CHAPTER - IV
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SPATIAL STRUCTURE OF URBAN DISTRIBUTION

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1. Introduction :

Geographers study man's reaction to space much the same way that they examine his reaction to resources. The pattern emerge by the distribution of people on the surface of the earth is some thing which is of fundamental relevance to almost any analysis of man and his behaviour. The geographers emphasize of the view of measurement and interpretation of the facts of distributional phenomena.

Geographers are interested in spatial distributions. So it is essential to understand the meaning of the term 'spatial', indicates that an occurrance occupy the portion of earth surface. An occurrance is an identified phenomena of its specified magnitude, where the 'distribution' is spatial arrangement of occurrance of the same time.

2. Nature of distribution :

There are three types of distributions discrete, continuous and contingent. Discrete distribution consists of an assemblages of different occurance, a continuous distribution exist when occurance are dependant, a contingent distribution occur where the magnitude of distribution is expressed in terms of either area or type.

The spatial distribution of urban settlements, urban population, density of urban population, degree of urban population; Degree of urban population concentration and other some factors of

urbanism in the state of Maharashtra is the main theme of present
chapter. Here an attempt is made to highlight the salient feature
of the distribution of various factors of urbanism and the study
seeks to examine these aspects in background of physical, economic,
cultural, historical and locational features of the region. District
is taken as a basic administrative units for the study purpose.

The raw data have been extracted from the volume; census
of India 1981, series II Maharashtra Part II A and B, General
population tables 1981, Directorate of census operation Maharashtra.

3. Influencing factors :

There are various factors which are responsible for the
origin, growth, development and distribution of urban settlements.
The physical factors are very significant in the location of urban
units, but the socio-economic factors also play and important role
in determining, whether the particular place should grow, develop
and functions as urban settlement or not. Physical factors provides
the basic frame or the location or urban settlements. Administrative
importance than transport nodes and religious sites are the other
important factors which jointly or individually attract several
functions and give rise to the towns. Exchange of goods, commodities
and provision of services are the other important aspects, the
commerce and trade factors, for which town originate. Development
of transport net work play a vital role in the growth and development
of urban settlements.

Industrilization bears a great impact on the growth and development of urbanisation. Industrialization & urbanisation grow hand in hand. Improved agricultural practices development of irrigation, improvement in technology and industrial development are the important factors which are by and large, responsible for concentration of urban centres in a certain area. Concentration of economic activities notably trading activity and industrial development are the major factors that causes distortion in distribution pattern of urban settlements. Other factor includes market organisation and levels of economic development of a region.

4. Distribution of urban centres :

The region under study is essentially agricultural where 64.97 percent of population is living in a rural settlement and more than 1/3 population (35.03 percent) is living in urban centres. There are 307 urban centres in Maharashtra of which 29 urban centres are classified as class I cities. The total number of inhabited rural settlements is 39,354 in the region. Distribution of urban settlements has been presented in Fig.4.1 A & B. The regional analysis of distribution of the urban centres shows that large number of urban centres are concentrated along the segments of the two national urban corridors that follow the system of national highways and railways converging on Bombay. The relatively less urbanised area in the state occur in central and South Konkan, the rugged region of the Sahyadries, the Satpuras

and hilly areas of Chandrapur, Yavatmal, Wardha and Osmanabad regions. There are 105 urban centres in Bombay division. The northern portion of division has relatively more number of urban centres than the southern portion. Out of 105 urban centres there are 21 cities in this division. This division has seven class II towns, 26 class III, 24 class IV, 18 class V and 9 class VI. So far as total population, urban population and density of total and urban population Bombay division has higher statistical figures (Table 4.1).

Fifty three urban centres are distributed in Aurangabad division. This region of Maharashtra is considered as a economically backward area; industrially & agriculturally low developed & hence poorly urbanised. Out of the fifty three urban settlements within the Aurangabad division six are class I towns. The medium towns and small towns are relatively small in numbers.

Seventy four towns are distributed within the jurisdiction of Poona division next to Bombay division. Poona division consists 18 class I towns. 5, 19, 21, 8, 3 are the class II, III, IV, V, VI towns respectively.

Nagpur division has 75 urban centres distributed in eight districts. There are fifteen large size towns, 48 medium size (class III and IV) and 12 small size urban centres (Fig.4.1 A & B).
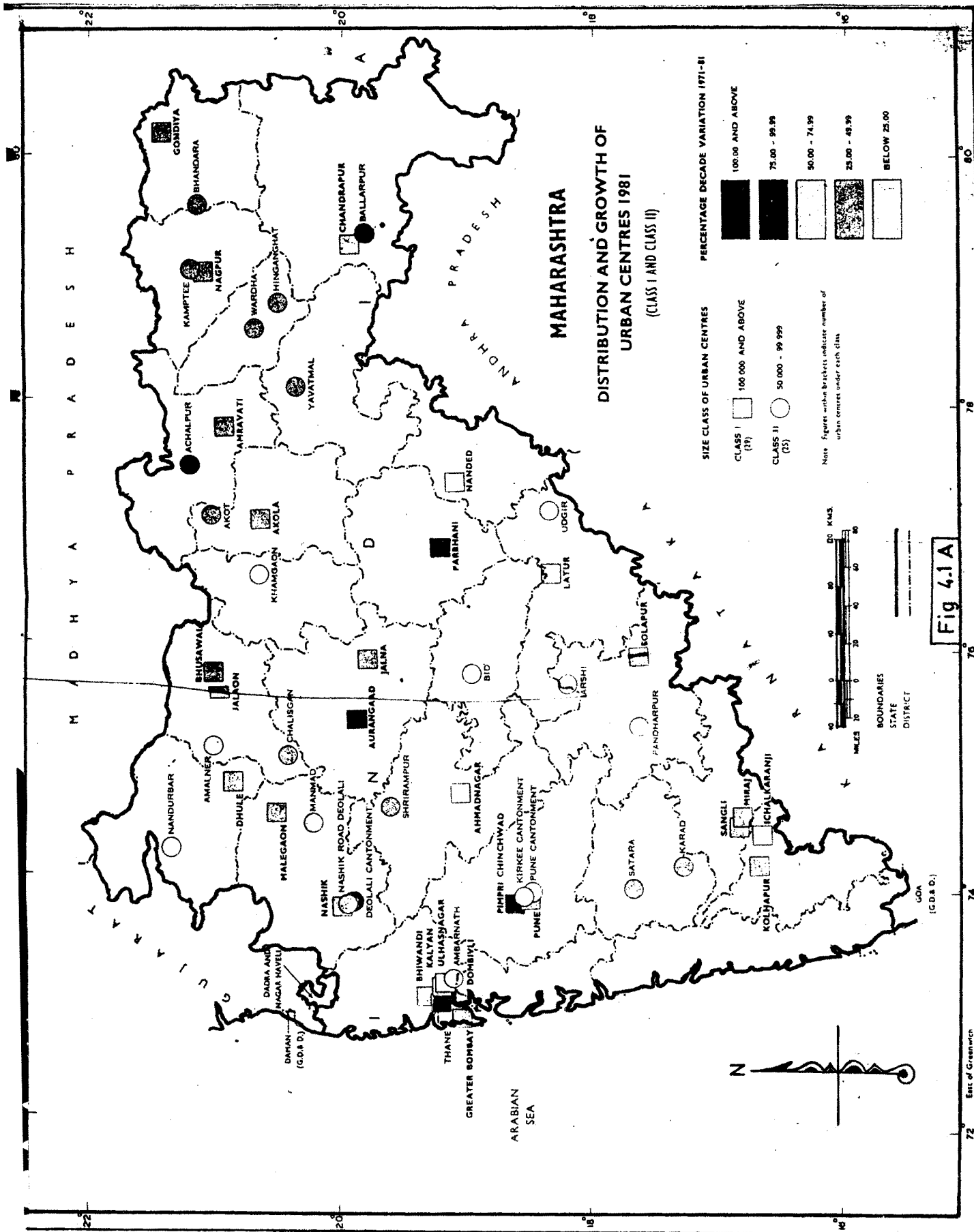
MAHARASHTRA

DISTRIBUTION AND GROWTH OF
URBAN CENTRES 1981

(CLASS I AND CLASS II)

SIZE CLASS OF URBAN CENTRES

CLASS I   100 000 AND ABOVE
(19)

CLASS II   50 000 - 99 999
(25)

Note Figures within brackets indicate number of
urban centres under each class

PERCENTAGE DECADE VARIATION 1971-81

100.00 AND ABOVE
75.00 - 99.99
50.00 - 74.99
25.00 - 49.99
BELOW 25.00

BOUNDARIES
STATE
DISTRICT

MILES

KMS.

Fig 4.1 A

East of Greenwich

ARABIAN
SEA

MADHYA PRADESH

ANDHRA PRADESH

GOMDIYA
BHANDARA
KAMPTEE
NAGPUR
WARDHA
HINGANGHAT
CHANDRAPUR
BALLARPUR
YAVATMAL
ACHALPUR
AMRAVATI
AKOT
AKOLA
KHAMGAON
PARBHANI
NANDED
UDGIR
LATUR
BHUSAWAL
JALNA
JALGAON
AURANGABAD
CHALISGAON
BID
OSMANABAD
PANDHARPUR
KOLHAPUR
MIRAJ
ICHALKARANJI
SANGLI
KARAD
SATARA
AHMADNAGAR
SHRIRAMPUR
MANMAD
NASHIK ROAD DEOLALI
DEOLALI CANTONMENT
NASHIK
MALEGAON
DHULE
AMALNER
NANDURBAR
PIMPRI CHINCHWAD
KIRKEE CANTONMENT
PUNE CANTONMENT
PUNE
BHIWANDI
KALYAN
ULHASNAGAR
AMBARNATH
DOMBIVLI
DADRA AND
NAGAR HAVELI
DAMAN
(G.D.& D.)
THANE
GREATER BOMBAY
GOA
(G.D.& D.)

22
20
18
16
80
78
76
74
72

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DISTRIBUTION AND GROWTH OF
URBAN CENTRES 1981

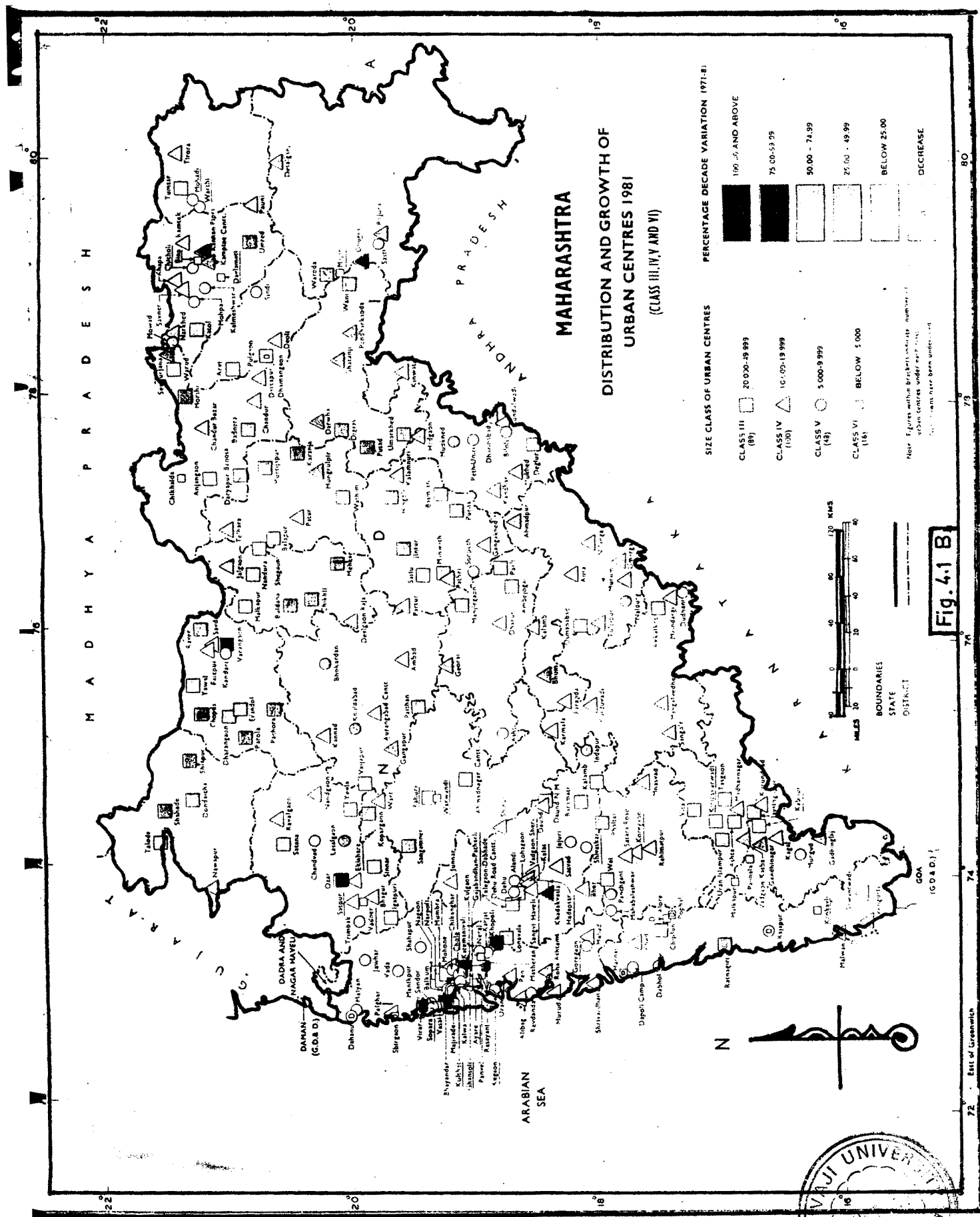(CLASS III, IV, V AND VI)

Fig. 4.1 B

Table 4.1 : Maharashtra Area, Population and Density.

Sr. No.	Region	Area in sq.km.	% of the state area	Population	% of state's population	Urban population	% of state's urban population	Density of population	Density of urban population
1.	Bombay division	70,808	23.01	22,853,037	36.40	12,097,001	55.00	322	171
2.	Poona division	74,810	24.31	15,859,142	25.26	4,371,822	19.88	212	58
3.	Aurangabad division	64,663	21.02	9,728,782	15.50	1,781,214	8.10	150	27
4.	Nagpur division	97,409	31.66	14,343,210	22.84	3,743,560	17.02	147	41
	Maharashtra	307,690	100.00	62,784,173	100.00	21,993,594	100.00	-	-

5. Distribution pattern of urban population
   at division level :

The state of Maharashtra has a geographical area of about
307,690 sq.kms. According to 1981 census the state has 62.78
million population and 21.99 million urban population with 35.03
percent degree of urbanisation. Administratively state is sub-
divided in four divisions and 26 districts. Bombay division
includes seven districts namely Gr.Bombay, Thane, Raigarh,Ratnagiri,
Nashik, Dhulia, Jalgaon with 70,808 sq.kms area. There are 105
towns in this division. This division has 36.40 percent share of
total population and 55 percent share of urban population and density
of population and urban population per sq.kms. is 322 and 171 respe-
ctively.

Out of 307 towns Poona division has 74 towns and 25.26
percent share of total population and 19.88 percent share of
urban population of the state. Comparatively Aurangabad division
is poor in urbanisation as it has very low statistics in number
of towns (53), population (15.50 percent of the state), urban
population share (8.10 percent), population density (150 person
per sq.kms.) and urban density (27 per sq.kms.).

Vidharbha region (Nagpur division) has a share of 31.66%
of the state area, 22.84 percentage of state population, 17.02%
of state urban population and 75 towns are distributed in this
part of Maharashtra. Table 4.1 indicates the comparative statistics
of the area, urban population and density at division level.

It is significant to note that out of the total urban settlements of the state Bombay and Poona divisions have relatively higher percentage of population, urban population, and both the population density and urban population density as the area is industrially developed.

6. Distribution of urban population :

The spatial distribution of urban population in the area has been studied by considering urban population density, degree of urbanisation, and urban concentration. The density of urban population has been studied by taking district as a areal unit. Out of 26 districts, two districts namely Beed and Satara have very low degree of urban population density (Fig.4.2). Nasik, Jalgaon, Chandrapur, Solapur, A.Nagar, Raigarh, Nanded, Parbhani, Ratnagiri, Sangli and Osmanabad, these districts have urban population density ranging between 1000 to 2000 persons per sq.kms. and therefore the low category of urban density is observed in these districts. A medium category of the urban density with 3,000 to 4,000 person per sq.kms. is found in the districts of Dhulia, Yavatmal, Aurangabad, Amaravati, Bhandara, Kolhapur, Pune and Akola of the region. It is worth mentioning that Thana, Wardha, Nagpur and Buldhana districts have higher urban density. This category ranges, 4,000 to 10,000 persons per sq.kms. The urban density should be looked upon as a well indicator of level of urbanisation. The very high urban density is found in the Greater Bombay district, it is an highest figure with 10,000 persons per
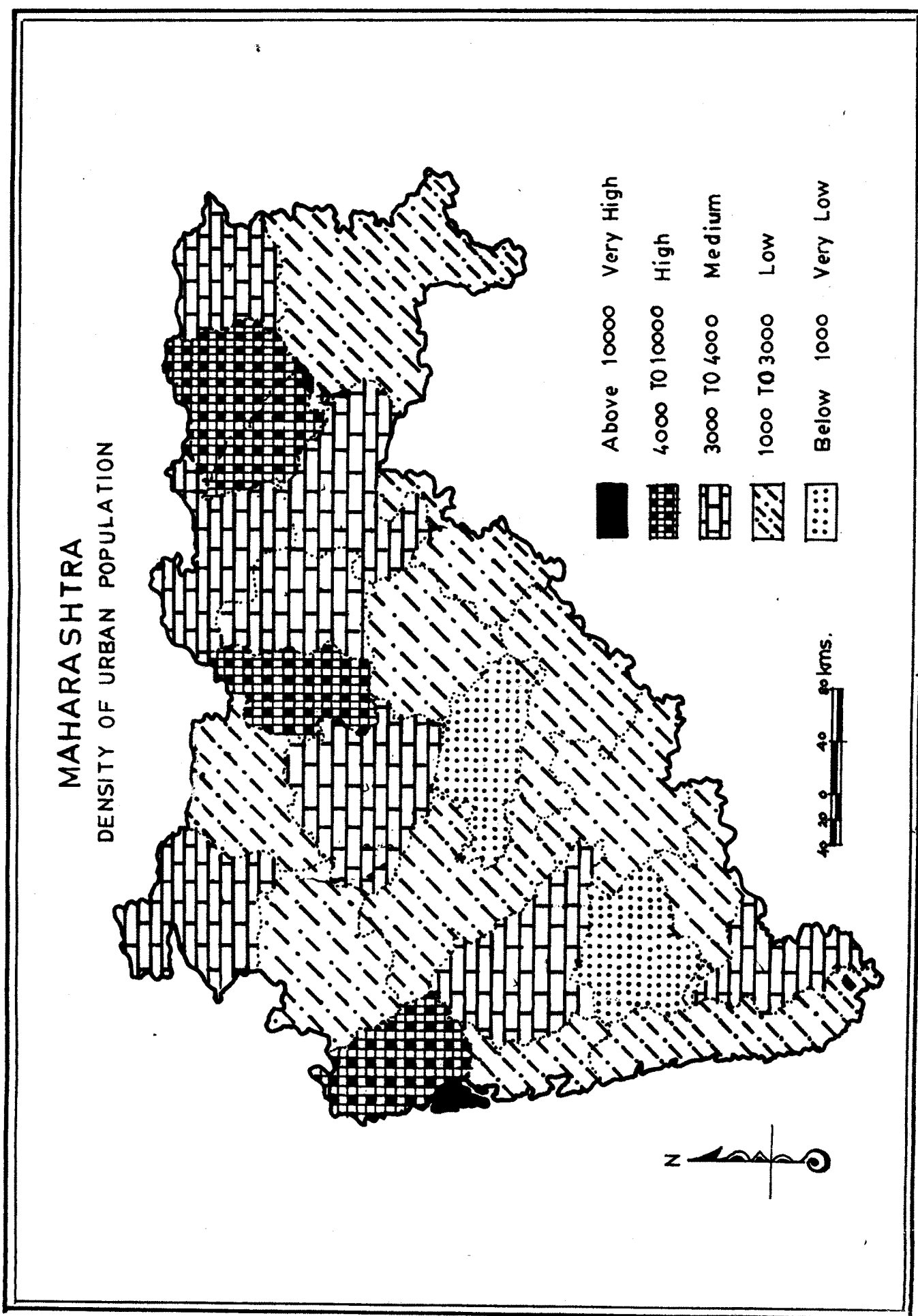
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DENSITY OF URBAN POPULATION

Above 10000	Very High
4000 TO 10000	High
3000 TO 4000	Medium
1000 TO 3000	Low
Below 1000	Very Low

Fig 4·2

sq.kms. The regional analysis of urban density clearly shows
a close relationship between the urban density and level of
urbanisation. Higher level of urban density is found in the
district of Gr.Bombay, Thane, Wardha, Nagpur and Buldhana at
the other end of the scale lower level of urban density is
found in the districts of Satara and Beed.

7. Degree of urbanization :

Degree of urbanisation has been calculated by using the
following simple equation.

$$\text{Degree of urbanisation} = \frac{\text{Urban population of areal units}}{\text{Total population of areal units}} \times 100$$

Having obtained the indices of degree of urbanisation
for all districts in the state, they have been classified into
various classes. Table 4.2 gives the details of degree of
urbanisation.

The regional analysis of the degree of urbanisation at
district level shows that in the study region highest degree of
urbanisation is found in the Gr.Bombay district. It is entirely
urbanised district in the state. Where the degree of urbanisation
is 100 percent. Four districts Nagpur, Pune, Thane and Nashik
are included in the next category, where the degree of urbanisation
is ranging between 30 to 60 percentage. Moderate degree of urbani-
sations ranging between 20 to 30 percent includes Solapur,Amaravati,
Jalgaon, Wardha, Akola, and Kolhapur districts of the state. The

Table 4.2 : Distributional aspects of urbanization 1981.

Sr. No.	District	Town	Urban population	Degree of urbanisation	Urban-Rural ratio
	Maharashtra	307	21,993,594	35.03	199.00
	Bombay Division	105	12,097,001	52.93	1,124.70
1.	Gr.Bombay	1	8,243,405	100.00	1,000.00
2.	Thane	34	1,486,220	44.34	797.00
3.	Raigarh	16	209,876	14.11	164.00
4.	Ratnagiri	13	170,917	8.09	88.00
5.	Nashik	19	928,145	31.02	449.00
6.	Dhulia	7	400,181	19.51	242.00
7.	Jalgaon	15	568,257	25.14	336.00
	Poona Division	74	4,371,822	25.57	380.60
8.	A.Nagar	8	351,368	12.97	149.00
9.	Pune	26	1,471,082	47.33	899.00
10.	Satara	10	265,795	13.03	150.00
11.	Sangli	8	394,089	21.52	274.00
12.	Solapur	6	767,466	29.40	416.00
13.	Kolhapur	12	622,022	24.81	330.00
	Aurangabad Division	53	1,781,214	18.31	224.00
14.	Aurangabad	10	537,535	22.08	284.00
15.	Parbhani	12	342,822	18.73	231.00
16.	Bid	7	229,771	15.46	183.00
17.	Nanded	11	327,849	18.74	231.00
18.	Osmanabad	13	343,237	15.38	182.00
	Nagpur Division	75	3,743,560	26.09	353.20
19.	Buldhana	9	278,986	18.49	227.00
20.	Akola	9	454,662	24.88	331.00
21.	Amaravati	12	544,499	29.25	413.00
22.	Yavatmal	8	262,135	15.08	178.00
23.	Wardha	6	231,510	24.98	333.00
24.	Nagpur	16	1,469,279	56.75	1,312.00
25.	Bhandara	7	240,754	13.10	151.00
26.	Chandrapur	8	261,735	12.73	199.00

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DEGREE OF URBANISATION 1981
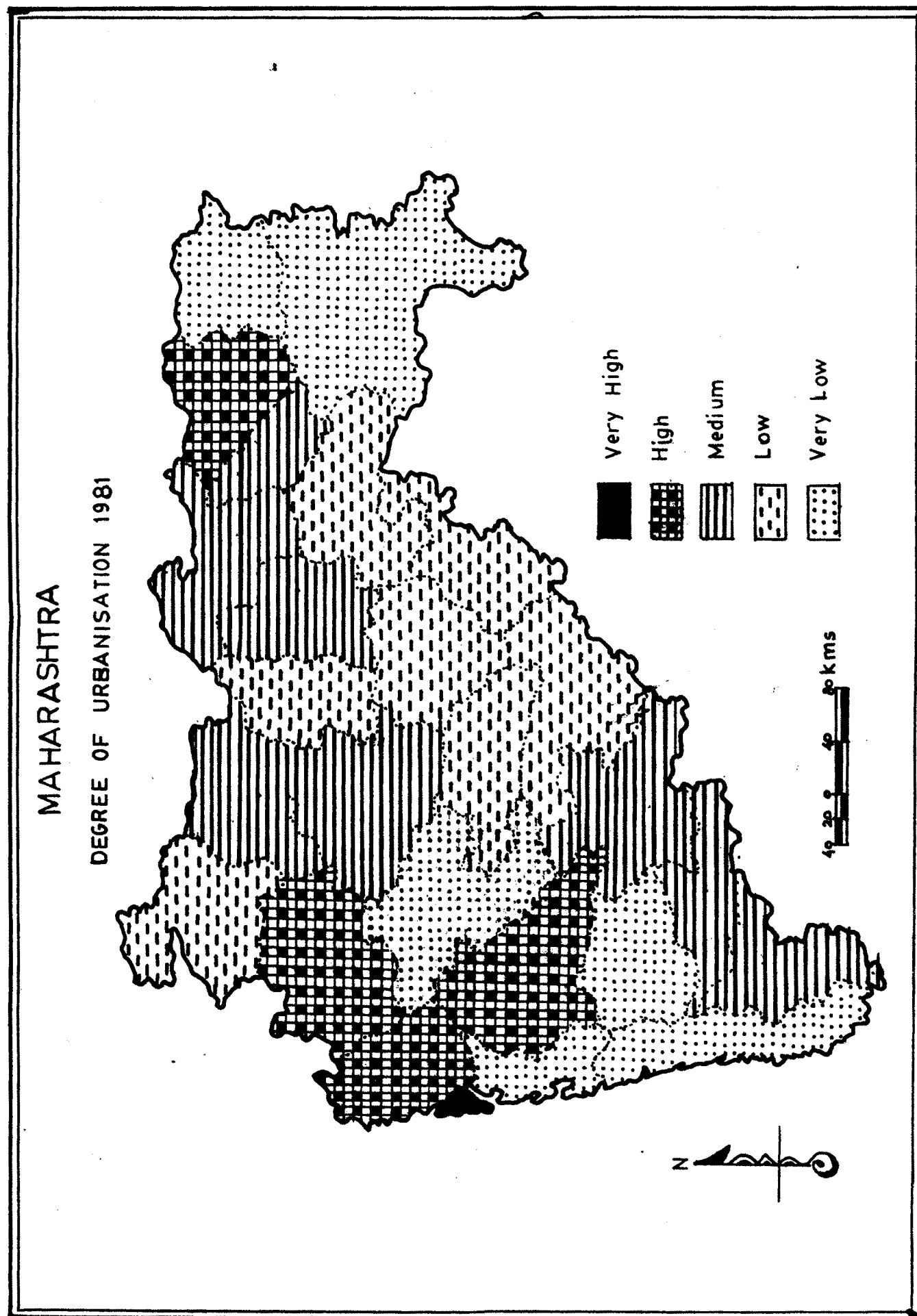
Very High
High
Medium
Low
Very Low

kms

Fig 4.3

poor degree of urbanisation is observed in the districts of
Yavatmal, Osmanabad, Beed, Buldhana, Parbhani, Nanded & Dhulia.
This poor or lower class of degree of urbanisation ranges
between 15-20 percent.   There are six districts namely Raigarh,
Bhandara, Satara, A.Nagar, Chandrapur and Ratnagiri have degree
of urbanisation less than 15 percent (Fig.4.3).   The study of
degree of urbanisation indicates that only four districts have
level of urbanisation above the state average (35.03 percent).
These districts are Thane (44.34%), Pune (47.33%), Nagpur (56.75%),
Gr.Bombay district (100%).   The degree of urbanisation in the rest
of 22 districts are below the state average.   It obviously shows
that urbanisation over the state is imbalanced.   These regional
emblances are the net product of physical, social, economic
conditions and variations among them within the state.

8.   Degree of urban concentration :

Most of geographical problem spring of due to uneven
distribution of resources.   A uniform distribution is an
abstraction and not a geographical reality.   Distribution
diversity give rise to concentrations and dispersions.

Degree of concentration of urban population is measure
with the help of following simple equation.

$$DC = \frac{Pi}{PI} \times 100$$

Where, DC = Degree of concentration

        Pi = Percentage of urban population
              of areal unit

        PI = Percentage of urban population
              of the study area

This method is helpful in calculating the concentration

of urban population. In this method the areas having values less

than 100 are suposed to have no concentrations. But in the case

of urban population concentration we have considered the values

which are less than 100 to indicate the poor concentration of

urban population. Out of the total, 22 districts have low concen-

tration of urban population where the degree of concentration is

less than 100. The concentration of urban population in real

sense is found only in four districts. It includes the districts

of Gr.Bombay, Nagpur, Pune and Thane.

For a comparative regional analysis, the calculated

values of degree of urban concentration have been grouped into

five categories i.e. very high, high, poor, low, very low.

The regional analysis of the degree of urban concentra-

tion shows that a very high concentration of degree of urbanisa-

tion is found at Gr.Bombay district at the other end of the scale

Ratnagiri district, is at the end of ranking position of the

district with very low (23.09) degree of urban concentration

(Table 4.3).

The high category of degree of urban concentration is

observed only in three districts. This category includes the

Table 4.3 : Degree of urban concentration (1981).

Rank	District	Percentage of urban population	Degree of urban concentration
1	Gr.Bombay	100.00	285.47
2	Nagpur	56.75	162.00
3	Pune	47.33	135.11
4	Thane	44.34	126.58
5	Nasik	31.02	88.55
6	Solapur	29.40	83.93
7	Amaravati	29.25	83.50
8	Jalgaon	25.14	71.77
9	Wardha	24.98	71.31
10	Akola	24.88	71.02
11	Kolhapur	24.81	70.83
12	Aurangabad	22.08	63.03
13	Sangli	21.52	61.43
14	Dhulia	19.51	55.70
15	Nanded	18.74	53.50
16	Parbhani	18.73	53.47
17	Buldhana	18.49	52.78
18	Beed	15.46	44.13
19	Osmanabad	15.38	43.91
20	Yavatmal	15.08	43.05
21	Raigarh	14.11	40.28
22	Bhandara	13.10	37.40
23	Satara	13.03	37.20
24	A.Nagar	12.97	37.03
25	Chandrapur	12.73	36.34
26	Ratnagiri	8.09	23.09

MAHARASHTRA
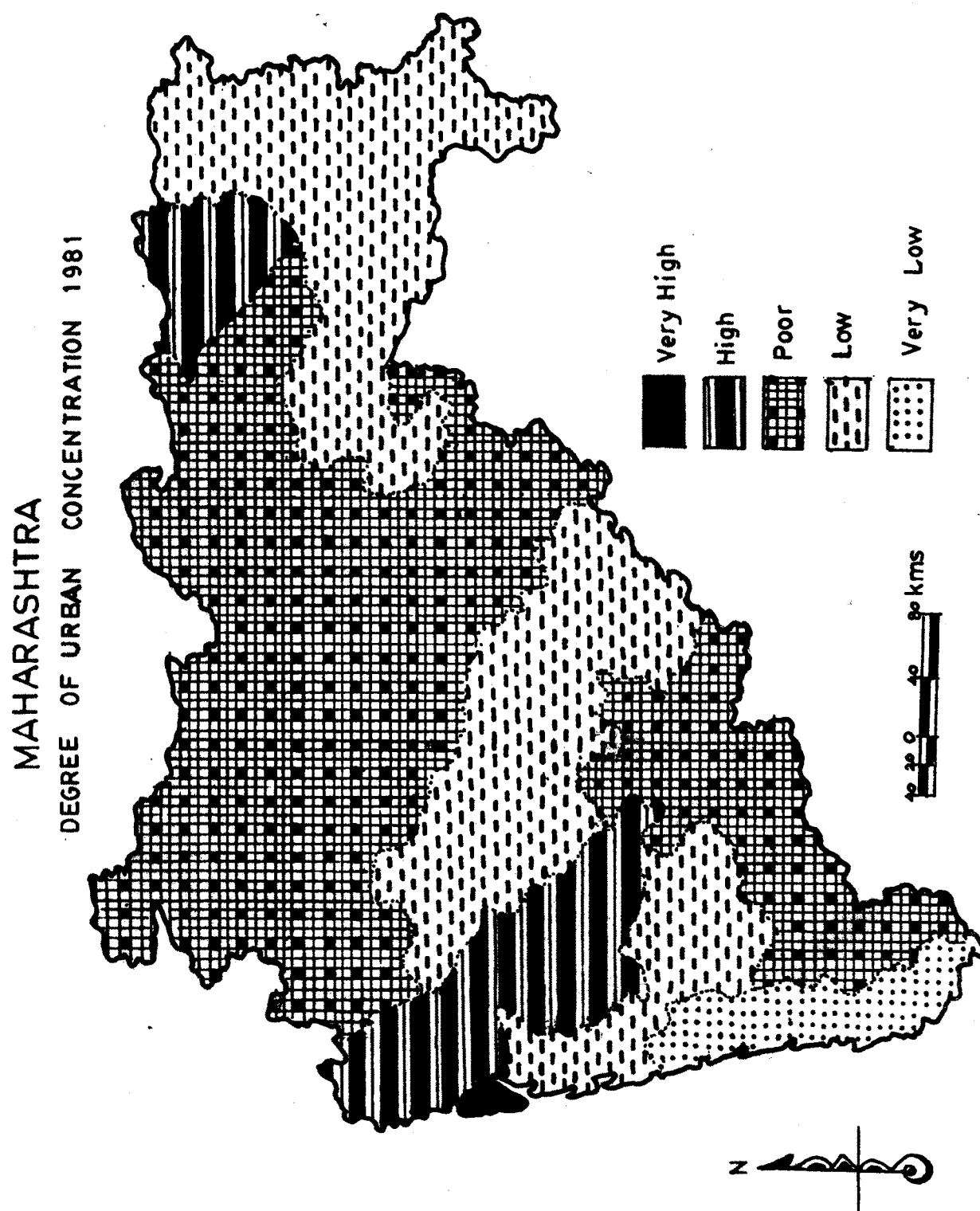DEGREE OF URBAN CONCENTRATION 1981

Very High
High
Poor
Low
Very Low

Fig 4·4

districts of Nagpur with 162.00, Pune 135.11, and Thane 126.58 as their concentration indices.

Poor concentration ranging between 50 to 99 index values found in 13 districts of the state. The lower concentration ranging between 30 to 49 index values found in the districts of Beed, Osmanabad, Yavatmal, Raigad, Bhandara, Satara, A.Nagar and Chandrapur. Fig.4.4 shows the urban concentration in the state of Maharashtra. Though there is a considerable regional contrast in the degree of urban concentration within the state of Maharashtra, the state ranks first at the state level comparison with national percentage. For state of Maharashtra degree of concentration is highest in India with 147.6 concentration index.

9. Distribution of urban centres and regional
   levels of Development :

In order to find out the relationship between the levels of development and distribution of urban settlements in the study area, the levels of developments where measured at the district level with the help of certain variables. The following variables where considered while calculating and determining the levels of development.

i) Percent of urban population to total urban population

ii) Percent of literate and educated persons

iii) Percent of land under cultivation

iv) Percent of land under irrigation

v) Percent of road length

vi) Percent of railway length

vii) Percent of industrial workers

viii) Percent of tertiary population to working population

ix) Percent of banking offices

There are two stages involved in this adopted method to determine the development levels. First determinition of the level of development in each district in terms of a discrete variable and second the intigration of values obtained for discrete variable which gives a composite index of development.

The coefficient of development of a district in terms of single variable is calculated by the following equation :-

$$CDi = \frac{Pi}{PI} \ X \ 100 \qquad \ldots\ldots\ldots \ I$$

Where, 'CDi' is the coefficient of development for variables i,

'Pi' is the percentage of variable i in the areal unit,

'PI' is the mean percentage of variable i in the study region

Summing up all individual indices we get the composite index of development by following equation.

$$CID = \frac{CDi_1 + CDi_2 + CDi_3 + \ldots CDi_n}{N} \qquad \ldots\ldots II$$

Where, 'CDi' is composite index of development

'N' is number of variables

Table **4.4** : Composite index of development.

Sr.No.	District	CDI	CID
1.	Gr.Bombay	4970.59	552.29
2.	Pune	1983.58	220.40
3.	Solapur	1212.50	134.72
4.	Nasik	1127.33	125.26
5.	Thane	1074.86	119.43
6.	A.Nagar	1055.72	117.30
7.	Nagpur	1019.80	113.31
8.	Jalgaon	942.97	104.77
9.	Aurangabad	876.04	97.34
10.	Osmanabad	720.05	80.00
11.	Sangli	701.03	77.89
12.	Kolhapur	695.57	77.29
13.	Chandrapur	672.39	74.71
14.	Satara	630.46	70.05
15.	Parbhani	629.21	67.25
16.	Bhandara	605.21	67.25
17.	Akola	577.60	64.18
18.	Dhulia	555.71	61.75
19.	Nanded	544.79	60.53
20.	Amaravati	539.59	59.95
21.	Beed	456.25	50.69
22.	Yavatmal	419.79	46.64
23.	Buldhana	383.07	42.56
24.	Raigarh	345.04	38.34
25.	Wardha	339.32	37.70
26.	Ratnagiri	334.11	37.12

With the above mentioned methodology the indices of levels of development are calculated for 26 districts. The composite indices of development (CDi) and coefficient of development for total selected variables (C$\underset{\text{CID}}{\text{DD}}$) are given in the Table 4.4. Thus the calculated composite indices of development at the district level have been treated statistically and five fold classification of levels of development is evolved as poor, low; moderate; high and very high. The regional levels of development have been represented in Fig.4.5.

The spatial analysis of the levels of development shows five districts namely Yavatmal, Buldana, Raigarch, Wardha, and Ratnagiri have poor level of development where out of the total 52 urban centres are located. This poor developed area of Maharashtra has only 5.24 percent urban population and 16.17% area of the state.

High level of development is observed in the Bombay district region. This region comprises only 0.20 percent area of the state, and only one metropolitan city. However, this region has 37.48 percent share of urban population of Maharashtra.

The area with high level of development comprises 5.08 percent area, 26 towns, and 8.96 percent urban population of Maharashtra state. This region is the Poona district of Western Maharashtra (Table 4.5).
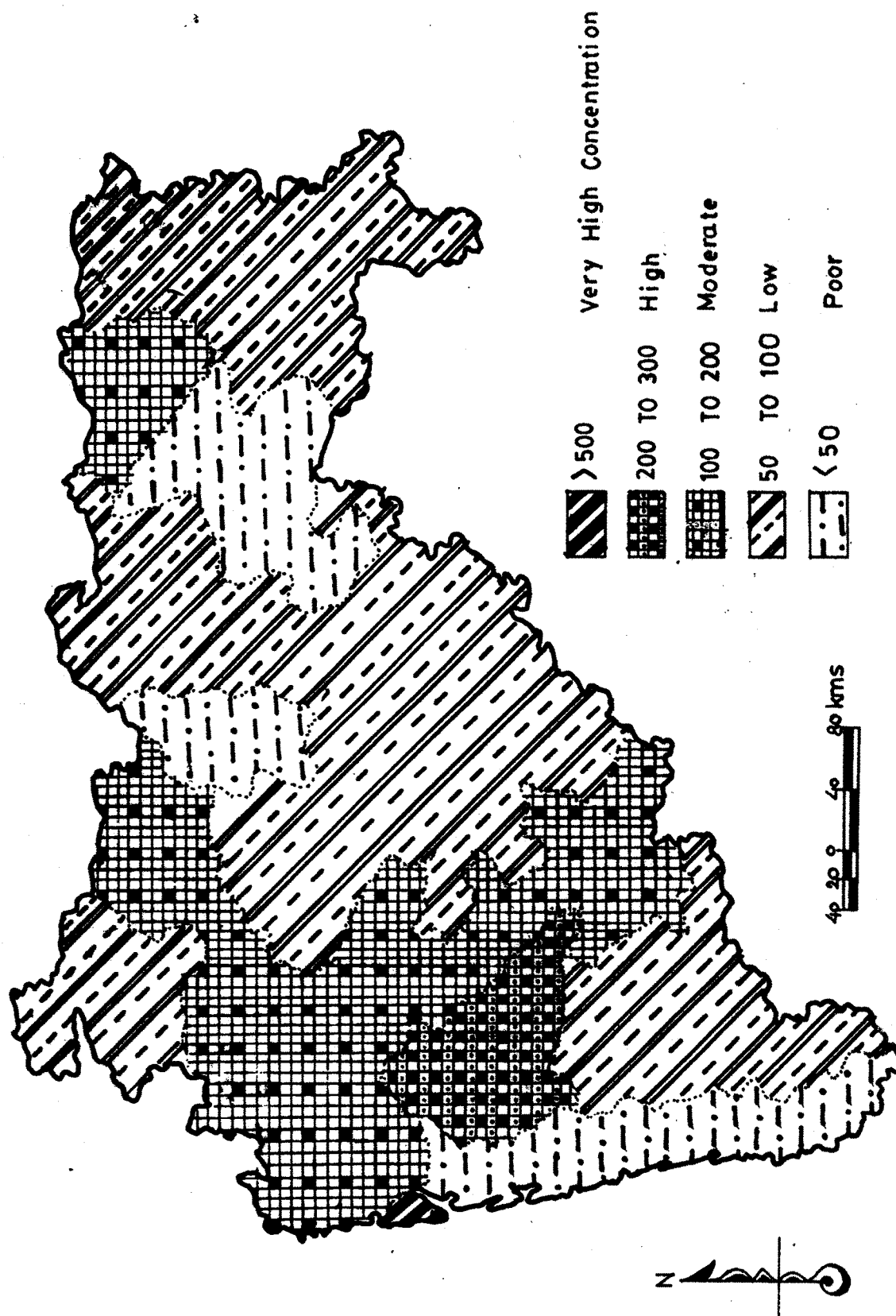
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LEVELS OF DEVELOPMENT-1981

>500	Very High Concentration
200 TO 300	High
100 TO 200	Moderate
50 TO 100	Low
<50	Poor

40 20 0   40   80 kms

Fig 4.5

Table 4.5 :   Levels of development and urban centres.

Levels of Development	Districts	% share of area	No.of towns	% share of urban population
Very high	Bombay (1)	00.20	1	37.48
High	Poona (1)	5.08	26	8.96
Moderate	Solapur, Nashik, Thane, Nagpur, A.Nagar, Jalgaon (6)	25.63	102	25.74
Low	Aurangabad, Osmanabad, Sangli, Kolhapur, Chandrapur, Satara, Parbhani, Bhandara, Akola, Dhulia, Nanded, Amaravati, Beed (13)	52.92	126	22.58
Poor	Yavatmal, Buldhana, Raigarh, Wardha, Ratnagiri (5)	16.17	52	5.24
	Maharashtra (26)	100.00	307	100.00

Six districts covering 25.63 percent area, indicate moderate level of development where 102 towns of the study area are located, these 102 towns share 25.74 percent of urban population of the state.

The low level of development is observed in the districts of Aurangabad, Osmanabad, Sangli, Satara, Kolhapur, Chandrapur, Parbhani, Bhandara, Akola, Dhulia, Nanded, Amaravati and Beed. This region constitutes nearly 53% of the state area. It has 22.58 percent share of urban population.

To sum up the characteristics of the distribution of the urban settlements, one may observed that, in addition to relief and surface confuguration, other socio-economic factors, i.e. population density and the levels of economic development play a significant role in the distribution of urban centres.

It is worthy to note that urban centres are widely spaced and relatively small in size and are found in the areas with poor level of development. In the other end of the scale, in highly developed area urban centres are more closely spaced and their size is comparatively larger.

In the economically poor areas few small size urban centres have developed. Whereas in economically prosperous area in which high level of development favours to the emergence of more urban centres with large size.

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