

CHAPTER - III

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CITIES OF MAHARASHTRA

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- Introduction
- Post Independence growth
- Characteristics of cities
- Rank order fluctuations of cities
- Rank size relationship of cities
- Spatial pattern of distribution
- Degree of concentration
- Levels of development

Introduction :

The evergrowing concentration of population in big cities is one of the most important features of urbanisation process taking place all over the world. It is typical in the developing as well as developed countries.

Every city in India is under stresses and strains. But the worst affected are the large cities with population a million or more. They are the national cities drawing migrants not only from the far off the rural hinterlands but also from smaller and intermediate cities.

The present chapter deals with growth and distribution of class I cities of Maharashtra. Big cities attract the bulk of rural migrants whose influx, as a rural, plays the main part in the growth of urban population. There are also many people coming to big cities from smaller towns. The big cities act as magnet and attract a large amount of population. The concentration of population in big cities is closely related to and resulted in the growth of urban agglomeration. The big cities need special attention in our planning process for such cities have special problems of growth and development. Here an attempts have been made to study the role of class I cities in the urbanisation of Maharashtra.

PERCENT SHARE OF CLASS I CITY POPULATION

—— % of class I city population to urban
population of STATE

----- % of urban population of MAHARASHTRA to
total population

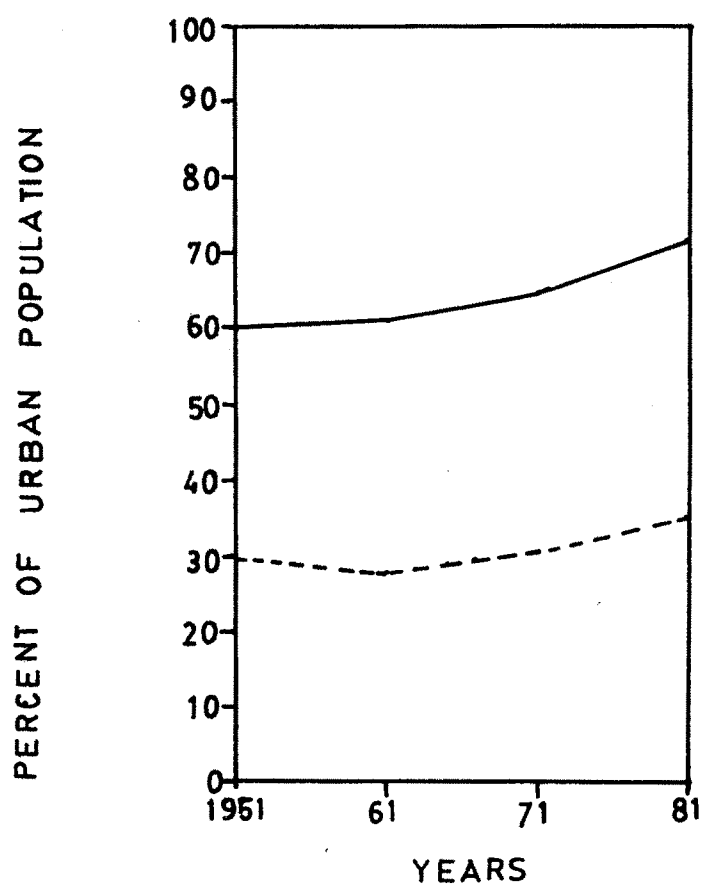


Fig 3.1

Post Independence growth characters^{ties} of cities :

As per 1981 population census Maharashtra has 307 urban centres. Out of these 29 urban centres are designated as Class I cities. If the growth in number of class I cities of Maharashtra is studied; we find that in 1951 there were five class I cities of Maharashtra sharing 1.31 percent of towns and 45.47 percent share of urban population. These five cities includes Gr.Bombay, Poona, Nagpur, Solapur, Kolhapur and Amaravati. In 1961, seven class I cities have been added. Thus, total twelve cities constitutes 4.51 percent of total urban unites and 60.49 percent of urban population of the state of Maharashtra. There were seventeen class I cities sharing 5.88 percent of towns and 64.75 percent of total urban population of the state in 1971. This clearly shows that class I cities are growing very fastly in their population size. More than 60 percent urban population of the state has concentrated in seventeen cities. The number of cities has increased from seventeen in 1971 to 29 in 1981. Over the past ten years there is net increase of 12 cities in the state.

The trends of growth of urban population and the population of class I cities is shown in Table 3.1, and represented in Fig.3.1 which points out that nearly 3/4 urban population of the state is concentrated only in 29 urban centres.

Variations in population growth of cities :

Fig.3.2 shows the variations of population growth of cities in Maharashtra during the post-independence decades.

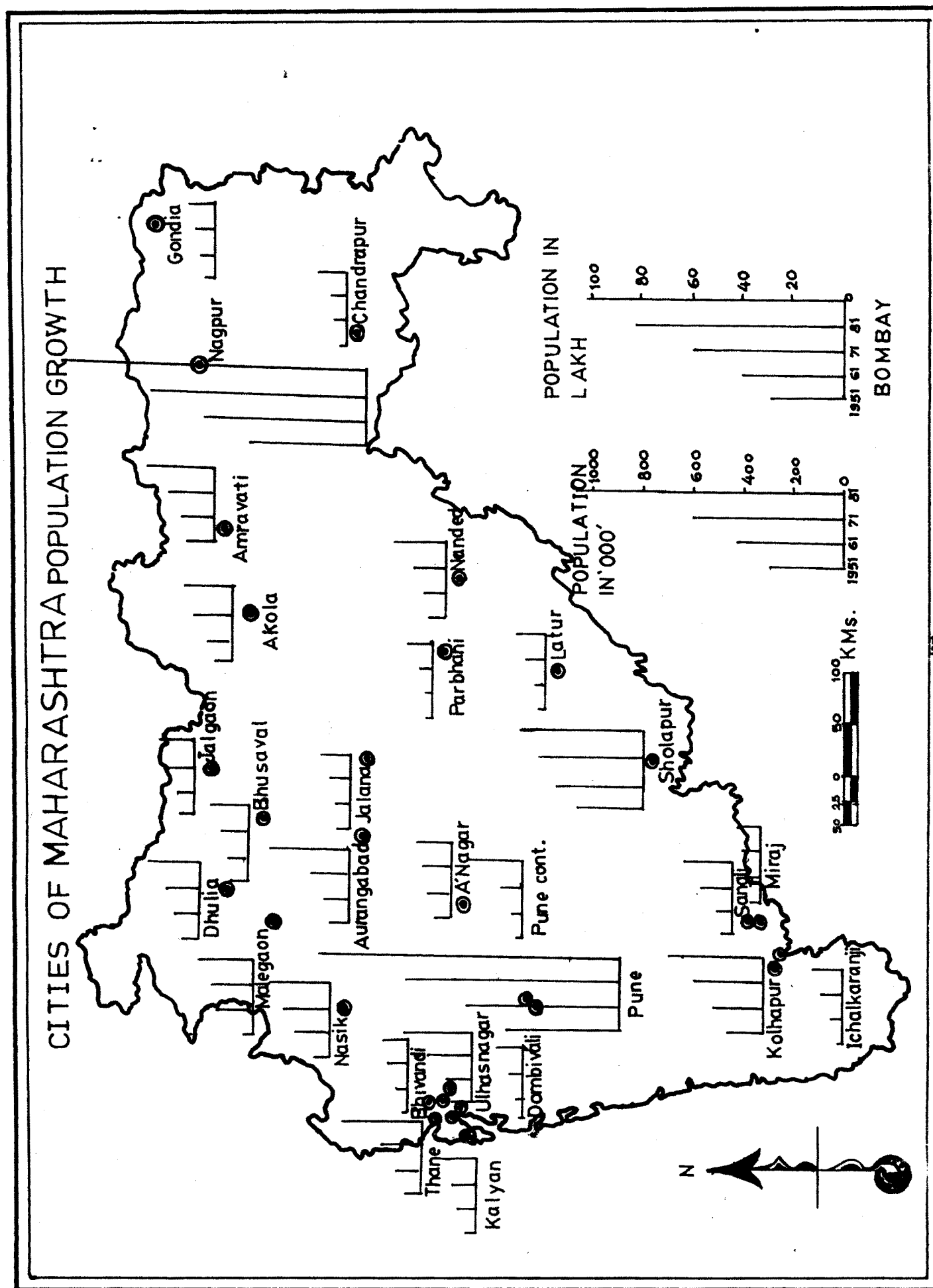


Fig 3-2

It helps to understand the trends of growth of individual city.

Table 3.1 : Growth of urban population and percentage share of class I cities population.

Year	Urban Population	% of urban population to total population	Population of class I cities	% of class I city population to urban population of the state
1951	9,201,013	28.75	4,183,273	45.47
1961	11,162,561	28.22	6,752,335	60.49
1971	15,711,211	31.17	10,173,715	64.75
1981	21,993,594	35.03	15,740,723	71.57

Status of cities :

In order to study the post-independence status of cities in terms of average growth rate of the cities in Maharashtra individual city growth rate has been calculated and their average growth rates for three decades have been calculated. Cities have been classified into four categories based on post-independence mean growth rate. The cities have been shown by different symbols in Fig.3.3.

Growth characteristics of cities :

Considering post-independence mean growth rate of individual cities (Table 3.2) their growth characteristics have been analysed.

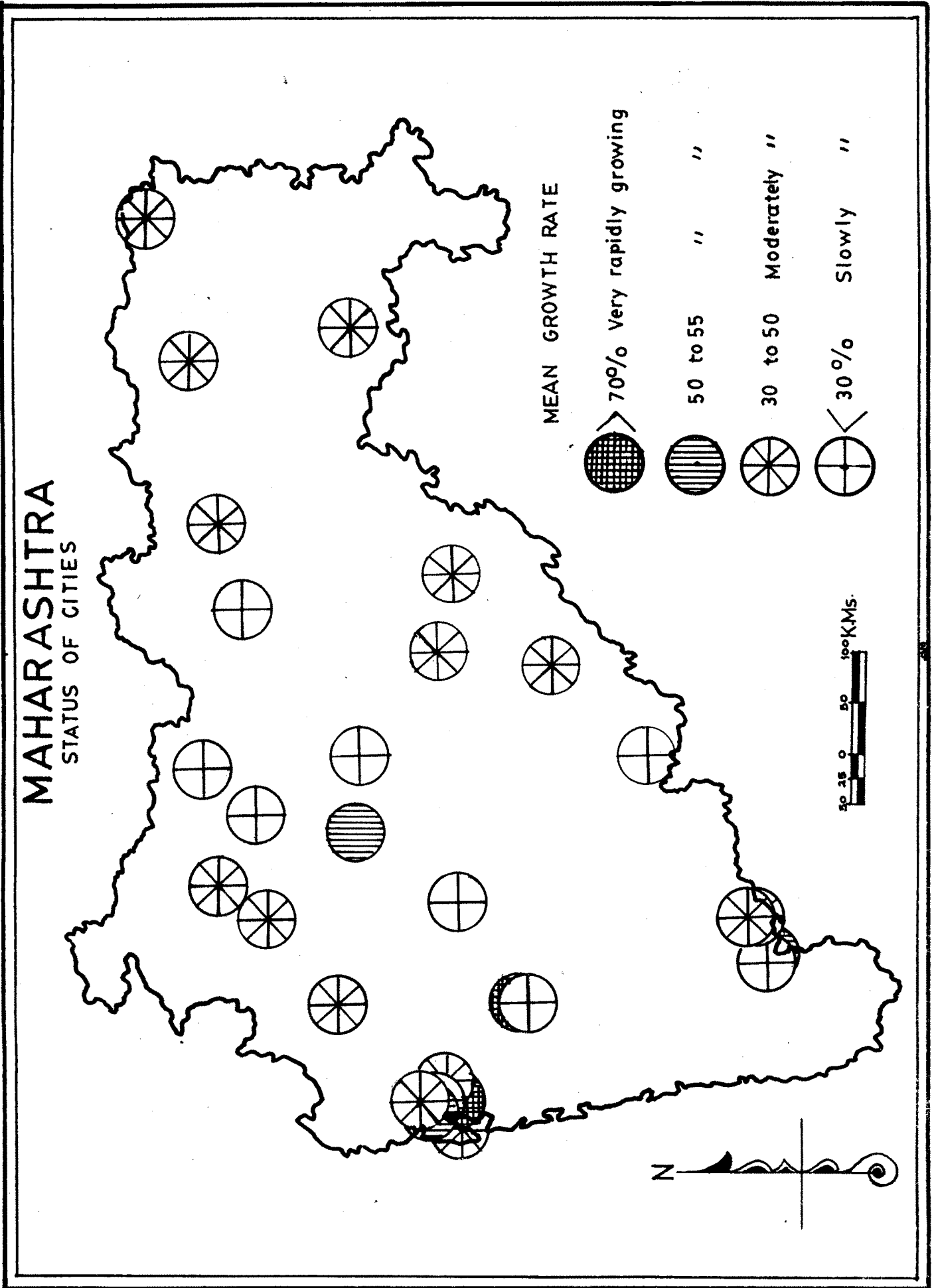


Fig 3.3

Table 3.2 : Post-independence mean growth rate of cities
in Maharashtra.

Rank	Class I cities	Mean growth rate
1	Pimpri Chinchwad	96.12
2	Dombivli	79.77
3	Aurangabad	53.21
4	Thana	52.48
5	Ichalkaranji	51.55
6	Bhiwandi	48.83
7	Malegaon	48.30
8	Ulhasnagar	40.20
9	Parbhani	38.61
10	Latur	37.70
11	Sangli	36.50
12	Nanded	35.50
13	Chandrapur	34.41
14	Bombay	33.73
15	Dhulia	33.26
16	Gondia	33.21
17	Nagpur	32.99
18	Nashik	32.84
19	Miraj	31.84
20	Amarawati	30.85
21	Akola	30.49
22	Kolhapur	30.17
23	Pune	29.81
24	Kalyan	27.72
25	Bhusawal	27.09
26	Jalgaon	24.96
27	Jalna	24.43
28	Solapur	20.23
29	Ahmadnagar	19.48

It is observed that in the study region there are two cities namely Pimpri-Chinchwad and Dombivli which are very rapidly growing cities with 96.12 p.c. and 79.77 percent mean growth rate respectively. These cities are essentially the industrial cities of the state.

Out of 29 cities of Maharashtra, Aurangabad, Thane and Ichalkaranji are rapidly growing cities. The mean growth rate ranges between 50 to 55 percentage. Aurangabad is administratively important. Whereas Thane and Ichalkaranji both the cities are industrially developed.

Moderate growth rate ranging from 30 percent to 50 percent is observed in Bhiwandi 48.83%, Malegaon 48.30%, Ulhasnagar 40.2%, Parbhani 38.61%, Latur 37.70%, Sangli 36.50%, Nanded 35.50%, Chandrapur 34.41%, Bombay 33.73%, Dhulia 33.26%, Gondia 33.21%, Nagpur 32.99%, Nashik 32.84%, Miraj 31.84%, Amaravati 30.85%, Akola 30.49% and Kolhapur 30.17%. Out of 29 cities 17 are moderately growing cities.

Slow growth rate below 30% is observed in the rest of six cities. These cities are comparatively slowly growing. This slowly growing category includes Pune, Kalyan, Bhusawal, Jalgaon, Jalana, Solapur and Ahmadnagar cities of the study region.

Growth characteristics of cities and status of cities when interpreted in terms of mean growth rate during independence period, it is observed that Pimpri-Chinchwad is the top in the list in the growing scale and Ahmadnagar is at the least.

Rank order fluctuations of cities :

There are three closely related aspects of urbanisation process which can be distinguished for analytical purposes. These are (i) The spatial and economic changes, characterising the process. (ii) The emergence of the system of the cities. (iii) The physical growth of individual cities and fluctuations in their population size. In this regard the attempts to derive some generalization have limited scope. Here the object is not to study rank size relationship of cities but to generalised the trends that has been produced by the changes in ranks of cities during the three decades. The general infrastructure and compitative growth of cities are largely responsible for the fluctuations in ranks of the cities.

The fluctuation of the rank and the maximum variations in the rank of cities is shown in Fig.3.4. The illustration obviously indicates that the first ranking city Bombay in 1901 and also in 1951 to 1981 has maintained its first rank through out the period. At the same time the fourth and fifth ranking cities (Solapur, and Kolhapur respectively) have also maintained their ranks since independence. Pune was second ranking city in 1951 but in 1961 it has shifted to third rank. Nagpur which was third in rank in 1951 shifted to second in 1961 and from 1961 onwards Nagpur and Pune maintained their ranks second and third respectively till the year 1981. Amaravati was at sixth rank in 1951 and continued at the same rank upto 1971; however, from 1971

MAHARASHTRA

RANK FLUCTUATION OF CITIES SINCE INDEPENDENCE

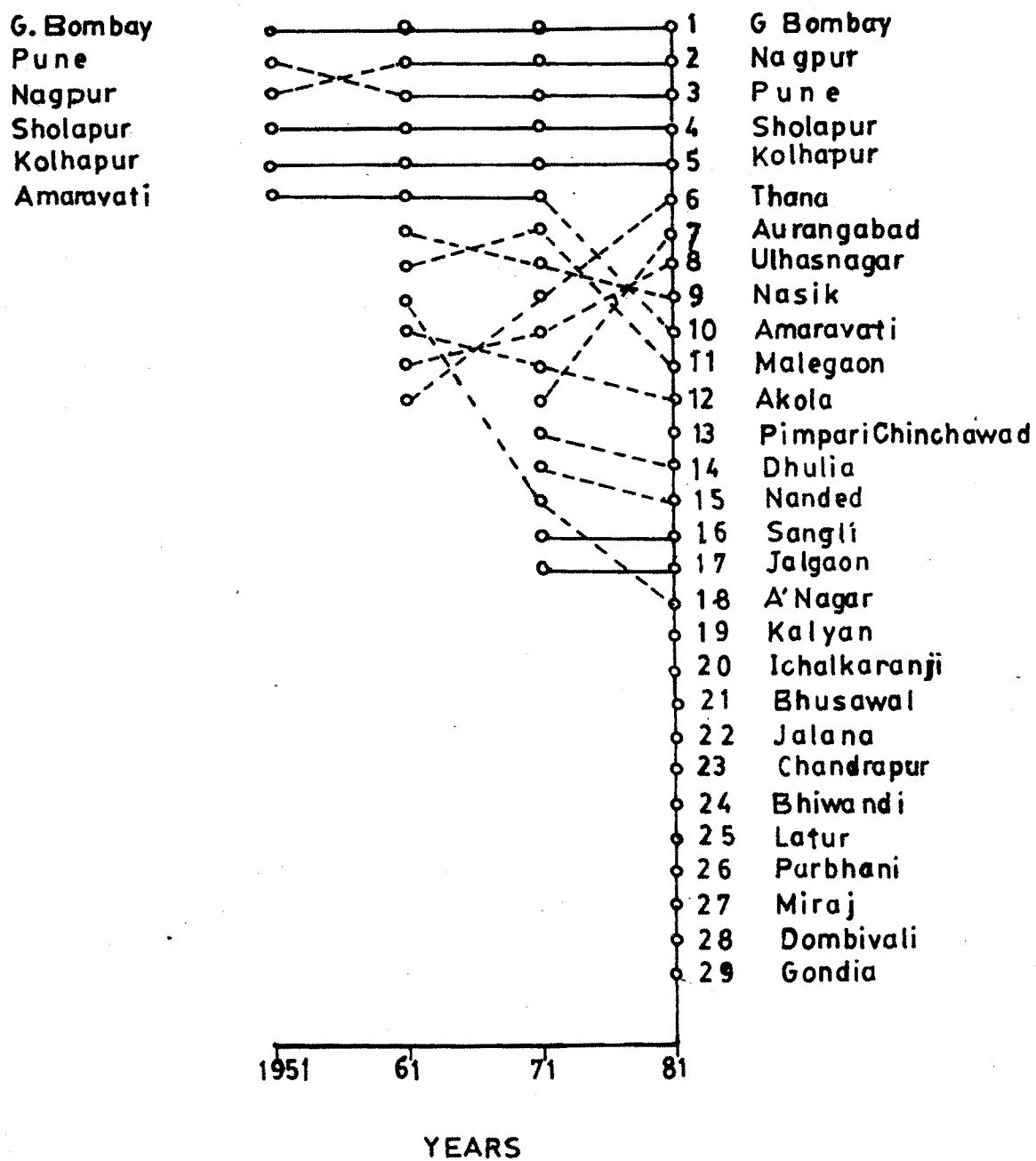


Fig 3-4

Table 3.3 : Ranking of cities and rank fluctuations.

Sr. No.	Class I cities	1951	1961	1971	1981
1.	Gr. Bombay	1	1	1	1
2.	Nagpur	2	2	2	2
3.	Pune	3	3	3	3
4.	Solapur	4	4	4	4
5.	Kolhapur	5	5	5	5
6.	Thane	-	12	9	6
7.	Aurangabad	-	-	12	7
8.	Ulhasnagar	-	11	10	8
9.	Nashik	-	7	8	9
10.	Amaravati	6	6	6	10
11.	Malegaon	-	8	7	11
12.	Akola	-	10	11	12
13.	Pimpri-Chinchwad	-	-	-	13
14.	Dhulia	-	-	13	14
15.	Nanded	-	-	14	15
16.	Sangli	-	-	16	16
17.	Jalgaon	-	-	17	17
18.	Ahmadnagar	-	9	15	18
19.	Kalyan	-	-	-	19
20.	Ichlkarnji	-	-	-	20
21.	Bhusawal	-	-	-	21
22.	Jalna	-	-	-	22
23.	Chandrapur	-	-	-	23
24.	Bhiwandi	-	-	-	24
25.	Latur	-	-	-	25
26.	Parbhani	-	-	-	26
27.	Miraj	-	-	-	27
28.	Dombivli	-	-	-	28
29.	Gondia	-	-	-	29



it has shifted to the lower rank i.e. at tenth rank in 1981. Malegaon, Nashik, Akola, and Ahmadnagar cities have shifted to the lower ranks, whereas Thane, Ulhasnagar and Aurangabad cities emerged as class I cities in the urban landscape of Maharashtra in 1971. These includes Dhulia, Nanded, Sangli and Jalgaon. Out of these four cities Sangli and Jalgaon remained on the similar ranks in 1971 and 1981, however Dhulia and Nanded which were at the thirteenth and fourteenth rank position in 1981. Out of 29 cities of Maharashtra 12 cities have been firstly appeared as class I cities in 1981. This group includes Pimpri-Chinchwad, Kalyan, Ichalkaranji, Bhusawal, Jalna, Chandrapur, Bhiwandi, Latur, Parbhani, Miraj, Dombivli and Gondia.

The study of rank fluctuations of cities since independence shows that Ahmadnagar city has maximum rank fluctuations in the lower rank direction. It is worth mentioning that the new industrial cities like Thane, Ulhasnagar and Aurangabad have upward trend in rank fluctuations. Table 3.3 indicates the rank fluctuations of the cities in Maharashtra.

Rank size relationship of cities :

Urbanization is uneven process on geographical space as some cities grow with rapid rate than others. It reflects the spatial geographical characteristics of a region. To identified whether a rank size rule (Zipff, 1949) is applicable in the study

region or not, the rule has been applied to find out the actual size distribution of cities in study region.

The rank size rule which states that if all the urban settlements in an area are rank in descending order of population size, the population of n^{th} town will be $1/n^{\text{th}}$ the size of largest city and the population of other urban settlements will be arranged according to series 1, $1/2$, $1/3$, $1/4$, $1/n$.

The rank size rule is an investigative hypothesis, a theoretical model or a norm to express the relationship of the often observed empirical regularity in the city size. It presents a generalised picture of the urban settlements of the region. The belief that the cities are related to each other in some orderly way forming into a system, is the basis for the postulation of 'rank size rule' (N.B.K.Reddy,1969).

The rank size rule as an empirical observation based on the study of population statistics. In the present study; rank size rule has been expressed by plotting the rank by size of cities on log-log scale graph. Fig.3.5 A & B shows the details of actual and expected population of cities in Maharashtra for the year 1981. The rank size distribution of cities when plotted on graph clearly indicates that the actual population of 1st ranking city Bombay and 2nd ranking city Nagpur is larger than expected population. All the remaining 27 cities have less actual population than the expected population. Table 3.4 shows the actual and expected population of different cities of Maharashtra.

Table 3.4 : Rank size relation

Rank	Class I cities	Receprocal of R (1/R)	Actual population (Pa)
1	Gr.Bombay	1.00000	8,243,405
2	Nagpur	0.50000	1,219,461
3	Pune	0.33333	1,203,351
4	Solapur	0.25000	511,103
5	Kolhapur	0.20000	340,625
6	Thane	0.16667	309,897
7	Aurangabad	0.14290	298,937
8	Ulhasnagar	0.12500	273,668
9	Nashik	0.11111	262,428
10	Amaravati	0.10000	261,404
11	Malegaon	0.09091	245,883
12	Akola	0.08333	225,412
13	Pimprichichwad	0.07692	220,966
14	Dhulia	0.07143	210,759
15	Nanded	0.06667	191,269
16	Sangli	0.06250	152,389
17	Jalgaon	0.05882	145,335
18	A.nagar	0.05556	143,927
19	Kalyan	0.05263	136,052
20	Ichalkaranji	0.05000	133,751
21	Bhusawal	0.04762	123,133
22	Jalna	0.04545	122,276
23	Chandrapur	0.04348	155,777
24	Bhiwandi	0.04167	115,298
25	Latur	0.04000	111,986
26	Parbhani	0.03846	109,364
27	Miraj	0.03704	105,455
28	Dombivli	0.03571	103,222
29	Gondia	0.03448	100,423
N	29	E = 3.96169	E 15,740,723

MAHARASHTRA RANKSIZE RELATIONSHIP 1981

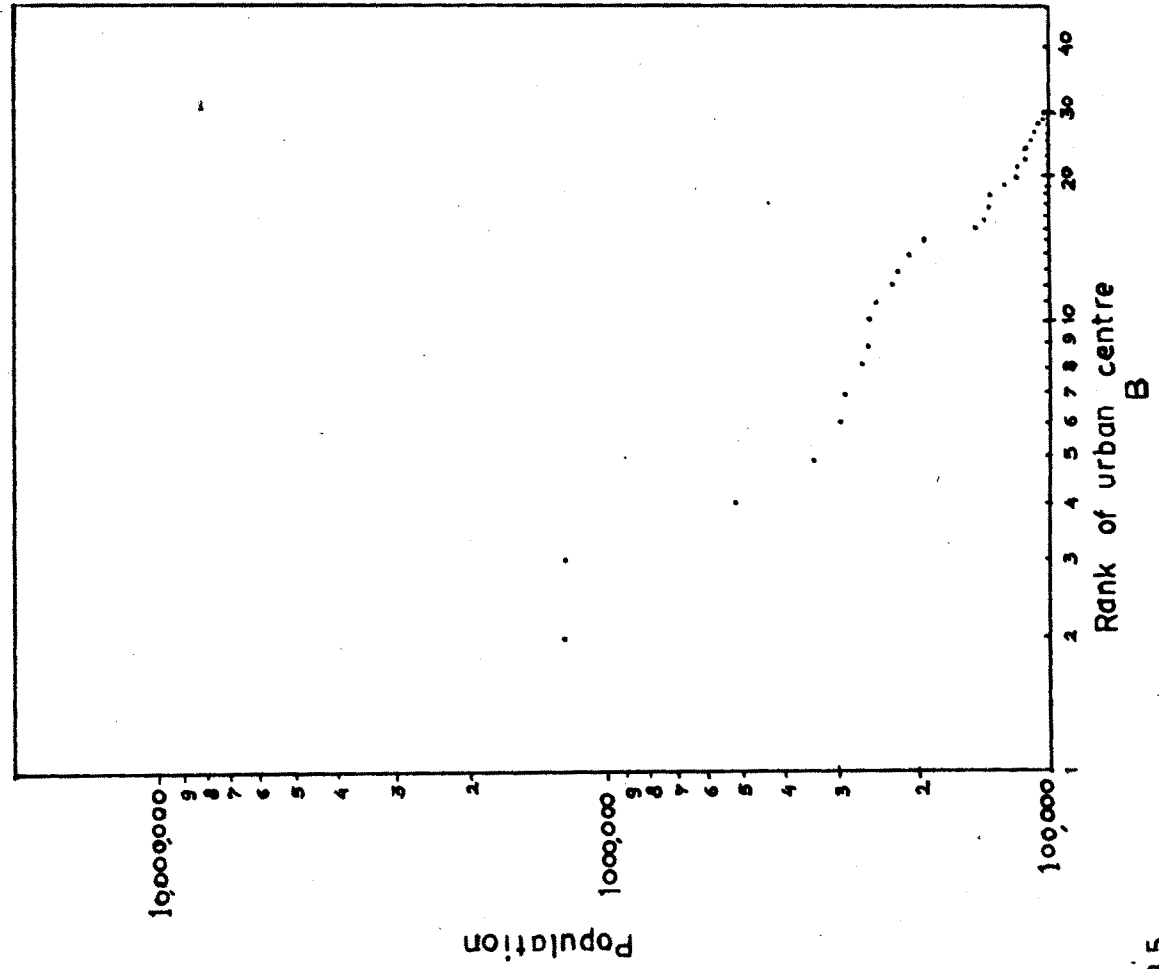
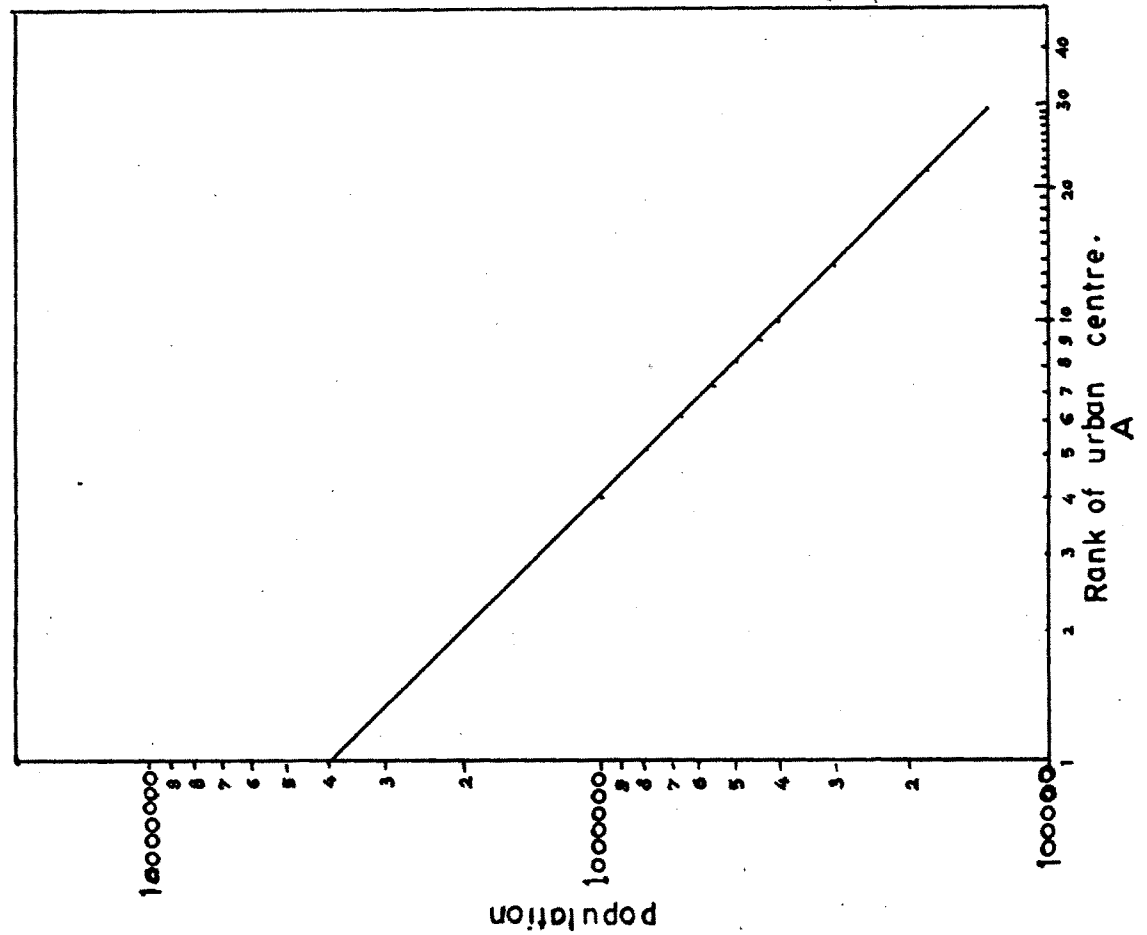


Fig 3.5

Spatial pattern of distribution :

The technique of nearest neighbour analysis is used for the purpose of analysis of the pattern of city distribution. The statistical technique called the 'Nearest Neighbour Analysis' developed by plant ecologists (Clark and Evans, 1954) has been used in the study of spatial distribution pattern of class I cities. The pattern of settlement distribution has already been studied by many geographers. The work of Decey (1962), Brush (1963), King (1962), and N.B.K.Reddy (1970) is worth mentioning.

The technique of 'Nearest Neighbour Analysis' is very significant in the study of point pattern, it is calculated as below.

$$R = \bar{D}_{obs} / \bar{D}_{ran} \quad \dots\dots\dots I$$

" \bar{D}_{obs} " - is the measured mean distance between nearest neighbour point observed in a given area.

" \bar{D}_{ran} " - is the expected mean distance for similar number of points randomly distributed in the same area.

R = is nearest neighbour index.

$$\bar{D}_{ran} = \frac{1}{2\sqrt{N/A}} \quad \dots\dots\dots II$$

Where, 'N' - is the number of urban settlements in the study region

'A' - is the area of spatial unit

$$\text{Hence, } R = \frac{\bar{D}_{obs}}{1 + (2\sqrt{N/A})} \dots\dots\dots \text{III}$$

It can be written in simplified form as below.

$$R = 2 \bar{D}_{obs} \sqrt{(N/A)} \dots\dots\dots \text{IV}$$

With the application of aforesaid formula nearest neighbour index is calculated for the entire region of Maharashtra considering a single unit. As the study area bears a visible contrast in the density pattern and spacing of cities the region has divided into four administrative divisions; and 'R' values have been calculated. The pattern of distribution has been studied by considering the revised 'R' values scale given in Table 3.5.

Table 3.5 : Revised 'R' value scale.

Sr.No.	'R' value	Description
1.	0.00 to 0.15	Absolute clustering
2.	0.16 to 0.50	Liniar clustering
3.	0.51 to 0.80	Clustered grouping
4.	0.81 to 1.20	Random distribution
5.	1.21 to 1.40	Near uniform
6.	Above 1.40	Uniform

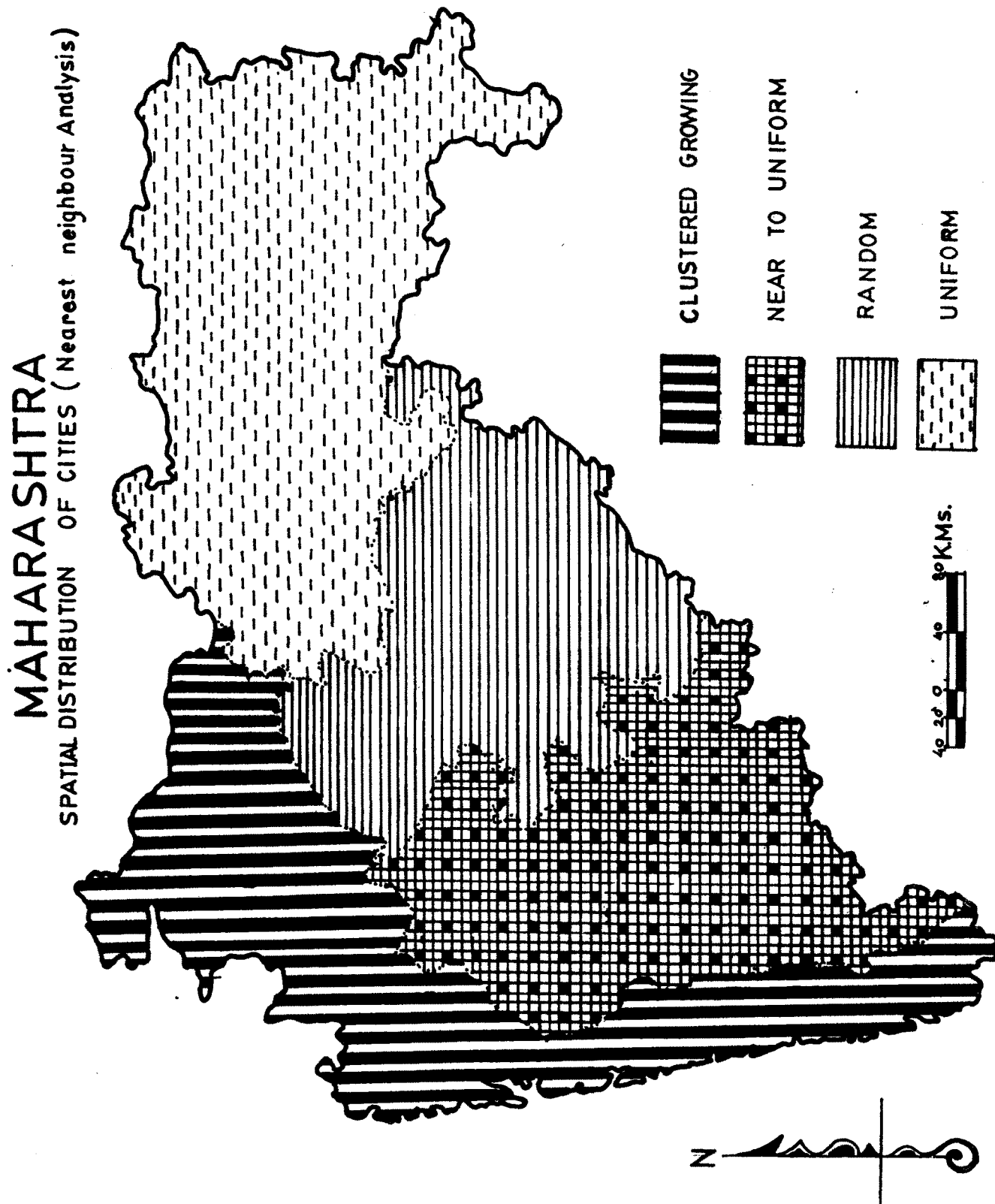


Fig 3.6

The spatial pattern of distribution of cities of Maharashtra has been studied by dividing region into four administrative divisions. These divisions includes Bombay division, Pune division, Aurangabad division and Nagpur division. These divisions shows wide contrast in geographical; social and economic conditions, where the degree of randomness differ considerably. The spatial contrast in degree of randomness is shown in Fig.3.6.

The Bombay division consists seven districts of the Maharashtra. The northern portion of the Bombay division is relatively more developed than the southern portion. The development of transport and industry has influenced the distribution and concentration of the cities in northern part of the division. The division has eleven cities distributed in clustered manner, where degree of randomness is 0.52.

Six districts of Maharashtra are included in Pune division. The area of Pune division is characterised by agriculture and the agricultur el play significant role in the economy of the region. There are eight cities in the area, found distributed in near to linear cluster, where the degree of randomness is 0.32.

Aurangabad division consist five districts in which five cities are found to be randomly distributed. The degree of randomness is 1.17.

Nagpur division comprises eight districts of Maharashtra and five cities are found distributed in the uniform manner where

the degree of randomness is 1.53 (Fig.3.7).

The 'R' value when calculated for the entire study region, indicates random distributions of cities where the degree of randomness 1.17.

Degree of concentration :

In a broader sense a close distribution is looked upon to be a concentration and a wide distribution a dispersion. It is easy to distinguish them if they are found in extreme cases. However, it is rather difficult to differentiate them in marginal cases due to the inherent nature of relativity of the concepts. The concentration of urban settlement is identified by a simple method, where the distributions in a region contents a number of discrete concentration. They can be group together if they are related to each other. They are considered to be related if the distance of separation between the continuous concentration across their settlement is less than the critical distance (N.B.K.Reddy).

The entire area under study has random distribution of cities where the degree of randomness is 1.17 and a critical value of 52.23 kms. (Fig.3.8). Considering this critical value the concentrations have been demarcated. There are seven concentration groups in the study area. Out of these seven concentration groups, the Gr.Bombay concentration group consists six cities namely Bombay, Thane, Bhiwandi, Ulhasnagar, Kalyan and Dombivli. The Kolhapur concentration group includes the four cities namely

MAHARASHTRA

SPATIAL DISTRIBUTION OF CITIES IN 1981

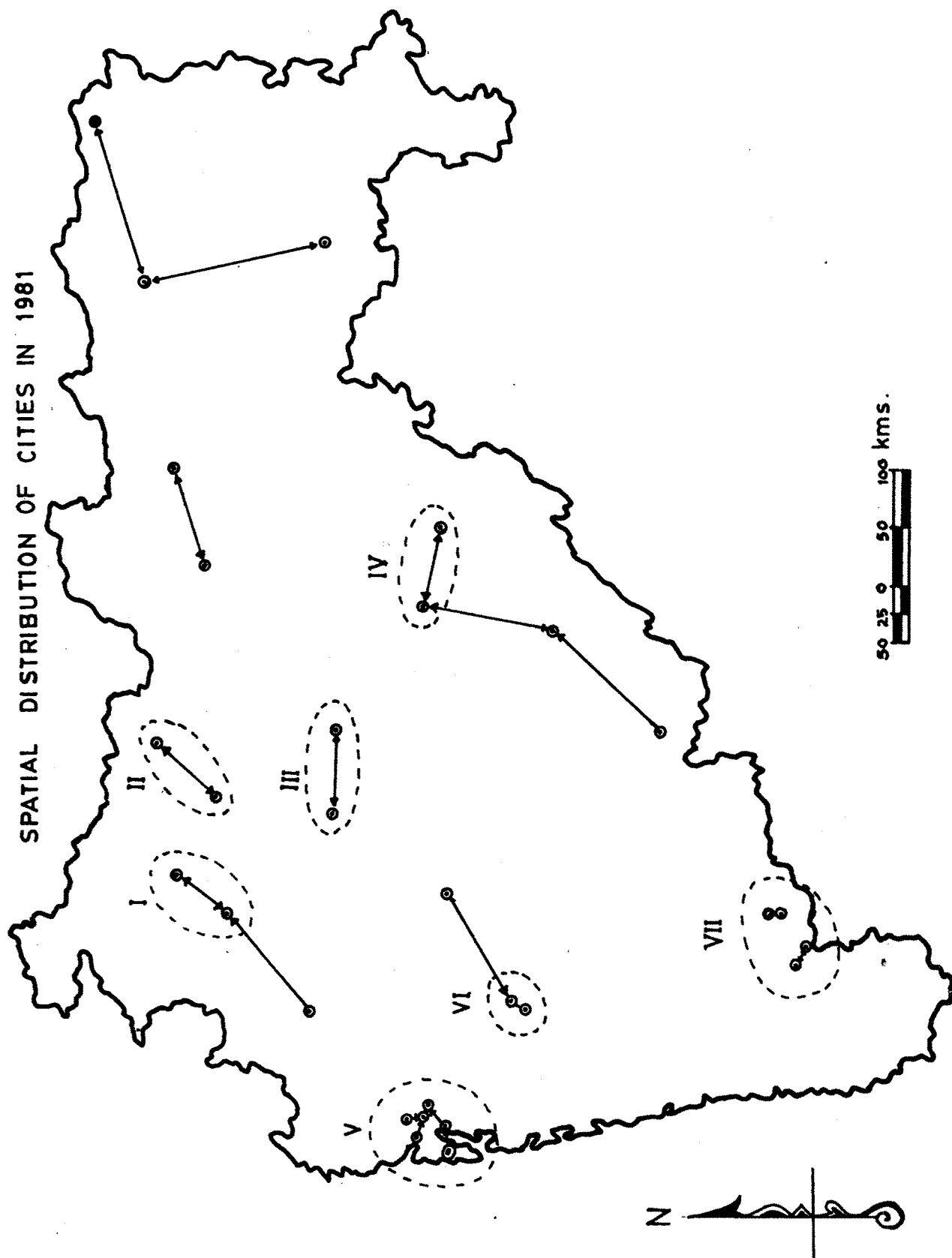


Fig 3.7

Kolhapur, Ichalkaranji, Sangli and Miraj. The remaining five concentration groups indicates the association of a pair of cities these urban concentrations are :-

Pune concentration	-	Pune and Pimpri - Chichwad association
Dhulia	"	- Dhulia and Malegaon association
Aurangabad	"	- Aurangabad and Jalna association
Jalgaon	"	- Jalgaon - Bhusawal group
Parbhani	"	- Parbhani Nanded group

It is worth mentioning that Bombay division comprises three urban concentrations. Pune and Aurangabad divisions have two urban concentrations in each; however, Nagpur division where all the cities are found in isolation and hence no emergence of concentration. Fig.3.8, shows the urban concentrations of the cities of Maharashtra for the year 1981.

Levels of development and distribution of cities :

For the purpose to find out the relationship between levels of development and distributions of cities in Maharashtra; the levels of development have been measured for the four administrative divisions of the Maharashtra state. The following variables were considered while determining the levels of developments.

- 1) Percent of urban population to total population
- 2) Percent of literacy
- 3) Percent of settlements electrified

MAHARASHTRA URBAN CONCENTRATION 1981

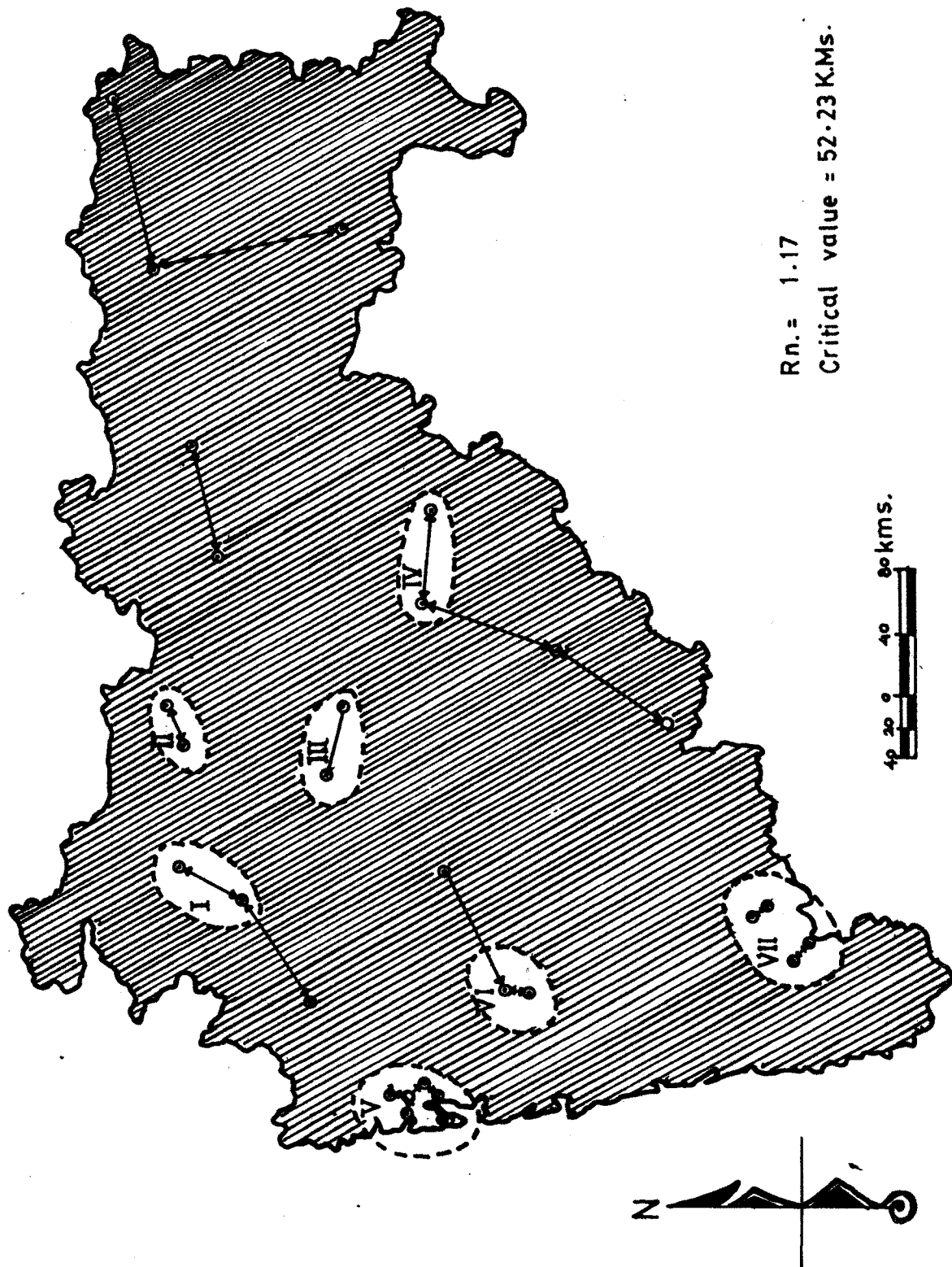


Fig - 3.8

- 4) Percent of net sown area
- 5) Percent of net area irrigated
- 6) Percent of road length
- 7) Percent of railway route
- 8) Percent of banking offices
- 9) Percent of total workers
- 10) Percent of workers in tertiary activities

Taking into account the above variables the data of 1981 census and statistical abstract of Maharashtra state (1980-81) have been considered for the calculation of levels of development.

The coefficient of development of a division in terms of single variable is calculated by a following equation.

$$CDi = \frac{Pi}{PI} \times 100 \quad I$$

where, 'CDi' - is the co-efficient of development for variables.

'Pi' - is percentage of variable 'i' in the areal unit.

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

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

$$CID = \frac{CDI1 + CDI2 + CDI3 \dots + CDIn}{N} \quad II$$

where, 'CID' - is composite index of development

'N' - is number of variables

The levels of developments are calculated for four administrative divisions. The composite indices of development have been given in Table 3.6. This table also highlights on percentage share of class I cities and percentage share of class I city population.

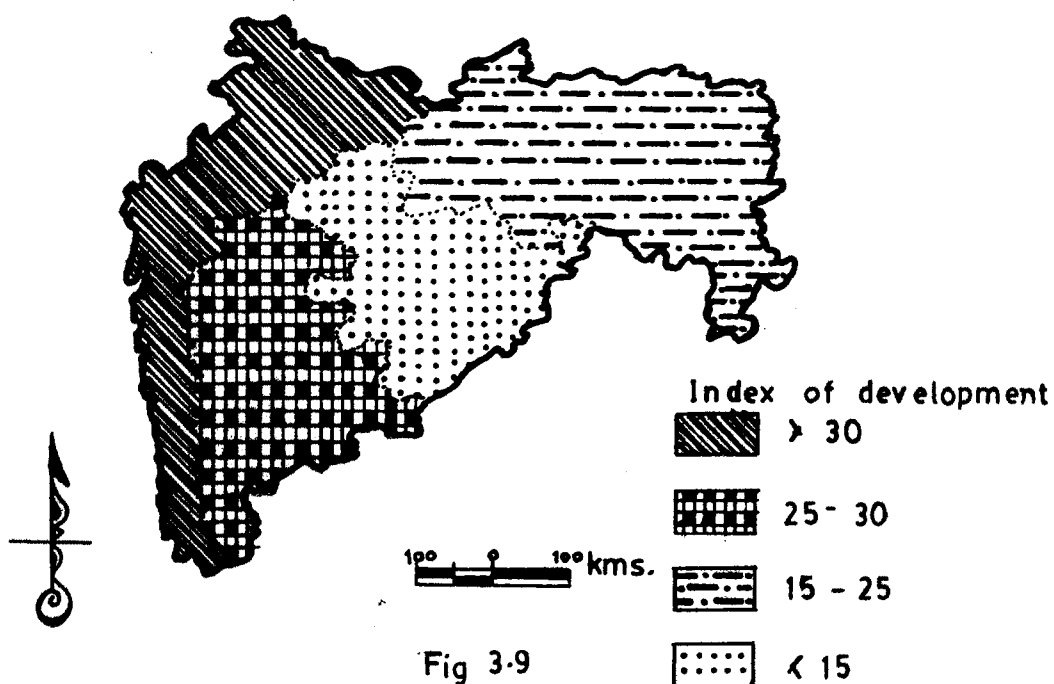
The spatial analysis of levels of development shows that Bombay division has 37.93% share of class I cities and this region has very high index of development. Out of the total class I city population of Maharashtra 64.58 percent population is concentrated in this division.

Table 3.6 : Composite indices of development and percent share of cities & class I city population in (1981).

Sr. No.	Division	% share of class I cities	% share of class I cities population	Index of development
1.	Bombay	37.93	64.58	38.61
2.	Pune	27.59	17.86	36.01
3.	Aurangabad	17.24	5.35	14.84
4.	Nagpur	17.24	12.21	20.66

Aurangabad division has very low index of development, This region of Maharashtra has 17.24 percent share of class I cities with only 5.35 percent share of class I city population.

MAHARASHTRA LEVELS OF DEVELOPMENT



POPULATION IN DIVISIONS

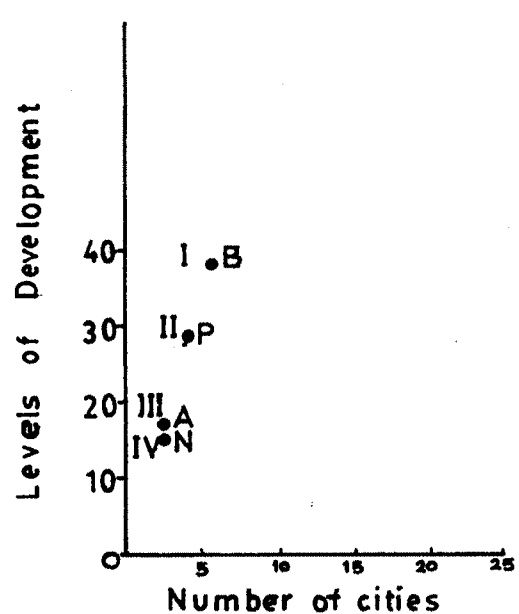


Fig.- 3-9 A

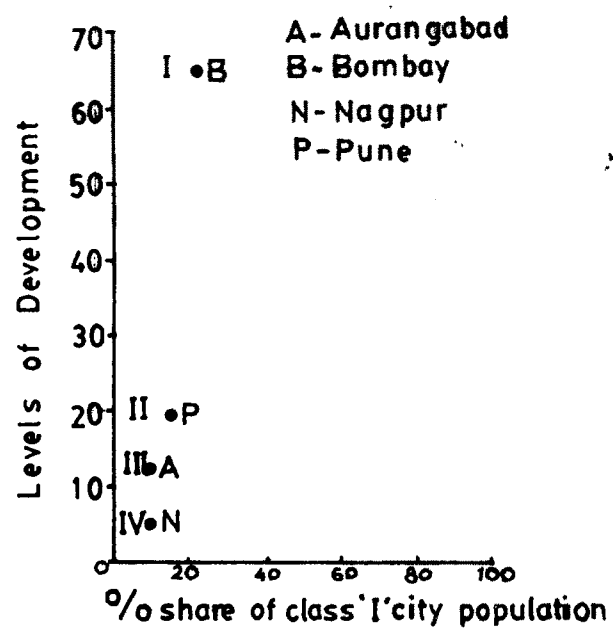


Fig.- 3-9 B

Pune division with 26.01 index of development shares
17.86 percent of class I city population of Maharashtra state.

Nagpur has 12.21 percentage share of class I city population and 20.60 index of development. Bombay and Pune divisions are relatively more developed and shares more than 81.0 percent of class I city population; on the otherhand; Nagpur and Aurangabad divisions are relatively less developed and share the limited number of class I cities and small size of class I city population. Fig.3.9 shows index of levels of development for each divisions. Fig.3.9 A illustrates the relationship between the levels of development and number of cities and Fig.3.9 B indicates index of development and percent share of class I city population in each divisions.

It has found that the relationship between the index of development and number of cities has very high positive correlations where $r = 75$. In the same way share of class I city population and index of development in each division also shows positive correlations of $r = 70$.

The analytical study of class I cities in Maharashtra shows that apart from geographical conditions; population density and levels of economic development play significant role in the distribution of urban centres.

Comparatively Bombay division region has more concentration of cities as it is industrially more developed as compared to the other administrative divisions of the Maharashtra.

ed as compared to the
shtra.

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