CHAPTER - V

# URBAN HIERARCHY - FUNCTIONAL BASE 1981

## 5.1 INTRODUCTION :

Urban centres is essentially a settlement which provides goods and services for the population of its hinterland along with its own. It provides various services to neighbouring areas such as administrative, banking, professional services, educational, cultural facilities, retail and wholesale trade and even employment opportunities. In this context the importance of urban centres various and their significance depends upon the level and functions of urban centres mention about, they can be classified as i) Urban centres of higher order which provide wide array of goods and services to a large area and population ii) Urban centres of lower order which deal with a smaller range of goods and provide services to a smaller area and population.

Urban centres with different capacity of economic transaction, carryout a dynamic role in spatial integration in terms of various socio-economic activities serving the surrounding areas with different ranks and economic functions. Thus, the existing urban centres may be modelled as centres to provide services and extent development innovation to their service areas.

The hierarchy of towns and cities in any given region is a natural development of urbanization. The urban centres with smaller size and for functions will be linked with those up in the scale and services go upto the top. In the State of Maharashtra also every region is connected to each other with varying

intensity of exchange of goods and services at different levels of urban centres. While all the centres of region are not equally important in the areal functional organisation, they also differ in their capacities to provide services such functional magnitudanal differentiations and inequalities generate the hierarchical class system of urban centres.

## 5.2 THE CONCEPT OF CENTRALITY :

It is obvious that urban centres differ from each other in their population size, areal extention, functional magnitude and capacity to serve the surrounding region. Centrality is the measure importance of a place, in terms of its functional capacity to serve the need of the surrounding people and area. Centrality can be express qualitatively such as, low centrality and high centrality, as well as quantitatively by centrality scores which are obtained by converting the functional base of a place into scores on the basis of frequency and importance of the functions. There has also been a concern among Geographers to establish a precise relationship between the size of settlements in terms of population and range of services which it offers (Johnson,1967).

A present work is concern with the problem of calculating the centrality values of the urban centres in the State of Maharashtra.

Centrality, oftenly depends upon central functions, These

central functions have a certain range beyound the limit of the place and catters need of the surrounding region.

According to Christaller (1933), " The centrality of a place is that components of its functional magnitude which is required for the population of its hinterland." This statement very clearly indicates that mere agglomeration of the people and functions cannot give any place central importance, unless, it has surplus functions to provide services to its hinterland.

## 5.3 METHODS FOR MEASURING CENTRALITY :

Various methods have been evolved to calculate the centrality of urban places. During the last fifty years, centrality of a place can be measure in several ways by taking into account a single function or all important functions available at the place. The single functional index has been used by several geographers. The number of telephone connections was used by Christaller (1933) in his original work. Smalies (1944) has used Bus service frequency for calculating centrality of urban places. The single functional index sometimes gives misleading results if the indicator selected does not represent the level of economic development of the region.

Dickinson (1937) has considered wholesale trade of cities as an indicator of centrality. Berry and Garrison

(1958) have considered all central functions for calculating centrality of a place. Green (1948) has used Bus service index to measure the centrality index of a place. Godlunds (1956) has work out the trality of swilish settlements on the basis of capacity for service and trade in urban settlements. He has used the total population in a settlements and number of persons employed in retail trade and service.

Davies (1967) used a simple method for measuring the centrality in South Wales. He has calculated the location quotient for the functional available in the area by calculating the functional index of a centre. The relevant score for each functions is to be multiplied by the number of functional units of the functions and the summation of the values used for the functional index of place. This functional index gives of the aggregate important of a place.

## 5.4 CHOICE OF METHODS FOR CALCULATING CENTRALITY :

The researcher has calculated the centrality of urban centres of the State of Maharashtra by two methods. The Godlunds method and Davis method have been used to calculate the centrality values of the urban, centres. The result for all towns have been calculated by using Godlunds method in which population engaged in tertiary activities has been considered and functional index has been obtained. In the same way the centrality index has also been calculated by using the location quotient method.

## 5.5 DATA AVAILABILITY AND SELECTION OF CENTRAL FUNCTIONS :

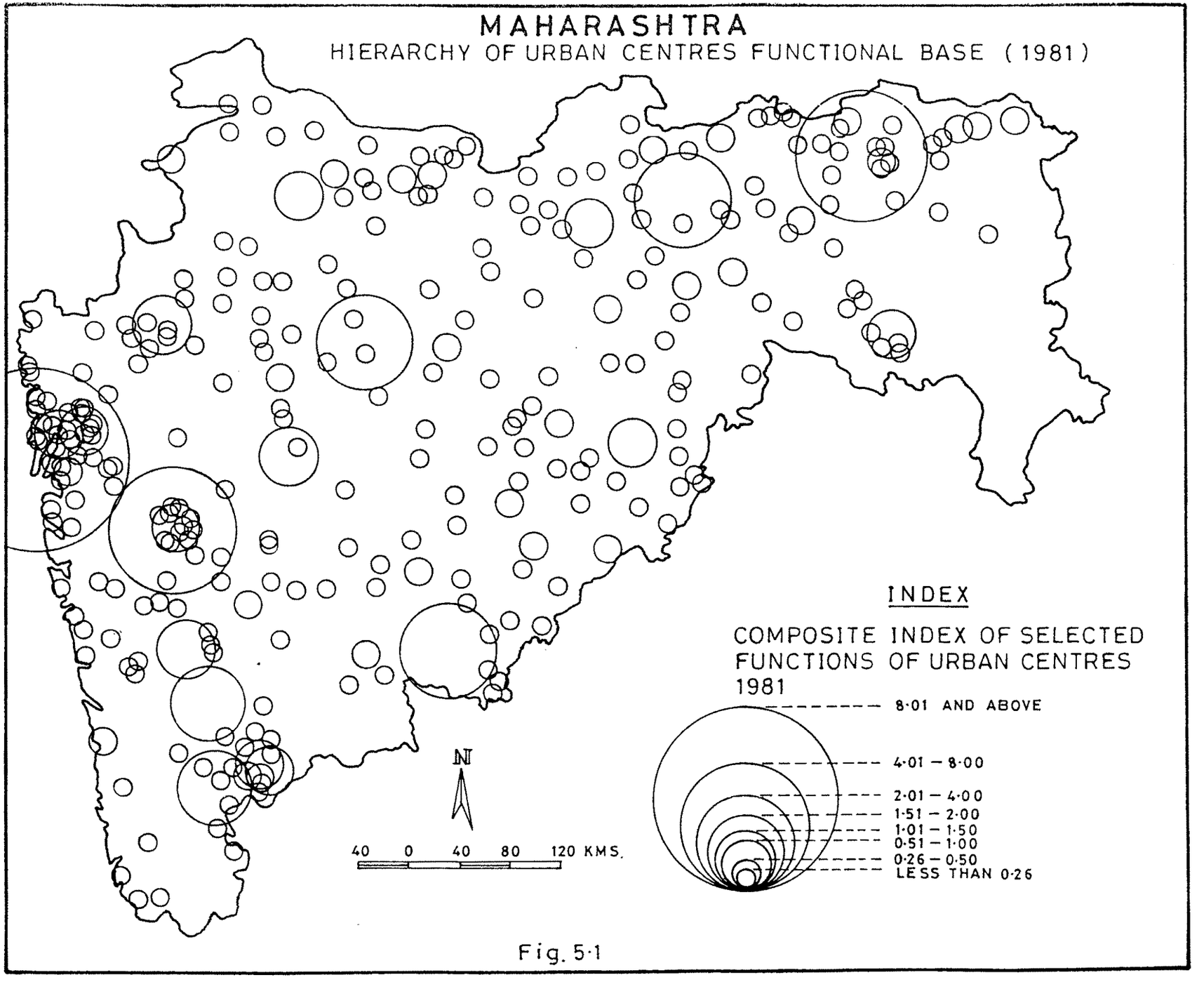
The non-availability of data create serious constrants on the choice of methods to be adopted. Considering the developing nature of the study region, care has been taken in the selection of central functions. As many as eight central functions have been selected for calculating centrality table (5.5).

Table 5.1 : List of central functions and services for calculating centrality (1981).

| Sr.No. | Central functions/Services |
|---|---|
| 1 | Number of hospitals |
| 2 | Number of hospital beds |
| 3 | Number of medical colleges |
| 4 | Number of Engineering colleges |
| 5 | Number of Degree colleges |
| 6 | Number of Higher secondary schools and Jr.colleges |
| 7 | Number of Cenema houses |
| 8 | Number of Banks |

Davies method of centrality :

Davies(1967) has used the location quotient method for South Wales urban centres. In this method a score for single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HIERARCHY OF URBAN CENTRES FUNCTIONAL BASE (1981)
INDEX
COMPOSITE INDEX OF SELECTED FUNCTIONS OF URBAN CENTRES 1981
8·01 AND ABOVE
4·01 – 8·00
2·01 – 4·00
1·51 – 2·00
1·01 – 1·50
0·51 – 1·00
0·26 – 0·50
LESS THAN 0·26
N
40 0 40 80 120 KMS.

Fig. 5·1

unit of functions is calculated by the following formula.

$$C = \frac{t}{T} \times 100$$

Where, C = is a score for any function 't'

t = is one unit of function 'T'

T = is the total number of functional units of function 't' in the area.

With the help of this method the centrality scores for eight functions have been calculated and the sum of individual centrality scores of eight functions at any urban place gives the composite locational index. The composite locational index for all urban centres (307) of Maharashtra State has been worked out and given in Appendix - A.

The spatial distribution of centrality scores calculated by this method has given in Appendix - A and represented in the Fig.5.1.

## 5.6 MEASUREMENT OF CENTRALITY BY GODLUNDS METHOD :

The investigation of centrality becomes very difficult when the functional data is not available. Under this condition, the method used by Godlunds (1956) can be used to calculate the regional mean index of centrality. He has worked the centrality scores of a place with a following equation.

$$C = \frac{Tp}{Rtp} \times 100$$

Where, C = is the centrality index of a place

Tp = is the Tertiary population of a place

Rtp = is the Tertiary population of a region under study.

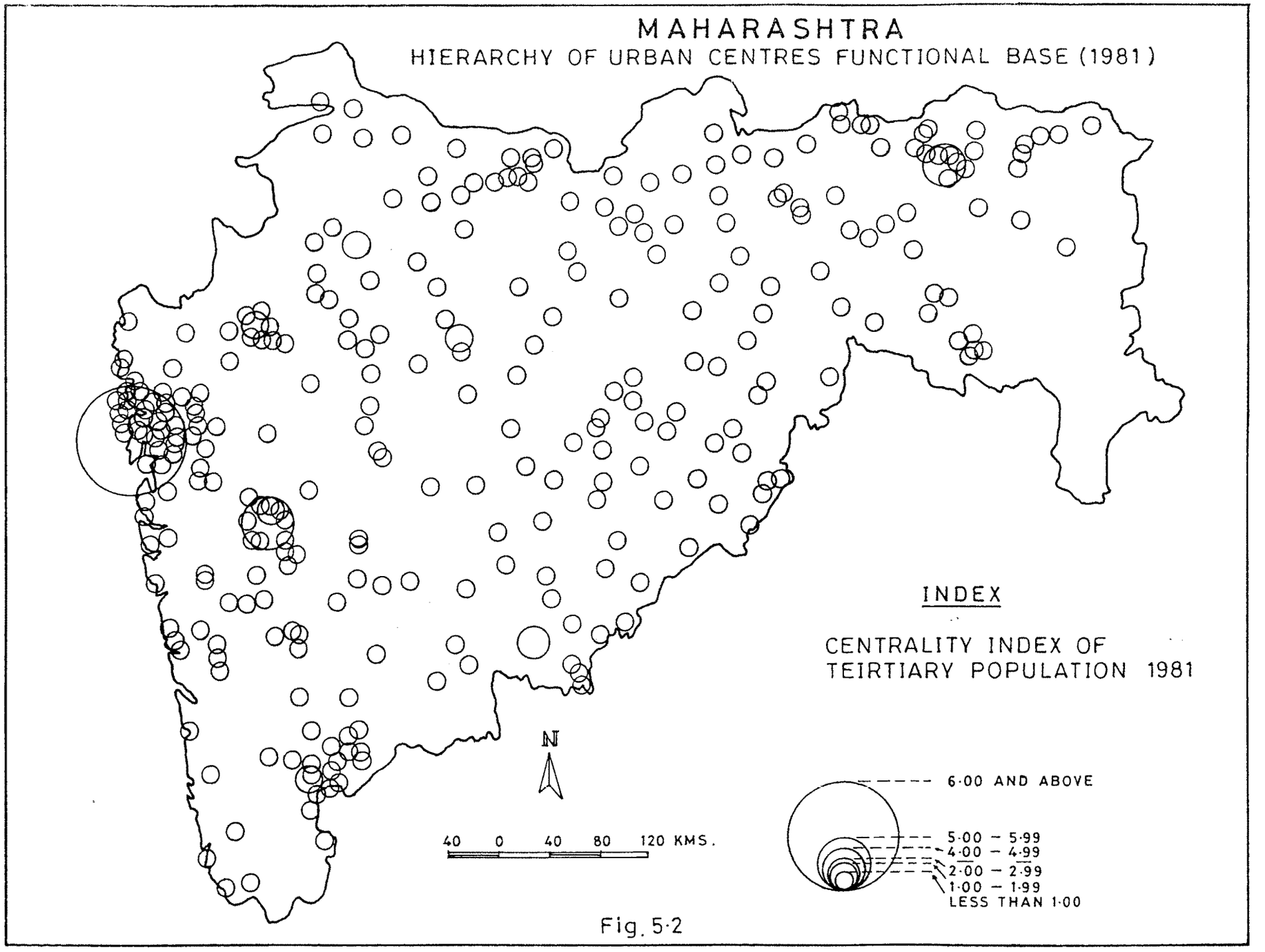
In this way the centrality index of every urban centre of the State of Maharashtra has been worked out and shown in Appendix - A and dipicted in Fig.5.2.

## 5.7 REGIONAL ANALYSIS OF CENTRALITY :

The spatial distribution of centrality scores calculated for individual urban centres of Maharashtra by Davies and Godlunds method have been dipicted in Fig.5.1. and Fig.5.2 respectively.

A comparative analysis of these two methods proves the suitability of Davies method in which the aggregate functional importance of a place is represented. The centrality scores based on Godlunds methods gives a deceptive picture of the area. It shows the high centrality values of small urban centres and sometimes the large centres with low centrality values. In general Godlunds method fail to differentiate between the importance of a small size centres and large size centres. Therefore the centrality circles shown in Fig.5.2 seems similar in their appearance.

The results obtained by the locational index method suggests the aggregate functional importance of urban centres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HIERARCHY OF URBAN CENTRES FUNCTIONAL BASE (1981)
INDEX
CENTRALITY INDEX OF
TEIRTIARY POPULATION 1981
N
40 0 40 80 120 KMS.
6·00 AND ABOVE
5·00 – 5·99
4·00 – 4·99
2·00 – 2·99
1·00 – 1·99
LESS THAN 1·00

Fig. 5·2

and hence it clearly distinguish the centrality circles of the place indicating their functional importance (Fig.5.1). Taking into consideration the suitability of Davis method the centrality values calculated by this method are considered for establishing the hierarchy of urban centres of the state.

## 5.8 HIERARCHIC ORDERS OF URBAN CENTRES :

After calculating the centrality index for 307 urban places of the State of Maharashtra by Davies method, all the places have been arranged in a decending orders of centrality values and further classified into a eight hierarchical orders (Table 5.2) It is eight tier hierarchy.

Table 5.2 : Urban hierarchy - functional base,1981.

| Sr. No. | Centrality values | Order | No. of Towns |
|---|---|---|---|
| 1 | More than 8.01 | I | 1 |
| 2 | 4.01 - 8.00 | II | 2 |
| 3 | 2.01 - 4.00 | III | 3 |
| 4 | 1.51 - 2.00 | IV | 2 |
| 5 | 1.01 - 1.50 | V | 3 |
| 6 | 0.51 - 1.00 | VI | 9 |
| 7 | 0.26 - 0.50 | VII | 28 |
| 8 | Less than 0.26 | VIII | 259 |
| | Total | | 307 |

SOURCE : Computed by Researcher.

On the basis centrality scores computed by Davies method all the 307 urban centres have been grouped into eight hierarchic orders and shown in Fig.5.3.

The First order centres :

The Gr.Bombay city is the first order city in the urban hierarchy of Maharashtra state. The city Bombay has the highest centrality scores. It is the political capital of Maharashtra and the economic and commercial capital of India. Moreover, it is the largest/primate city of the state and a centre of industry, business, services and other social, cultural and economic activities.

Second order centres :

Nagpur and Pune cities are second order centres of the Maharashtra having 6.98 and 6.93 centrality index respectively. Both are division headquarters and regional centres of trade, commerce, industries, education and administrative. Besides several educational and technical institutions both are having the University headquarters. Pune is a cultural centre of the Maharashtra State, whereas, Nagpur is secondary political capital of the state. Both are having the greater area under their influences.

Third order centres :

There are as many as three cities have been recgnised as third order urban centres of the state. These cities are

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## HIERARCHY OF URBAN CENTRES 1981
## DAVIES'S CENTRALITY INDEX (SCATTER DIAGRAM)

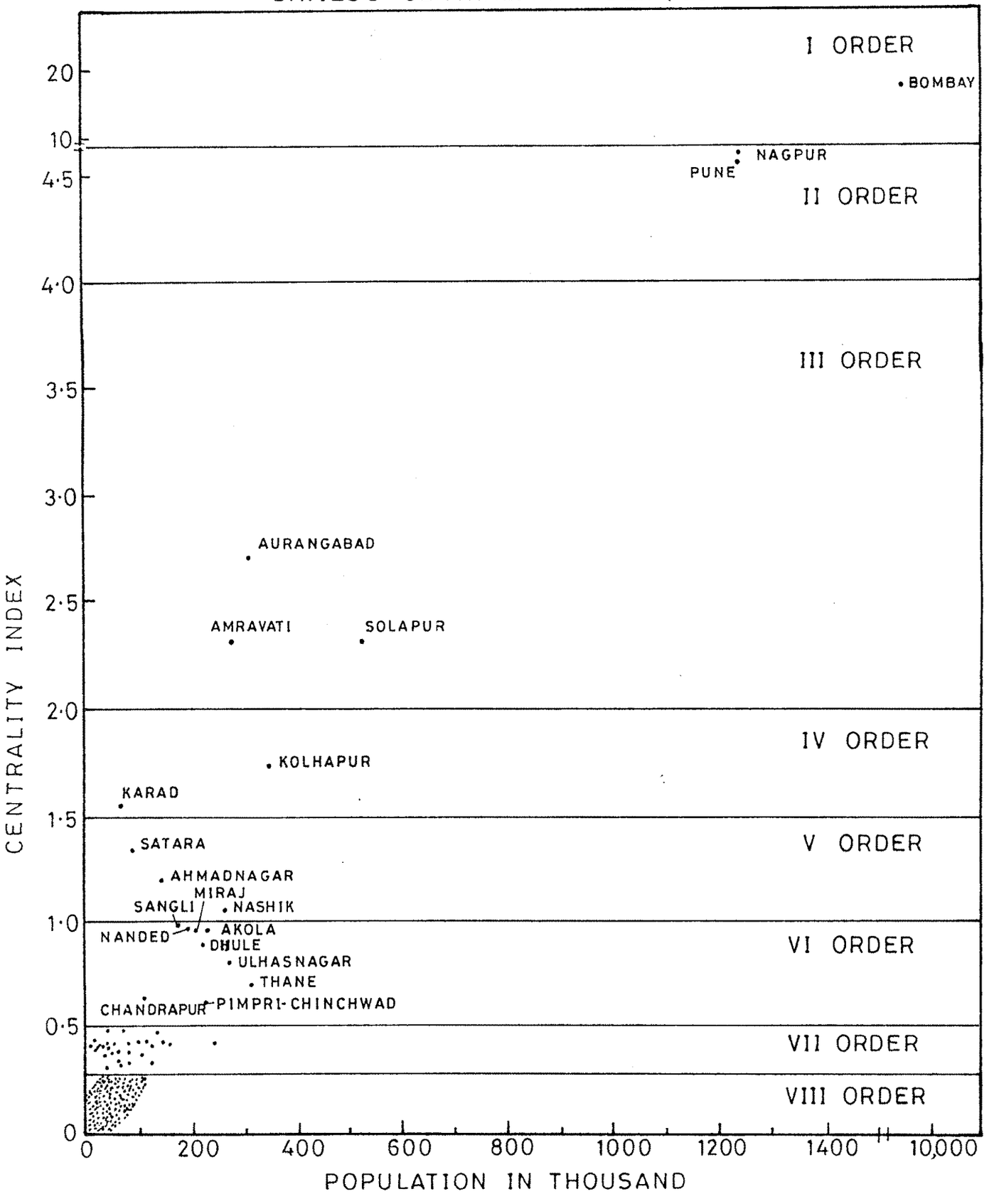


Fig. 5·3

Solapur, Aurangabad and Amravati. Their centrality values ranges between 2.01-4.00.

Out of these three cities Aurangabad is a divisional headquarter and a University place. Solapur and Amravati are very important manufacturing and cultural cities of Maharashtra.

Fourth order centres :

Kolhapur city and Karad town are the fourth order centres of the state. Both are commercial and educational centres of the Western Maharashtra. Both the centres are located on National Highway No.4, and both are acting as connected nodes between Ghats settlement and the Konkan settlements. The trading activity is flourished at its high level in these centres of the region.

Fifth order centres :

This category includes the cities like Nashik, Ahmednagar and Satara. The functional magnitude of these centres has characterised by the presence of administrative functions, educational as well as commercial activities of the places.

Sixth order centres :

The nine urban namely Thane, Ulhasnagar, Akola, Pimprichinchvad, Dhule, Nanded, Sangli, Chandrapur and Miraj are the sixth order centres of the eight fold urban hierarchy of the Maharashtra. Out of these nine sixth order centres Thane, Ulhasnagar, Pimprichinchvad are the industrially advanced centres and the rest of the centres are district headquarters of the Maharashtra.

Seventh order centres :

Nearly 28 urban centres are recognised as seventh order centres of the urban hierarchy of the state. The centrality values for this categories ranges between 0.26 - 0.50.

Eight order centres :

This is the lowest order of the hierarchy and it includes 259 urban places of the state. Most of the centres in this order are taluka headquarters or market towns. Their functional magnitude is comparatively low and they provides the goods and services to the restricted surrounding area and population. Fig.5.3 shows the hierarchy of urban centres (1981) of the Maharashtra State.

## 5.9 SPATIAL ORGANIZATION OF TOWNS IN DIFFERENT ORDERS OF HIERARCHY :

The spatial distribution of urban centres in different orders of hierarchy in the state displace the pattern in which the larger number of towns are concentrated in Bombay division. (Table 5.3 and Fig.5.3). In this part of the state there are 94 towns of eight order, 6 towns of seventh order, 3 towns of sixth order, 1 centre in fifth order and 1 city of first order.

The regional analysis indicates that the Nagpur division ranks second so far as the number of urban centres are concerned.

It has 75 towns. Out of this 75, sixty towns are eight order, 2 towns are third order and second and third order have one town in each.

Table 5.3 : Divisionwise distribution of towns - functional base, composite index - Eight selected attributes (1981).

| Sr. No. | Name of the Division | I | II | III | IV | V | VI | VII | VIII | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Bombay division | 1 | - | - | - | 1 | 3 | 6 | 94 | 105 |
| 2 | Poona division | - | 1 | 1 | 2 | 2 | 3 | 6 | 59 | 74 |
| 3 | Aurangabad Division | - | - | 1 | - | - | 1 | 5 | 46 | 53 |
| 4 | Nagpur division | - | 1 | 1 | - | - | 2 | 11 | 60 | 75 |
| | State Total | 1 | 2 | 3 | 2 | 3 | 9 | 28 | 259 | 307 |

Aurangabad division has lowest number of urban places, there are 53 urban centres. This division does not have first, second, fourth and fifth order urban centres. Majority of the towns in Aurangabad division seems the lowest order centres.

Out of the total urban centres (307) of the state 74 towns are located in Poona division. Except first order centres the division has all order centres. Particularly it has one town each in second and third order, towns in each fourth and fifth order,

Three towns in fifth, six towns in seventh and fifty nine towns in eighth order.

Table 5.3 shows the details of urban centres with their hierarchic orders located in various divisions of the study region.

## R E F E R E N C E S


1. Berry, B.J.L. and Garison, W.L. (1958) : A note on central place theory and the range of good. Economic Geography, 34, pp.304-311.

2. Christaller, W. (1933) : The central places of Southern Germany, transleted by Baskin (1966), Printish Hall.

3. Davis, W.K.D. (1967) : Centrality and central place hierarchy, Urban Studies, 4, pp.61-79.

4. Dickinson, R.E. (1947) : City region and regionalism, London.

5. Godlund, S. (1956) : The functions and growth of bus trafics within the sphere urban influence, Land Studies in Geography, Series B-17.

6. Johnson, J.H. (1967) : Urban Geography, An Introductory Analysis, Pergamon Press, Oxford, p.92.

7. Mulik, A.D. (1989) : Dynamics of Urbanisation - A Geographical Perspective, Himalaya Publishing House, pp.47-61.