CHAPTER. NO. III

"SPATIAL DISTRIBUTION AND GROWTH OF RURAL SETTLEMENTS"

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CHAPTER – III

"SPATIAL DISTRIBUTION AND GROWTH OF RURAL SETTLEMENTS"

3.0 INTRODUCTION

The village as a basic administrative settlement unit means usually a central and in many a case scattered aggregate of residences and inhabitant of which have certain relations and even some kind of union. The village with a number of clusters or hamlets separated from each other by parcel of agricultural or other lands within a specific territorial unit. Settlement as an occupance unit, it represent the organized colony of human beings including the building in which they live or work or store their material, it also includes tracks or streets over which their movement take place.

Various factors such as physical, social, economic and political factors, which affect the distribution pattern of settlements. The settlement distribution is not only determined by the natural condition but other several factors also influence on the distribution of settlement such as physiography, drainage, population and road net work etc

It is very essential to study the growth character of settlement and population of settlements. The change in population in the area have always affects the overall growth character of the study region. Dynamics of population is a interwoven phenomenon, which reflects the social and economic change in the area .

In the present study an attempt has been made to find out the influence of several factors on the distribution of settlements as well as growth of settlements in Khandala taluka. To compare the relationship of various geographical factors and distribution of rural settlements in the study region is size of grid 4 X 4 Km . found suitable to study.

3.1) PHYSIOGRAPHY AND DISTRIBUTION OF SETTLEMENTS

It is difficult to divide the study region into different physiographic division clearly so the study region is broadly divided into four categories according to height from sea level. These are:

1) The mountain Region (Above 1200m)
2) The Hilly Region   (900 to 1200m)
3) The Plateau Region   (600 to 900m)
4) The Plain Region   (Below 600m)

1) Mountain Region (Above 1200m)

The area, which lies above the height of 1200m, includes the area southwestern and south central portion of the study region. Which occupies 2.74 percent of the total land and accounts about 4.44 percent, 8.20 percent and 6.15 percent settlements in the decades 1971, 1981and 1991 respectively. In this physiographic categories there are less settlements because the mountainous region, steep slopes and rigid topography affects the distribution of settlements. (Fig. 3.1)

2) The Hilly Region (900 to 1200m)

The southern part of the study region has covered by the height between 900 to 1200m from sealevel, which occupies about 24.31 percent of the total land of the study region and accounts for 17.78 percent settlements in 1971 and 18.76 percent of the total settlements in decade1991.(Fig. 3.1)

3) The Plateau Region (600m to 900m)

The central part of the study region physiographic division stretches from west to east direction. It covers an area about 32.82 percent of the total land and occupies 40.00, 32.79 and 30.77 percent rural covers between height between 600 to 900m from mean sealevel. It includes the part of local hills. This settlements in the decades 1971, 1981 and 1991 respectively. (Fig.3.1)

4) The Plain Region (below 600.m.)

The plain region is located in the northern part of the study region. It stretches from west to east direction, which accounts only 40.13percent area of the Khandala taluka and comprises 37.78percent of the total settlements in decade 1971.Nearly 42.62percenr and 44.62 percent settlements occupied in 1981and 1991 respectively. The region below 600m. Heights is situated on the right bank of Nira river which is fertile as well as transportation net work is very well developed and more population is found engaged in other activities so the

density of settlements and population is higher as compare to other regions.

In the above discussion it is also found that the area which lies between the below 600m to 900m in height occupies an area about 72.95 percent of the total and accounts for 75.39 percent of the settlements. It is also observed that there is a positive correlation between area and settlement distribution.

The table III-I and figure 3.1 gives clear idea about physiographic divisions and rural settlement distribution.

Table-III-I

Khandala Taluka

PHYSIOGRAPHIC REGIONS AND DISTRIBUTION
OF RURAL SETTLEMENTS (1971 TO 1991)

SR. no	Height in m.	Area covered in sq. km	% of Total	1971		1981		1991	
				No.of Ru.se.	%of Total	No.o Ru.se	%of Total	No.o Ru. se.	%of Total
1	Below 600	211.3	40.13	17	37.78	26	42.62	29	44.62
2	600 to 900	172.8	32.82	18	40.00	20	32 79	20	30.77
3	900 to1200	128.0	24.31	08	17.78	10	16.39	12	18.46
4	Above 1200	14.4	02.74	02	04.44	05	08.20	04	06.15
	Total	526.5	100.00	45	100.00	61	100.00	65	100.00

## 3.2 Drainage Density and Distribution of Settlements: -

Rivers always attracted human being to set up their banks. In any region, more number of settlements are found in the areas where the drainage density is high. In order to testify this fact, the entire study region has been divided into four categories and distribution of settlements have been verified.

In the study region drainage density is very low. It is observed that 26.94 percent of the total area has drainage density is below 0.50 km. per sq. km, western, southern and central part of the study region which accounts 27.69 percent settlements in decade 1991, 26.22 percent in 1981 and in 1971 the settlements are 26.67 percent respectively.

The second category of the drainage density is 0.50 to 0.75km. per sq. km. Which has occupied 30.18 percent area of the study region. Central part of the Khandala taluka is covered by this category of drainage density. In the decade 1971, 1981 and 1991 the settlement accounts for 35.55 percent, 36.10 percent and 30.83 percent respectively.

The third category of the drainage density is 0.75 to 1.00 km. per. sq. km. It covers an area about 24.10 percent, which is located in the study region in three belt's first belt is found from at Bhatghar towards west and at village Water Bk to the east. The second belt is located into north south direction mostly in eastern portion of the Khandala taluka. Third

KHANDALA TALUKA
PHYSIOGRAPHIC DIVISION
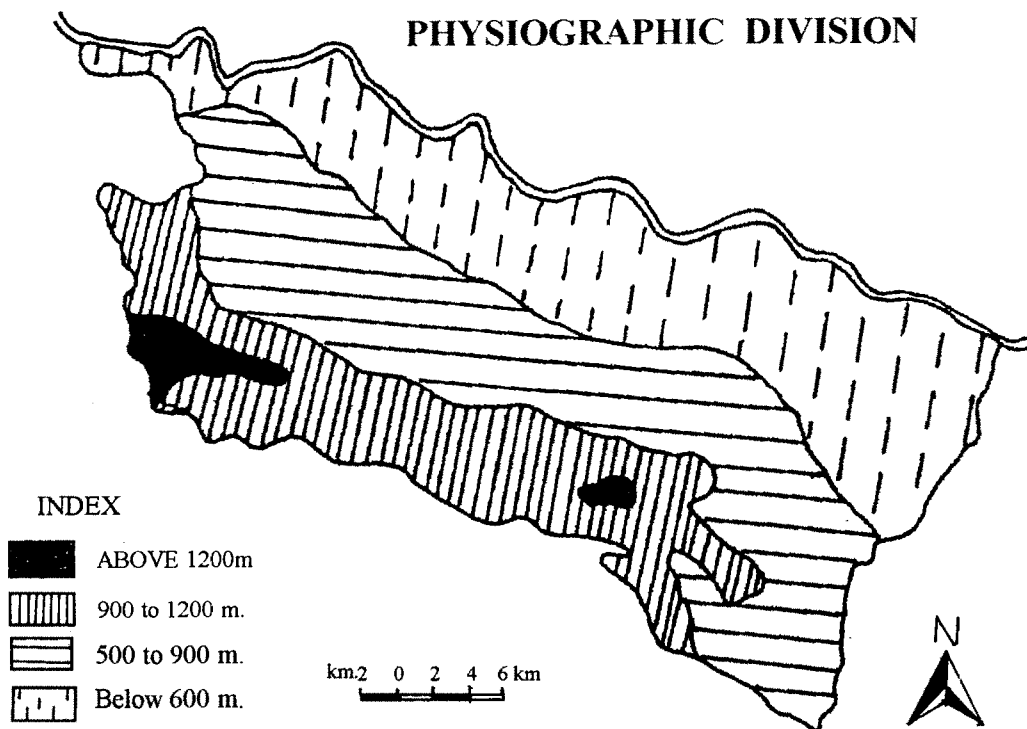
INDEX
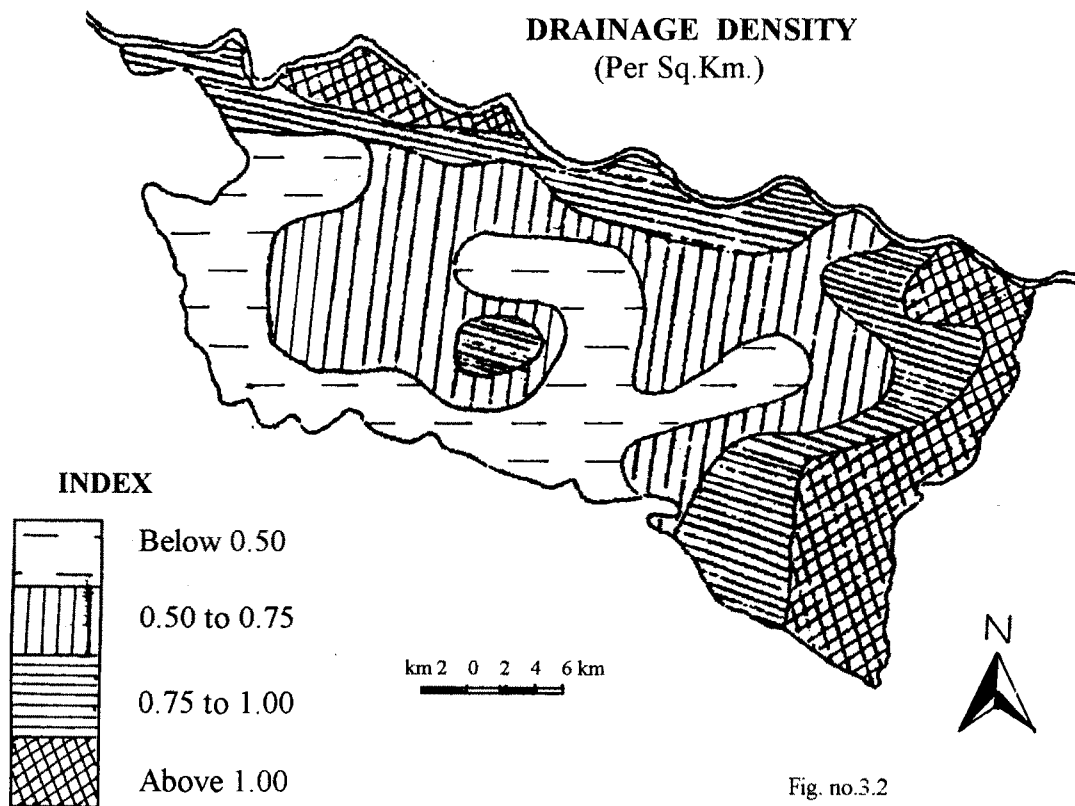
ABOVE 1200m

900 to 1200 m.

500 to 900 m.

Below 600 m.

km.2 0 2 4 6 km

N

Fig. no.3.1

KHANDALA TALUKA
DRAINAGE DENSITY
(Per Sq.Km.)

INDEX

Below 0.50

0.50 to 0.75

0.75 to 1.00

Above 1.00

km 2 0 2 4 6 km

N

Fig. no.3.2

31

patch is located near Khandala village and occupied nearly 22.22 percent of the total settlements in 1971and nearly 21.30percent and 23.10 percent settlements found occupied in 1981 decade and 1991 decade respectively. (fig.3.2)

The last category of drainage density is above 1 km. per sq. km. is found mostly in the area comprises eastern part of the study region Koparde, Nimbodi, Lonand and Bhavakalwadi villages .The Settlements in this region accounts for 15.26 percent in decade 1971, 16.38 percent in decade 1981 and 15.38 percent in decade 1991 respectively.

In the study region it is observed that flat and plateau region the drainage density is less but there is correlation between medium drainage density and area covered and number of settlements. The drainage density between 0.50 to 0.75 km. per sq. km. covers an area about 57.11 percent of the total, which accounts for 61.52 percent of the settlements in decade 1991.

The table III-II indicates the drainage density classes, area covered, number of settlements and their percentage. The figure 3.2 indicates that where the drainage density is high but the number of settlements are low and the area which covered by these settlements is also less.

Table No. III-II

Khandala Taluka

Drainage Density, Area Covered Number

Of settlements and their percentage

Sr No	Category	Area in sq. km.	% of Total	1971		1981		1991	
				No.of Settle	%of Total	No. of Settle.	%of Total	No. of Settle	%of Total
1	<.50/sq.km	141.8	26.94	12	26.67	16	26.22	18	27.69
2	.50-.75/sq.km	158.9	30.18	16	35.55	22	36.10	22	33.83
3	.75-1/sq.km	126.9	24.10	10	22.22	13	21.30	15	23.10
4	>1/sq.km.	98.9	18.78	07	15.26	10	16.38	10	15.38
	Total	526.5	100	45	100	61	100	65	100

3.3 POPULATION DENSITY AND DISTRIBUTION OF SETTLEMENTS

The western, midwestern, southern and eastern part of Khandala taluka has got the density of the population below 100 persons per sq. km. And which accounts only 25.10 percent area of the total. The population density between 100 to 150 person per sq. km. is observed in the western and eastern portion of the region, covers an area about 52.91 percent of the total and accounts for 14.00 percent rural settlements. The area covered by the population density between 150 to 200 persons per sq. km. is 13.51 percent of the study region mainly of central, north west and eastern part and

accounts for 18.50 percent of the total rural settlements. The density of the population above 200 persons per sq. km. Covers less area, it is about 08.48 percent of the total land. It is mainly observed in northern, central and eastern part of the study region an account for 24.60 percent of the total rural settlements.

The table III-III and figure 3.3 gives clear idea of the density of rural population and distribution of rural settlements for the year 1991.

Table. III-III

Khandala Taluka

Population Density, Area Covered, No. Of

Settlements and Their Percentages (1991)

Sr.No	Population Density	Area In Km.	% of Total	1991 No. of Settl.	% of Total
1	Below 100	132.0	25.10	11	16.92
2	100 to 150	278.6	52.91	26	14.00
3	150 to 200	71.2	13.51	12	18.46
4	Above 200	44.7	8.48	16	24.62
	Total	526.5	100.00	65	100.00

3.4 AGRICULTURAL LAND AND DISTRIBUTION OF SETTLEMENT

Agriculture is the major occupation of the Khandala taluka. Out of the total population 62.03 percent population engaged in this sector. There are various types of crops are grown, such crops are also influenced on the

distribution of settlement as well as population, therefore agricultural land have been classified into four categories as follows:

In the first category land under agriculture is below 0.75% and covered huge area of the study region and it is about 40.44%, its occupied 29.33%of the total settlements. Such land is found in to two places one is western side and other is southern, middle eastern portion of the study region.

Under the second category agriculture land is 0.75 to 1.00 %, which is covered 32.16% out of the total area and 46.15% of the total settlements. This type of agricultural land group also found in two belts one belt is extended on the north which is along the Nira river, this area stretches western side in north east to south west direction and another belt is located, which is found north to south direction.

The third and fourth categorized agricultural land covered 27.40% land and 24.62% of the settlements in decade 1991, such category land located eastern, central and western part of Khandala taluka.

The analysis clearly indicates that where less land available for cultivation, the number of rural settlements are more, but their size is small as compare to the areas where more land is available for cultivation that is the land occupied below 1.00 percent land under agriculture where 75.38 percent settlements out of the total.

Table III-IV

Khandala Taluka

Percentage of Agricultural Land, Area Covered,

Number of Settlements and Their Percentage (1991)

Sr.No	% of Land Under Agri.	Area in He.	% Of. Total	1991 No. Of settle.	% of total
1	Below 0.75	21252	40.44	19	29.23
2	0.75 to 1.00	16900	32.16	30	46.15
3	1.0 to 1.25	9600	18.27	07	10.77
4	Above 1.25	4800	09.13	09	13.85
	Total	52552	100.00	65	100.00

3. 5 Irrigation Land and Distribution of settlement

When region does not have sufficient rainfall then an artificial supply of water is necessary. This is known as irrigation. In the study region well, canal and river are the major irrigation sources. The distribution of irrigation facilities also responsible for the distribution of settlements, under this cultural aspect here an attempt has been made to analyse the irrigation facilities and distribution of settlements. The irrigation land of Khandala taluka has been divided under the four category.

In the first category irrigated land is below 10 percent covers nearly 31.68 percent of the total land

KHANDALA TALUKA
POPULATION DENSITY
Pre.Sq. Km. 1991

INDEX
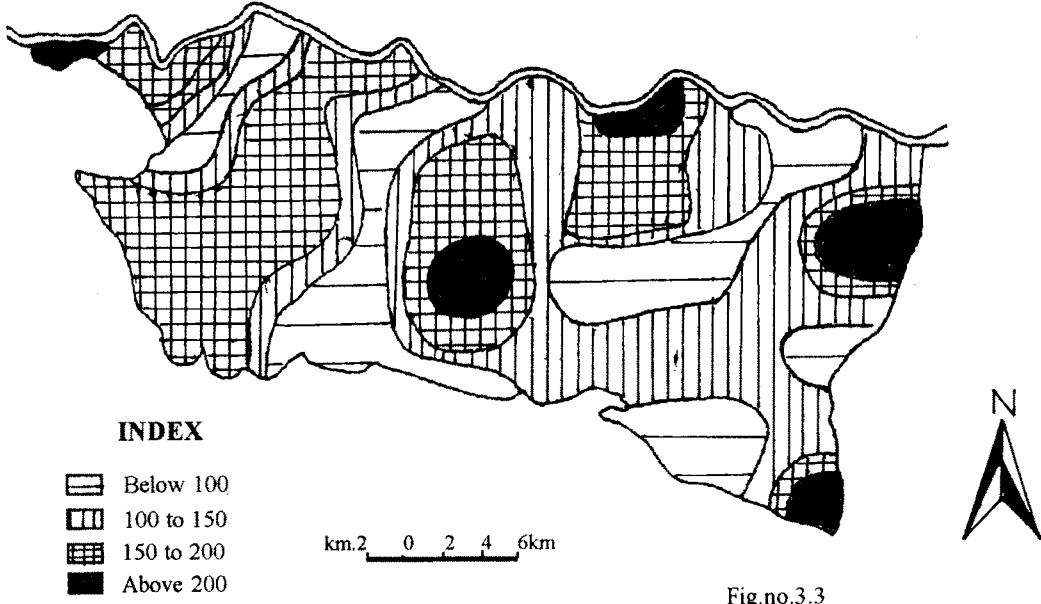
- Below 100
- 100 to 150
- 150 to 200
- Above 200

km.2 0 2 4 6km

Fig.no.3.3

KHANDALA TALUKA
PERCENTAGE OF LAND UNDER AGRICULTURE

INDEX

- Below 0.75
- 0.75 to 1.00
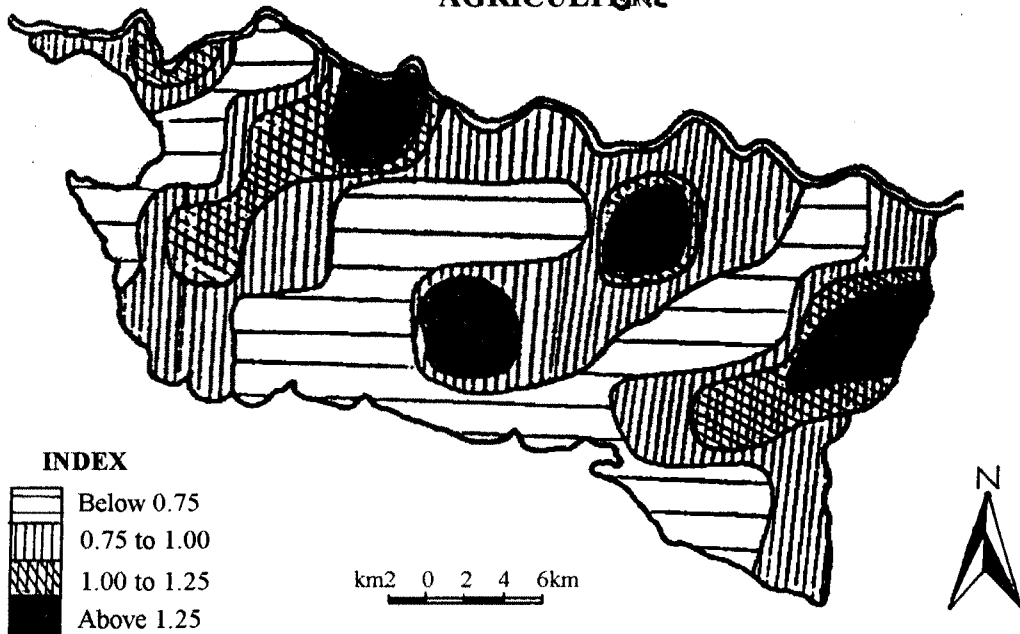- 1.00 to 1.25
- Above 1.25

km2 0 2 4 6km

Fig.no.3.4

37

and having 26.15 percent of the rural settlements. This irrigated land is found southern, western and middle eastern margin of the study region.

The second category is between 10 to 20 percent land under irrigation, covers an area about 45.57 percent of total, such portion of the Khandala tahasil also located central and southern area.

In the third category of irrigation between 20 to 30 percent land under irrigation is found only 11.52 percent of the study region and accounts for 12.31 percent of the total settlements. This land is located in three patches at Shirwal and its adjesant area Khandala and Pargaon village and Lonand and its surrounding areas. The land, which has irrigation above 30 percent covers less area of the Khandala taluka. It is also only 11.23 percent and accounts for 15.38 percent of the total settlement. This land is distributed into three parts i.e. western side of the Bhatghar and at Bhatgare, the northeastern part and along the right bank of the Nira river and south east of Nimbodi village.

Table No. III-V

Khandala Taluka

Irrigation Land ,Area Covered, Number of

Settlements and Their Percentage.(1991)

Sr. No.	Category	Area in He.	% of total area	1991 No. of settlements	% of total
1	Below10%	16650	31.68	17	26.15
2	10 to 20%	23950	45.57	30	46.16
3	20 to 30%	6052	11.52	08	12.31
4	Above30%	5900	11.23	10	15.38
	Total	52552	100.00	65	100.00

In the study region it is observed that plain and plateau region having more land under the irrigation so there is correlation between irrigation land and distribution of settlement (fig.3.5)

3.6 DENSITY OF ROAD AND DISTRIBUTION OF SETTLEMENTS

The grid-wise analysis of distribution of settlements and distribution of road net-work indicate positive relationship. It is observed that the road net-work is more, the density of settlements is also more. In the areas where the road net-work is better developed, the large size settlements are found in the study region.

The study region is divided into four categories of road density per sq. km. In the western, southern and central part the density of road per sq. km. is found below 0.35km covers an area about 44.45 percent of the total and accounts for 48.89 and 55.74 percent rural settlements in decade 1971and 1981 respectively but 1991decade it accounts for 55.38 percent.

Nothern, central and eastern parts have road density between 0.35 to 0.70 km per sq. km covers an area about 41.71 percent of the total, and accounts for 35.56 percent, 29.50 percent and 27.69 percent rural settlements respectively.

The road density per sq. km. between 0.70 to 1.05 km. stretches in the nothern part form west to east direction and north east side of the study region, which occupies about 8.15 percent of land and nearly 7.69 percent of rural settlement.

In the western part of Bhatghar village and central part of Khandala and Paragaon settlements have occupied the road density per sq. km. above 1.05km. This category of road density has occupied nearly 5.32 percent of the total land of the study region and accounts for 9.94 percent of the rural settlements in decade 1991.

Form the above analysis it is observed that where the density of the road is moderate, more land occupied by more number of settlements. The density of road between below 0.35 km. per sq. km. and 0.35 to 0.70 km. per sq. km. covers nearly 92 percent of the total land area and 83.07 percent of the total settlements

KHANDALA TALUKA
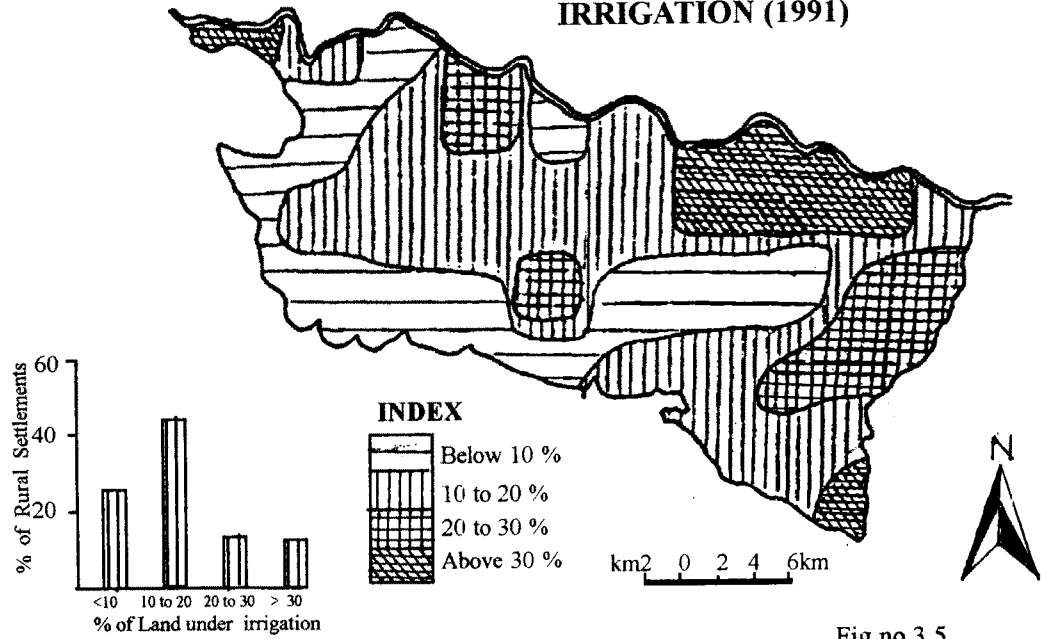## PERCENTAGE OF LAND UNDER
IRRIGATION (1991)

INDEX

Below 10 %

10 to 20 %

20 to 30 %

Above 30 %

% of Rural Settlements

60

40

20

<10   10 to 20   20 to 30   > 30

% of Land under irrigation

km2   0   2   4   6km

Fig.no.3.5

KHANDALA TALUKA
ROAD DENSITY Per Sq. Km.(1991)

INDEX

Below 0.35 km

0.35 to 0.70 "

0.75 to 1.05 "

Above 1.05 "

% of Rural settlements

60

40

20

<.30   .30 - .70   .70 - 1.05   1.05>

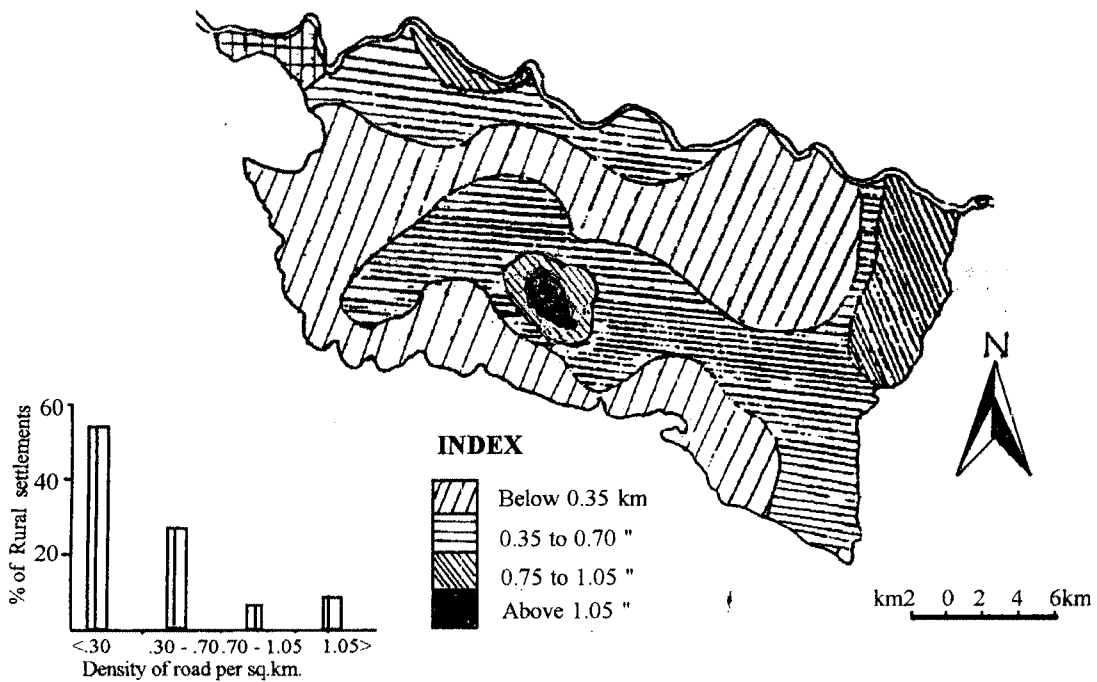Density of road per sq.km.

km2   0   2   4   6km

Fig.no.3.6

41

The table III –IV and figure

no. 3.6 indicates the clear picture of the road net-work density

and distribution of settlements.

Table III-IV

Khandala Taluka

Road Density, Area Covered, Number of

Settlements and Their Percentage

Sr. No	Category	Area in sq. km.	% of Total	1971		1981		1991	
				No. settle.	%of Total	No. settle	%of Total	No. of settle.	%of Total
1	<0.35	234.0	44.45	22	48.89	34	55.74	36	55.38
2	0.35-0.70	219.6	41.71	16	35.56	18	29.50	18	27.69
3	0.70-1.05	44.8	8.51	04	8.89	05	8.20	05	7.69
4	>1.05	28.1	5.32	03	6.66	04	6.56	06	9.24
	Total	526.5	100	45	100	61	100	65	100

3.7 SPATIAL PATTERN OF RURAL SETTLEMENT DISTRIBUTION

In the above discussion we have tried to show

how the various factors influenced on the distribution of rural

settlement. Here an attempt has been made to study the existing

distribution pattern of rural settlement with the help of

quantitative technique "Nearest Neighbor Analysis". The entire study region is divided into sizeable grids (4 Km x 4Km) and "Rn" values from the settlement have been calculated. The "Rn" values have been calculated by using the Hamond and Mcullugh P.S., (1974) formula.

Formula –

$$\overline{Dran} = \frac{1}{2\sqrt{(N/A)}}$$

Where as

N = is the no. of settlements.

A = is the area of the grid or spatial unit.

From these "Rn" values the isopleths have been drawn to show the spatial distribution pattern of rural settlement. The table III –VII and figure 3.7 gives the detail about the area with different "Rn" values area covered, it's percentages, no. of settlements and their percentage.

KHANDALA TALUKA
SPATIAL DISTRIBUTION OF
SETTLEMENTS

INDEX

CLUSTERED	
RANDOM	
UNIFORM	

N
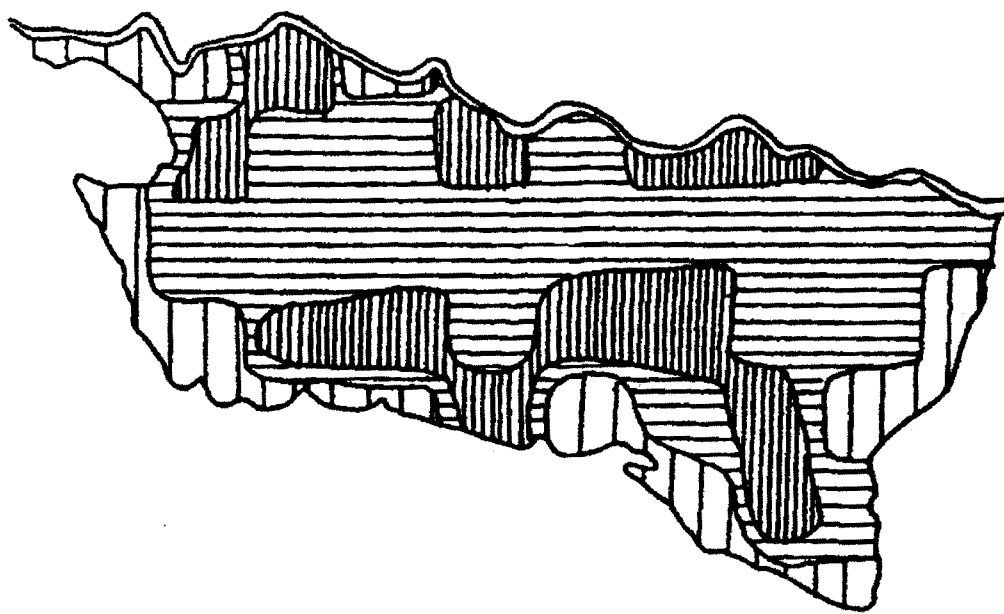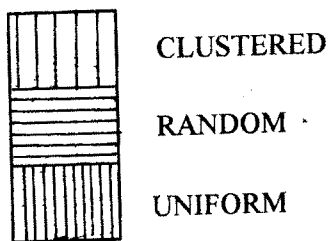
Km2 0 2 4 6Km.

Fig.no.3.7

Table III-VII

Khandala Taluka.

The "Rn" Values, Area Covered, Number

Of Settlements And Percentage

Sr. No	'RN' value	Settle. Type	Area in sq. Km.	% of Total	No.of Settle.	% of Total
1	Below 1.00	Uniform type	122.5	23.27	16	24.62
2	1.0 to 1.50	Clustered type	276	52.42	36	55.38
3	Above 1.50	Random type	128	24.31	13	20.00
Total			526.5	100.00	65	100.00

The western, southern and middle eastern part of the study region, which covers an area about 23.27 percent of the total and accounts for 24.62 percent of total settlements have clustered type of pattern. The region which lies in the south east ,nothern and middle east to west part of the study area, covers an area about 52.42 percent of the total and accounts for 55.38 percent of total settlements have random types of pattern. In the southern and central as well as northern portion have been covered the 24.31percent of the total area and account for 20 percent of the total settlement have uniform type of settlement pattern. .

3.8 GROWTH CHARACTERISTICS OF RURAL SETTLEMENTS.

It is very essential to study the growth character of settlements and the population of settlements. The change in population in the area always affects the over all growth character of the study region. Dynamics of population is an interwoven phenomenon, which reflects the social economic change in area.

Various factors are influenced on the distribution of rural settlements, several of those factors are also responsible for the varying growth of rural settlements. The region, where resources are limited, land under cultivation is poor and physiography is rugged, in such areas the growth rate of rural settlements is poor, at the same time vary few new settlements develop in these areas. On the other hand, in the plain area, where land is fertile, irrigation is developed and agriculture is found in prosperous stage, the rural settlements grow at a higher rate and several new settlements also emerge in the landscape.

1) Size growth of rural settlements

The size growth of settlements is considered for the decades 1971, 1981, and 1991. In the study region there is change in each decade in the total number of settlements, over all the size of settlements are small. There are only three settlements which are large in size namely Lonand, Shirwal and Khandala, which accounts for 24.85 percent of the total population (1991)

and the area which covers about the 13.01 percent of the total (1991), inhabited into 65 rural settlements.

To analyze the size growth of settlements, they have grouped into five categories according to population size as shown in table III- VIII.

In the year 1971, there are 09 settlements which have population below 600 persons but in this group of population number of settlements are increased in decade 1981 upto 15, in 1991 number of settlements are decreased as compared decade 1981 it is found upto 13 settlements.

In the second size group of settlements it is observed that there is increase in number of settlements. In the decade 1971 there are 16 settlement (35.56 percent) and in decade 1981 there are 23 settlements (37.70 percent) but in the decade 1991 number of settlements found decrease upto to ten (38.46 percent).

In the fifth size group of rural there are 15.56 percent of settlements in decade 1971, 09.85 percent. In decade 1981 and 09.23 percent in decade 1991 respectively. The same number of rural settlements are found in the decade 1981 and 1991 but in the decade 1971 there were 7 rural settlements.

The table III-VIII and fig. 3.8 and 3.8A shows clear picture of decade changes in population size of the rural settlements in Khandala taluka.

KHANDALA TALUKA

DECADAL GROWTH OF RURAL SETTLEMENTS

(1971-81)

Ⓐ **(1981-91)**
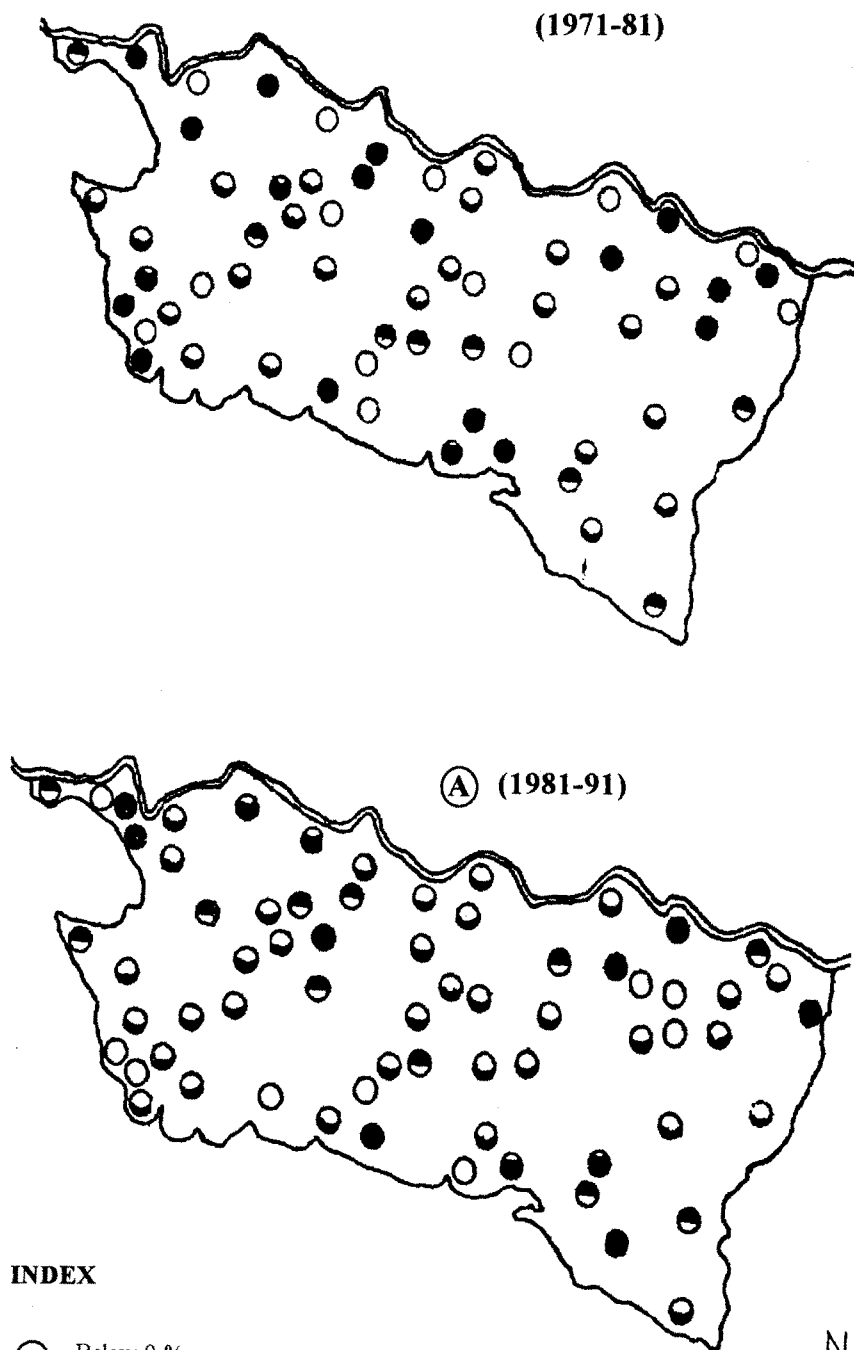
INDEX

◯   Below 0 %

◖   0 to 20 %

⬤   20 to 40 %

⬤   40 to 60 %

⬤   Above 60 %

N

km2 0 2 4 6km

Fig.no.3.8 & 3.8 A

Table III-VIII

Khandala Taluka

Population Size Of The Rural Settlement, Number Of

Settlements And Their Percentage

| Sr. No.	Size of Rural settlements	1971		1981		1991	
		No.of settle.	% of total	No.of settle.	% of total	No.of settle.	% of total
1	Less than 600 persons	09	20.00	15	24.59	13	20.00
2	600 to 1200 persons	16	35.56	23	37.70	25	38.46
3	1200 to 1800 persons	08	17.76	13	21.31	10	15.38
4	1800 to 2400 persons	06	13.33	04	06.56	11	16.93
5	above 2400 persons	07	15.56	06	09.85	06	9.23
	Total	45	100	61	100	65	100

2) DECADAL GROWTH RATE OF SETTLEMENTS

The physiography of the region plays an important role in the distribution of rural settlements of varying size order, but there is also different growth rate of population, which is affected by various factors. For analysis of the growth rate of settlements the in the study region, settlements from 1971to1991 have been taken into consideration and the growth rate of settlements have been categorized into five groups.

In the study region, the minimum (below zero percent) growth rate of population is found in 12 settlements in the decade 1971 to 1981, but it is decreased by five settlements in

KHANDALA TAKLUKA

POPULATION SIZE OF RURAL SETTLEMENT

(1991)

Ⓐ
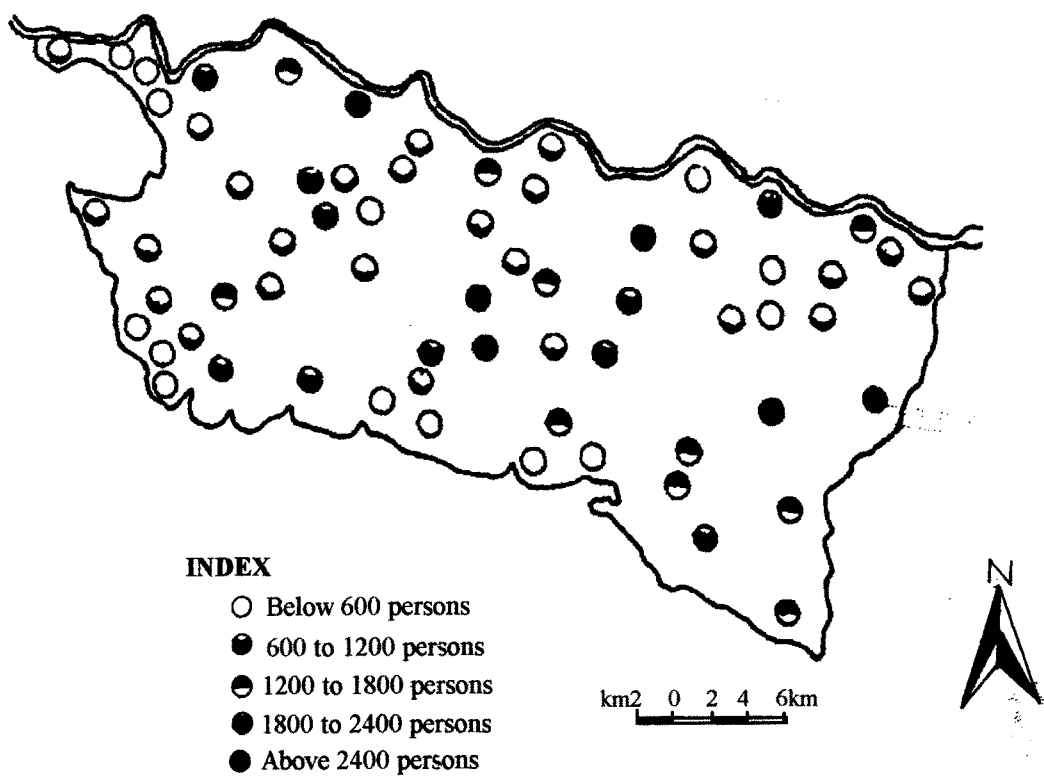
INDEX

○ Below 600 persons

● 600 to 1200 persons

◑ 1200 to 1800 persons

● 1800 to 2400 persons
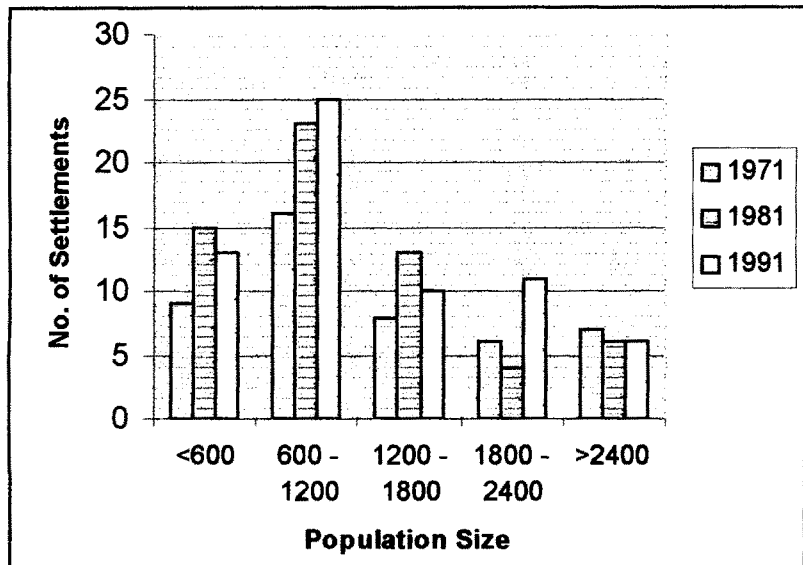
● Above 2400 persons

km2 0 2 4 6km

Fig.no.3.9

the decade 1981 to 1991. In the second growth rate category (0 – 20) there are 22 settlements in 1971-81 but in the next decade 1981- 91 there are 34 settlements which are 52.31 percent of the total settlements. In the third group of growth there are 08 settlements in 1971 – 81 and 11 settlements in decade 1981 – 91. In the fourth category of settlements there is growth of only 03 and 04 settlements in the decade 1971 – 81 and 1981 – 1991 respectively. In the 1981 – 91decade, one settlement is added and fifth group there is one settlement in 1971 – 81, but in 1981 – 91 the number of settlements are decreased upto 09 settlements (fig.3 .9 and 3.9 A)

From the figure 3.9 and 3.9A it is observed that the minimum growth rate of settlements in the decade 1971 – 81 found in the central belt extended into east to west direction and south east region and in the decade 1981 – 91 it is found in the south west, central and middle east region.

The more growth rate of settlements is observed in northern, northwest and northeast portion of the study region. In the decade 1971 – 81 and 1981 – 91 more growth rate of settlements is also observed in northern and southeastern part of the study region.

The sailent feature of the growth character of rural population and settlements, it is observed that in the study region some villages are agriculturally prosperous and economically better developed , indicate more growth rate of

rural an addition of more new villages which have been carved out of the old large size villages. Due to this reason some villages in the economically prosperous area indicate decrease in their population size.

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