# CHAPTER - V

# CENTRALITY AND HIERARCHY OF RURAL SERVICE CENTRES

# CENTRALITY AND HIERARCHY OF RURAL SERVICE CENTRES.

In the previous chapter functional association of rural service centres is discussed. In this chapter an attempt has been made to study the centrality and hierarchy of rural service centres. The entire chapter is divided in-to two parts. Part I deals with centrality and Part II deals with hierarchy of rural service centres.

## P A R T - I

### THE CENTRALITY :

Centrality is the measure of importance of a place in terms of its functional capacity to serve the needs of surrounding area. The centrality however depends only upon the central functions. Christaller (1933) considers rural service centre as a central place which provides central goods and services to it's hinterland.

### METHODS OF MEASURING CENTRALITY :

The centrality of a place can be measured in several ways by taking into account a single function or all the functions available at a place. The single functional index has been used by several authors. Christaller (1933) used no. of telephones. Bus service frequency was used as a measure of centrality by A.E. Smailes (1944). Dickinson (1937) has used whole-sale trade of cities as an indicator of centrality. Berry and Garrison (1958) have considered all

central functions of a place. Davis (1967) has used location quotient for calculating centrality. Brush (1963) has considered the volume of trade. Goodlund (1956) has used population engaged in trade and commerce for calculating centrality. Abiodum (1967) has used all small important functions for calculating centrality.

CHOICE OF METHOD FOR DETERMINING CENTRALITY :

In the present study the centrality of rural service centres has been calculated by using location quotient of Davis (1967). At the same time Gudlund's method of centrality based on population engaged in trade and commerce has also been used for comparing the results.

METHODOLOGY :

Davis (1967) has used this method for South Wales. In this method a score for any single unit of function is calculated by following formula -

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

Where

' C ' is 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 centrality scores for all the functions have been calculated and sum of individual centrality scores of all functions at any urban place gives composite locational index.

The spatial distribution of centrality scores calculated by this method are given in table number 5-II and shown in figure 5.1. The merits and demerits of the method have been discussed in the review of literature.

MEASUREMENT OF CENTRALITY BY GODLUND'S METHOD :

In the absence of functional data, the investigation of centrality becomes very difficult. In such conditions the method used by Godlund (1956) can be used to calculate the regional mean index of centrality. He used the relationship between the number of persons employed in retail trade and commerce to the total population with the help of following equation -

$$C = \frac{Tc}{P} \quad 100$$

Where

'C' is regional mean of index of centrality.

'Tc' is the number of persons employed in retail trade, commerce and other services in study region.

'P' is total population of the study region.

In this way centrality of every rural service centre in the study region can be determined. All rural service centres whose index exceeds the regional mean are supposed to have a service area. Higher indices being naturally associated with important rural service centres. With the help of this method the centrality scores of rural service

centres in the study region have been calculated (Table 5-II) and depicted in the figure 5.1 for comparison.

SELECTION OF CENTRAL FUNCTIONS :

Since the analysis is related to rural service centres and rural population is an important component of the market for central goods and services. Care has been taken to select thos functions which are used by rural population. The list of central functions used for calculating centrality is given in table 5-I.

The results obtained by Davis method and Godlund method have been given in table 5-II.

REGIONAL ANALYSIS OF CENTRALITY :

The comparative scores of centrality obtained by both the methods clearly indicate that, the centrality calculated by Davis method gives better results because this method directly considers the central functions available at the place. It is observed that the scores obtained by Davis method indicate high difference between the lower and higher values. For analysis all the centrality scores have been put under root and the sizable values have been obtained. All these values have been plotted in figure 5.1 according to their rank.

The highest centrality value is obtained for Kolhapur city (15.01), followed by Ichalkaranji (6.21), Jaysingpur (5.12), Vadgaon (4.93), Kurundwad (4.83) and

Gadhinglaj (4.73). After these six urban centres 7th ranking rural service centre is Hupari. It is observed that the places having high centrality are located in the central and eastern parts of Kolhapur district. Western and north western parts have association of the rural service centres with low centrality.

In the study area Kolhapur has more than 15 centrality value. There are six places, Ichalkaranji, Jaysingpur, Vadgaon, Kurundwad, Gadhinglaj and Hupari having centrality values between 4 to 7. 31 places are having centrality value between 2 to 4. Remaining 21 places have centrality score below 2.

## TABLE - 5-I

A LIST OF CENTRAL FUNCTIONS AND SERVICES SELECTED FOR DETERMINING CENTRALITY.

| Sr. No. | Central Function/Service |
|---|---|
| 1. | High Scool |
| 2. | College |
| 3. | Other higher educational institute |
| 4. | Vocational institute |
| 5. | No. of doctors |
| 6. | Vet. Dispensary |
| 7. | Banks |
| 8. | Agri. Credit Society |
| 9. | Patpedhi |
| 10. | S.T. Stand |
| 11. | S.T. Depot |
| 12. | S.T. Division HQ. |
| 13. | Post |
| 14. | P and T Office |
| 15. | General Workshop |
| 16. | Printing Press |
| 17. | Weekly market |
| 18. | Sub-market yard |
| 19. | Market Yard |
| 20. | Chemist Shop retail |

| Sr.No. | Central Function/Service |
|---|---|
| 21. | Cloth shop retail |
| 22. | Cloth shop wholesale |
| 23. | Readymade garment shop |
| 24. | Electric goods stores |
| 25. | Stationery retail shop |
| 26. | Stationery wholesale shop |
| 27. | Bakery and Confectionary shop |
| 28. | Seed and Fertilizer shop |
| 29. | Wholesale grocery shop |

## T A B L E - 5-II

CENTRALITY SCORES OF RURAL SERVICE CENTRES CALCULATED BY DAVIS METHOD.

| Rank | Name of R.S.C. | Centrality Score |
|---|---|---|
| 1. | Kolhapur | 15.01 |
| 2. | Ichalkaranji | 6.21 |
| 3. | Jaysingpur | 5.12 |
| 4. | Vadgaon | 4.93 |
| 5. | Kurundwad | 4.83 |
| 6. | Gadhinglaj | 4.73 |
| 7. | Hupari | 4.23 |
| 8. | Malkapur | 3.99 |
| 9. | Kodoli | 3.89 |
| 10. | Kagal | 3.82 |
| 11. | Murgud | 3.73 |
| 12. | Ajara | 3.66 |
| 13. | Chandgad | 3.66 |
| 14. | Gargoti | 3.45 |
| 15. | Panhala | 3.43 |
| 16. | Halkarni | 3.26 |
| 17. | Uttur | 3.07 |
| 18. | Shirol | 3.07 |
| 19. | Rukadi | 2.99 |
| 20. | Radhanagari | 2.99 |

| Rank | Name of R.S.C. | Centrality Score |
|---|---|---|
| 21. | Hatkanagale | 2.95 |
| 22. | Kapashi ( K ) | 2.87 |
| 23. | Gandhinagar | 2.80 |
| 24. | Rashiwade | 2.72 |
| 25. | Dattawad | 2.70 |
| 26. | Walve | 2.70 |
| 27. | Mahagaon | 2.70 |
| 28. | Gagan Bawada | 2.69 |
| 29. | Pattan Kodoli | 2.66 |
| 30. | Nesari | 2.52 |
| 31. | Kowad | 2.52 |
| 32. | Lat | 2.44 |
| 33. | Nandani | 2.24 |
| 34. | Kumbhoj | 2.17 |
| 35. | Pargaon | 2.15 |
| 36. | Turkewadi | 2.07 |
| 37. | Kale | 2.01 |
| 38. | Herle | 2.01 |
| 39. | Sawarde | 1.96 |
| 40. | Kapashi | 1.94 |

| Rank | Name of R.S.C. | Centrality Score |
|---|---|---|
| 41. | Chikhali | 1.94 |
| 42. | Kotoli | 1.89 |
| 43. | Kadgaon | 1.84 |
| 44. | Nool Kasba | 1.84 |
| 45. | Beed | 1.84 |
| 46. | Satve | 1.84 |
| 47. | Hamidwada | 1.84 |
| 48. | Hasur | 1.84 |
| 49. | Mudshingi | 1.80 |
| 50. | Shengaon | 1.67 |
| 51. | Rendal | 1.66 |
| 52. | Siddenerli | 1.65 |
| 53. | Sawarde ( BK ) | 1.50 |
| 54. | Sangaon | 1.43 |
| 55. | Bambavade | 1.43 |
| 56. | Mangaon | 1.43 |
| 57. | Bhadwan | 1.43 |
| 58. | Umbarde | 1.36 |
| 59. | Mhakave | 1.35 |

## P A R T - II

### HIERARCHY OF RURAL SERVICE CENTRES :

The hierarchical class system is very important part of the spatial model of rural service centres and it is useful in the regional planning. Berry and Garrison (1958) have given very nice explanation of the central hierarchy. They have pointed out that, there are three types of class orders in the hierarchy of central places ( Hamlet, Village and town ). These centres differ more from one type to another than they differ within a type.

There are various methods of calculating hierarchy. Out of them two basic methods are important. In one method the calculated values of centrality are plotted against the population of rural service centres and any breaks visible in the distribution can define the hierarchy between the places. Berry and Garrison (1958) have used another method in which they have explained that the rural service centres belong to one or another class and each class has its specific central functions. They have used exponential relationship to determine population threshold for individual function.

Preston has tried to give new method to find out the hierarchy of central places. He has used the technique of moving averages. The cumulative average of differences when plotted on a graph shows more than one slopes. These

different slopes can be identified as different groups of rural service centres of different order.

CHOICE OF METHOD FOR DETERMINING HIERARCHY :

In the present study new method given by Peter Davis (1975) has been used to determine the hierarchy of rural service centres.

METHODOLOGY :

Class limits on an interval, which varies in some regular ways, are the most difficult to calculate. The present method involves the use of successive terms in a geometric progression as a class boundaries. The method involves four steps :-

1. Find the log value of lowest value in the distribution and substract it from the log value of the highest in the distribution.
2. The result is divided by the required classes.
3. Starting with log value of lowest value make a list by adding to it progressively result of step 2 until the log value of highest figure is reached. The number of items in this list should be one more than the number of classes used.
4. Find the antilog of each log value and use it in a class interval.

In the present study the log value of highest centrality score is 1.1761 and for the lowest centrality it is 0.1303, lowest log value is substracted from highest log value :

$$1.1761 - 0.1303 = 1.0458$$

The assumed classes are four hence

$$\frac{1.0458}{4} = 0.2614$$

By adding this constant value four class intervals are obtained. They are as follows :-

Class I - Less than 2.4

Class II - 2.5 to 4.4

Class III - 4.5 to 8.2

Class IV - More than 8.2

Considering the above class interval all rural service centres have been classified into four classes of hierarchic order. Table No. 5-III indicates the number of rural service centres in each class order of hierarchy.

TABLE - 5-III

CLASSWISE DISTRIBUTION OF RURAL SERVICE CENTRES

| Class | No. of R.S.Cs |
|---|---|
| IV | 1 |
| III | 5 |
| II | 26 |
| I | 27 |

KOLHAPUR DISTRICT

Centrality Scores of Rural Service Centres


Centrality Scores

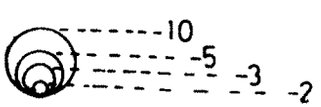
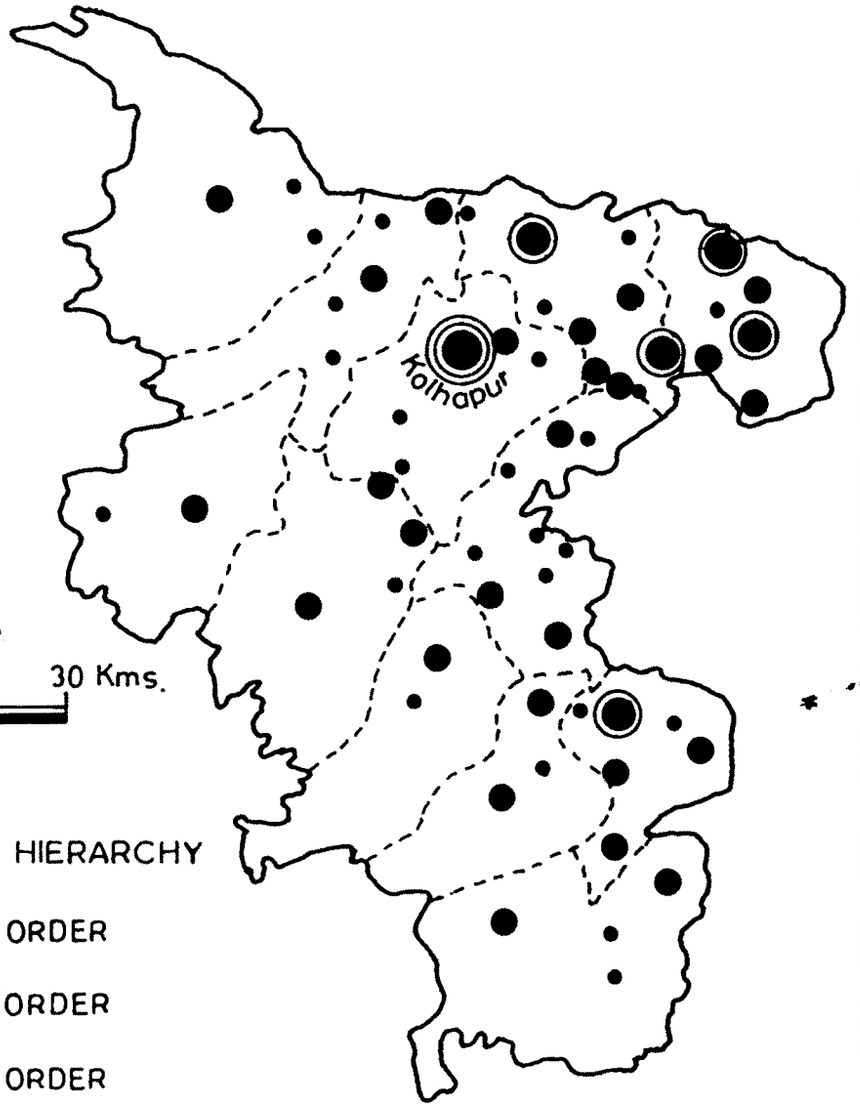
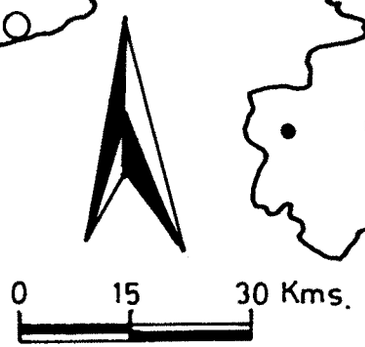



Fig. 5·1

Hierarchy of Rural Service Centers




EXISTING HIERARCHY

- 1st ORDER
- 2nd ORDER
- 3rd ORDER
- 4th ORDER

Fig. 5·2

REGIONAL ANALYSIS :

The regional analysis of hierarchic distribution of rural service centres clearly indicates that higher order rural service centres are located in the central and eastern part of Kolhapur district. The table 5-III clearly shows that higher class order has only one rural service centre Kolhapur. The next lower order ( Class III ) has five rural service centres namely Ichalkaranji, Jaysingpur, Vadgaon, Kurundwad and Gadhinglaj. Class II order of the hierarchy includes 26 rural service centres and class I includes 27 rural service centres.

Table No. 5-IV shows the distribution of rural service centres in talukas and their class order hierarchy. From this table it is evident that lower order rural service centres are found in all the talukas of the study region. Lower order rural service centres of class I and class II have a higher frequency of distribution in the region. The highest order rural service centre is located in Karveer where total number of rural service centres is five. Panhala taluka has only lower order rural service centres of class III. It also has a better distribution of lower order rural service centres Chandgad, Ajara, Bhudargad, Radhanagari, Bawada, Shahuwadi and Panhala all these hilly talukas have lower order rural service centres. Figure 5.2 shows the hierarchic distribution of rural service centres.

## TABLE - 5-IV

### TALUKAWISE DISTRIBUTION OF RURAL SERVICE CENTRES IN HIERARCHIC CLASS ORDER.

| Taluka | Total No. of Rural Service centres. | No. of rural service centres in each class order of hierarchy | | | |
|---|---|---|---|---|---|
| | | IV | III | II | I |
| Karveer | 5 | 1 | - | 1 | 3 |
| Panhala | 5 | - | - | 1 | 4 |
| Hatkanagale | 10 | - | 2 | 5 | 3 |
| Shirol | 6 | - | 2 | 3 | 1 |
| Kagal | 9 | - | - | 3 | 6 |
| Gadhinglaj | 6 | - | 1 | 2 | 3 |
| Chandgad | 4 | - | - | 3 | 1 |
| Ajara | 3 | - | - | 2 | 1 |
| Bhudargad | 2 | - | - | 1 | 1 |
| Radhanagari | 4 | - | - | 3 | 1 |
| Bawada | 2 | - | - | 1 | 1 |
| Shahuwadi | 3 | - | - | 1 | 2 |

The analysis clearly indicates that the economically prosperous areas have more number of rural service centres of higher order while economically poor areas have rural service centres of lower order.

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