HIERARCHICAL PATTERNS OF RURAL CENTRAL PLACES IN THE PAINGANGA VALLEY

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The Painganga Valley of the Vidarbha region of Maharashtra State (India) is selected as study for the present investigation. The investigation is an attempt to hierarchical patterns of rural central places in the Painganga Valley (20°30" N to 19°0" N latitude and 76°0" E to 79°0" E longitude). Administratively the region consists of 28 tahsils and 2208 villages and 183 rural central places with rural area of 16,610 Sq.Km. i.e. 7 per cent of the total area of the Maharashtra State. The Painganga Valley region of Vidarbha, constituting a part of Deccan Plateau of India. The elevation already established by it ranges from 200 M - 600 M. The soil of the region Vidarbha in the Painganga Valley is generally sound black. The average rainfall in the Valley is 999 mm.

Rural service centre is defined as "A place, which supplies the economic, administrative and social needs of the people of service area as well as of the people of a place itself, through public and private institutions, establishments and organizations. According to empirical studies growth centre or service centres cater to the provisions of services such as education, health, transport, communication, trade, finance and other services. The rural central-places are important nodal centres on communication lines enjoying centrality in a given area or a region with respect to a variety of functions or services for its contiguous surrounding areas. Here the quantitative analysis of spatial pattern of the rural central places and their services in the different tahsils in the Painganga valley the region of Vidarbha is under analysis.

HYPOTHESIS—This chapter les to analyses the correlation among the basis of population size of service centres and the services, function performed by them in the region under study. The average population size of rural settlements and their centrality score of services/functions, performed by rural settlements mainly depend on their population size and vice versa.

METHODOLOGY—Several methods have been devised for measuring power of rural service centres. Although two centres have the same type of centralities still they can be distinguished from each other in two types namely,

a) The Relative Centrality Index (R.C.I.)

$$R.C.I. = \frac{Pc_1 - (Pt_1 . Rc / Pt}{Pc - (Pt . Rc / Pt)} \times 100$$

Where Pc_1 = Commercial population of the centre place, Pt_1 = Total population of the centre, Rc = Regional commercial population, Rt = Total regional population, Pc = Summation of Pc_1, Pc_2, Pc_3, etc., Pt = Summation of Pt_1, Pt_2, Pt_3, etc.

On the basis of the data from different sources (Appendices No. 1), service categories were obtained and due values have been given to different services, and ultimately to determine the centrality of rural settlements in the study region.

b) The Absolute Centrality Index (A.C.I.) has been calculated with the following formula.

$$A.C.I. = \frac{Pb}{10,000}$$

Where, Pb = Basic population of the place / commercial population of the centre.

A.C.I. of a place can be calculated by dividing the total basic population by 10,000 in order.

c) Size Index (S.I.)

Size-Index is calculated by the following formula

$$S.I. = \frac{Pt_1 \times 100}{Pt}$$

Pt_1 = Total population of the centre, Pt = Summation of Pt_1, Pt_2, Pt_3 etc.

EXPOSITION—The Painganga valley has 184 rural service centres, which are not equally significant in the total areal functional organization. These differences regarding the importance of rural service centres generate ultimately, the concept of hierarchy of rural service centres. With the above procedure of centrality indices hierarchical class system exists in the region.

The class system is often shown with the help of a distributional graph or scatter diagram with A.C.I. and S.I. values of the basic parameters. Hierarchical orders of central places can be determined only by centrality indices. All the centres, therefore, have to be arranged in a hierarchical order i.e. in a descending order from the smallest to the largest. With a practicable class limit with almost equal or reasonable

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class interval the centres must be grouped.

A scatter diagram plotted on a doubly logarithmic scale with the size index and the absolute centrality index parameter is prepared to test (a) the justifiability of hierarchical grading on the basis of break points in the distribution, and (b) to see if there is any consistent positive relationship between population size and the centrality of central places. Absolute centrality indices and size indices are calculated for 184 central places.

On the basis of A.C.I. the results obtained are tabulated and hierarchical class system is shown in Fig. 1.

The method used is very easy. The data used plays an important role in the structure of a centre. Availability of data easily, large and small centre gets equal importance, the relative efficiency, quality and complexity of the commercial function of various centres becomes proportional to varying sizes. The population sizes of rural service centres and their centrality score of services / functions have been analysed. Population sizes of rural central places, their services and functions, the centrality is the measure of importance of a place in terms of its functional capacity to serve the needs of the people of the surrounding area. This is expressed qualitatively, such as low and high centrality, at the same time it can be expressed quantitatively by centrality scores calculated by covering the functional base of a place to score. The centrality, however, depends upon the central function and population size available at the place.

ANALYSIS OF ABSOLUTE CENTRALITY INDEX

This index is quite different in nature from the above. This shows that how much area or population, a centre can serve on an absolute basis (Table No. 1). With reference to the data of A.C.I., also notice the gradations of the centres, which has a higher number of people under commerce as a higher A.C.I. value. Arni has the highest A.C.I. value of 2.44 followed by Dhanki with 1.50, and Dangaon with 1.4, Chandur 1.28. Arni and Dhanki being the regional centres of the region have high R.C.I. and A.C.I. values but other centres having medium R.C.I. values have low A.C.I. values which denote that the percentage of population engaged in commercial activity is very low as the majority are under agricultural or primary activities.

ANALYSIS OF RELATIVE CENTRALITY INDEX

Relative Centrality Index (Table No. 1) shows how much service a particular centre render as compared to other centres in the total services. The centres which have high commercial population as compared to its total population rank first in order of R.C.I. Arni ranks first with 991 as its R.C.I. Dhanki ranks second with 882 and Dongaon ranks third with 738, Deulghat with 538, Chandur with 540, Sakharkheda 635, Ansing 435, Manora 291 respectively. Regarding the total population when the commercial population shows a higher percentage, then the R.C.I. value goes down. In this way the value goes on decreasing up to 7.5. This is also show that the centres, which have R.C.I. up to 168, increase in the service scale gradually. Higher R.C.I. value centre renders the maximum services.

ANALYSIS OF SIZE INDEX

This shows the relation of the total population of a service centre with that of the total regional population. With the help of the calculation as the population figures increases so also there is increase in S.I. value (Table No. 1). This shows the percentage of the size share of every centre. This is very much essential for calculating the hierarchical classes. The scattered diagram showing hierarchical classes (Table No. 1 and Fig. 1) makes clear that there is a general positive co-relationship "r"= + 0.72 is observed between the population size of the rural service centre and their centralities of all the centres. This clearly indicates that the centrality score of services/ functions of the rural service centres totally depends on the population sizes. The structure of the smaller centres is seen diminishing rapidly and this is proved, when we see the population figures, which show mostly at rural trend. Larger service centres are seen diversified distinctly. This diversification is noticed as the large centres have numerous activities of function to render whereas the smaller ones have less important functions due to which the large centres occupy a higher order in the Fig. 1 and the specific centres like Arni, Dhanki, Dongaon, Sakharkherda renders a greater percentage of service than the other centres. These centres occupy a high status due to favourable, location transport function and observe distinctly the seven rural service centres are scattered.It is observed that the population size of majority of rural central services (82), 45 percent of the total 184 rural service centres of the region, is above 1000 persons, as shown in the following Table 1 and Fig. 1. This observation supports the view that the minimum population size of a rural service centres to perform central services and functions efficiently, in the region is 1000 persons.

Table No. 1
Hierarchical classes of central places Based on A.C.I. In the Painganga valley

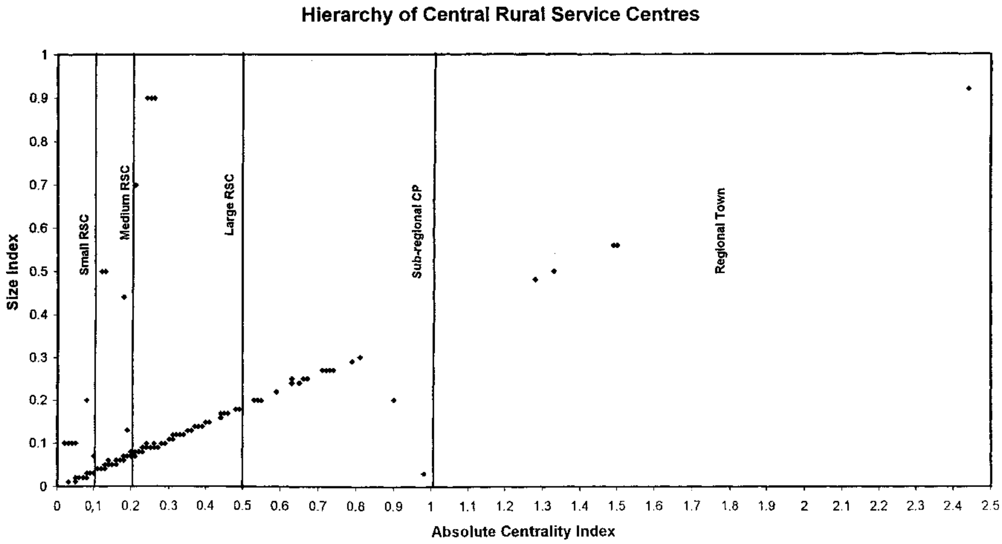
Sr. No.	No. of R.S.C.	% of the total R.S.C.	A.C.I. size of R.S.C.	Population	Name of the class
1	26	14.13	< -0.1	<1000	Small R.S.C.
2	82	44.56	0.1-0.2	1001-2500	Medium R.S.C.
3	50	27.60	0.2-0.5	2501-5000	Large R.S.C.
4	19	10.30	0.5-1	5001-10,000	Sub-regional C.P.
5	7	3.80	>1	>10,001	Regional R.S.C. (towns)

Above 10 percent of the total rural service centres of the region has population size above 50001 persons, which is the optimum population size of rural service centres to perform the maximum services efficiently in the rural areas of the region. The few rural service centres have population size above 10,001 persons amounting only 3.80 percent out of the total (184 R.S.C.) of the region. Arni-24441 persons, Dhanki-150260 persons, Dongaon, Sakarkherda-13367 persons, Chandur-12863 persons, Deulghat-11857 persons and Ansing-10126 persons, in the Painganga valley are very big size, regional towns rural service centres, having population size above 10,001 persons. Most of the sub-regional C.P./ big-size rural centre-places are having population size ranging between 5001 persons to 10,000 persons, including Mulawa-6378 persons, Yavatmal-7315, Mukutban-5990 persons, Bori patan-7944, Kali Dau-6529, Gunj-7421, Sawana-6339, Mahagaon-6787, Fulsawangi-6410, Shambul Pimpri-8107, Bori Kh.-6698, Mahagaon Kasba-5436, Dongar Khandla-5539, Janefal-7188, Mira Bk.-5373, Kinhiraja-5347, Manora-7154, Sultanpur-7269 in the Painganga valley. Most of them are having A.C.I. score ranging between 0.51.

CONCLUSION

An attempt has been made to find out rural service centres of central functions in the study area. Considering central functions and services, the

centrality has been calculated. A.C.I. values are computed by giving weightages according to their importance. Agricultural development in the valley, demand for various agricultural inputs as well as purchasing power of the people also responsible for the existence of various functions at the service centres. The hierarchical structure of rural service centres in the Painganga valley classifies them into five orders of hierarchy. It is observed that the first order is occupied by seven centres, second by nineteen centres, third by fifty centres, fourth by eighty centres and fifth order by twenty-six centres in the study area. Most of these places hold periodic markets and provides various services and functions. All the major service centres are located along the roadway, which pass through the central part of the valley. The northern and north-western hilly and inaccessible part of the Painganga valley are devoid of any important rural service centres.



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