CHAPTER - III

SPATIAL DISTRIBUTION OF RUIRAL SETTLEMENTS IN THE SINDHUDURG DISTRICT

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CHAPTER - III

SPATIAL DISTRIBUTION OF RURAL SETTLEMENTS IN THE SINDHUDURG DISTRICT

3.0 INTRODUCTION :

Rural settlement and urban settlement are the two areas that constitute the discipline of settlement Geography which itself is a recent branch of Human Geography. A rural settlements as the point of origin and primary residence of human society, is the linking thread and life blood of all geographical studies, (Mandal, 1979).

Rural settlements play vital role in human life. Rural settlement is a relatively small and simple agglomeration of houses at a favourable site, primarily associated with agriculture and related phenomena. The distribution of rural settlements is affected by several factors in which the relief, distribution of resources, population, land under cultivation, types of agriculture, development of network, localization of resources, political decisions and cultural bonds are the important factors.

The location and space relationship are the important aspects, which have been studied widely by many geographers.

Rudberg (1957) has given more attention to this point in studying the distribution of settlements in Northern Sweden. Sharma (1972) has studied the distribution of settlements from various aspects in Indian Desert. The spatial distribution of rural settlements in the Lower Ganga-Yamuna Doab studied by Tiwari in 1984. Sinha (1976) has discussed distribution of settlements of Chota Nagpur plateau in Bihar. Kumbhar (1997) has studied the spatial distribution of rural settlements from various aspects in the Nira Valley.

In the present chapter, an attempt has been made to find out the influence of various factors on the distribution of rural settlements in the Sindhudurg district. The study includes the analysis of spatial distribution of rural settlements according to different size order and analysis the influence of various physical and socio-economic factors on the distribution of rural settlements. The spatial pattern of rural settlements has been studied by using statistical technique.

3.1 DATA BASE AND METHODOLOGY :

In the present study, the data have been obtained mainly from 1991 census. The data pertaining to

agriculture, irrigation, road transport has been collected from recent socio-economic abstract.

In the present study, the spatial distribution of rural settlements and the information of various aspects have been collected in regular frame of grid. The division of area into grids allow a very ready comparison. The size of the grid of 10 x 10 kms was found to be suitable. Thus, the whole area was divided into this size and the information was collected gridwise.

Using nearest neighbour analysis of Clark and Evans (1954) has done the spatial analysis of rural settlements. In the present study various physical and cultural factors have also influenced on the distribution of rural settlements in study area.

3.2 PHYSIOGRAPHY AND DISTRIBUTION OF RURAL SETTLEMENTS :

The Sindhudurg district is broadly divided into three physiographic divisions:

1. The Sahyadri Region
2. The middle Belt of the hilly Region or Valati
3. Coastal Belt Region or Khalati

1) The Sahyadri Region :

In the eastern part of the study region, the hilly area of Sahyadrian ranges. The height of this region is above 450 metres from the sea level. It covers about 12.70 per cent area of the total study region.

The region is hilly and mountainous so the ranges covered by dense forest. The remoteness is an obstacle in agricultural and transportation development, so the land under cultivation is very less. It is rugged topography, with several hills and spurs. Only 2.04 per cent rural settlements are found in this area.

2) The Middle Belt of the Hilly Region or Valati:

The middle belt of the hilly region has an average height of 150 to 450 metres above mean sea level. There are many scattered hill ranges in the area. It covers about 36.14 per cent area of the region. In this region, land under agriculture is found more, transportation network have developed, therefore, the number of rural settlements are found more. In this part only 11.55 per cent rural settlements are located.

3) Coastal Belt Region or Khalati :

This is the most important region of the western part of the study area where the various river basins covered by coastal belt or Khalati. The height of this region is below 150 metres from sea level. It covers about 51.16 per cent area of the total study region. It covers most of the area of the Sindhudurg district. Highly fertile soils, availability of water, developed mode of transportation and Horticulture cultivation, all these factors attracts the people in this region, hence there are more number of settlements are located. Out of the total rural settlements 86.41 per cent settlements are located in this part.

TABLE NO. III.I

SINDHUDURG DISTRICT

HEIGHT FROM SEA LEVEL, AREA COVERED, NO. OF RURAL SETTLEMENTS AND THEIR PERCENTAGE

Sr. No.	Height (in Metres)	Area covered in Sq.km.	% of Area covered	No. of Rural Settlements	% of Rural settlements
1	Less than 150	2664	51.16	636	86.41
2	150 - 450	1882	36.14	85	11.55
3	Above 450	661	12.70	15	2.04
	District	5207	100.00	736	100.00

Source : Compiled by author

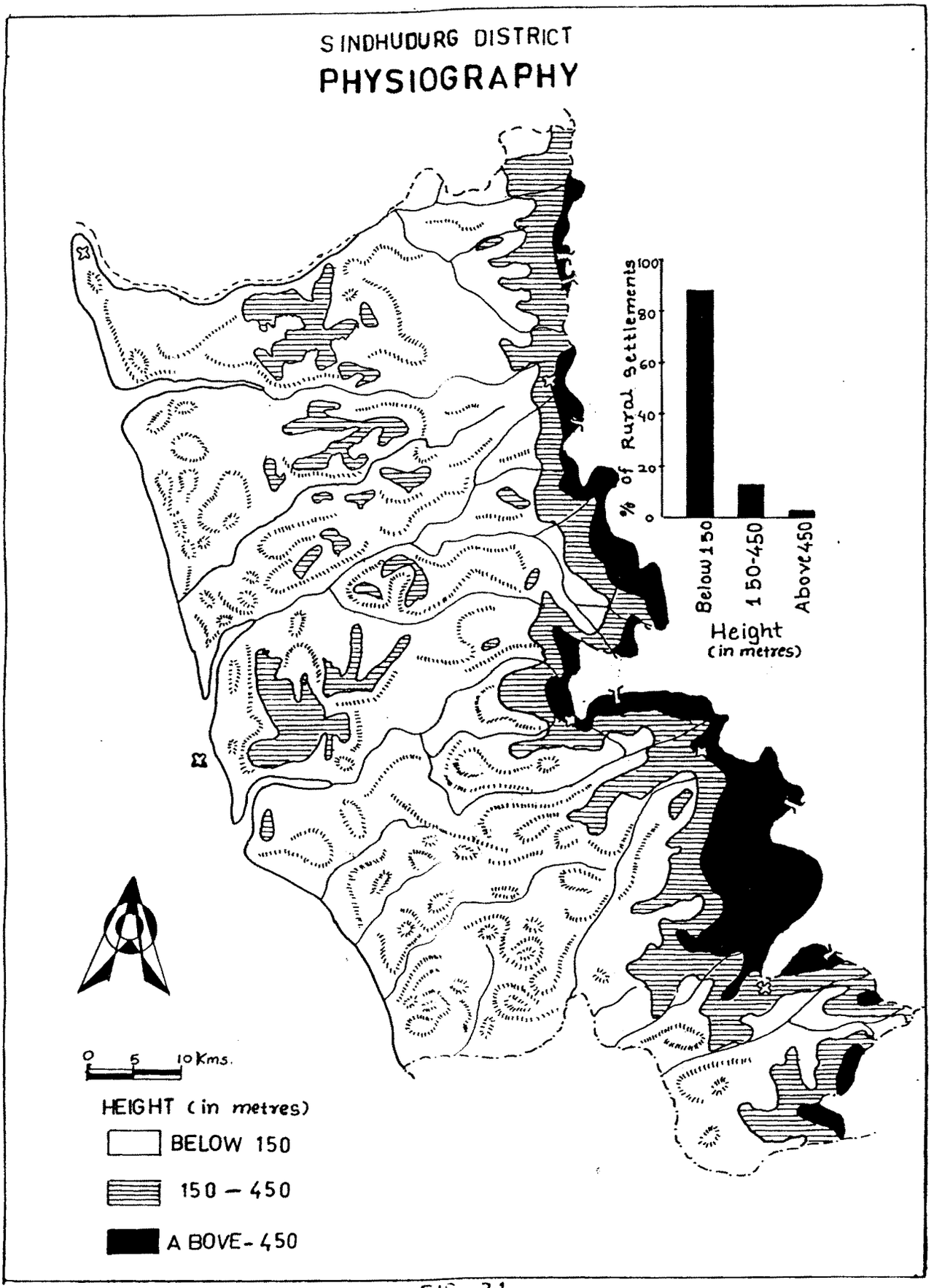
SINDHUDURG DISTRICT
PHYSIOGRAPHY
% of Rural Settlements
100
80
60
40
20
0
Below 150
150-450
Above 450
Height
(in metres)
0 5 10 Kms.
HEIGHT (in metres)
BELOW 150
150 – 450
ABOVE-450

FIG.-3·1

It is observed that the co-efficient of correlation between the average height and the percentage of rural settlements indicate negative correlation. The above analysis clearly indicates that the relief plays very important role in the distribution of rural settlements. The Table III.I indicates the height from sea level, area covered, number of rural settlements and their percentage. The Figure No. 3.1 indicates the classification of the area into different height and relationship between height and rural settlements.

3.3 DRAINAGE DENSITY AND DISTRIBUTION OF RURAL SETTLEMENTS :

Water resource is an important part of human life. In any part, more number of rural settlements is found in the areas where the drainage density is high. In order to testify this fact, the entire study region has been divided into five categories and the distribution of rural settlements has been verified.

TABLE NO. III.II

SINDHUDURG DISTRICT

DRAINAGE DENSITY CLASS, AREA COVERED, NO. OF RURAL SETTLEMENTS AND THEIR PERCENTAGE

Sr. No.	Drainage Density per 100 sq.kms.	Area Covered in sq.kms.	% of Area covered	No. of Rrural settlements	% of Rural settlements	Settlement Density per 100 sq. kms.
1	Less than 25 kms.	38	0.73	3	0.41	7.89
2	25 to 50 kms.	162	3.11	36	4.89	22.22
3	50 to 75 kms.	2136	41.02	318	43.21	14.89
4	75 to 100 kms.	2666	51.20	357	48.50	13.39
5	Above 100 kms.	205	3.94	22	2.99	10.73
	District	5207	100.00	736	100.00	14.13

Source : Compiled by author

It is observed that, very few coastal part of Devgad and Malvan talukas has found only 0.73 per cent area of the study region has an average less than 25 kms. drainage density per 100 sq.kms. In this part out of the total, only 0.41 per cent settlements have been located and the density of rural settlements is only 7.89 settlements per 100 sq.kms.

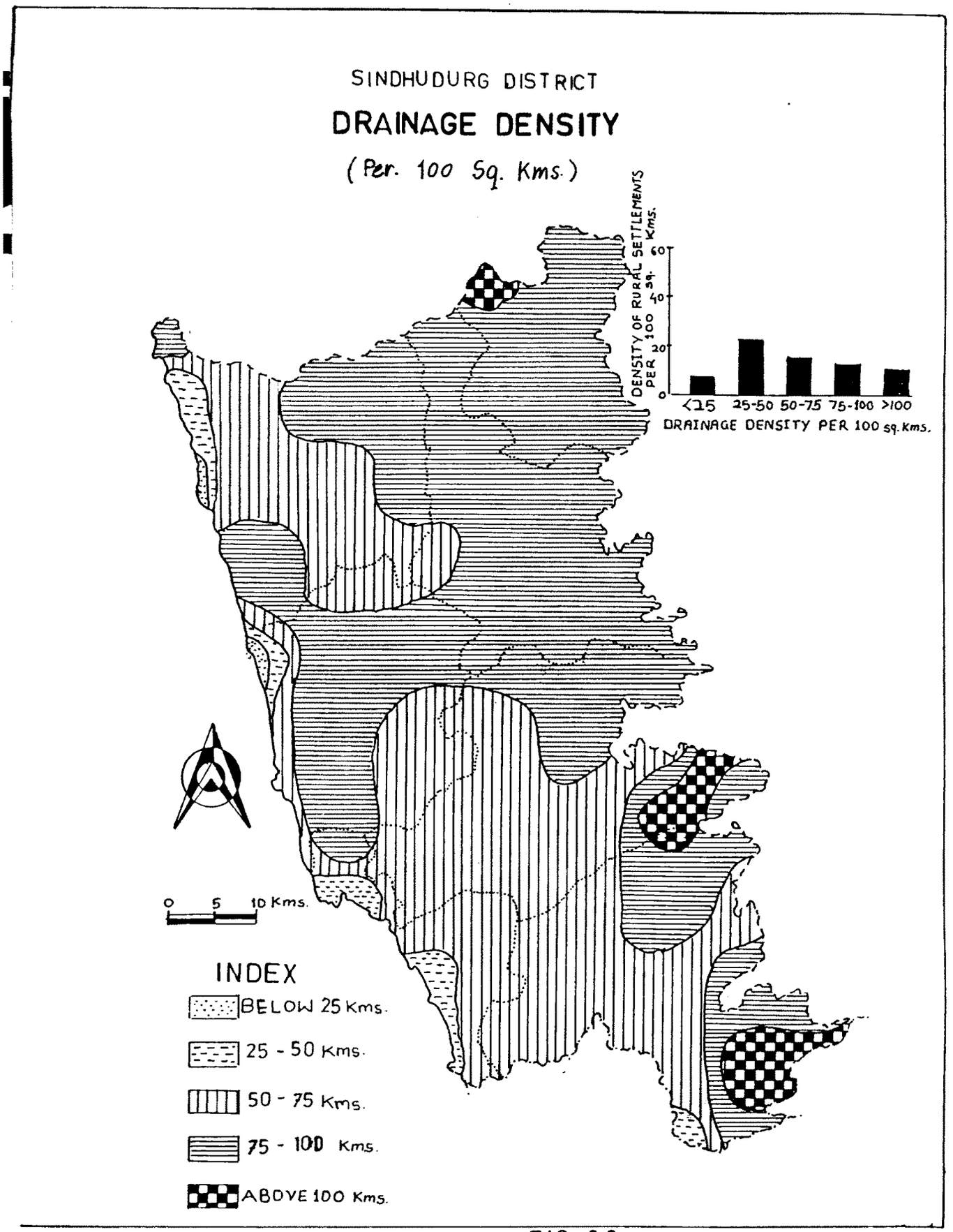
SINDHUDURG DISTRICT
DRAINAGE DENSITY
(Per. 100 Sq. Kms.)
DENSITY OF RURAL SETTLEMENTS PER 100 Sq. Kms.
60
40
20
0
<25
25-50
50-75
75-100
>100
DRAINAGE DENSITY PER 100 sq. kms.
0 5 10 Kms.
INDEX
BELOW 25 Kms.
25 - 50 Kms.
50 - 75 Kms.
75 - 100 Kms.
ABOVE 100 Kms.

FIG.- 3·2

Only 3.11 percent area is covered with a drainage density of 25 to 50 kms. per 100 sq. kms. In this part only 4.89 per cent of the rural settlements are located. The region has higher density of rural settlements which is 22.22 per 100 sq. kms.

Nearly 41.02 per cent area is covered with a drainage density of 50 to 75 kms. Per 100 sq. kms. and accounts for 43.21 per cent of the rural settlements located where the density of rural settlements in only 14.89 per 100 sq. kms.

It is also observed that, where the drainage density is found between 75 to 100 kms. per 100 sq. kms. covers an area about 51.20 per cent of the study region and accounts for 48.50 per cent of the rural settlements are located where the density of rural settlements is only 13.39 per 100 sq. kms.

Very small area, particularly a part of Swantwadi, Kudal and Vaibhavwadi talukas indicates high drainage density of above 100 kms. It covers only 3.94 per cent area of the study region. In this region only 2.99 per cent rural settlements are located where the density of rural settlements is 10.73 per 100 sq. kms.

The above analysis clearly indicates that the density of drainage and the density of rural settlements have a low positive correlation.

The table III.II indicates the drainage density classes, area covered, number of rural settlements, their percentage and density of rural settlements. The figure No.3.2 indicates the drainage density of the area and relationship between drainage density and settlement density.

3.4 VARIATION IN RAINFALL AND DISTRIBUTION OF RURAL SETTLEMENTS :

Climate affects human life many ways. It also affects the human habitat, settlements pattern and occupation of the people and their activities. Particularly rainfall plays an important role is a controlling factor in determining the agricultural practices and cropping pattern of the region.

In the study region, the rainfall increases from West to East. The figure No. 3.3 indicates the isopleth map of rainfall distribution in study region and relation between rainfall category and rural settlements. The rainfall of the study region has been grouped into seven categories.

TABLE NO. III.III

SINDHUDURG DISTRICT

RAINFALL CATEGORY, AREA COVERED, NO. OF RURAL SETTLEMENTS AND THEIR PERCENTAGE

Sr. No.	Rainfall Category	Area Covered in sq.kms.	% of Area covered	No. of Rrural settlements	% of Rural settlements
1	Less than 200 cm.	205	3.94	24	3.26
2	200 to 250 cms.	320	6.15	57	7.74
3	250 to 300 cms.	388	7.45	75	10.19
4	300 to 350 cms.	1980	38.03	343	46.60
5	350 to 400 cms.	1301	24.98	144	19.57
6	400 to 450 cms.	565	10.85	45	6.12
7	Above 450 cms.	448	8.60	48	6.52
	District	5207	100.00	736	100.00

Source : Compiled by author

It is observed that the area, which experiences more than 450 cm of rainfall covers eastern part of Kankavli and north eastern part of Kudal talukas of the study region. In this region

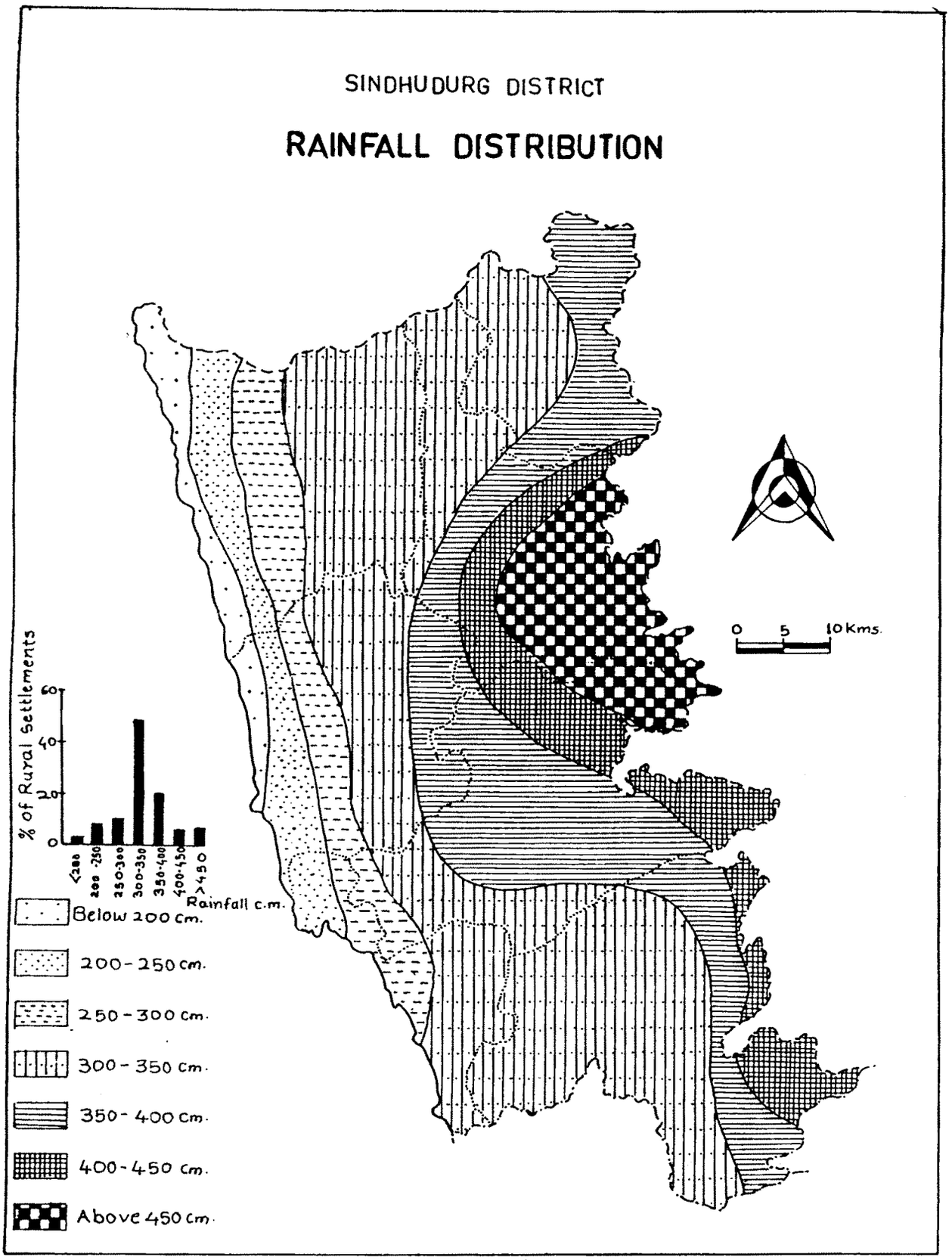
SINDHUDURG DISTRICT
RAINFALL DISTRICTION
0 5 10 Kms.
% of Rural Settlements
60
40
20
0
<200
200-250
250-300
300-350
350-400
400-450
>450
Rainfall c.m.
Below 200 cm.
200-250 cm.
250-300 cm.
300-350 cm.
350-400 cm.
400-450 cm.
Above 450 cm.

FIG.-3·3

it covers 8.60 per cent of area where 6.52 per cent of rural settlements are located. The second zone, having 400 to 450 cm. rainfall covers, central part of Kankavali, eastern part of Sawantwadi and Kudal talukas. It covers 10.85 percent area where 6.12 percent of the rural settlements are observed. The third zone, having rainfall between 350 to 400 cm. covers nearly 24.98 per cent area of the region where 19.57 per cent of the rural settlements are located.

It is observed that the fourth zone covers major part of the Sawantwadi taluka, Western part of Vaibhavwadi, Kudal and Kankavli talukas, eastern part of Devgad, Malvan and Vengurla talukas having 38.03 per cent area of the region where 46.60 per cent of the rural settlements are located.

The fifth zone, having rainfall between 250 to 300 cm covers only 7.45 per cent area of the region and observes 10.19 per cent of the rural settlements.

It is observed that in the western part of the study region, where the rainfall is found less than 250 cm which covers 10.09 per cent area of the region and includes western part of Devgad and Malvan talukas and north western part of Vengurla

taluka. It covers 11 per cent of the rural settlements of the total rural settlements.

The table III-III indicates the Rainfall Category, Area covered, number of rural settlements and their percentage. The analysis clearly indicates that the amount of rainfall and number of rural settlements have a low positive correlation.

3.5 DENSITY OF RURAL POPULATION AND DISTRIBUTION OF RURAL SETTLEMENTS :

The density of rural population and density of rural settlements in the study area indicates a typical relationship. In the study region the density of rural population has been calculated gridwise (10 x 10 kms.) and the isopleth map has been drawn.

It is observed that, eastern part of the study region in the hilly area, where the density of rural population and density of rural settlements is very low. The western part of the study region where the density of rural population and rural settlements is very high. The density of rural population and the density of rural settlements have a high positive correlation.

TABLE NO. III-IV

SINDHUDURG DISTRICT

CLASSES OF POPULATION DENSITY, AREA COVERED, NO. OF SETTLEMENTS AND THEIR PERCENTAGE

Sr. No.	Classes of Rural Population density per sq.km. (Persons)	Area covered in sq.kms.	% of Area covered	No. of Rural Settlements	% of Rural Settlements	Rural settlement density per 100 sq.kms.
1	Below 100	1115	21.41	105	14.27	9.42
2	100 to 200	2926	56.20	396	53.80	13.53
3	200 to 300	976	18.74	178	24.18	18.24
4	300 to 400	165	3.17	40	5.44	24.24
5	Above 400	25	0.48	17	2.31	68.00
	District	5207	100.00	736	100.00	14.13

Source :- Compiled by author.

In the study region, the area where low density i.e., less than 100 persons per sq.km. is observed, covers 21.41 per cent area and accounts for 14.27 per cent rural settlements. It includes the hilly region of Vaibhavwadi, Kankavli, Kudal and Sawantwadi talukas.

The second zone, where density of population is 100 to 200 persons per sq.km., covers nearly 56.20 per cent area and accounts for 53.80 per cent of the rural settlements. It covers mainly a part of Vaibhavwadi, Devgad, Kankavli, Kudal and Sawantwadi talukas. (Figure No. 3.4).

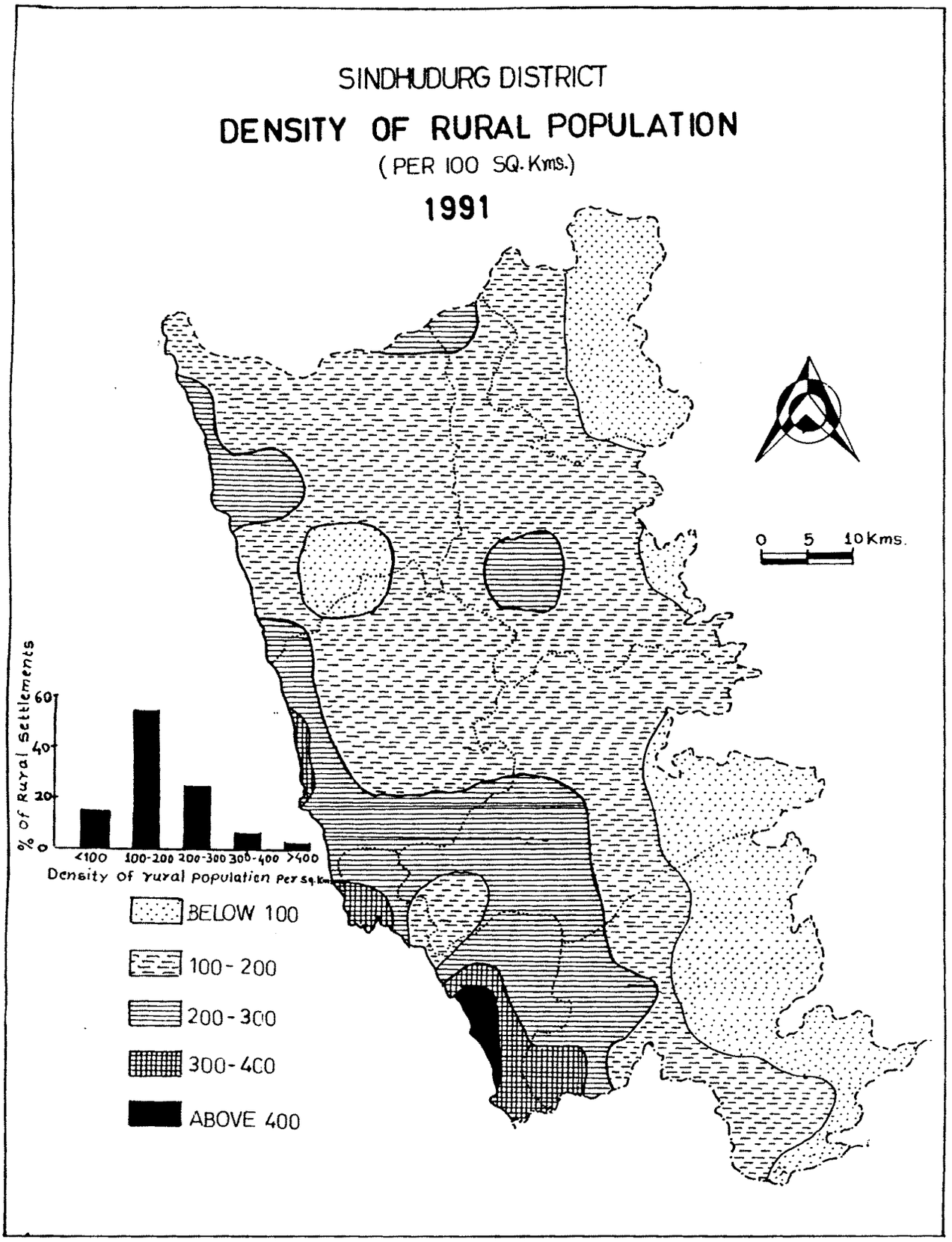
SINDHUDURG DISTRICT
DENSITY OF RURAL POPULATION
(PER 100 SQ. Kms.)
1991
0 5 10 Kms.
% of Rural Settlements
60
40
20
0
<100
100-200
200-300
300-400
>400
Density of Rural Population Per Sq. Km.
BELOW 100
100 - 200
200 - 300
300 - 400
ABOVE 400

FIG.- 3·4

The third zone, where density of population is between 200 to 300 persons per sq.km., covers an area about 18.74 per cent of the total and accounts for 24.18 per cent rural settlements. In this part the density of rural settlements is about 18.24 settlements per 100 sq.kms.

The fourth zone, where density of population is between 300 to 400 persons per sq.km., covers 3.17 per cent and accounts for 5.44 per cent of the rural settlements. It covers Western part of Malvan taluka, Central and North western part of Vengurla taluka and south western part of Sawantwadi taluka. In this part the density of rural settlements is about 24.24 settlements per 100 sq.kms.

The fifth zone covers very small area, where population density is more than 400 person per sq.km. It covers only 0.48 per cent of area and accounts for only 2.31 per cent rural settlements. It covers mainly a western part of Vengurla taluka and the density of rural settlements is very high, is about 68 settlements per 100 sq. kms.

In the western and eastern of study region more settlements of small size are distributed while in the central part, the size of rural settlements is large.

The table III-IV, indicates the rural population density classes, area covered, number of rural settlements, their percentage and Rural settlement density.

3.6 AGRICULTURAL LAND AND DISTRIBUTION OF RURAL SETTLEMENTS :

Agriculture is the most important activity in the study region, because nearly 76 per cent of the population directly engaged in agricultural activities. The agriculture activity is mainly influenced by various physical, social and economical factors, ultimately different types of cropping pattern are found in this region. Rice is the principal crop of the study region and horticultural is the another important occupation of the people. Agricultural practices are also affected on the distribution of rural settlements.

The gridwise analysis of land available for cultivation divides entire study area in to five zones. The table III-V indicates the land under agriculture, area covered, no. of rural settlements and their percentage.

In the study region the eastern part of hilly area and few part of the north western part, where less than 10 per cent land is under cultivation, covers 15.48 per cent area and

accounts for only 6.79 per cent rural settlements. The size of rural settlements is small.

The second zone, which covers 35.83 per cent area of the region, has 10 to 20 per cent lands under cultivation. In this part 25.68 per cent rural settlements are located. In this region, it is observed that, the foothill region of the Sahyadrian ranges has low density of population and small size settlements are also observed. The northwestern part of the study region is covered with the hard laterite rock, where land under agriculture is found less the size of rural settlements is comparatively small.

TABLE NO. III-V

SINDHUDURG DISTRICT

LAND UNDER AGRICULTURE, AREA COVERED, NO. OF RURAL SETTLEMENTS AND THEIR PERCENTAGE

Sr. No.	Categories of Land under Agriculture	Area covered in sq.kms.	% of Area covered	No. of Rural Settlements	% of Rural Settlements	Rural settlement density per 100 sq.kms.
1	Less than 10%	806	15.48	50	6.79	6.20
2	10 to 20%	1850	35.53	189	25.68	10.22
3	20 to 30%	1579	30.32	278	37.77	17.61
4	30 to 40%	580	11.14	143	19.43	24.66
5	Above 40%	392	7.53	76	10.33	19.39
	District	5207	100.00	736	100.00	14.13

Source :- Compiled by author.

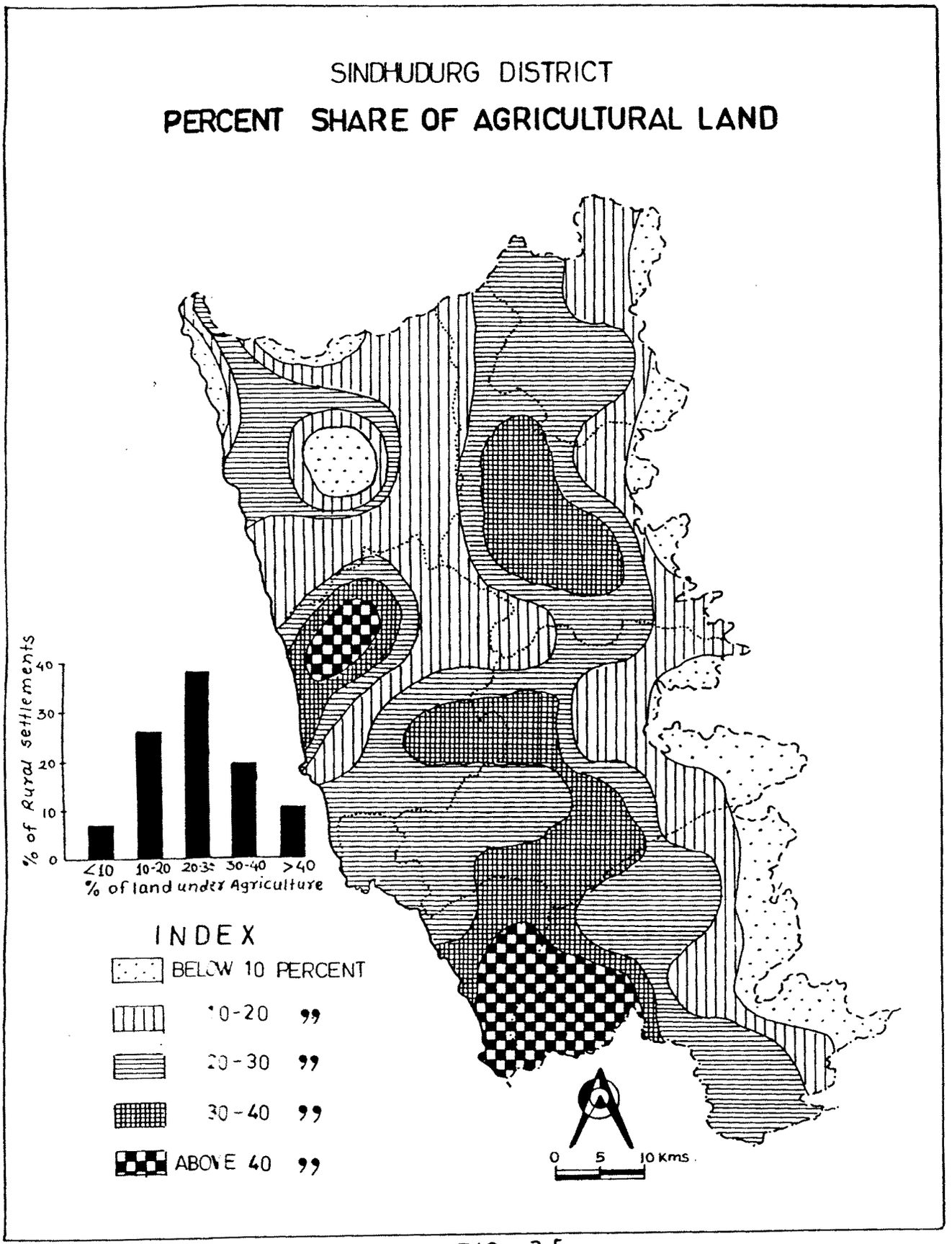
SINDHUDURG DISTRICT
PERCENT SHARE OF AGRICULTURAL LAND
% of Rural settlements
0
10
20
30
40
<10
10-20
20-30
30-40
>40
% of land under Agriculture
INDEX
BELOW 10 PERCENT
10-20 ,,
20-30 ,,
30-40 ,,
ABOVE 40 ,,
0
5
10 Kms.

FIG.- 3·5

The third zone which covers 30.32 per cent area of the region and has 20 to 30 per cent lands under cultivation. In this part 37.77 per cent rural settlements are located and the size of rural settlements is comparatively large. In this region the agriculture and road network has developed more, so the more number of rural settlements are found in this region.

The fourth zone, where 30 to 40 per cent land is under cultivation, covers 11.14 per cent area and accounts for 19.43 per cent rural settlements are located but the size of rural settlements is comparatively large.

The fifth zone, where more than 40 per cent land is under cultivation, covers only 7.53 per cent area and accounts for 10.33 per cent of rural settlements are located. (Figure No. 3.5)

The analysis clearly indicates that the percentage of land under cultivation and distribution of rural settlements shows very low positive correlation.

3.7 IRRIGATION AND DISTRIBUTION OF FURAL SETTLEMENTS :

Irrigation plays key role in agriculture development. Sindhudurg district has a very small-scale potential of development in irrigation facilities. The percentage of land under

irrigation has been calculated gridwise and comparison of distribution of rural settlements has been done.

It is observed that the northern part and south eastern part of the study region where less than 1 per cent land under irrigation, covers an area about 70.23 per cent and accounts for 60.32 per cent rural settlements are located but density of rural settlements is very low. It covers mainly Vaibhavwadi, Devgad and Kankavli talukas and a part of Malvan, Kudal and Sawantwadi talukas. In this study region a part of Sahyadri hilly ranges, where the physiography of the region is very rugged and complex due to steep slope of the region, irrigation facilities are not developed.

The area where 1 to 2 per cent of land is found under irrigation, covers an area about 14.98 per cent and accounts for only 16.58 per cent rural settlements. This area has the dominance of median to large size settlements.

TABLE NO. III-VI

SINDHUDURG DISTRICT

LAND UNDER IRRIGATION, AREA COVERED, NO. OF SETTLEMENTS, THEIR PERCENTAGE AND RURAL SETTLEMENTS DENSITY

Sr. No.	Categories land under irrigation	Area covered in sq.kms.	% of Area covered	No. of Rural Settlements	% of Rural Settlements	Rural settlement density per 100 sq.kms.
1	Less than 1%	3657	70.23	444	60.32	12.14
2	1 to 2%	780	14.98	122	16.58	15.64
3	2 to 3%	455	8.74	87	11.82	19.12
4	Above 3%	315	6.05	83	11.28	26.35
	District	5207	100.00	736	100.00	14.13

Source :- Compiled by author.

The area where 2 to 3 per cent land is under irrigation, covers an area about 8.74 per cent and accounts for 11.82 per cent of the total rural settlements. It covers mainly a part of Malvan, Vengurla, Kudal and Sawantwadi talukas. (Table III-VI)

The south western part of the study region, where the land under irrigation is found above 3 per cent, covers an area about 6.05 per cent of the total and accounts for ony 11.28 per cent of the total rural settlements. In this part, density of rural

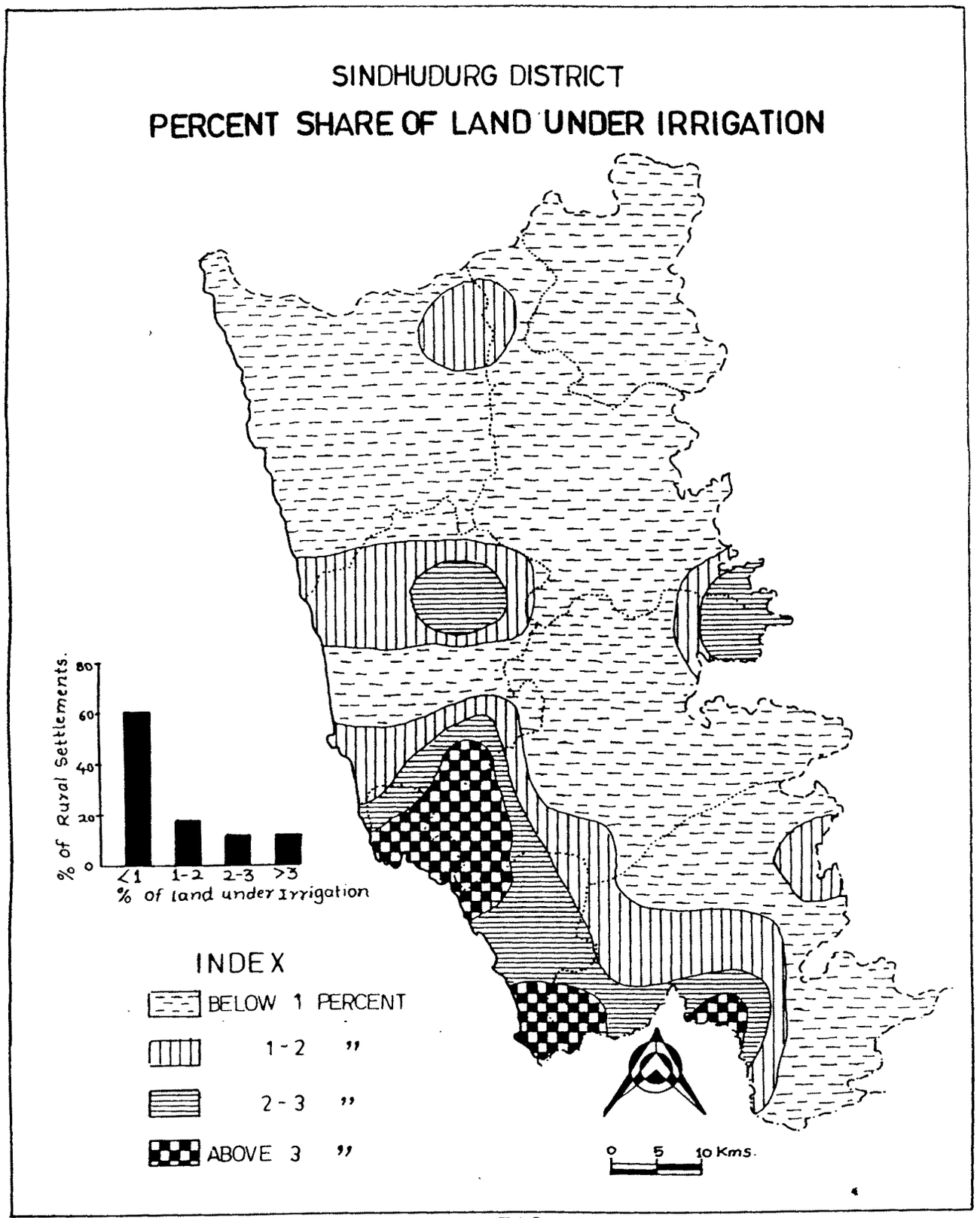
SINDHUDURG DISTRICT
PERCENT SHARE OF LAND UNDER IRRIGATION
% of Rural Settlements.
80
60
40
20
0
<1
1-2
2-3
>3
% of land under Irrigation
INDEX
BELOW 1 PERCENT
1-2 "
2-3 "
ABOVE 3 "
0 5 10 Kms.

FIG.- 3·6

settlements is high but the size of rural settlements is comparatively medium.

It is observed that, in the study region there is no effect of land under irrigation on the distribution of rural settlements, because this area has absence of irrigation facilities. In the study region, where the land under irrigation is found less than 2 per cent, covers an area about 85.21 per cent of the total and accounts for 76.90 per cent of the total rural settlements.

The Figure No. 3.6 indicates percentage share of land under irrigation and relationship between land under irrigation and rural settlements.

3.8 DENSITY OF ROAD AND DENSITY OF RURAL SETTLEMENTS :

The road transportation network plays an important role in the distribution and growth of rural settlements. In the study areas, it is observed that, more number of rural settlements are developed on the roads or on the nodal points.

The gridwise analysis of distribution of rural settlements and distribution of road network indicates very strong positive correlation has been observed for the distribution of road network and the density of rural settlements. In the areas where

road network is better-developed large size settlements are found. The figure No.3.7 indicates the density of road.

In the study region, the area where low density of road below 40 km per 100 sq.kms is observed, covers 15.55 per cent area and accounts for only 5.98 per cent rural settlements. It includes the hilly region of Sahyadrian mountains ranges the road network is very poor, the density of rural settlements is very low and the size of rural settlements is small.

The area where the density of road is found between 40 to 60 km per 100 sq.kms., covers an area about 19.69 per cent and accounts for only 19.84 per cent rural settlements. This area has the dominance of small to medium size settlements and the density of rural settlements is about 14.24 settlements per 100 sq. kms.

TABLE NO. III-VII

SINDHUDURG DISTRICT

DENSITY OF ROAD, AREA COVERED,

NO. OF SETTLEMENTS, DENSITY OF SETTLEMENTS AND

THEIR PERCENTAGE

Sr. No.	Category of road density per 100 sq.kms.	Area covered in sq.kms.	% of Area covered	No. of Rural Settlements	% of Rural Settlements	Rural settlement density per 100 sq.kms.
1	Less than 40 km	810	15.55	44	5.98	5.43
2	40 to 60 km	1025	19.69	146	19.84	14.24
3	60 to 80 km	2306	44.29	351	47.69	15.22
4	Above 80 km	1066	20.47	195	26.49	18.29
	District	5207	100	736	100	14.13

Source :- Compiled by author

The area where the density of road is found between 60 to 80 km per 100 sq.kms., covers an area about 44.29 per cent and accounts for 47.69 per cent of rural settlements and the size of rural settlements is comparatively large.

The south western part and few scattered northern part of the study region, where the density of road is observed above 80 km per 100 sq.kms., covers 20.47 per cent area and accounts for 26.49 per cent of the rural settlements. This area has the dominance of medium to large size settlements and density of rural settlements is high.

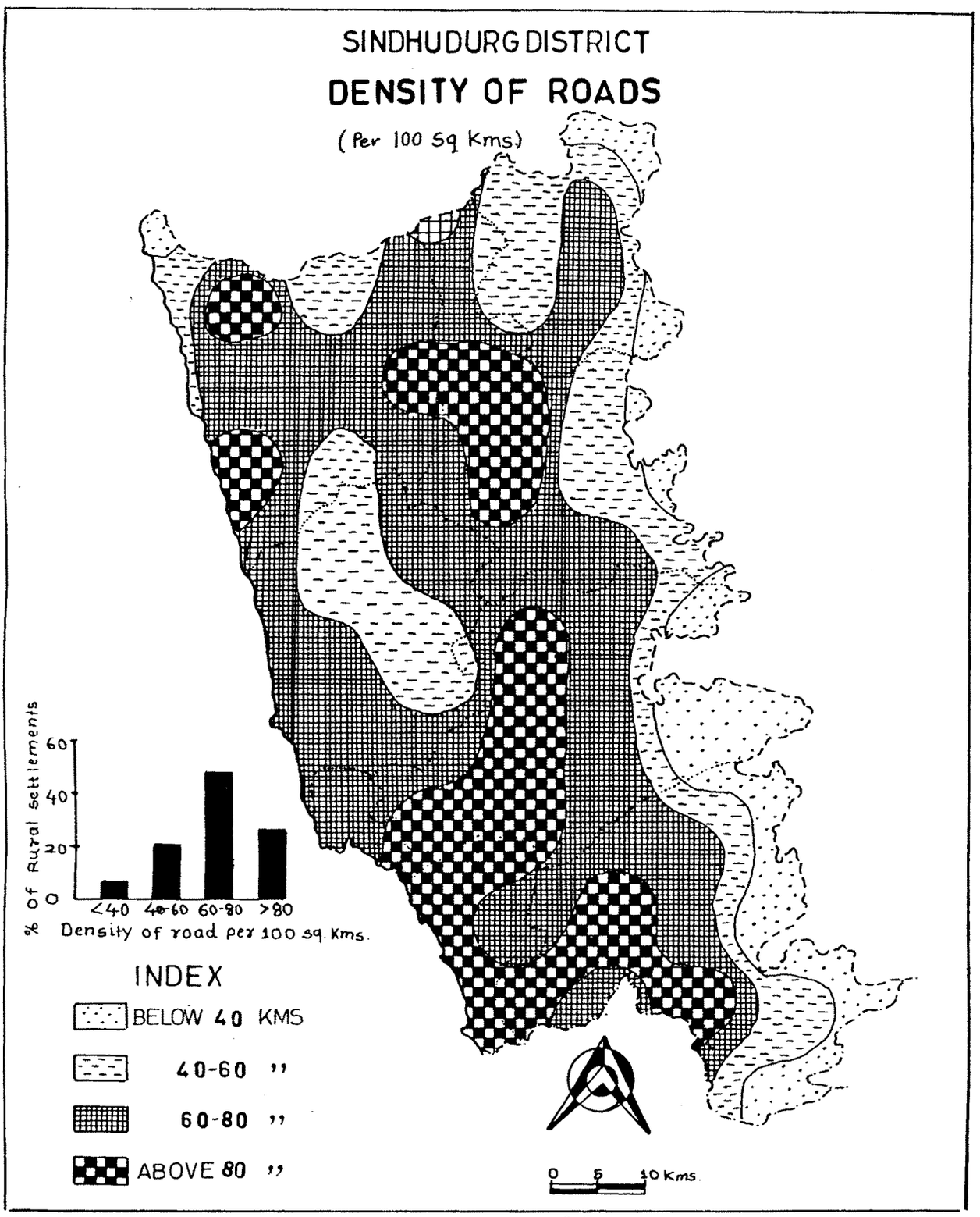
SINDHUDURG DISTRICT
DENSITY OF ROADS
(Per 100 Sq Kms)
% of Rural settlements
60
40
20
0
<40
40-60
60-80
>80
% Density of road per 100 sq. Kms.
INDEX
BELOW 40 KMS
40-60 ''
60-80 ''
ABOVE 80 ''
0 5 10 Kms.

FIG.-3.7

The table III-VII shows the area, rural settlements and their percentage in each zone of density of road per 100 sq.kms.

3.9 SPATIAL PATTERN OF RURAL SETTLEMENT DISTRIBUTION :

The various physical and cultural factors influence on the distribution of rural settlements. In order to study the spatial pattern of rural settlement distribution, the statistical technique called 'Nearest - Neighbour Analysis' developed by plant ecologists, Clark and Evans (1954) has been used to analyse the nature of distribution.

Settlements often appear an maps as dots. Dot distributions are commonly used in geography, yet their patterns are often difficult to describe. Some times patterns are obvious, such as when settlements are extremely nucleated or dispersed. As, in reality, the pattern is likely to lie between these two extremes, and then any description will be subjective. One way in which a pattern can be measured objectively is by using rural neighbour analysis.

Many geographers have studied the problem of finding a mathematical explanation to the pattern of settlement distribution. Dacey (1962) studied the distribution of hamlet,

village and towns in an area of United States; the same area was studied by Brush (1953). The same technique of Nearest Neighbour analysis has been used by King (1962) in a comparative analysis of twenty sample areas within the United States. Gettis (1964) has used this technique to study the temporal landaus pattern.

The technique of the Nearest Neighbour analysis is very useful in studying the point pattern in any area. It is calculated by the following formula. (R. Hamond and P. S. Mcullugh, 1974).

$$Rn = \bar{D} \text{ obs} / \bar{D} \text{ ran}$$

Where, $\bar{D}$obs is the measured mean distance between nearest- neighbour points observed in a given area.

$\bar{D}$ ran is the expected mean distance from similar number of points randomly distributed in the same area.

'Rn' is the nearest-neighbour index.

$$\bar{D} \text{ ran} = \frac{1}{2\sqrt{(N / A)}}$$

Where,

'N' is the number of rural settlements.

'A' is the area of spatial units.

Hence,

$$Rn = \frac{\overline{D}obs}{1 + (2\sqrt{(N/A)})}$$

Which can be written in simplified form as :

$$Rn = 2\overline{D}obs\sqrt{(N / A)}$$

With the help of this formula the nearest neighbour statistic is calculated for the small rural units. The study region is divided in to sizeable grids (10 x 10 kms) and the 'Rn' values from rural settlements have been calculated and isopleths were drawn to show the different pattern of distribution. (Figure No. 3.8)

On the basis of observation a four categories 'Rn' value scale was prepared to interpret the distribution pattern of rural settlements (Table III-VIII)

The Random distribution of rural settlements is observed in southern part of Vaibhavwadi, Vengurla talukas, central part of Kankavli, Devgad and Malvan talukas and major part of Sawantwadi taluka. It covers nearly 45.80 per cent area of the study region where 41.44 per cent of the total rural settlements.

TABLE NO. III.VIII

SINDHUDURG DISTRICT

NEAREST - NEIGHBOUR DISTRIBUTION OF

RURAL SETTLEMENTS - 1991

Sr. No.	'Rn' Value Category	Area sq.km.	% of Area	No. of Rural Settlements	% of Rural Settlements
1	0.91 to 1.2	23.85	45.80	305	41.44
2	1.2 to 1.4	1772	34.03	272	36.96
3	1.4 to 1.6	802	15.40	143	19.43
4	Above 1.6	248	4.77	16	2.17
	District	5207	100.00	736.00	100.00

Source :- Compiled by author.

Near to Random distribution of rural settlements occupies nearly 34.03 per cent area and 36.96 per cent of the total rural settlements. It covers most of the area of Sawantwadi, Vengurla, and Malvan talukas and the part of Kudal, Devgad, Kankavli and Vaibhavwadi talukas.

Near to uniform distribution of rural settlements occupies nearly 15.40 per cent area and accounts for 19.43 per cent of the total rural settlements. It covers major part of Kudal taluka and little part of Vaibhavwadi, Devgad, Malvan, Kankavli and Vengurla talukas.

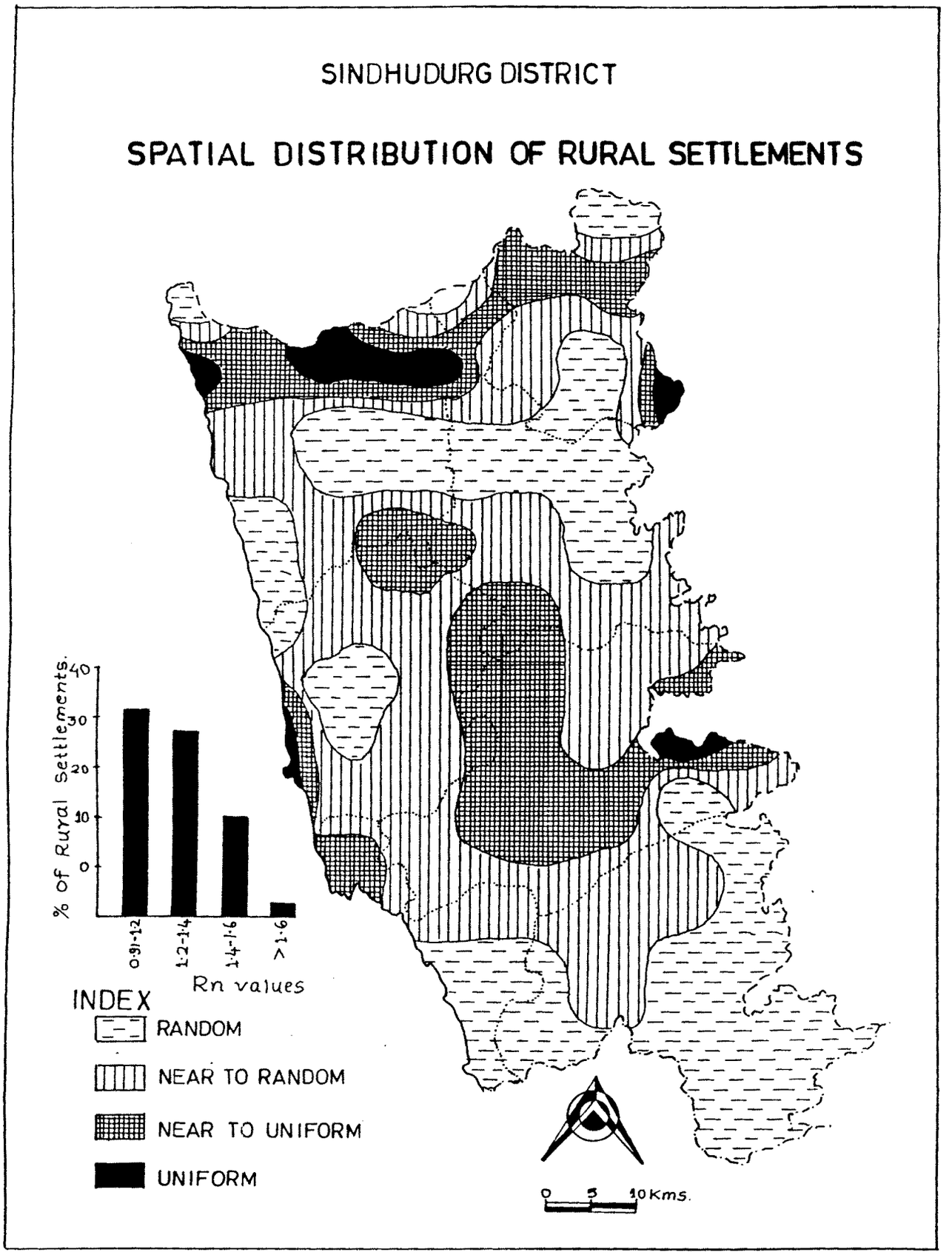
SINDHUDURG DISTRICT
SPATIAL DISTRIBUTION OF RURAL SETTLEMENTS
% of Rural Settlements.
40
30
20
10
0
0·91-1·2
1·2-1·4
1·4-1·6
>1·6
Rn values
INDEX
RANDOM
NEAR TO RANDOM
NEAR TO UNIFORM
UNIFORM
0
5
10 Kms.

FIG.- 3·8

Uniform pattern of rural settlements is found very small area covering 4.77 per cent covers an area, where only 2.17 per cent of the total rural settlements are located. It covers few part of Vaibhavwadi, Devgad, Malvan and Kudal talukas.

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