39.78	60.63
8.	Sangola	12.22	19.32	33.73	53.41
9.	Mangalwedha	11.95	18.76	34.07	53.68
10.	South Solapur	14.60	18.72	32.18	54.21
11.	Akkalkot	13.96	19.99	29.30	54.17
	District Total	**20.49**	**26.93**	**41.73**	**58.84**

There are still wide variations in terms of female literacy within the different tahsils of district. In the year 1971, the North Solapur tahsil, due to the presence of Solapur city itself, the percentage of female literacy was more than 30 percent. On the other hand, the Mangalwedha tahsil recorded least percentage of female literates, because of lack of education facilities. There are four tahsils, where the percentage of female literates was below 15 percent, consisting of southern four tahsils of Sangola, Mangalwedha, South Solapur and Akkalkot. Besides, there are three tahsils in north western part of district, consisting of Malshiras, Madha

and Karmala represented the percentage of female literate in between 15 to 20 percent. Rest other three tahsils of Barshi, Mohol, Pandharpur in the north central part of the district represented the percentage of female literacy in between 20 to 25 percent.

In the year 1981, the percentage of female literacy for region as a whole was 26.93 percent. Though, North Solapur stands in first rank as regard to female literacy in the Solapur district, but there are other two tahsils namely Barshi and Madha which also have high percentage of female literacy than the region average. Unfortunately, South Solapur tahsil though is in the vicinity of the Solapur city has represented lowest percentage of female literates in the district. Like previous decades, southern four tahsils of the district represented lower percentage of female literacy which was below 20 percent. Karmasla, Mohol and Malshiras shows, the percentage of female literate between 20 to 25 and Madha and Pandharpur represented between 25 to 30 percent for female literacy.

In the year 1991, the region as a whole, represented 41.73 percent female literacy, as expected, North Solapur occupied first rank, while Akkalkot in the eastern part of the region as represented lowest percentage of female literacy. This recorded below 30 percent. Sangola, Mangalwedha and South Solapur have shown percentage of female literates in between 30 to 35.

There are other three tahsils, namely Karmala, Mohol, Malshiras which show the percentage of female literates between 35 and 40 percent. Except, North Solapur tahsil, where the percentage of female literates were more than 50 percent rests other three tahsils, namely Madha, Barshi and Pandharpur shows the percentage of female literates, below fifty percent.

SOLAPUR DISTRICT

Percentage of Female Literates (1971)



Percentage of Female Literates (1981)

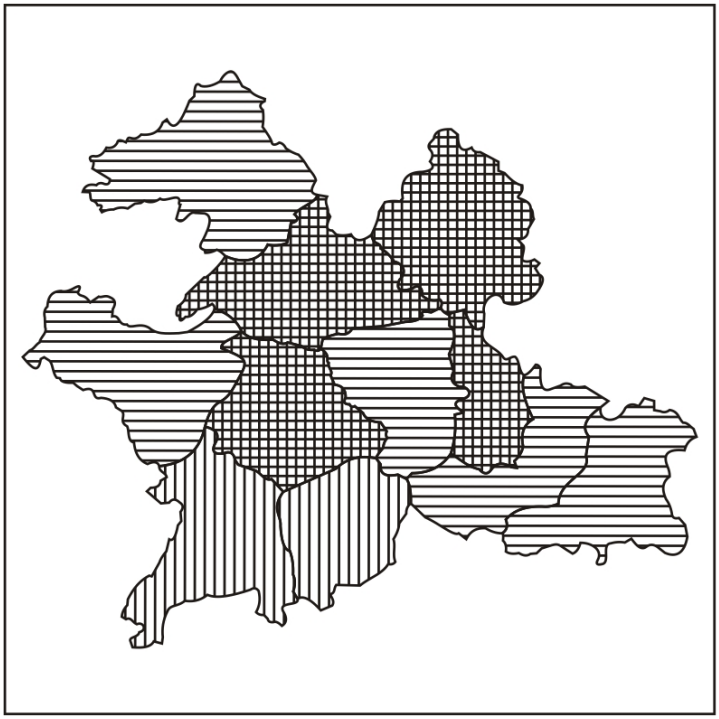
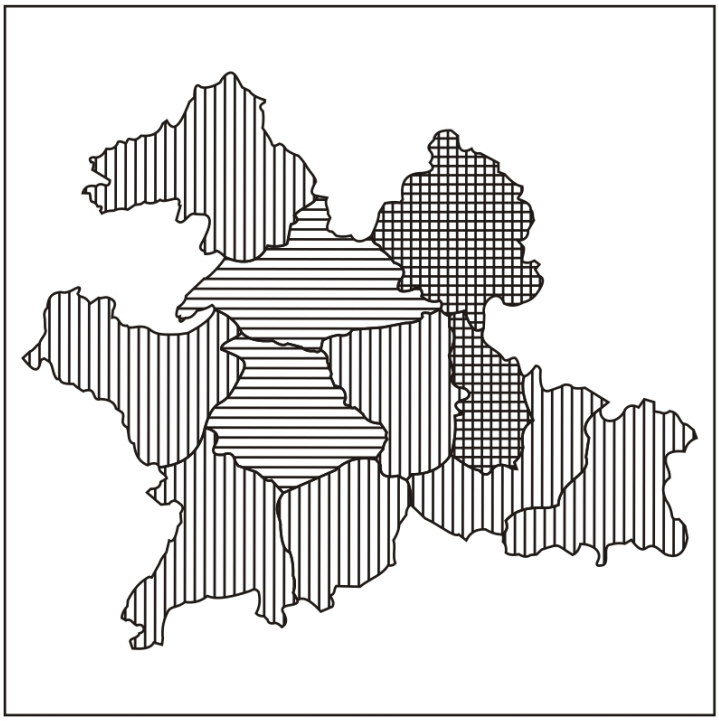


Fig. No.6.12

SOLAPUR DISTRICT

Percentage of Female Literates (1991)



Percentage of Female Literates (2001)

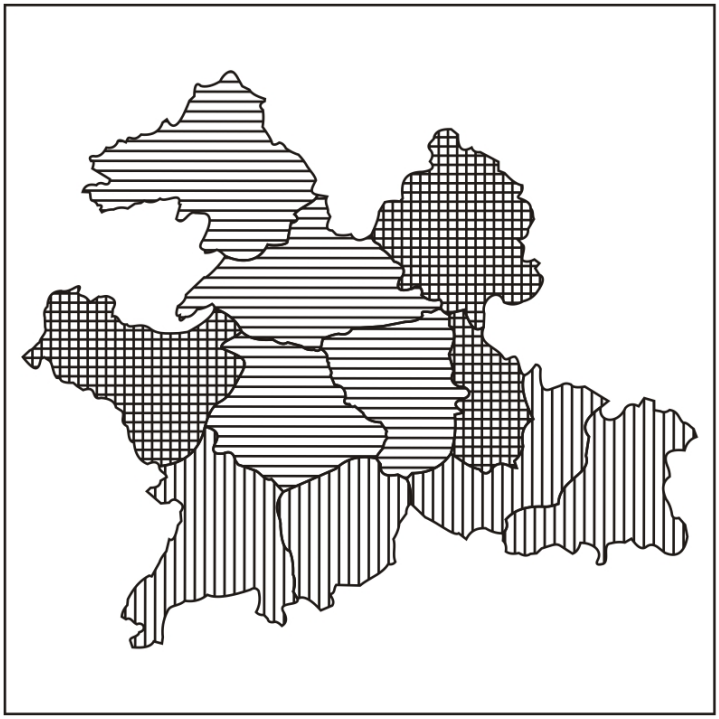


Fig. No.6.13

The most recent decade of 2001, has shown tremendous improvement in percentage of female literates. The region as a whole, has shown the percentage of female literates to 58.84. The North Solapur being in the first rank followed by Barshi where the percentage of female literates were more than 63 percent, Malshiras also represent third position as regard to percentage of female literates. The four southern tahsils namely, Sangola, Mangalwedha, South Solapur and Akkalkot recorded below 55 percent of female literates. And rest of other four tahsils of Karmala, Madha, Mohol and Pandharpur has shown the percentage of female literates, between 55 to 60 percent. In short, it may be concluded that the equal importance given to female by Government has open the way for females in the race of progress hand in hand with males. This has been shown by the spatial and temporal variations in the female literacy in the Solapur district. As a matter of fact, females are also participating enthusiastically in all sectors of economic activities, as well as in political sectors.

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CHAPTER-VII

CORRELATION MATRIX OF THE VARIABLES, INFLUENCING ON CHARACTERISTICS OF POPULATION IN SOLAPUR DISTRICT

Introduction

7.1 Growth Rate of Population and Birth Rate

7.2 Growth Rate of Population and Infant Mortality Rate

7.3 Growth Rate of Population and Literacy Rate

7.4 Growth Rate of Population and Male Literacy

7.5 Growth Rate of Population and Female Literacy

7.6 Growth Rate of Population and Percentage of Rural Population

7.7 Growth Rate of Population and Percentage of Urban Population

7.8 Growth Rate of Population and Workers in Agriculture

7.9 Growth Rate of Population and Proportion of Workers in Manufacturing.

7.10 Growth Rate of Population and Per Capita Income

7.11 Growth Rate of Population and Density of Population

7.12 Growth Rate of Population and Sex Ratio

7.13 Growth Rate of Population and Age at Marriage for Male

7.14 Growth Rate of Population and Age at Marriage for Female

7.15 Growth Rate of Population and Proportion of Muslim Population

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7.17 Growth Rate of Population and Road Density

7.18 Growth Rate of Population and Percentage of Schedule Caste

7.19 Growth Rate of Population and Percentage of Schedule Tribe Population

7.20 Growth Rate of Population and Persons per Household

7.21 Growth Rate of Population and Death Rate

CHAPTER – VII

CORRELATION MATRIX OF THE VARIABLES, INFLUENCING THE GROWTH OF POPULATION IN SOLAPUR DISTRICT

INTRODUCTION:

The subject matter of Geography, like that of other social and natural sciences, has been undergoing changes during the last few decades. The traditionally held view the geography deals with distribution of the earth is a challenge faced by contemporary geographers. Advances in technology and scientific methods have provided more accurate data and information about the various features of the geographical landscape and this in turn has provided the geographer with an opportunity to search for the explanations about the patterns of distribution of physical, economic and socio cultural elements, and the relationship if any among them.

Thus, starting for qualitative descriptions, the study of geography now makes use of quantitative data in distribution analysis and interpretation of the spatial patterns and variations in socio-economic and geographical elements.

The measurement of associations among the different elements of the geographical landscape and difference of the spatial patterns would require the application of appropriate techniques. Geographers are familiar with techniques of mapping and tabular analysis of data. Even then the explanation of the patterns of distribution tends to be may description of the features observed. Where the explanation is provided, it is likely to be based on a subjective judgment. For example, given the maps of the distribution of rainfall and proportion of area under rice to total cultivated area, we, might be able to compare the pattern usually and

say that the areas of high density of population is found in most productive river valleys having enough amount of rainfall.

The growth of population is influenced by the number of factors in a particular region. The important factors such as the demographic factors, economic factors, social factors and physical factors have great bearing upon the growth of population. The theoretical aspects of any phenomena occurring over the surface of the earth may not give very authentic information, but when it is proved on scientific ground, facts become more clear. In Geography, most of the things are descriptive with the reasoning of, why and how are the most important enquiries. How and why, provide an answer and support the arguments discussed theoretically. In Geography, both, qualitative and quantitative aspects have its important which denotes the quality and quantity of any component.

Now a day, Geography is not merely descriptive subject. The use of statistical techniques and quantitative methods by using computer has enables geographers to bring out the most authentic and correct results from the analysis of data and information associated with a particular region. Geographical information system (GIS) has open the new ways, for geographer to interpreter various kinds of problems within a region on the surface of the earth. GIS are applied to find out exact situation and position of the facts. The analysis by using computers with the help of software program, solve the difficult problems within a short period of time.

For Solapur district a region under study for the growth of population, an attempt has made to find out different problems associated with the growth of population and its future oriented program and planning to implements for the improvement of overall human social and economic conditions. Though, there are a number of statistical techniques

and quantitative analysis like mean, median, mode, standard deviation, mean deviation, principle component analysis regression line analysis factors analysis and co-efficient of correlation. Here, an attempt has been made to find out the relationship between growth of population on a one hand and different social-economic, physical, variables on other hand. A co-relation matrix has been prepared for different variables in order to establish relationship between population growth and different socio-economic and physical variables. The variables that have been taken into consideration are shown in the (Table 5.1)

7.1 Growth Rate Of Population and Birth Rate:

In order to understand, some of the problems associated with rapid growth of population in Solapur district, the contribution made by various factors have been assessed for all the tahsils of the district. Data giving total births and deaths were collected from the socio-economic abstract, published by the Government of Maharashtra. It was, therefore, necessary to analyze clearly the factors influencing variations, to establish their relationship to the growth of population. This might help in deciding a strategy to regulate the growth of population. With this view in mind, the tahsil level data regarding various demographic, economic, and social factors were collected from different sources and were analyzed accordingly.

In an economically backward region, like Solapur, demographic factors such as birth rate, death rate and infant mortality rates were excepted to influence the variations in the growth rate of population in a very significant manner. By using tahsil level data, the co-efficient of correlations were calculated between these factors on one hand and variations in growth rate of population and birth rate on other hand separately.

Among the demographic factors, the one that was taken into consideration, first was the birth rate by using tahsil level data when co-efficient corelation was calculated between the growth rate of population and birth rate for entire district, the value of 'r' (0.77) was found to be positive and significant. Such a high value of 'r' shows that variations in birth rates have a direct bearing on the variations in the growth rate of population in Solapur district.

The relationship between growth rate of population on the one hand, and the birth rate on the other shows very clearly that in an economically and socially backward regions like Solapur. The birth rates are higher influencing the higher growth rate of population. The reasons for high growth rate of population are an account of high birth rate of population in Solapur district. Now, the question arises, that why birth rates are higher in region under study. The answer for this question is very easy that in such poor economic and backward region predominantly agricultural and where more than 70% people engaged in primary sectors. Generally people desire more hands to work in their fields to increase their income. Secondly the children are the only hope for the old age security and protection to them. Hence, people do not stop on one child but they continue to produce more and more children, resulting in high birth rate, and consequently on the high growth rate of population.

7.2 Growth Rate of Population and Infant Mortality Rate :

In the similar way, to understand the relationship between growth rate of population on one hand, and infant mortality rate on the other, the value of co-efficient of correlation was 0.77 positive and significant. This means that with increase in infant mortality rate, that are the children below one year of age or children during sucking period. Obliviously with high infant death, the people would like to have more children for

their old age security and protection. This has resulted in high growth rate of population in a country like India in general and Solapur district in particular. In short, it may be stated that with increasing mortality rate, the birth rates goes on increasing in a developing regions like Solapur. Hence, with a high infant mortality rate which in turn affect high birth rate and consequently, affecting high growth rate of population. This has been proved by the positive 'r' value of 0.77, between infant mortality rate on one hand and growth rate of population on other.

7.3 Growth Rate of Population and Literacy Rate :

When the correlation co-efficient between the growth of population and literacy rate were calculated by using the tahsil level data for Solapur district, it was found positive of 0.487, contrary to expectation. The value of 'r' may be interpreted in a region like Solapur that literacy has not still influenced the growth rate of population negatively. The birth rates are still high in Solapur district with high literacy rate. This may be interpreted in other way round that the proportion of people belonging to schedule caste is relatively high. The proportions of the people belonging to lower economic strata group, still do not believe fully in the family planning programme and small norm of the family. Most of the, such joint families and they are not highly literate, resulting in high birth rate. Therefore, the correlation co-efficient was positive and significant between the growth rate of population and literacy rate in Solapur district.

7.4 Growth of Population and Male Literacy:

It is expected that like total literacy rate, the impact of male literacy rate on the growth of population will be the same. However, the male literacy rate gives the negative value of coefficient of co-relation. It means that there is a relationship between male literacy and growth of

population negative, though not very significant. The value of ‘r’ is calculated to be – 0.25. It clearly indicates that with increase in male literacy in the Solapur district, the growth rate of population goes on declining. The may be interpreted that with high male literates, the social awareness among the people becomes high. Males are very much conscious about the norm of family size and standard of living. India is a pre-dominantly male country where most of the decisions are taken by man only. The size of family is also decided by male. Hence, by the value of ‘r’ which is -0.25 makes clear that the impact of male literacy influence the growth of population negatively. As a matter of fact, it is desirable that with social awareness among the people particularly among the males the birth rate is controlled and family planning programs are readily accepted. Therefore, it is scientifically and logically, proved by the value of ‘r’ which is negative influencing the growth of population in Solapur district. This inverse relationship between the growth of population and male literacy rate is correct but contrary to total literacy rate. One more point worth mentioning, is the age at marriage of male literate, becomes higher, thereby a considerable period of reproductive age is lost. This, in turn influences the negative growth rate of population. Therefore, it may be concluded that the value of ‘r’ is in favor of increase growth rate of population in Solapur district.

7.5 Growth of Population and Female Literacy:

The education is an index of social and economics deployment. The education open ways to, adopt new and modern innovation. Higher the performance of literacy is reflected in the higher performance of the workers in secondary and tertiary sectors. The correlation, between growth of population and female literacy gives a negative values ‘r’ – 0.021. It means with growing female literacy the weight is given to

negative on the growth of population. It as a matter fact since that higher the performance of female literacy in a regions will be reflected in higher persons of female workers in secondary and tertiary sectors. The level of literacy and higher education also have open the way to higher age at marriage. It is a generally found, that with per capita of female literacy the awareness among the people for higher standard of living, higher per capita income and small family norms become most significant factors. These all factors have influenced growth of population inversely in the Solapur district. The value of co-efficient correlation supports the factors as mentioned above. In brief, it may be stated that with higher female literacy rate in a particular region, the growth rate of population decline this is very correct and in case of Solapur district the region under study.

7.6 Growth of Population and Percentage of Rural Population:

The percentage of rural population to total population shows a negative relationship with the growth of the population in Solapur district. It is a matter of fact, with increase in percentage of rural population to total population, the growth of population should increase, the value of ‘r’ is calculated to -0.73 between the two which shows that with high percentage of rural population in a particular region, the rate of growth of population declines, significantly. This may be partly due to out-migration of the rural people, in search of better employment particularly in the urban areas of the district. The rural urban migration leads to the urbanization process as the -0.37 value of the correlation co-efficient clearly indicates, that with higher percentage of rural population the growth population decline in Solapur district, which is the effect of rural urban migration.

7.7 Growth of Population and Percentage of Urban Population

The value of co-efficient of correlation between growth rate of population and percentage of urban population was 0.75. It is quite significant and positive. It clearly reveals that with high percentage of urban population, the growth of population rapidly increases. Generally, it is believed that in urban areas the growth of population should be lower than that of rural areas. However, here the situation is found in other way round. In case of Solapur district, the rural-urban migration has great bearing upon the growth of population. Most of the urban places, in fact, are the centre of economic activities, most of the literate and illiterate people who come to the urban places in search of better employment opportunities. This is how the urban population growth is considerably reflected upon the growth population. Therefore, it may be concluded that rural-urban migration has influenced the growth of population positively in Solapur district. The process of urbanization and consequent industrialization are intimately related. The spread of one leads to overall development of jobs. It has been supported by the positive and significant value of 'r' in Solapur district between the percentage of urban population and growth of population.

7.8 Growth of Population and Workers in Agriculture:

The proportions of workers in agriculture on the one hand, and the growth of population on other, depicts the value of co-efficient of co-relation (r) -0.697. This is quite significant but negative. It clearly means that with the increase in the proportion of workers in agriculture, the growth rate of population declines. It is further contrary to expectation in case of Solapur district. Here, it must be interpreted in terms of migration from the rural areas to urban areas. Though, the natural increase of population, which is the total number of birth deducting by the total

number of death in rural sectors. The out migration from the rural areas to urban places for the handsome wages, even than generally workers go to the nearby urban places. Hence, the proportion of workers in agriculture has inverse relationship between workers in agriculture and growth of population. Secondly educational facilities and job opportunities in various sectors, marriages attract people and negative impact is experienced in rural areas. Therefore, with increase in the proportion of workers in agriculture, the growth rate of population declines particularly in rural areas in Solapur.

7.9 Growth of Population and Proportion of Workers in Manufacturing:

In order to understand the relationship between percentage of workers in manufacturing and growth of population in Solapur district by using tahsil level data a co-efficient of correlation was obtained which was 0.765 positive and quite significance. The value of ‘r’ indicates that with the increase in the proportion of workers in manufacturing the growth rate of population also considerably increases. But the question arises why it is so. It may be interpreted that with the high percentage of workers in manufacturing increases the per capita income to support their family. Most of the secondary types of activities are available in urban places in the Solapur district. Therefore, literate and educated peoples are associated with the manufacturing activities in the urban centre of the district which in turn positively affect the growth of population in the region under study. It is also proved by the ‘r’ value of 0.765 in case of Solapur district.

7.10 Growth of Population and per Capita Income :

Per capita income is an index of development overall for a region. The standard of living of people is clearly reflected by the per capita income in a region. The economic activities may be primary, secondary and tertiary are expected to develop in a region where a per capita income is high. Lower the per capita income, poor and tower is the standard of living of the people and poor developed economic activities. In order to understand the relationship between the growth of population and per capita income, the co-efficient of correlation was obtained a strongly positive and much significance. The value of 'r' between the two is 0.874 that indicates that with increasing per capita income the growth of population also increases.

It is human tendency that in order to enhance the income, people desire more hand to work this in turn reflects the positive growth of population. The economic condition is the important means to leave comfortably and without worry. The economy of any region is a major factor to improve a high standard of living of people. Therefore, it is shown by the 'r' value that with high per capita income, the high growth of population is also resulted. This is true in case of Solapur district, as the tahsilwise data of growth rate of population and per capita income have shown positive value of 'r'.

7.11 Growth of Population and Density of Population:

Density of population and growth rate of population gives again positive and significant value of 'r' (0.761). It is a matter of common sense that with increasing density of population which is the number of person per square unit of area. If the density is high, naturally the growth rate of population should be high. Most of the civilization of the world have flourished and developed in the river valleys. Where, the natural

resources such as water availability, fertile soil for agriculture, favorable land for settlement were available. Even today, most of the river valleys and plain areas are density populated due to the availability of plenty resources. Solapur district is by and large, located in the homogeneous region drained by the Bhima, Sina, Man and Bori rivers. Therefore, with dense population the high growth rate of population is expected in Solapur district, which is supported by the correlation value between the two.

7.12 Growth of Population and Sex-Ratio:

Sex ratio is the ratio between the number of male and female. It is calculated by number of females per thousand males developing regions like India, the sex ratio is relatively low. Generally sex-ratio in the region under study, is around 935 per thousand males. It means that in the region under study there is gap of 65 females per thousand males. Since females are the only source of children and new generation, if their number is considerably low, certainly it will be reflected on the birth rate. Less the number of females, there will be less possibility of birth of the children. But in the country like India most of female children are not given the priorities and preferences like male children. Therefore, the female infant mortality is very high in such developing regions. There are many other socio-economic and demographic reasons in case of developed and advanced societies in the world where despite, high sex-ratio, the growth of population is low. But in the case of a developing region like ours where sex-ratio considerably is low and female mortality rate in particular is significantly high.

In order to check the relationship between growth of population and sex-ratio, the co-efficient of correlation value is calculated 0.429 which is positive, though not very much significant. In other words, with

high sex-ratio the growth of population is also reflected positively and high in Solapur district.

7.13 Growth of Population and Age at Marriage for Male:

Age at marriage is influenced the growth of population to greater extent. Late marriages, generally, waste considerable reproductive periods which in turn inversely influence the growth of population. Particularly, among the literate and highly educated male spend a lot of period in acquiring professional education like doctors, engineers, layers, journalist and other such as professor and scientists. The correlation between age at marriage for male and growth of population as a presents 0.511 positive and significant value of ‘r’. It means that if the age at marriage for female is increased the growth of population should decline as a common rule. But in this case, the situation is in other way around. Here, the age at marriage for male has positive relationship with the growth of population in Solapur district. It has been already mentioned in preceding discussion that age of marriage is higher generally in urban and industrial places. Though, such people engaged in secondary and tertiary sectors. These workers spend a considerable period of their life in attaining higher education may be general and technical education from rural areas, such educated people move to urban areas in search of better jobs. Hence, the growth in urban areas of population is higher due to late marriages of educated people. This is true by the positive value of 0.511 of ‘r’ for the case of Solapur district a region under study.

7.14 Growth of Population and Age at Marriage for Female:

India is a male dominated society, where most of the decisions associated to family are even today, taken by the man. As discussed in the previous factors of age at marriage for male, the correlation co-efficient is

slightly lower than for male. One most important point to note is that by increasing the age of marriage, the growth of population should decline, because a considerable period of reproductive is wasted. Hence, the number of children born to the same couple, decline to a greater extent. In order to understand, the fact of age at marriage for female, a correlation between population growth and age at marriage for female was calculated which was 0.486 positive and contrary to expectation the age at marriage for female has positive relationship with the growth rate of population. Now the question arises, why it is so? The age of marriage for female is high for those, who are highly literate and educated. A very precious time which, they have a spent in acquiring the education such as completing of graduate and post graduate degrees from different branches of knowledge such as engineering, medical, lawyers, and computer sciences, there by male and female financially become in dependent and strong. The sound economic conditions may be responsible for them to have children, which in turn affect positively the growth rate of population in Solapur district. Secondly, as mentioned earlier, though highly educated female, the decision for the size of family is taken by the male only to a greater extent in a region which is socially and economically backward like Solapur district.

7.15 Growth of Population and Proportion of Muslim Population:

The proportion of Muslim population shows, a positive relationship with the growth of population in Solapur district. The tahsilwise percentage of Muslim population on the one hand and growth rate of population on other, has given value of ‘r’ 0.436 positive. It clearly reveals that with the high percentage of Muslim population the growth rate of population increases considerably in Solapur district. This is because, even today the Muslim society lag behind in the general

education which is responsible to absorb them in the main stream of employment. Secondly, they do not readily accept the family planning program imposed by the government. It is generally observed that Muslim society wants to increase the number of children per couple, in order to increase the total number of Muslim population. Thus, it may be concluded that the Muslim dominated regions have high growth of population in Solapur district. As it is clear from the value of 'r' between the two.

7.16 Growth of Population and Proportions of Hindu Population :

The proportions of Hindu population, to total population on the one side, and growth of population on the other, have given a negative value of co-efficient of correlation, which is -0.411. It is a simple indication towards the declining trends of population growth. It is contrary to expectation that impact made by the percentage of Hindu population on the growth of population is negative. It can be understood by the fact, that Hindus are relatively more conscious to live a high standard life by controlling the small size of family. The small size of family will be reflected upon the high and sound economic conditions of the family. This is particularly true in case of highly educated people among the higher caste of Hindu religion. Many of the Hindus believe in small size of family. It is therefore, may be a stated that with high percentage of Hindus population have inverse relationship a negative relationship with the growth of population in a country like India and Solapur district is no exception to this rule.

7.17 Growth of Population and Road Density:

The accessibility is considered as the lifeline of the economy in a particular region. The means of transportation and communication, no

doubt influence the economic activities to a greater extent. The concentration of industrial development and other economic activities are found in areas which are easily connected with the roads railways and airways. For the purpose, to know the impact of road density on the growth of population, a correlation was calculated between the two. The calculated value of ‘r’ was found to be negative and most insignificant. It means that in a region like Solapur, the road density has not significantly influenced the growth of population. The region under study is predominantly agriculture where more than 70 percent people are still engaged in primary activities. Therefore, the accessibility of the road density does not shows any effect upon the growth of population in the region under study. The movement of the people within the region has not made any impact upon the growth of population. Though, it is a matter of fact, that with high density of the road the concentration of population becomes higher and higher resulting in the high growth of population. But in the case of Solapur, the situation is in other way around.

7.18 Growth of Population and Percentage of Schedule Caste:

The proportion of schedule caste to total population has a negative relationship to the growth of population. In case of Solapur district, the proportion of schedule caste population is high in comparison to state of Maharashtra. The value of ‘r’ -0.394 indicates that with increasing the proportions of schedule caste, the growth rate of population declines. The literacy rate among the schedule caste population is relatively low. Hence, the workers from these castes migrate to near by district like Pune, Ahmadnagar, Bijapur and Bidar in search of work. This has resulted in the inverse relationship to the growth of population in Solapur district. This is again contrary to expectation; with high proportions of

illiterate people belonging to schedule caste should have shown positive relationship with the growth of population. With poor economic condition, of the standard of living becomes poor and lack of luxurious life's, lack of recreational facilities would have encourage them to have more number of children per family healthy. But due to their migration from the source region have shown opposite relationship with the growth of population.

7.19 Growth of Population and Percentage Schedule Tribe Population:

Like schedule caste population, the percentage of schedule tribe also shows negative relationship with the growth of population. In Solapur district the percentage of schedule tribe is insignificant. Hence, the impact of schedule tribe on the growth of population is negative and insignificant. Schedule tribe belongs to the lower strata of the society. Their economic condition is very poor since such people are associated with the primary economic activities. The value of 'r' is calculated of -0.191 between schedule tribe population and growth rate. The growth of population declines with high percentage of schedule tribe population. It means, the schedule tribe who are born in the different tahsils of Solapur district are enumerated somewhere else. This results in the opposite or negative growth rate of population in the district.

7.20 Growth of Population and Persons per Household:

It is a matter of commonsense that with large size of family, there is a possibility of high birth rate. The correlation between person per household and growth rate of population shows positive 0.185 but insignificant relationships to a certain extent. Though, the persons per household means, if the family is a small, the growth of population will

be lower and if the size of family is large, the growth of population will be higher. There is a saying of a slogan by the family planning department that “HUM DO, HAMARE DO”. To a certain extent this has also positively affected and controlled the growth rate particularly among the highly educated people. But in our nearby country namely China which is most populous in the world has made a policy regarding the family planning program in order to control the growth rate of population they accepted and implemented in their life a slogan like “HUM DO, HAMARA EK” means we are two-ours is one. The government policies of China award such small size family by providing them better employment opportunities and many other benefits are provided to them. India should also apply such family planning program to control the growth rate of population. In Solapur district, the size of the family and growth rate of population shows positive relationship as it is shown by the value of ‘r’.

7.21 Growth of Population and Death Rate:

It is only a death, which reduces the population over the surface of the earth. Perhaps, if there would not have been deaths, the size of population would have remained by and large constant. While discussing the impact of birth rate over the growth rate of population, it was found that in a country like India in general, and the Solapur district in particular, the birth rates are high on account of high death rates. In order to examine the impact of death rate on growth rate of population in Solapur district, the value of ‘r’ is calculated between the two. It is 0.733 positive and very significant. In a region like Solapur, the growth rates of population are higher on account of high death rates. Because, of insecurity, people do not like to take risk by having only one or few children. In case of accidental death of their children, the danger of old

age security allows them to go far many more children. Hence, the value of 0.733 shows a strong and positive relationship of death rate with the growth rate of population in Solapur district. In other words, with high death rate, there will be high decline of population growth and with lower death rate there will be increase in the growth of population.

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CHAPTER - VIII

CONCLUSIONS AND SUGGESTIONS

The main purpose of this chapter is to sum up and give conclusions and suggestions. Population geography is a recently, developed branch of human geography. In any region population characteristics are of various types, suitable suggestions are also given. The present study entitled "A study of population characteristics of Solapur district" is an attempt, to study various types of population characteristics. The following result has emerged from the analysis. The topics of research are divided into eight units such as, introduction of the region, background of the region, growth of population, density and distribution, age and sex structure, literacy and occupation structure, correlation matrix of the variable influencing growth of population in Solapur district and last section is of conclusions and suggestions.

The first chapter, deals with the introduction of the topic, in which meaning and significance of population geography, choice of the topic and choice of the region have been considered. The hypotheses, objectives, the sources of data and methodology have also been discussed.

The present work entitled "A study of population characteristics in Solapur district" is an attempt to analyze the major characteristics of population and these characteristics have influenced the social and economic aspects in region under study. Population is the major source of any work. Due to growing awareness among geographers of the fact, that geography is one of social sciences hence, geographers they are taking interest in the study of problems related to population.

Population geography is a recently developed branch of human geography. While geographers have, generally been interested in relationship between population compositions, migration, the population

characteristics which have only recently assumed importance in geographical study.

According to Trewartha, population geography can be defined as "The understanding of regional differences in the earth's covering of people. In the words of Madam Beaujea Garnier, the problems of population geographers are one describing" the demographic facts in their present environment context studying also causes, their original characteristics and possible consequences." Clark has explained the definition of population geography concerned "with demonstrating how, spatial variations in the distribution, composition, migration and growth of population are related to spatial variations in the nature of places".

In the words of Millar, "Geography may be defined as an exact, organized knowledge of the distribution of phenomena on the earth surface". The study of population by geographers, therefore, leads to a better understanding of the process creating areal distribution. Population geography places for greater emphasis upon maps and therefore, man become the focus of the study in a more precise sense. The study of population geography is concerned, itself, with population size, its structure, characteristics, distribution and changes taking place in them through time. The study of population, therefore, is multidisciplinary in nature, involving, knowledge of geography biology, statistics, Economics and Sociology.

Population geography is therefore, necessary to discuss its need, scope and aim. But we may first start with the term demography. Demography as a field of enquiry, originated in 1662 with publication of John Grants observations, but the first term used by Achille Guillard in 1855. The elements of demography such as fertility, mortality and territorial movements and changes the components of population.

Some authors have distinguished between demography and population studies. Thus, while demographic analysis is confined to the study of the components to population variation and changes in population studies are concerned not only with population variables but also with the relationship in between population variables like social, economic, biological and geographical.

For the economists, the inter-relationship between population growth and economic development, as a source of manpower and labour supply must be of principal interest. The interest of sociologist in population studies has been indicated for morphologic, social, the term used by another includes of the physical form and structure of groups of populations. The tremendous growth in population of the world during the past two centuries is a matter of great concern in the realm of economic, social and political sphere. Three centuries back, the world population was 500 million and at present to more than 6300 million. There are three sections of population geography in past, population number and qualities of population and their regional pattern of distribution.

A more advanced study of population can form a course in applied geography. Such a study, infact, provides for the applied geography course at Punjab University, Chandigarh, known as population geography. In this applied course following topics are included in the scope of population geography.

1) The nature of demography, 2) elements of demography, 3) world population distribution, growth and economic development, 4) Population theories, population problems and migration, 5) Urban population of the world social characteristic of the urban population, 6) Composition of population.

The choice of the topic entitled, "A study of population characteristics in Solapur district", is not very arbitrary, since no study of Solapur district has been seriously attempted form population characteristics point view. Solapur district is a peculiar region with areas at different economic and social development. The study of various population characteristics in Solapur district, such as, growth of population, density and distribution, age and sex ratio, literacy and occupational structure. The present study belongs to the field of geography of population.

It is true that population study does not belong exclusively to the population geography; but to diverse disciplines of knowledge, like demography sociology, Anthropology, Psychology, Economics, History as well as Geography. A geographer, studies population not as a phenomenon itself but, as an already varying area characterizing elements.

The region under study lies in southern Maharashtra. Its geographic location is typical i.e. occupying region on the border of Maharashtra and Karnataka and sprawling on dry and semi-humid part of the state. Therefore, it is necessary to bring out the salient features of the population through geographic analysis. Apart from this, fertility, mortality the aspect of mobility also plays a major role. Solapur district occupies an important position in Maharashtra in terms of area and population. Hence, it is selected for the study of population characteristics in Solapur district. Hypotheses infact, are the basis of any research. These are facts and realities that exist in the region. Hypotheses are the pre supposition on which entire research is based. Hence hypotheses are foundation and basis to the research to be carried out of a particular problem. No study can be carried out without forming certain hypotheses.

Without objectives, no study can be fulfilled and completed. As a matter of fact, the chief purpose of research is to obtain, the result by fulfilling its objectives. Infact, the objectives are the goal to obtain by the researcher in this study.

The data is collected from the secondary source i.e. district census handbook of 1971, 1981, 1991 and 2001. The data is collected in respect of total population. Rural-Urban population total male and female population upto 2001. The family planning data have been collected from District Health Office, Solapur. Different tables are prepared for different purposes. The tables are used to analyze the data. The results obtained for above demographic characters have been used to prepare the maps.

The second chapter deals with various backgrounds of the region under study. In includes physical background like location physiography, drainage pattern, geology, climate, soil and natural vegetation. Besides, the historical, social and economic backgrounds have also been taken into account. The district of Solapur lies entirely in the Bhima-Sina-Man river basin. It is bounded by 17^0.10' norths to $18^0$32' north latitudes and $74^0$42' easts to $76^0$15' east longitudes. It covers an area of 14,878 square kilometers and has a population of 38,55,383 according to 2001 census. It is bounded by Ahemadnagar to its northwest, by Beed and Osmanabad districts to its east by Satara district to its west to the south west.

The district of Solapur is well defined to its west as well as to its east by inward looking scarps of Phaltan and Osmanabad plateau. Most of the area of the district belongs to the Deccan plateau region. There are two important hill ranges in the district, namely Mahadev and Balaghat hills. Physiographicaly Solapur district may be divided into three divisions. i) The hilly region ii) The plateau region and iii) The plain region. The hilly region occupied about 10 percent geographical area of the Solapur district. These hilly regions, are expected to be very poor

agriculturally and hence, human settlements are very few and far. In the western and south western region occupies its sizable area by Mahadev ranges and Shukaracharya ranges having average height more than 600 meters. There is another important Balaghat range in the north eastern part of district, having average height more than 600 meters to 750 meters. Almost, 70 percent of total Geographical area occupied, by the plateau region; which has an average height of 450 meters, to 600 meters. Mostly, this region is drained by the river Bhima and its tributaries, so the soils of plateau region are fertile and suitable for the production of various kinds of crops. The plain area in the Solapur district has 20 percent of the geographical area. The plain region is occupied by Bhima river and its tributaries. The central part of the district lies in the plain region. The soil of plain region is most fertile due to the deposition of eroded material transported by the river Bhima and its tributaries. Bhima river is most significant rain fed river which originate from the Bhimashankar plateau. Bhima and its tributaries are seasonal in character and remain dry during the summer season. The right bank tributaries of Bhima are Nira and Man, Bhima drains in the central part of Solapur and main feeders of river Krishna. It has an average length of 289 kilometers and making a shape of crescent near Pandharpur, locally it is called as Chandrabhaga, which is the holiest place in Maharashtra.

Geographically, the Solapur district is relatively small in area, and features associated with geology are not expected. Geological sequences in the Solapur district is divided into two main categories, recent Alluvium and soil covering horizons of calcareous pebble, gravel and silt like material, while volcanic flows are fissures eruptions of basalt. The basalt belonging to Deccan trap is in fact of volcanic episode.

The climate of the Solapur district is monsoonal in nature. The climatic conditions of Solapur district can be divided into four seasons

namely, cold weather season, hot weather season, southwest monsoon and post monsoon season. There are regional variations in the climatic conditions in the region under study. The temperature varies from place to place. The month December, is the coolest month with mean daily maximum, temperature of 29.39^0C and means daily minimum temperature of 14.8^0C. May is the hottest month with the mean daily maximum temperature of 39.9^0C and the mean daily minimum temperature of about 25.2^0C. Solapur district comes under rain shadow area, yet the average annual rainfall of the district is about 584.3 millimeter most of the rainfall is received during the south west monsoon during the months of June to September. This rainfall account for about 75 percent of the normal annual rainfall and about 17 percent of the rainfall in the district is received during post monsoon or retreating monsoon season in October and November. The rest about 8 percent annual rainfall is received during the pre-monsoon, along with thunder storm. There are wide variations, in the amount of rainfall, through time and space. The maximum rainfall is about 690 millimeter at Akkalkot in the south eastern border of the district, while the minimum amount of rainfall is recorded of about 448.8 millimeter at Akluj near the western border of the district. In the monsoon season, the winds are mainly from direction between southwest to north east. During the period from October to December, winds blow from North-East to south west direction. In the next four months, winds vary in directions. In the month of May winds are mostly blowing from North-East to South-West direction.

Soils of the Solapur district are essentially derived from the Deccan trap, which are of the predominant rock's formation. In the district, calcareous (KANKAR) and nodules are commonly associated with these soils. In the region under study, the forest cover is very poor. The forests

of Solapur district occupy 357.9 Square kilometer area in which 345 square kilometer forest is classified and 12 Square kilometer is unclassified forest. In other wards, 157 Square kilometer is under revenue department 188 Square kilometer is under forest department and on a average, 12 Square kilometer is unclaimed forests surprisingly, these, scattered, poor forests constitute only 0.94 percent of the total area of the district. In the past, the forests were comparatively dense of predominant of scrubs forest on the range of hills and with growth of Babul and Neem, lower down in the plains. At present, forest are mainly observed in patches in Malshiras, Sangola and Barshi tahsils on hills slopes and low lying areas elsewhere. Most of the forests produce of the district is consumed by the local people.

The history of Solapur can be traced back to the early centuries of the Christian era. (BC-90 to AD-300): Solapur most probably, formed a part of the territory of the Shatokrni or Andrabhritya dynasty, whose capital was paithan on the river Godavari. A Sanskrit inscription dated Shaka 1238, after the downfall of Yadavas, this town was a Sonalipur, later on called as Sonalapur. Hence, it is probable that during census time, the name Solapur was derived by dropping “na” from the origional name Sonalapur. During the 900 years, ending with Muslim by over throwing of the Devgiri Yadavas in the beginning of the fourteenth century. Solapur lies in the neighboring, district of Ahmadnagar, Bijapur and Pune and was held by the early western Chalikyas from 550 to 760 A.D. by the Rashtrakulas to 973, by the revived or western Chalukyas up to 1184 and by the Devgiri Yadavas till the Muslim conquest of the Deccan in about 1300 A.D. The Solapur district was formed in 1838 and although, it was abolished in 1864, it was revived in 1869. As a result of the merging of the states in 1949 to new tahsils namely Akkalkot and Malshiras were formed and added to Solapur district with the reorganization of the state

in 1956, the Solapur district was included in the larger bilingual state of Bombay. Since 1st May 1960 it forms a part of Maharashtra of uni-lingual state.

The district of Solapur is influenced by different social aspects such as language and traditions. The social, structure of the district is made up of various religious communities like Hindu, Muslim, and Buddhists. Though, majority of the people speak Marathi, the language is at certain extent mixed with the language of adjacent states, and tone, in which their speak is also influenced and that is the reason; people from this area can easily be identified.

The growth of population for the district as a whole is represented; since the beginning of the 20th century, it was than 8 percent, for the decade, 1901-1911. During the period 1911-1921, the growth rate was extremely low due to the impact of a epidemic diseases. During 1931-51 the growth rate was maximum which increased to more than 22 percent, again it started declining gradually and became 16 percent in 2001. The highest percentage of 24.96 was recorded for north Solapur tahsil and similarly the density of population was highest for north Solapur tahsil on the other hand, the lowest population density was recorded for Karmala.

Economic background of the region occupies a significant position since many other sectors are influenced by the level of economy. The data regarding the classification of the total area of the district according to various needs of land utilization not only reflect the extent of development of agricultural activities in the district but also represents the cultivation potential of the region. As stated earlier, the total geographical area of the district is about 1487 square kilometer. The area under forest is only 2.14 percent of the total geographical area. This is an index to understand the place of Solapur district within Maharashtra and India. In India forest cover of total geographical area is about 20.2 percent, in

which 6.8 areas is covered by good forest and 13.4 percent area is covered by open degraded forest. Ecologically required forest cover is 33 percent of the total geographical area. Net required forest cover is 12.6 percent of the total geographical area in our country. The Solapur district has much less percentage of forest than that of the country, partly due to the fact that Solapur belongs to drought prone area of Maharashtra. Land used for non agricultural purposes in the Solapur district is below one percent the land which is under fallow category, is 4.0 percent of the total geographical area, while pastures land is about 2.74 percent of the total geographical area.

The proportion of irrigated land is relatively poor due to physical constrain and scarcity of water. The surface irrigation shows only 3.21 percent areas, while the well irrigation is as high as 7.21 percent of the total cultivated land in Solapur district. Total grossed area irrigated is 12.23 percent of the total cultivated area of the district. Net irrigated area is 9.86 percent of the total cultivated land and total irrigated land is about 11.58 percent of the cultivated land of the district.

In terms of railway, the Solapur district is quite fortunate to have sizable length of total railway lines. At present the district, has the total length of railway lines of 452.60 kilometer within the district yet, 12690 kilometer is under construction from narrow gauge into broad gauge. Unlike railway, roads provide door to door service. In terms of rodas transportation, the Solapur district is better off, since it has total length of roadways of 14108 kilometers, out of this, 188 kilometers belong to national highway, 173 kilometers, major state highway, while 1332 kilometer state highway. Apart from this, the major district roads have the length of 3039 kilometers, while other district roads, occupy 2238 kilometers within the Solapur district.

The third chapter deals with general growth of population in the region. The most important problem before the country, today, is the one created by population explosion. Solapur district during the period of 1901 to 2001 also experienced enormous increase in total population which increased from 0.87 million to 3.8 million in 2001.

The growth of population is one of the significant factors associated with mans occupancy. The growth of population in any area is determined by three basic factors namely, human fertility, mortality and human mobility. The difference between human fertility and mortality is called, natural increase of population. The trends of population growth are basic to the change in the overall geographic personality of any area.

The purpose of this topic is, to examine the dynamic of population numbers in the study region during the period 1901-2001, along with their broad implications contemporary demographic situation in the study region but it will also provide clues about the likely trend in this regard in the years to come. Then we have discussed the taluka-wise growth of population which is of great significance.

It reveals that the trends of general rural and urban population growth rates vary from rural to urban areas during the span of 100 years (1901-2001). The trend of general population growth rate and rural population growth rate, by and large, are lower than the urban growth rate except during 1951-1971 periods. But, there are remarkable ups and downs in the urban population growth rate during the span of hundred years (1901-2001).

The general population growth rate and rural population growth rates have gradually increased up to the year 1961, on the contrary 1911-1921 and 1931-1941 decades showed reveres trends. There was severe toll of life due to influenza epidemic (1981) and other severe diseases. During the 1911-1921 decade, there were 93766 deaths (out of 96.961

births) due to plague, cholera, fevers, bowel complaints and other many more causes. Same case was recurred in 1931-1941 decade, where 89,008 deaths (out of 115520 births) occurred. The heavy toll of life was experienced in the rural areas as compared to the urban areas. After the independence period, huge medical facilities have been provided to rural areas, which helped in controlling the epidemics and other diseases in the study region.

The population in the study region has experienced consistent acceleration in growth, since 1921, the increase in rural and urban population reveals differing trends, while during 1921-1951 the rural population was increasing at practically uniform moderate rates of about 16 to 19 percent. During 1961-2001 decades, the rural and urban growth of population both for rural as well as for urban areas in the district declined due to the impact made by family planning programs and increase in literacy rate. It is Solapur district which had 93.50 percent of growth rate of population that varies enormously within the district. The Barshi taluka recorded highest growth rate, while Pandharpur taluka recorded lowest growth rate during 1961-2001. Within the district the Barshi, Akkalkot and Karmala talukas have recorded the growth of population above the average for the region. The Madha, Mangalwedha, South Solapur and Mohol talukas of the study region fall in medium population growth rate category. Sangola, North Solapur, Malshiras and Pandharpur talukas belong to low population growth rate category.

Birth rates for the region was 22.64 percentage in the year 1981 and Karmala, Madha, Mohol, Malshiras, Sangola, Mangalwedha and south Solapur have shown, birth rates below from the district average, while north Solapur, Barshi and Pandharpur have shown, birth rate above the district average. In 2001, the tahsils which have recorded birth rates lower than the district average are Karmala, Madha, Mohol, Pandharpur,

South Solapur and Akkalkot, on the other hand, tahsils which have shown higher birth rates than the region average, are north Solapur, Barshi, Malshiras, Sangola and Mangalwedha.

In 1991, the birth rate for rural areas for district as a whole was 16.82 percentage and for the urban areas it was 36.95 percentages during the same period. The highest birth rate for rural sector was for the Mangalwedha tahsil while the lowest was for the Malshiras tahsil. For 2001 the average birth rate was 15.50 percentages, the highest for Malshiras, while the lowest for North Solapur. In the year 2001, the urban birth rate was 31.46 percentages for district as a whole. The highest for the Karmala and lowest for the North Solapur.

Death rate is another important factor influencing the growth of population in a region. In the year 1981, the highest death rate was recorded for Barshi on one hand and lowest 3.94 percent for the Malshiras tahsil on the other. Similarly, in the year 1991, the death rates were calculated for all the tahsils in Solapur district, average death rate was 5.08 percent, for the region as a whole, while; highest death rate was recorded for Mangalwedha and lowest for Malshiras tahsil. The average death rate was found 5.35 percent for the region as a whole. The highest death rate was recorded of 6.78 percentage for North Solapur tahsil and the lowest death rate of 3.68 percent was observed for south Solapur and Barshi tahsil while all the other tahsils have shown death rates much lower than the region average.

For year 2001, the average death rate for the district as whole was 3.88 percent per 1000 of population, surprisingly; it increased to 24.38 percent for the year 2001 in rural areas of Solapur district. The highest death rate was for the Mangalwedha tahsil, while it was lowest for Malshiras tahsil in the south western for Solapur district. For the year 2001, as stated earlier the average death rates for the district as a whole,

was 4.38 percent per 1000 of population. The highest death rate was found in Akkalkot tahsil, while it was lowest for Karmala tahsil within district of Solapur.

There are three tahsils, namely Mohol, Malshiras and South Solapur where there in no urban settlement. The highest death rate for urban areas was for Madha tahsil while the lowest was for the Sangola tahsil. The average death rate of Solapur district as a whole was 7.43 per 1000 of population due to improvement in better medical facilities secured food supply has resulted in decline death rate in 2001. The highest death rate was recorded for Madha tahsil while the lowest for Sangola in year 2001.

The infant mortality rates have been calculated for the year 1981, 1991, 2001 for different tahsils of Solapur district. In 1981, the infant mortality rate was 0.81 for the Solapur district as a whole, which declined to 0.28 in the year 2001. For the year 1991 and 2001, average infant mortality rate for the district was 0.36. For the year 2001, the average infant mortality rate was calculated 0.28. The highest, for north Solapur and lowest for Mangalwedha tahsil, with slight fluctuation the infant mortality rate was recorded below 0.5 for almost, all talukas, except for north Solapur.

The fourth chapter deals with density and distribution of population in the region. Distribution of population is very commonly represented by two types of maps, one using dots for numbers and other using different density categories based on ratios of number of people to area. The dot map is very effective in representing spatial distributional pattern that cannot be clearly shown on density maps. The term, density of population on the other hand refers to a ratio between population and land area. It is, generally expressed in terms of number of persons per unit of area. The density of population is expressed in different ways such as arithmetic

density, physiological density, nutrition density, agricultural density and economic density. Land and people constitute the two vital elements of an area.

Arithmetic density is a ratio between total population and total area is expressed in terms of persons per square mile or kilometer of the area. It cannot be used, as a measure of population pressure on land because it merly gives a simple quantitative relationship between man and land. Physiological density is a ratio between total population and total cultivated or cropped area. It is expressed in terms of number of persons per square mile or kilometer of cultivated area. Sometimes it is also called nutritional density. Another measure of man-land ratio is devised quite frequently is known as agricultural density. In this measure, only agricultural population is correlated with the total area under cultivation. It is expressed of the cultivated area. The relationship between man and land is, therefore, complex and interact. Economic density is a relation between man and land by working out an economic density of population. We took into account both, the index size of population and the index of production. Economic density is expressed = 100 P/p where 'P' is index of population and 'p' is the index of population.

The factors, which determine the pattern of population distribution and density, are very complex and varied. These three major factors such as geographical factors, economic and social factors and demographic factors, in geographical factors, which influence population distribution, are physical conditions, nature and degree of fertility of the soil, nature of surface and climatic conditions. The more complex a society becomes, the less directly physical factors, influence the distribution of its population. The techniques of productions are intimately related to the types of economic activities. The steps taken to implement, the social policies related to the distribution of population also depend upon the

spatial pattern of population. The demographic factors are influenced by the variations in birth and death rates in different areas and variations in volume and nature of migration between the areas.

For district as a whole, and tahsil levels, density of population were calculated for the year 1971, 1981, 1991 and 2001. In the year 2001, the total density of population for the region as a whole was 258 persons per square kilometer. In the year 1971, the total density of population was only 150 persons as compared in 1981, the density of population was 173 which is low. In 1991, the total density of population has increased as 217 persons per square kilometer.

The table 4.1 reveals the density of population for various tahsils of Solapur district. In the year 1970, as expected, it was highest for the North Solapur tahsil and lowest for the Karmala tahsil. The Barshi and North Solapur show higher density than the region average. In the year 1981, the average density for region as a whole, was 173 persons per square kilometer. In this year highest density for North Solapur tahsil is expressed to 825 and lowest for the Karmala and Mangalwedha is expressed same for both 102 persons per square kilometer. In the year 1991, for region as a whole density were 217 persons per square kilometer for Solapur district. For North Solapur tahsil the highest density was expressed to 1124 and lowest for the Karmala tahsil was 123 persons per square kilometer. The spatial variation in the density of population for the Solapur district in 2001 varies, from one tahsil to another. As expected, highest for the North Solapur tahsil was expressed to 1287 and lowest for Karmala tahsil where, it was as low as 145 persons per square kilometer. In the year 2001, the region as a whole, the density of population was 258 persons per square kilometer. There are number of factors responsible for the variation in the density of population. Such

factors are nature of terrain, proportions of land under agriculture degree of urbanization and industrialization.

The density of rural population for the region under study as well as, for different tahsils for the last four decades. The rural density of population for the year 1971 was 112 persons per square kilometer, which is much lower than the total density for the region as a whole. The lowest, rural density was observed for the Karmala tahsil was 87 and highest for the Malshiras tahsil was 149 persons per square kilometer. In the year 1981, the rural density of population region as a whole was 123 persons per square kilometer. It was highest for Malshiras tahsil of 175 and lowest for Karmala tahsil, represented 94 persons per square kilometer. In the year 1991, the rural density of population for the region as a whole was 156 person per square kilometer as against 217 persons for the total density of population. In this year the density was also highest for Malshiras and lowest for Karmala tahsil. In the year 2001, the rural density of population was 180 persons per square kilometer. The reasons behind it are the higher geographical area for Karmala and lower development of secondary and tertiary sectors. Here, for Malshiras tahsil, the reasons for higher rural density are attributed to entire rural population of Malshiras tahsils which treated inspite of more than 50000 population of Akluj. Since, it is divided into several grampanchayats.

The density of urban population for the region under study as well as for different tahsils, have also been found out for the last four decades. The urban density for district as a whole was, 1767 in 1971 and 2200 in the year 1981, further 2664 in the year 1991 and lastly in 2001, the urban density of population was 3512 persons per square kilometer. The urban density of population has increased year by year, because of rapid rate of industrialization and consequent urbanization. During the period 1971-2001, the urban population has doubled for the district as a whole. At the

very outset, it should be mentioned that three tahsils namely Mohol, Malshiras and South Solapur have no urban settlements throughout the period under consideration. In the year 1971, North Solapur had the highest urban population which is expressed to 13918, and lowest for Akkalkot tahsil is expressed to 1050 urban population per square kilometer. For the year 1981, the highest urban density was for North Solapur tahsil and lowest was for the Mangalwedha tahsil. The year 1991, also shows, the similar trend of the year 1981. For last decade of 2001, the urban density of population had shown the highest for North Solapur tahsil and lowest for Mangalwedha tahsil. In Akkalkot tahsil, there are three urban centres such as Akkalkot, Maindargi, Dudhani etc.

The density of population is expressed in different ways, such as, arithmetic density, physiological density, nutrition density, agricultural density and economic density. The physiological density is also known as nutritional density, which is high for industrial and urbanized regions of North Solapur tahsils, while lowest for the Karmala tahsil. The physiological density represents the relationship between man and actual cultivated area, this shows that low physiological density have much cultivated area per person, while the high physiological density, the lower is cropped area per person in the district of Solapur.

In Solapur district, the region under study, the population, though largely depends on agriculture but does not depend entirely on agriculture. The working population has been grouped into various primary, secondary and tertiary workers. Of these the primary workers, particularly engaged in cultivation and as agricultural labors, are the workers concerned in agricultural density. The ratio in agricultural population thus, arrived and are a under agriculture is called as agricultural density. This density shows a realistic picture of the pressure of population on land. The North Solapur tahsil represent the highest

value of agricultural density due to relatively low percentage of people engaged in cultivation.

The critical density is another method to express man land ratio. The ratio between, cultivated area and follow land on the one hand, and per capita planted acreage and percentage of cultivable land. For the district as a whole, the critical density was computed to 10.87. It was found higher for Mangalwedha and lowest for Barshi tahsil. Economic density is the relationship between man and economic production by working out. In Solapur district Madha, Pandharpur and Mohol have the economic density, more than 4.5. It means in such tahsils the indices of population are high in relation to indices of production. The higher economic density means, the overall exploitation of the natural resources in relation to population in that particularly region. Lower the economic density the poor is the exploitation of natural resources by the people and high economic density means the maximum utilization of resources in the region.

The distribution of population in Solapur district, is affected by different factors such as relief, soil, transportation, industries, rivers etc. Along the river have relatively thicker population. In Solapur district Barshi, Pandharpur, North Solapur have much thick population due to increase industrialization and urbanization. The nature of distribution of population in Solapur district has been studied with the help of location quotients. The highest value of location quotients for North Solapur tahsils, which is highly urbanized, represents the values of 4.72 for the year 1981 and 4.99 for the year 2001. It shows that there is high concentration population is found in North Solapur tahsil. On the other hand Karmala tahsil represent minimum lowest values of location quotients, shows the extent of low concentration of population.

In order to understand the relationship between the percentage of area and the population a lornze curve has been prepared which indicates the district of Solapur has 5 percent area which is almost 25 percent of population of the district. Apart from this, almost 75 percent area has 85 percent of population. This shows that the cumulative of each tahsil, with the area and population gives an idea of the total geographical area in percentage on one hand and percentage of population on the other.

The information about the average area per village and average number of villages per 100 square kilometer area gives more clear picture of land and population. For the district as a whole, the average area per village in a square kilometer is estimated to 7.82 square kilometer, for district as a whole, owing to the existence of city of Solapur in North Solapur tahsil, the lowest area of 5.62 square kilometer has been computed per village. This clearly indicates that larger the area per village, lower the concentration of the village. The highest number of villages varies which was associated with Akkalkot tahsil, while lowest number of villages for the North Solapur tahsil. The size of villages in each tahsils of Solapur tahsil has also been studied. The size average population for the district as a whole was 2306. In Malshiras tahsils, it has the highest population per village. As a matter of fact, Malshiras though entirely rural, the Akluj having population, more than 50,000 positively influencing the size of population per village. Higher the population per village represents high density of population. Since, there is close correspondence between geographical area and total number of people. For instance Karmala has the lowest population per village, infact, have higher geographical area than many tahsils of Solapur district.

The fifth chapter is concerned with the age and sex composition of population. The important characteristics of population are age and sex

ratios. Of the demographic characteristics, the sex composition of a population is the most basic, for the marriage and growth rate of population. Sex ratio is an index of socio-economic conditions, revealing in an area and is useful tool for regional analysis. In India, sex ratio is generally expressed in terms of number of females per 1000 males.

According to 2001 census, the sex ratio of Solapur district was 935 per thousand males as compared it is higher than the Maharashtra state. In the year 1901, sex ratios for Solapur district is 985, which is relatively higher than the state of Maharashtra. In the 1961, the sex ratios were equal for the state of Maharashtra and Solapur district. In 1991, more or less sex ratio was equal for the both of the regions. It may be concluded that there have been wide variations in sex ratio during last ten decades. The imbalance in sex ratio may be attributed to high female mortality, particularly of infant females. Secondly, the male selective migration for the better employment opportunities in the state of Maharashtra in general and Solapur district in particular. The reason for the lowering of the sex ratio during the last ten decades, is improvement in medical facilities, the choice preference for male children, and the impact of sonography has adversely affected birth rate of female children.

A spatial variation in sex ratio in Solapur district for the period 1971-2001, it was calculated for each tahsils of the region understudy. For the year 1971, sex ratio for Solapur district was 933. It was highest for Pandharpur tahsil, while lowest for North Solapur tahsil. It is higher for the tahsil, which are having higher percentage of out-migrants particularly of males to the city like Solapur, and lower for the region which have higher percentage of rural population. During 1981 sex ratio was 942 for the district as a whole. In the year 1991, situation was totally different as the sex ratio declined because it may be probably due to improvement in decentralization of industries and spread of urban

population in different parts of the region. In the year 2001 sex ratio for the district as a whole was 936 per thousand males.

The rural sex ratio was 927 for the district as a whole in the year 2001. It was highest for the Akkalkot tahsil and lowest for Pandharpur tahsil for rural areas. The low rural sex ratio in different tahsils of the Solapur districts may be attributed to the high infant mortality among the females as a result of less availability of medical facilities and very much negligence of female children as regard to medical facilities in rural areas of the Solapur district. The urban sex ratio for the district as a whole was 957 in 2001, which substaintially higher than the rural sex ratio. For Akkalkot tahsil it was highest lowest for Mangalwedha tahsil it was lowest. The medical facilities are much better in urban areas resulting in the low infant death. Secondly, the high percentage of literate people give equal attention towards both male and female children.

The temporal variations in rural-urban sex ratios for the district as a whole have been taken into consideration, for the last 10 decades. As expected, the rural sex ratios are higher than the urban sex ratios except, the year 1991 and 2001. This may be probably due to, rural-urban migration for the better employment opportunities, available in the urban areas, particularly for the working male, who leave their families behind at home in rural areas. During the year 1991 and 2001, the urban sex ratios were recorded higher than the rural sex ratios, perhaps due to better medical facilities and lower infant death rate of female in urban areas. Now a days, due to social awareness and high rate of literacy in urban areas of Solapur district, might have resulted in the higher sex ratios in urban areas of the district of Solapur.

Age composition is one of the most basic characteristics of a population. Age composition is an important consideration in planning, the educational and military and welfare programme of a region. Age

composition is also influenced by specific mortality rate. In economically developed regions is low for younger as well as older age groups. Thus, age composition of a region is influenced by fertility, mortality and the pattern of migration to a significant extent. In addition to these, wars, natural calamities and government population policies also influence age composition of population of a region to a certain extent.

The age group population, gives an idea about the working and non-working population. For the Solapur district, the percentage of population belonging to 0-14 years and above 60 years are grouped in non-working population and 15-59 age group is put into working population. In the year 1971, the proportions of children below 14 years were 42.96 percent of the total population and 6.02 percent were old people and rest of 51.96 percent, were young and matured persons, who were engaged in economic activities. It is interesting to note, that in comparison to urban areas, the rural areas of district the proportions of children below 14 years, was high due to high birth rate in rural areas, and due to low literacy rate, where as the working population between 15-59 age group was much lower in the rural areas of the Solapur district, perhaps, it was due to rural-urban migration for the better employment opportunities. In the year 1991, the proportions of children declined from the previous decades, while increased for the working population as well as for the old age people. In the year 1991, the pattern of population belonging to different three age groups was of the the magnitude of 36.38 for children below 14 age, and 56.02 percent, for young and matured and 7.59 percent for old age people for the district as a whole. For the year 2001, the percentage of children has declined tremendously form 42.96 percent in 1971 to 33.80 percent in the year 2001. This is probably due to decline, in birth rate as a result of social awareness and the implementation of family planning programmes, on the contrary for the

total percentage of working population has increased from 50.91 percent in 1971 to 56.30 percent in the year 2001. Due to improvement in medical facilities, the expectancy of life has increased both rural and urban areas. As a result of it, the proportions of old age people has remarkably increased from 6.02 percent in the year 1971 to 9.65 percent in the year 2001. The comparison between rural-urban age group indicates the same pattern, higher for children in rural areas and much higher for old age people in rural areas. To a certain extent, the proportions of working population, correspondingly increased for urban areas during the last four decades.

The dependency ratio gives a picture of the burden on the society. In order to understand, the dependency burden for the district of Solapur as a whole, the dependency ratios were calculated for the years 1971, 1981, 1991 and 2001 for the rural urban and total. In 1971, the dependency ratio for Solapur district was 48.98 percent which was high for rural areas as compared to urban areas. This is probably high birth rate in rural areas and the out migration of the rural population belonging to rural working population to urban areas for better employment opportunities. For the year 1981, dependency ratio was 46.25 percent, which went on declining for the next two decades and became as low as 43.56 in the year 2001. Both, rural and urban dependency ratio as compared were found higher for rural areas of the Solapur district for all four decades. But, one thing should be noted that the dependency burden is continuously declining both for rural and urban areas during last four decades. Probably, this may be because of declining trend in birth rate and death rate, secondly, the change in the definition of working population. Now a day's, permanent workers, marginal workers, temporary workers have affected the positively the pattern of dependency ratio in region under study. Many persons even after retirement are

engaged in economically active population. All these factors are responsible for the declining ratio for the dependency burden in the Solapur district.

The sixth chapter deals with the literacy and occupational structure of population. Proportions of economically active population influence the nature and volume of production. Rapid growth of population creates a higher supply of labour than its demand, resulting in unemployment. The working population of a region gets distributed in different professions, broadly, group into primary, secondary and tertiary sectors of the economy. The census authorities have classified workers into nine industrial categories.

The proportions of workers broadly grouped into primary, secondary and tertiary workers for the year 1971, 1981, 1991 and 2001, for the district as a whole and its various tahsils. In the year 1971, there were 70.56 percent workers in the primary sectors, which declined and became as low as 62.90 percent in the year 2001. This decline in percentage is due to industrialization and consequent urbanization during last four decades. This may be, the reflection of least priority to primary sectors, due to increase in the literacy and educational attainment and better job opportunities in secondary sector. In the year 2001, spatial pattern of primary workers have shown variation in North Solapur only of 15.76 percent people working in primary sector; while highest primary sectors workers were in Mohol tahsil of 87.20 percent.

The proportion of secondary workers, has also been calculated for the year 1971, 1981, 1991 and 2001. The proportions of secondary workers was of 12.97 percent for the region as a whole, as expected it was highest for the North Solapur tahsil and lowest for Mangalwedha for the year 1971. In the year 1981 decline in the percentage of secondary workers in North Solapur tahsil was due to closing down off cotton textile

mills and spinning mills in an around the Solapur city. After the year 1981, next decade 1991 and 2001 increased in proportions of secondary workers in North Solapur tahsil.

The tertiary workers are engaged in the services, trade, transportation and construction. For the year 1971, the percentage of tertiary workers for the district as a whole was 16.46 percent, which doubled in 1981. And another next decade percentage of tertiary workers was declining due to out-migration of the people in other parts of Maharashtra. In 2001 once again increase in percentage of tertiary workers was due to attraction of the people for different services in a large urban centre in Solapur district.

Definitions of literacy vary, from country to country. In India all those persons who can read as well as Wright in any language of the world, are classified as literate. Many factors influence the literacy pattern. The percentage of literates, to the total population for the year 1971, 1981, 1991 and 2001, have been calculated for total rural and urban areas. In the year 1971, only 33.90 percent literate were recorded, while in rural areas 28.20 percent and urban areas 49.10 percent respectively. It is expected, that due to the availability of educational facilities in urban areas, the proportions of literate are higher, while for the rural area due to lack of educational facilities, the percentage of literate was low. In the year 2001, district as a whole of literacy is 71.25 percent, while rural areas 68.26 percent and for urban areas educational facilities are available and government policies also useful for increase in percentage of literates.

For different tahsils of Solapur district the percentage of literacy were also calculated for the last four decades. The average literacy for the region as whole was 33.90 percent for the year 1971, being highest for the North Solapur and lowest for Mangalwedah tahsil. Similar trend was

also found in the year 1981, but for the average of the region increased to 40.69 percent. But, in the year 1991, highest literacy was in North Solapur and lowest literacy recorded for the Akkalkot tahsil. In the year 2001, highest literacy was for North Solapur and lowest literacy was recorded for the Sangola tahsil, but region as a whole literacy rate was increased to 71.25 percent. The literacy rate has increased due to primary education facilities are being made compulsory by the government.

In the year 1971, the percentage of male literacy was calculated to 46.40 percent. The highest percentage of male literate was for North Solapur tahsils, while lowest was recorded for Mangalwedha tahsil. In North Solapur tahsil, the literates are high due to number of educational institutions are increasingm hence, Barshi and Pandharpur also have high percentage of male literates. In the year 2001, due to improvement in educational facilities, there has been substantial increase in most of the tahsils of the Solapur district. As the percentage of male literates for North Solapur tahsil being 86.04 percent and lowest for Mangalwedha and Sangola tahsil.

After the independence of India the performance has been given to female literacy, numbers of facilities has been provided by the government to primary education, both for male and female. At present, government has furnished the scheme of free education for female till 12^{th} standard. Apart from this the free noon food supply to the children upto seventh standard is also supplied. This has resulted in the improvement of female literacy even in Solapur district. It is clear from the fact, that in the year 1971, the percentage of female literates was 20.49 percent for the district as a whole, which was consistently went on increasing for the next three decades and finally, it became, 58.84 percent in the year 2001. Again, over this entire trend increase in the percentage of female literacy has also been observed for all the tahsils within the district for all four decades.

In short, it may be concluded, that the equal importance given to female by government has open the way for the female to in the race of progress hand in hand with male. This has been shown, by the spatial and temporal variations in the female literacy in the Solapur district. As a matter of fact, females are also participating in physically in all sectors of economic activities as well as political sectors.

The seventh chapter deals with correlation matrix of the variables, influencing growth of population in Solapur district. The growth of population is influenced by the number of factors in a particular region. The important factors such as the demographic factors, economic factors, social factors and physical factors all of them have great bearing upon the growth of population. There are a number of statistical techniques and quantitative analysis like mean, medium, mode, standard deviation, mean deviation, principal component analysis and co-efficient of correlation. Here, an attempt has been made to find out the relationship between growth of population on the one hand and different social-economic, physicals variable on other hand.

In an economically backward region, like Solapur, demographic factors such as birth rate, death rate and infant mortality rates were expected to influence the variation in the growth rate of population in a very significant manner. When co-efficient correlation was calculated between the growth rate of population and birth rate for entire district, the value ‘r’ (0.77) was found to be positive and significant. The birth rates are higher influencing the higher growth rate of population. The backward regions predominantly agricultural where more than 70 percent people are still engaged in primary sectors.

The correlation between growth of population infant mortality rate have a positive relationship. This means that with increase in infant mortality rate, that are the children below one year of age or children

during suckling period, this has resulted in high growth rate of population in a country like India in general and Solapur district in particular. When the correlation co-efficient between the growth of population and literacy were calculated by using the tahsil level data for Solapur district. The value of ‘r’ may be interpreted in a region like Solapur that literacy has not still influenced the growth rate. The proportions of the people belonging to lower economic strata group, still do not believe fully in the family planning program and small norm of the family.

The impact of male literacy rate on the growth of population is the same as it was for total literacy rate. Hence, by the value of ‘r’ which is -0.25 makes clear that the impact of male literacy influence the growth of population negatively. As a matter of fact, it is desirable that with social awareness among the people, particularly among the males the birth rate is controlled and family planning programs are readily accepted. The growth of population and female literacy gives a negative value ‘r’ -0.021. It means with growing female literacy weight is given to negative on the growth of population. It is a generally found, that with per capita of female literacy the awareness among the people for higher standard of living, higher per capita income and small family norms become most significant factors.

The percentage of rural population to total population shows a negative relationship with the growth of population in Solapur district. The growth of population should increase the value of ‘r’ is calculated to -0.73 between the two, which shows that with high percentage of rural population in a particular region, the rate of growth of population declines, significantly. This may be, partly due to, out migration of the rural people in search of better employment in the urban areas of the district. This is how the urban population growth is considerably reflected upon the growth of population.

The value of co-efficient of correlation between growth rate of population and percentage of urban population was 0.75. It is quite significant and positive. It clearly reveals that with high percentage of urban population, the growth of population rapidly increases. Generally, it is believed that in urban areas the growth of population should be lower than that of rural areas. However, here the situation is found in other way round. In case of Solapur district, the rural-urban migration has great bearing upon the growth of population. Most of the urban places, infact, are the centre of economic activities, most of the literate and illiterate people who come to the urban places in search of better employment opportunities. This is how, the urban population growth is considerably reflected upon the growth of population. Therefore, it may be concluded that rural-urban migration has influenced the growth of population positively in Solapur district. The process of urbanization and consequent industrialization are intimately related. The spread of one leads to overall development of jobs. It has been supported by the positive and significant value of 'r' in Solapur district between the percentage of urban population and growth of population.

The proportions of workers in agriculture on the one hand and the growth of population on other, depicts the value of coefficient of correlation of -0.697. This is quite significant but negative. The natural increase of population which is the total number of births deducting by the total number of deaths in rural sectors. Hence, the proportion of workers in agriculture has inverse relationship between workers in agriculture and growth of population. The out migration from the rural areas to urban places for the handsome wages even workers generally go to the near by urban places. Hence, the proportion of workers in agriculture and growth of population, may be interpreted that with the high percentage of workers in manufacturing increase their per capita

income to support their families. Therefore, literate and educated peoples are associated with the manufacturing activities in the urban centre of the district, which in turn positively affect the growth of population in the region under study.

It is human tendency, that in order to enhance their income, people desire more hands of population. The economic condition is the important means to leave comfortable and without worry. The economy of any region is major factor to improve the high standard of living of people where the natural resources such as water, availability, fertile soil for agriculture, favorable land for settlement were available. Even today, most of the river valleys and plain areas are densely populated due to the availability of plenty resources. Solapur district, is by and large, located in the homogeneous region drained by the Bhima, Sina, Man and Bori river. There are many other socio-economic and demographic reasons in case of developed and advanced societies in the world, where despite, high sex-ratio, the growth of population is low. But in the case of a developing regions like ours where sex-ratio considerably low and female mortality in particular is significantly high. It means, that if the age at marriage for female is increased, than the growth of population should decline as a common rule. But in this case, the situation is in other way round. Here, the age at marriage for male, has positive relationship with the growth of population in Solapur district.

In order to understand, the fact of age at marriage for female, a correlation between population growth and age at marriage for female has positive relationship with the growth rate of population. Now the question arises, why it is so? The high age of marriage for female is for those, who are highly literate and educated. The proportion of Muslim population shows a positive relationship with the growth of population in Solapur district. It clearly reveals that with the high percentage of Muslim

population the growth rate of population increase considerably in Solapur district. It is generally observed that Muslim society wants to increase the number of children per couple, in order to increase the total number of Muslim population. It can be understood by the fact, that Hindus are relatively more conscious to enjoy a high standard life by controlling the small size family. Hindus population have inverse relationship a negative relationship with the growth of population in a country like India and Solapur district is no exception to this rule.

The accessibility is considered as the lifeline of the economy in a particular region. The means of transportation and communication, no doubt influence the economic activities to a greater extent. The concentration of industrial development and other economic activities are found in areas which are easily connected with the roads railways and airways. For the purpose, to know the impact of road density on the growth of population, a correlation was calculated between the two. The calculated value of ‘r’ was found to be negative and most insignificant. It means that in a region like Solapur, the road density has not significantly influenced the growth of population. The region under study is predominantly agriculture where more than 70 percent people are still engaged in primary activities. Therefore, the accessibility of the road density does not shows any effect upon the growth of population in the region under study. The movement of the people within the region has not made any impact upon the growth of population. Though, it is a matter of fact, that with high density of the road, the concentration of population becomes higher and higher, resulting in the high growth of population. But in the case of Solapur, the situation is in other way around.

The proportion of schedule caste to total population has a negative relationship to the growth of population. In case of Solapur district, the

proportion of schedule caste population is high in comparison to state of Maharashtra. The value of ‘r’ -0.394, indicates that with increasing the proportions of schedule caste, the growth rate of population declines. The literacy rate among the schedule caste population is relatively low. Hence, the workers from these caste migrate to near by district like Pune, Ahmadnagar, Bijapur, Bidar in search of work. This has resulted in the inverse relationship to the growth of population in Solapur district. This is again contrary to expectation, with high proportions of illiterate people belonging to schedule caste should have shown positive relationship with the growth of population. With poor economic condition, of the standard of living becomes poor and lack of luxurious life’s, lack of recreational facilities would have encourage them to have more number of children per family healthy. But due to their migration from the source region have shown opposite relationship with the growth of population.

Like schedule caste population, the percentage of schedule tribe also shows negative relationship with the growth of population. In Solapur district the percentage of schedule tribe is insignificant. Hence, the impact of schedule tribe on the growth of population is negative and insignificant. Schedule tribe belongs to the lower strata of the society. Their economic condition is very poor since such people are associated with the primary economic activities. The value of ‘r’ is calculated of -0.191 between schedule tribe population and growth rate. The growth of population declines with high percentage of schedule tribe population. It means, the schedule tribe who are born in the different tahsils of Solapur district are enumerated some where else. This results in the opposite or negative growth rate of population in the district.

It is a matter of commonsense, that with large size of family, there is a possibility of high birth rate. The correlation between person per household and growth rate of population shows, positive ‘r’ value of

0.185, but insignificant relationships to a certain extent. Though, the persons per household means, if the family is a small, the growth of population will be lower and if the size of family is large, the growth of population will be higher. There is a saying of a slogan by the family planning department that “HUM DO, HAMARE DO”. To a certain extent this has also positively affected and controlled the growth rate particularly among the highly educated people. But in our nearby country namely China which is most populous in the world has made a policy regarding the family planning program in order to control the growth rate of population, they accepted and implemented in their life a slogan like “HUM DO, HAMARA EK” means, we are two, and ours is one. The government policies of China award such small size family by providing them better employment opportunities and many other benefits are provided to them. India should also apply such family planning programme to control the growth rate of population. In Solapur district, the size of the family and growth rate of population shows positive relationship as it is shown by the value of ‘r’. It is only a death, which reduces the population over the surface of the earth. Perhaps, if there would not have been deaths, the size of population would have remained by and large constant. While discussing the impact of birth rate over the growth rate of population, it was found that in a country like India in general, and the Solapur district in particular, the birth rates are high on account of high death rates. In order to examine the impact of death rate on growth rate of population in Solapur district, the value of ‘r’ is calculated between the two. It is 0.733, which is positive and very significant. In a region like Solapur, the growth rates of population are higher on account of high death rates. Because, of insecurity, people do not like to take risk by having only one or few children. In case of accidental death of their children, the danger of old age security allow

them to go far many more children. Hence, the value of 0.733 shows a strong and positive relationship of death rate with the growth rate of population in Solapur district. In other words, with high death rate, there will be high decline of population growth and with lower death rate there will be increase in the growth of population.

It may be stated that, in the region under study, various, social, economic and geographical factors have influenced not only the growth rate of population, but also have influenced all other characteristics of population in Solapur district.

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Table No. 7.2

CORELATION MATRIX OF THE FACTORS INFLUENCING GROWTH RATE IN SOLAPUR DISTRICT

	Growth Rate	Birth Rate	Infant Montality Rate	Literacy Rate	Male Literacy Rate	Female Literacy Rate	% of Rural Population	% of Urban Population	% of workers in Agriculture	% of workers in Manufactu re	Per Capita Income	Density of Populatio n	Sex Ratio	Age of marriage for male	Age of marriag e for female	% of Muslim populati on /total	% of Hindu populati on/ total	Density of Road prr sq/km	% of SC populatio n/ total populatio n	% of ST population / total population	Person Per house hold	Death Rate
Growth Rate	1																					
Birth Rate	0.77868	1																				
Infant Montality Rate	0.77467	0.930433	1																			
Leteracy Rate	0.48738	0.738796	0.643664	1																		
Male Literacy Rate	-0.2574	0.260389	0.23813	0.604871	1																	
Female Literacy Rate	-0.2152	0.229095	0.24605	0.589177	0.919236	1																
% of Rural population	-0.7318	-0.90344	-0.92576	-0.71072	-0.26241	-0.20334	1															
% of Urban Population	0.75748	0.982029	0.943751	0.771567	0.333395	0.300417	-1	1														
% of workers in Agriculture	-0.6973	-0.69891	-0.72846	-0.55441	-0.02802	-0.05718	0.804342	-0.80031	1													
% of workers in Manufacture	0.76525	0.875511	0.959847	0.734218	0.328544	0.315511	-0.89507	0.912786	-0.72149	1												
Per Capita Income	0.87497	0.886652	0.920424	0.753278	0.153434	0.179738	-0.92855	0.934716	-0.76078	0.929795	1											
Density of Population	0.76181	0.935967	0.985956	0.715588	0.315051	0.283925	-0.9263	0.94531 1	-0.73389	0.981682	0.91765	1										
Sex Ratio	0.42906	0.372252	0.550779	0.215803	0.034069	0.131324	-0.42914	0.358859	-0.37332	0.518878	0.521982	0.500195	1									
Age of Marriage for Male	0.51153	0.547487	0.686298	0.221681	-0.07126	-0.16605	-0.58405	0.586191	-0.39858	0.673058	0.567992	0.67983	0.478592	1								
Age of Marriage for Female	0.48654	0.347756	0.585018	-0.02984	-0.17786	0.00022	-0.32507	0.352689	-0.33996	0.521775	0.447241	0.499903	0.800923	0.553979	1							
% of Muslum Population/Total Population	0.43653	0.592781	0.770057	0.505349	0.423628	0.421255	-0.69038	0.866505	-0.29819	0.796808	0.71950.	0.750013	0.552745	0.626472	0.5458	1						
% of Hindu Population /Total Population	-0.4113	-0.60552	-0.55304	-0.49403	-0.38517	-0.43452	0.346119	-0.61653	0.051865	-0.55117	-0.48651	-0.56098	-0.45244	-0.32863	-0.4197	-0.53048	1					
Density of Road per Sq/Km	-0.0596	0.058795	0.006712	0.167038	0.269281	0.46628	0.049481	-0.03232	-0.26274	-0.018	-0.01201	-0.01364	0.269164	-0.43774	0.206	-0.16499	-0.172	1				
% of SC population/Total Population	-0.3944	-0.21529	-0.30972	-0.28362	0.177567	0.133631	0.501579	-0.47376	0.549289	-0.31659	-0.51313	-0.26699	-0.31093	-0.22207	-0.1539	-0.33199	-0.3461	0.0121-	1			
%of ST Population/Total Population	-0.1916	-0.10307	0.078124	-0.18326	0.241117	0.103583	0.037392	0.096538	0.44694	0.117054	-0.05135	0.071297	0.282459	0.405461	0.294	0.58648	-0.2571	/ - 0.4001	0.110801	1		
Person Per house hold	0.18514	0.028395	0.172061	-0.46355	-0.35365	-0.40948	-0.00297	-0.09969	-0.03561	0.118842	-0.00244	0.131556	0.43126	0.517699	0.606	0.13564	-0.2253	-0.1024	0.233938	0.4042288	1	
Death Rate	0.73331	0.973953	0.964113	0.701795	0.283218	0.257894	-0.93394	0.964924	-0.66199	0.89568	0.901464	0.951645	0.479621	0.629841	0.4328	0.72026	-0.5932	-0.0097	-0.28871	0.042829	0.064317	1