Centrality of Settlement in Beed District: By Using Surplus Service Capacity Index

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Abstract:
During the last forty years, various methods have been evolved to calculate the centrality of tahsils. Centrality of a place can be measured in several ways by taking into account a single function of all important functions available at the place. The single function index has been used by several geographers. The number of telephone was used by Christaller (1933) in his original work. Smailes (1944) has used bus service frequency calculating centrality of central place. Smailes functional index some times gives misleading results, if the indicator selected does not represent the level of economic development of the region.

The researcher has calculated centrality of settlement in Beed District by two methods. These two methods are already used by the geographers. The results for all settlements have been calculated by using ‘Surplus Service Capacity Index’ method of Shete S.T. (2002). The results obtained by this method have been compared with the method of Davies (1967) in terms of surplus population served.

Key word: Centrality, Settlement, Surplus Service Capacity Index

Introduction:
Centrality is the measure of importance of a place in terms of its functional capacity to serve the needs of the people in the surrounding area. Centrality can be expressed qualitatively, such as low, moderate and high centrality as well as obtained by converting the functional base of place into scores on the basis of frequency and importance of the function. There has also been a concern among geographers to establish a precise relationship between the size of settlement in terms of population and the range of services which it offers (Johnson, 1967).

Centrality, however, depends upon the central functions. Which have a certain range beyond the limit of place and cater to the needs of the surrounding region. According to Christaller (1933), “the centrality of a place is that component of its functional magnitude which is required for the population of its hinterland.” The above statement clearly indicates that mere agglomeration of population and functions cannot give any place central importance, unless it has surplus functions to provide the services to its umland.

Study Area:
Bid district is selected as the region for present study. It lies between 18°27’ and 19°27’ north latitudes and 74°49’ and 76°44’ east longitudes. It is surrounded by Aurangabad and Jalana district to the north, Parbhani district to the north-east, Latur district to the south-east and Osmanabad district to the west. It has an area of 10,692 square km. which constitutes 3.47 percent of the total area of the state. The total population of the study region is 21.61 lakh. The density of population in Bid district is 202 persons per sq.km. The district is divided into two revenue divisions i.e. BEED and Ambajogai. Beed district includes 11 tahsils of Maharashtra i.e. Beed, Georai, Patoda, Ashti, Shirurkasar, Ambajogai, Mahjalgaon, Kajj, Dharur, Parali and Wadwani. There are 1365 villages in the study region.
Objectives:
1. To analyse the centrality of settlement in study region.
2. To study the developing nature of the study region.

Data Base
The non-availability of data imposes serious constraints on the choice of method to be adopted. Considering the developing nature of the study region, care has been taken in the selection of central functions. In all twenty five functions have been selected for calculating centrality by two methods. While selecting functions, functions of different order have been selected to avoid the problem of equivalence. The lower order functions like post office, Bus stand, High School etc. The medium order functions like Higher Secondary School, Degree College (ASC), etc, and Higher order functions like Market yard, District headquarters, University sub-centre etc. are selected.

As stated earlier, that non availability of recent tahsil wise data for retail establishments and services provided by the tahsils in the area imposes serious constraints on the selection of central functions as well as on the selection of method. This deficiency was made up to certain extent by field work. A comprehensive interview schedule required for all such information needed for the work was used and at the same time data is also collected from Block Development Offices, District Statistical Offices, Municipal Offices and Office of the District Town Planning Office. The reliability of the data has been established by visiting eleven tahsils center and field checking.

Methodology:
Using the data for the above mentioned central functions and centrality of settlements is calculated by surplus service capacity index method of Shete, S.T. For comparison and justification for the choice of method, centrality has been also calculated by using Location Quotient Method of Davies.

Measurement of Centrality by ‘Surplus Service Capacity Index Method’:
The following equation gives the ‘Surplus Service Capacity Index’.

\[ S_x = \frac{P}{N_{xr}} \]  

Whereas,
\[ S_x = \text{Mean service value of function ‘}x\text{’ in terms of population.} \]
\[ P = \text{Total population of the study region.} \]
\[ N_{xr} = \text{Total number of functional units of function ‘}x\text{’ in the study region.} \]

\[ S_p = N_{xc} \times S_x \]  

\[ S_p = \text{Total service value of function ‘}x\text{’ at central place in terms of Population.} \]
\[ N_{xc} = \text{The number of units of function ‘}x\text{’ at the central place.} \]

\[ S_{Sc} = S_p - C_p \]  

\[ S_{Sc} = \text{Surplus service capacity of the central place for any function ‘}x\text{’ in terms of population.} \]
\[ C_p = \text{Population of the central place.} \]

\[ S_{Sci} = S_{Sc1} + S_{Sc2} + S_{Sc3} + \ldots \ldots \ldots \ldots S_{Scn} \]  

\[ S_{Sci} = \text{Surplus Service Capacity Index (Total Centrality Value) of a central place (measured in term of population).} \]
Measurement of Centrality by Davies Method:

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

\[ C = \frac{t}{T} \times 100 \]

Whereas,

- \( C \) = Score for any function \( t \).
- \( t \) = One unit of function \( t \).
- \( T \) = The total number of functional units of function ‘\( t \)’ in the area.

Regional Analysis of Centrality:

The calculated centrality scores for all urban places in the study region are given in Table No. 1.1 with Surplus Service Capacity Index Method as well as Location Quotient Method. With this method centrality scores for all functions have been calculated and sum of individual centrality scores for all functions at any central place gives composite locational index.

The spatial distribution of centrality scores for individual tahsils by Surplus Service Capacity Index Method and Location Quotient Method are shown in Table No. 1.1. The Surplus Service Capacity Index method indicates that, in the northern and southern part of the region with a sparse population has small settlements and the centrality score of most of the settlement is very low. The higher centrality score of settlement is found in the middle part of the region where prosperity is more than northern and southern part of the study area.

Table No. 1.1: Centrality Scores of Settlements Calculated by Surplus Service Capacity Index and Location Quotient Method, with Population Size and their Ranks

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Tahsil</th>
<th>Centrality Value by Surplus Service Capacity Index</th>
<th>Rank</th>
<th>Centrality Value by Location Quotient method</th>
<th>Rank</th>
<th>Rank By Population Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ashti</td>
<td>1944.98</td>
<td>2</td>
<td>266.27</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Patoda</td>
<td>1289.75</td>
<td>7</td>
<td>125.08</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>Shirur K.</td>
<td>942.32</td>
<td>10</td>
<td>89.15</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Georai</td>
<td>1872.55</td>
<td>3</td>
<td>243.9</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Manjlegaon</td>
<td>1420.97</td>
<td>5</td>
<td>141.24</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Wadwani</td>
<td>1054.21</td>
<td>9</td>
<td>98.42</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>7</td>
<td>Beed</td>
<td>4314.73</td>
<td>1</td>
<td>1290.79</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Kaij</td>
<td>1709.39</td>
<td>4</td>
<td>211.19</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Dharur</td>
<td>745.65</td>
<td>11</td>
<td>75.85</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>Parli</td>
<td>1172.57</td>
<td>8</td>
<td>101.7</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>Ambajogai</td>
<td>1307.34</td>
<td>6</td>
<td>112.42</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: Compiled by the Researcher.

The comparative analysis of the two methods shows that the ranks obtained by settlements by Surplus Service Capacity Index Method and Location Quotient Method are same for the eleven tahsils but different for two tahsils. The two tahsils are Patoda and Ambajogai. Both Surplus Service Capacity Index Method and Location Quotient Method give appropriate functional importance of the tahsils.
Conclusions:

Functional classification of settlements of the study area shows considerable changes as seen in the comparative analysis of 1991 and 2011 functional classification. According to 1991’s functional association of tahsils, Beed, Patoda, Ashti, Georai, Ambajogai and Kaij tahsils are mono-functional tahsils, whereas Georai is two functional and Georai, Manjlegaon and Kaij are multifunctional tahsils. According to 2011 functional association of tahsils Beed, Parli, Ashti and Ambajogai are mono-functional tahsils, whereas Patoda and Kaij are two functional tahsils, Georai is three functional and Manjlegaon is multifunctional tahsil.

The centrality of settlements in the study area has been calculated by selecting important functions. Centrality ranks calculated by using ‘Surplus Service Capacity Index’ and ‘Location Quotient Method’ are nearer to match each other. According to ‘Surplus Service Capacity Index’ Beed ranks first, Ashti ranks second, Georai ranks third, Kaij ranks fourth, Manjlegaon fifth, Ambajogai ranks sixth, Patoda ranks seventh, Parli ranks eighth, Wadwani ninth, Shirur K tenth and Dharur ranks eleventh in centrality order.

References: