CHAPTER – IV
DISTRIBUTION OF CENTRAL PLACES

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CHAPTER – IV
DISTRIBUTION OF CENTRAL PLACES

4.1 Introduction:

The main aim of this chapter is to study the distribution of central places in the study area and the factors affecting on the distribution of the central places.

The distribution of central places is to be studied in terms of the frequency of their occurrence, their physical spacing and regularity in their locational pattern. On isotropic surface central places, following distribution of other rural settlements should have a regular pattern with uniform spacing. In the real world, however, isotropic surface is rarely found. The topography of the area is rarely uniform and resources are not uniformly distributed. As a result, the distribution of population and settlements becomes uneven.

The distortion in the distributional pattern of central places took place because of the concentration of intense economic activities, notably industrial development at certain specific points. Other factors which influence the distribution of central places are the development of agriculture, transport and communication network, market organization and level of economic development.

The study region is essentially agricultural with an agrarian economic base with more than 68.96 percent population (In 2011 census) living in rural settlements. The topography, soil agricultural practices and level of the economic development of the region had wide contrasts. Hence it is essential to examine the influence to these factors on the distribution of central places. The study region has nine tahsils covering an area 6214 sq. km; and a population of 1835982 persons (In 2011 census).
Out of total 830 settlements 69 are rural settlements and 8 urban settlements are central places. These 77 settlements accounts for only 8.85 percent of the total settlements.

The tahsil wise distribution of central places is shown in Table No. 4.1. The table reveals that the number of settlements per 100 Sq.km is above the district average (12.87) in Gangakhed, Palam, and Sonpeth and Jintur tahsils. The number of central places per 100 sq. km is above the district average (1.18) in Parbhani, Gangakhed, Sonpeth, Pathri and Jintur tahsils and below the district average in Palam, Purna, Manwat, and Sailu tahsils. The district average of the central places per 100 sq. km is exactly same in the Pathri tahsil. There are 9 tahsils in the district, out of which Palam tahsil have neither urban population nor urban central place (Fig. No. 4.1).

4.2 Distribution of Central Places in Different Size Group:-

The distribution of central places in different size groups (Fig. No. 4.2) shows a concentration in small size groups. The small size central places show a very high frequency. Nearly 87.01 percent of the central places have a population less than 10,000 persons (Table No. 4.2).

There is a large concentration of central places in the first four population groups, which together account for 87.01 percent of the total central places and about 33.81 percent of their population.

Eighty seven percent central places have a population between 3000 and 10000. Central places with a population of over 10000 are less in number and normally they are tahsil headquarters. The largest numbers of central places occur in below 3000 population group. These are the large villages with agricultural base. In these central places there is accumulation of less important central functions to serve the adjacent village to get their goods and services from these central places.
The Study of Central Places in Parbhani District

![Correlation Graphs]

**Area and Number of Central Places**

- Area in Sq. Km.
- Number of Central Places
- R = 0.657

**Settlement and Central Places Ratio**

- Number of Settlements in 2001
- Number of Central Places
- R = 0.807

**Population and Central Places Ratio**

- Population in 2001
- Number of Central Places
- R = 0.881

*Source: Complied by the Author.*

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PARBHANI DISTRICT
Tahsilwise No. of Settlements per 100 sq. km.
2001

PARBHANI DISTRICT
Tahsilwise No. of Central Places per 100 sq. km.
2001

Index
Above - 1.5
1.0 - 1.5
Below - 1.0

Central places with population above 10000 are in less number as they are only tahsil and district headquarters. It is essential to note that the village Bori is the only central place which is neither tahsil place nor a district place has a population above 10000. It is a very important central place located in Jintur tahsil. From the planning point of view, it acts as a growth centre in the study area.

The concentration of central places is measured in terms of seven population groups. The higher concentrations of small central places are observed as compared to large size central places (Fig. No. 4.3).

**Table No. 4.1**

**Parbhani District**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Tahsil</th>
<th>Area in sq.km.</th>
<th>No. of Settlements R+U=T</th>
<th>No. of Central places R+U=T</th>
<th>No. of Settlements per 100sq.km</th>
<th>No. of Central Places per 100 sq. km.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parbhani</td>
<td>1113</td>
<td>128+1=129</td>
<td>16+1=17</td>
<td>11.59</td>
<td>1.52</td>
</tr>
<tr>
<td>2</td>
<td>Gangakhed</td>
<td>635</td>
<td>105+1=106</td>
<td>07+1=08</td>
<td>16.69</td>
<td>1.26</td>
</tr>
<tr>
<td>3</td>
<td>Palam</td>
<td>561</td>
<td>81+0=81</td>
<td>6+00=06</td>
<td>14.44</td>
<td>1.07</td>
</tr>
<tr>
<td>4</td>
<td>Sonpeth</td>
<td>383</td>
<td>57+1=58</td>
<td>05+1=06</td>
<td>15.14</td>
<td>1.56</td>
</tr>
<tr>
<td>5</td>
<td>Purna</td>
<td>730</td>
<td>92+1=93</td>
<td>07+1=08</td>
<td>12.74</td>
<td>1.09</td>
</tr>
<tr>
<td>6</td>
<td>Pathri</td>
<td>592</td>
<td>56+1=57</td>
<td>06+1=7</td>
<td>9.63</td>
<td>1.18</td>
</tr>
<tr>
<td>7</td>
<td>Manwat</td>
<td>487</td>
<td>54+1=55</td>
<td>04+1=05</td>
<td>11.30</td>
<td>1.02</td>
</tr>
<tr>
<td>8</td>
<td>Sailu</td>
<td>753</td>
<td>93+1=94</td>
<td>04+1=05</td>
<td>12.48</td>
<td>0.66</td>
</tr>
<tr>
<td>9</td>
<td>Jintur</td>
<td>1257</td>
<td>164+1=165</td>
<td>14+1=15</td>
<td>13.12</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td>District</td>
<td>6511</td>
<td>830+8=838</td>
<td>69+8=77</td>
<td>12.87</td>
<td>1.18</td>
</tr>
</tbody>
</table>

R = Rural, U= Urban, T = Total.


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The percentage of central places also exceeds the percentage of population of central places. In the first four groups of population classes, the trend is reversed in central places, with population over 10000. In this category a few central places command a relatively larger population of central place population. In fact seven central places with a population over 20000 command 61.46 percentage of the total population of central places.

4.3. Factors affecting on the distribution of Central Places:

The distribution of central places in the study region indicates that central places are neither uniformly spaced nor evenly distributed. This lack of uniformity and evenness is caused by number of physical and socio-economic factors. Some of them are important and they are discussed here.

Table No. 4.2
Parbhani District

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Population Group</th>
<th>No. of Central Places</th>
<th>Frequency of Central Places</th>
<th>Cumulative Frequency of Central Places</th>
<th>Frequency of Central Place Population</th>
<th>Cumulative Frequency of Central Place Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Below 3000</td>
<td>25</td>
<td>32.47</td>
<td>32.47</td>
<td>8.06</td>
<td>8.06</td>
</tr>
<tr>
<td>2</td>
<td>3000-4000</td>
<td>19</td>
<td>24.67</td>
<td>57.14</td>
<td>8.31</td>
<td>16.87</td>
</tr>
<tr>
<td>3</td>
<td>4000-5000</td>
<td>11</td>
<td>14.29</td>
<td>71.43</td>
<td>6.34</td>
<td>23.21</td>
</tr>
<tr>
<td>4</td>
<td>5000-10000</td>
<td>12</td>
<td>15.58</td>
<td>87.01</td>
<td>10.60</td>
<td>33.81</td>
</tr>
<tr>
<td>5</td>
<td>10000-20000</td>
<td>03</td>
<td>3.90</td>
<td>90.91</td>
<td>4.73</td>
<td>38.54</td>
</tr>
<tr>
<td>6</td>
<td>20000-50000</td>
<td>06</td>
<td>7.79</td>
<td>98.70</td>
<td>27.70</td>
<td>66.24</td>
</tr>
<tr>
<td>7</td>
<td>Above 50000</td>
<td>01</td>
<td>1.30</td>
<td>100.00</td>
<td>33.76</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: - Compiled by the Author.
4.3.1 Relief:-

Relief plays an important role in the distribution of central Places. The different topographical areas of the study region play a vital role in the distribution of the central places. The physiographic divisions decide the extent of economic activities of the region and they are important and useful in the planning process.

The land structure of the study region has two types i.e. plain region and plateau region. In Jintur hill range there are many Ghats. Therefore, the transportation network becomes convenient and because of it number of central places in the area is observed. It is also seen in the Parbhani tahsil.

The central and southern part of study region (i.e. Parbhani, Purna, Manwat, Sonpeth, Pathri, Gangakhed and Palam) is drained by Godavri. This area is comparatively level land, with black cotton soil. Because of it this area has a higher percentage of land under cultivation with considerable amount of land under irrigation, which has increased the agricultural productivity of the area. The density of population of this part is more and nearly two third of the central places are found here.

4.3.2 Agricultural Development:-

Agricultural development of any region is largely influenced by physical as well as socio-economic factors. Development of agriculture in the study region is assessed by considering the percentage of cultivated area to total geographical area, percentage of net irrigated area to net sown area and yield of some important crops. It is observed that development of agriculture is high in Parbhani, Purna, Gangakhed, Pathri and Jintur.

The cropping pattern and yield per hectare can serve as indicators of the stage of agricultural development in the study region. The Physical environment, as an element of it, continues to pre dominate the
agricultural landscape. It is also seen that the pattern of cropping of the region is the combined result of socio-physical and economic determinant spreading in the study region. The pattern also shows itself how sharply the net sown area is being utilized and used for various crops in the Parbhani, Purna, and Gangakhed tahsils. It is also observed that most of the large and medium size central places are found where agricultural development is high and moderate and very few small size central places are found where agricultural development is low.

4.3.3 Urbanization:

The degree of urbanization and industrial development has a very high correlation. In the study area most of the urban centers are found along the important transport routes and most of the urban centers are found in agriculturally prosperous area. Out of nine tahsils in the study area, one tahsil is without urban centre. High concentration of urban population is found in Parbhani, Gangakhed Sailu, and Jintur tahsils. Though it is observed that urbanization has an influence on distribution of central places but it is not seen in Palam and Sonpeth tahsils. This is due to the development of agriculture and agro based industries.

Parbhani, Jintur, Gangakhed and Purna tahsils are having 76.44 percent total urban population and 62.33 percent of central places of the study region. It indicates that there is co-relation between urbanization and distribution of central places.

4.3.4 Industrialization:-

The study region was not known for its industrialization. According to IPA 1948, in the year 2004 there were 250 registered small scale and seasonal industries but only 164 are functioning. There are no large scale industries. Out of three sugar industries one in Parbhani and two are in Pathri tahsil. The concentration of industrial activity found in Parbhani, Gangakhed and Jintur tahsil of the area. There are some agro
base industries like cotton mills and oil mills. The textile mills are concentrating in Manwat, Jintur, and Parbhani tahsils. There is one factory of fertilizers at Bhainapuri of Jintur tahsil. The oil mills are concentrated in Jintur, Parbhani and Sailu tahsil. Thus the less development in agro base and engineering industries brought less prosperity in some specific areas and has influenced the distribution of central places in a particular area.

4.3.5 Transportation:-

Transportation plays a very vital role in the distribution of central places. The accessibility depends upon the development of various means of transportation in the area. Economic development and development in transportation network go hand in hand. This economic development in the area increases the purchasing power and mobility of the people, which further increases the demand for more goods and services.

It is found that tahsils having more road density have more number of central places and vice-versa. Most of the central places are connected by pucca road. Therefore correlation between percentage of villages having approach by pucca road and percentage of central places to total settlements is determined by using the data given in the Table No. 4.3

The relationship between percentage of villages having approach by pucca road and percentage of central places is considerably high and co-efficient of correlation (r) is 0.59. Most of the large size central places are located in the areas where percentage of villages having pucca road is high.

4.3.6 Settlement Density:--

The distribution of central places in the study area is also affected by settlement density. Function of the central place is to cater needs of surrounding settlements.
Therefore it is essential to determine the relationship between the number and distribution of settlements and number and distribution of central places in the area.

Table No. 4.3
Parbhani District

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Tahsil</th>
<th>Percentage Villages Having Approach by Pucca Road</th>
<th>Percentage Central Places to Total settlements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parbhani</td>
<td>70.31</td>
<td>13.28</td>
</tr>
<tr>
<td>2</td>
<td>Gangakhed</td>
<td>63.81</td>
<td>7.62</td>
</tr>
<tr>
<td>3</td>
<td>Palam</td>
<td>44.44</td>
<td>7.41</td>
</tr>
<tr>
<td>4</td>
<td>Sonpeth</td>
<td>68.42</td>
<td>10.52</td>
</tr>
<tr>
<td>5</td>
<td>Purna</td>
<td>42.39</td>
<td>8.69</td>
</tr>
<tr>
<td>6</td>
<td>Pathri</td>
<td>92.86</td>
<td>12.50</td>
</tr>
<tr>
<td>7</td>
<td>Manwat</td>
<td>68.52</td>
<td>9.26</td>
</tr>
<tr>
<td>8</td>
<td>Sailu</td>
<td>73.12</td>
<td>5.38</td>
</tr>
<tr>
<td>9</td>
<td>Jintur</td>
<td>78.66</td>
<td>9.14</td>
</tr>
<tr>
<td>District</td>
<td>70.72</td>
<td></td>
<td>9.23</td>
</tr>
</tbody>
</table>

Source: Compiled by the Author.

The average settlement density for the region is 12.87 per sq. Km. as shown in table No. 4.4. The settlement density of Gangakhed, Palam, Sonpeth and Jintur is more than the average settlement density of the region. It is moderate in remaining all the tahsils. The average central place density for the region is 1.18 per sq. km. It is high in Sonpeth and Parbhani tahsils. To determine the remaining relationship between settlement density and distribution of central places value of co-efficient of correlation (r=0.65) between density of settlement and density of central place.
PARBHANI DISTRICT
Tahsilwise Percentage of Villages Having Approach
by Pucca Road (2001)

Index
Above - 70%
50% to 70%
Below - 50%

Fig. No. 4.6

PARBHANI DISTRICT
Tahsilwise Percentage of Central Places to Total Settlements
(2001)

Fig. No. 4.7

### Table No. 4.4

**Parbhani District**

**Settlement Density and Central Place Density**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Tahsil</th>
<th>Settlement Density per 100 sq. km.</th>
<th>Central Place Density per 100 sq. km.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parbhani</td>
<td>11.59</td>
<td>1.53</td>
</tr>
<tr>
<td>2</td>
<td>Gangakhed</td>
<td>16.70</td>
<td>1.26</td>
</tr>
<tr>
<td>3</td>
<td>Palam</td>
<td>14.44</td>
<td>1.07</td>
</tr>
<tr>
<td>4</td>
<td>Sonpeth</td>
<td>15.14</td>
<td>1.56</td>
</tr>
<tr>
<td>5</td>
<td>Purna</td>
<td>12.74</td>
<td>1.09</td>
</tr>
<tr>
<td>6</td>
<td>Pathri</td>
<td>9.63</td>
<td>1.18</td>
</tr>
<tr>
<td>7</td>
<td>Manwat</td>
<td>11.29</td>
<td>1.03</td>
</tr>
<tr>
<td>8</td>
<td>Sailu</td>
<td>12.48</td>
<td>0.66</td>
</tr>
<tr>
<td>9</td>
<td>Jintur</td>
<td>13.13</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td>District</td>
<td>12.87</td>
<td>1.18</td>
</tr>
</tbody>
</table>

*Source: Compiled by the Author.*

The settlement density of Gangakhed (16.70), Palam (14.44) Purna (12.74), Sailu (12.48) and Jintur (13.13) is more than Parbhani (11.59) tahsil. But central place density of Parbhani (1.53) is more than Gangakhed (1.26), Palam (1.07), Purna (1.09), Sailu (0.66), and Jintur (1.19) tahsils. The settlement density of Pathri (9.63) is lowest in the study region but the central place density of it is as much as the average central place density (1.18) of the study region. The settlement density of Palam (14.44) is more than the average settlement density (12.87) but the central place density of Palam (1.07) is less than the average central place density (1.18). After these observation it should not be considered that the density of central places is largely related to density of settlements.
PARBHANI DISTRICT
Settlement Density Per 100 sq. Km.
(2001)

Index
Settlement Density
■ Above - 14
■ 12 - 14
Below - 12


Fig. No. 4.8
PARBHANI DISTRICT
Tahsilwise Central Place Density per 100 sq. km.
(2001)

Index
Above - 1.50
1.00 - 1.50
Below - 1

Fig. No. 4.9

The important factors which shade their influence on the distribution of central places are number of consumers, their purchasing capacity and accessibility of the area.

4.3.7 Population Density:

The distribution of population plays an important role in determining the distributional pattern of the central places in the area. A major part of the study area has a density of less than 200 persons per sq.km, (Table no.4.5).

Table No. 4.5
Parbhani District
Population Density and Density of Central Place

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Tahsil</th>
<th>Population Density Per sq. km</th>
<th>Central Place Density Per 100 sq. km</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parbhani</td>
<td>412</td>
<td>1.53</td>
</tr>
<tr>
<td>2</td>
<td>Gangakhed</td>
<td>258</td>
<td>1.26</td>
</tr>
<tr>
<td>3</td>
<td>Palam</td>
<td>165</td>
<td>1.07</td>
</tr>
<tr>
<td>4</td>
<td>Sonpeth</td>
<td>174</td>
<td>1.56</td>
</tr>
<tr>
<td>5</td>
<td>Purna</td>
<td>222</td>
<td>1.09</td>
</tr>
<tr>
<td>6</td>
<td>Pathri</td>
<td>186</td>
<td>1.18</td>
</tr>
<tr>
<td>7</td>
<td>Manwat</td>
<td>199</td>
<td>1.03</td>
</tr>
<tr>
<td>8</td>
<td>Sailu</td>
<td>185</td>
<td>0.66</td>
</tr>
<tr>
<td>9</td>
<td>Jintur</td>
<td>159</td>
<td>1.19</td>
</tr>
<tr>
<td>Region</td>
<td></td>
<td>229</td>
<td>1.18</td>
</tr>
</tbody>
</table>

Source: - Compiled by the Author.

The density pattern however is disturbed by the presence of urban centers. The high density is found in the areas where important urban centers are located. This is true in the case of Parbhani and Gangakhed tahsils. Beside physical factors, sugar factories, oil mills, marketing in
certain parts of the area leads the variation in rural density pattern of the study region.

**Analysis of Density Zones:-**

According to population density the area is classified into four different density zones.

The high density zone occurs in Parbhani and Gangakhed tahsils where population density is above 241 persons per sq. km. This zone covers 26.84 percent area of the study region. The percent of central places in this zone is 32.47 percent and the density of central places is 27.87 per 1000 sq.km. (Table no.4.5) The density of this zone is high because of the large and medium size central places are located in this part. This part of the study region is characterized by comparatively high industrial population with high road density. (Fig No. 4.10)

The third density zone with a population density between 211 to 240 persons per sq.km includes Purna tahsil. It covers 11.21 percent area of the region. Central places which together account for nearly 10.39 percent of all the central places in the area are distributed in fairly uniform pattern. The density of central places is 10.96 per thousand sq. km. The transportation network especially rail network is good in this part of the study region.

The next zone where density of population is in 181 to 210 persons per sq. km covers 28.14 percent of area. Pathri, Manwat and Sailu tahsil are in this zone. This zone has 22.07 percent of central places. The density of central places in this zone is 28.73 percent. This part of the area is comparatively moderate transport network.

A low density zone occurs in Palam, Sonpeth and Jintur tahsil, where population density is ranging in 150 to 180 Persons per sq.km. It covers 33.80 percent of the total area and has only 35.06 percent central places.
PARBHANI DISTRICT
Population Density per Sq. Km.
(2001)

Index

<table>
<thead>
<tr>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above - 230</td>
</tr>
<tr>
<td>190 - 230</td>
</tr>
<tr>
<td>Below - 190</td>
</tr>
</tbody>
</table>

Fig. No.4.10

PARBHANI DISTRICT
Tahsilwise Central Place Density per 100 Sq. Km.
(2001)

Index
- Above - 1.50
- 1.10 - 1.50
- Below - 1.10

Fig. No.4.11

The density of central places is 38.29 per 1000 sq.km. Though this part of the study region is characterized by hilly terrain, scanty and uncertain rainfall, poor development in road network. The distribution of central places is fairly uniform pattern.

**Table No. 4.6**

**Parbhani District**

**Distribution of Central Places**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Areas of Different Population Density (per sq. km.)</th>
<th>Area in Percentage</th>
<th>Central Places in Percentage</th>
<th>Density of Central Places per 1000 sq. km.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>150-180</td>
<td>33.80</td>
<td>35.06</td>
<td>38.29</td>
</tr>
<tr>
<td>2</td>
<td>181-210</td>
<td>28.14</td>
<td>22.07</td>
<td>28.73</td>
</tr>
<tr>
<td>3</td>
<td>211-240</td>
<td>11.21</td>
<td>10.39</td>
<td>10.96</td>
</tr>
<tr>
<td>4</td>
<td>Above 241</td>
<td>26.84</td>
<td>32.47</td>
<td>27.87</td>
</tr>
</tbody>
</table>

*Source: Compiled by the Author.*

The distribution of population plays an important role in determining the distributional pattern of the central places in the area. To determine the relationship between population density and density of central places value of co-efficient and co-relation is significant. It indicates that higher the population density, the greater is the number and density of population.

**4.4 Spatial Pattern of Central Place Distribution:**

In the spatial distribution of central place there is a difference from tahsil to tahsil due to spatial variation in the area under cultivation, population and unbalanced transport network. It is noteworthy to study the existing pattern of spatial distribution of central places in Parbhani district. Parbhani, Sonpeth, Pathri, Manwat, Purna and Gangakhed tahsil being the most fertile tract, are developed in irrigation and transport network. These tahsils have a large number (51) of central places of...
varying sizes. While due to undulating topography, lack of transportation, Jintur, Sailu and Palam tahsils include few number of central place i.e. 23.

The method being adopted for the distribution of central places is the ‘Nearest Neighbor Analysis’ which involves the comparison between the mean distances in an area of a point from its nearest neighbor and the mean distance which could be expected in a random distribution pattern in the same area. The plant ecologist Clark and Evens (1954) was the first to develop this technique and it has been used to measure the patterns of incidence of different species of plants. In recent times many Geographers has been employing to the study of the spatial distribution pattern of settlement. For the present investigation following formula developed by Hamond and Mcullahgh (1974) has been employed.

\[
R_n = \frac{D_{obs}}{D_{ran}}
\]

Where,

\(D_{obs}\) = is the measured mean distance between the nearest neighbor point observed in a given area.

\(D_{ran}\) = is the expected mean distance for a similar number of points distributed in the same area.

\(R_n\) = is the nearest neighbor index.

\[
D_{ran} = \frac{1}{\frac{N}{2\sqrt{A}}}
\]

Where,

\(N\) = is the number of market centres in the study region.

\(A\) = is area of study region / spatial unit below.

Hence,
The value of the Rn will fall 0.0000 to 2.1491. The value of 0.0 showing to clustering at the point and the value of 2.1491 is showing a highly uniform pattern. Every hexagonal distribution can be shown with the help of scale also when the value is one the pattern is completely random. (Dacey 1960, 1962 King 1962) (Fig. No.4.12). Since the study area presents a visible contrast in the density pattern and spacing of central places, the Rn values at tahsil level are also calculated. In such situation different Rn values for different tahsil are obtained in order to find out the association of the central places with each other Rn value for the study region has been calculated. And its result has been shown in the Table No. 4.7 and position of various tahsils has been marked on the Rn value scale (Fig.No.4.13).

The analysis reveals that the central places are of regular pattern random manner where the degree of regularness is 1.317. Most of the central places in the study region are in the regular pattern random manner, having the range 1.00 to 1.50. The central places Parbhani, Gangakhed, Sonpeth, Purna, Pathri, Sailu and Jintur tahsil are in the regular pattern random manner. The central places in Palam tahsil are having Rn value above regular uniform pattern. But the central places in Palam tahsil are near to regular pattern.

\[
Rn = \frac{\bar{D}_{obs}}{1 \div (2\sqrt{\frac{N}{A}})}
\]

It can be expressed in a simplified form as below:

\[
Rn = 2\bar{D}_{obs} \frac{N}{\sqrt{A}} \quad \text{OR} \quad Rn = 2\bar{d} \frac{N}{\sqrt{A}}
\]
PARBHANI DISTRICT
Nearest Neighbour of Central Places

District Average
'\(R_n\)' Value = 1.317

Source: Compile by the Author.
PARBHANI DISTRICT
'Rn' Value Scale of Central Place

Source: Compile by the Author.

T A H S I L

PARBHANI
MANWAT/SAILU
SONPETH/JINTUR
PURNA
PALAM

Regular/Uniform
Random/Regular
Random
Clustered/Random

Fig. No.4.13
The Study of Central Places in Parbhani District

Table No. 4.7
Parbhani District
Nearest Neighbor Statistics of Central Places

<table>
<thead>
<tr>
<th>Tahsil</th>
<th>( \bar{D} )obs km.</th>
<th>( \bar{D} )ran km.</th>
<th>'Rn' Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parbhani</td>
<td>5.13</td>
<td>4.04</td>
<td>1.26</td>
</tr>
<tr>
<td>Gangakhed</td>
<td>5.59</td>
<td>4.45</td>
<td>1.25</td>
</tr>
<tr>
<td>Palam</td>
<td>9.54</td>
<td>4.83</td>
<td>1.97</td>
</tr>
<tr>
<td>Sonpeth</td>
<td>6.15</td>
<td>4.37</td>
<td>1.40</td>
</tr>
<tr>
<td>Purna</td>
<td>6.53</td>
<td>4.77</td>
<td>1.36</td>
</tr>
<tr>
<td>Pathri</td>
<td>4.75</td>
<td>4.59</td>
<td>1.03</td>
</tr>
<tr>
<td>Manwat</td>
<td>5.40</td>
<td>4.93</td>
<td>1.09</td>
</tr>
<tr>
<td>Sailu</td>
<td>6.70</td>
<td>6.13</td>
<td>1.09</td>
</tr>
<tr>
<td>Jintur</td>
<td>6.41</td>
<td>4.57</td>
<td>1.40</td>
</tr>
<tr>
<td>Total</td>
<td>6.243</td>
<td>4.74</td>
<td>1.317</td>
</tr>
</tbody>
</table>

**Source:** - Compiled by the Author.

The spacing of central places is uneven because of lack of transportation facilities for the movements of people and goods are also unevenly distributed. The northern hilly part of the region has inadequate facilities which prevent the farmer’s range of marketing their production, whereas central eastern and western part of the region has adequate facilities of transport and developed agriculture which is directly responsible for developing more central places having near about uniform distribution.

### 4.5 Levels of Development:

To find out the relationship between the level of development and distribution of central places in the study region, the computed levels of
development have been chosen for each tahsil with the assistance of selected socio-economic variables. To determine the levels of development the following variables are taken in view.

I) Percentage of above BPL households to total households.
II) Percentage of urban population to total population.
III) Percentage of general literacy.
IV) Percentage of net sown area to geographical area.
V) Percentage of irrigated area to net sown area.
VI) Percentage of using telephone facilities to total population.
VII) Percentage of village having Post offices.
VIII) Percentage of villages having bank facilities.
IX) Percentage of engaged population in secondary and tertiary activities to total population.
X) Percentage of villages having hospital facilities.
XI) Percentage of villages having veterinary hospital facilities.
XII) Percentage of co-operative agricultural society facilities to total population.
XIII) Percentage of co-operative society facilities to total population.
XIV) Percentage of cable connections to total population.
XV) Percentage of central places to total villages.

This method comprises two stages to determine the levels of development in terms of discrete variables the other stage is that the integration of values obtained to give a composite index of development.

\[
\text{CDI} = \frac{\Pi}{\Pi_1} \times 100
\]

Where,

\(\Pi\) = The Co-efficient of development for variable.
\(\Pi_i\) = Percentage of Variables ‘I’ in the unit.
\(\Pi_l\) = Mean Percentage of variables ‘I’ in the study region.
The composite index reflecting the composite effects of indicators enumerated above, the following equation is chosen to develop of composite index.

$$\text{CID} = \frac{\text{CDI}_1 + \text{CDI}_2 + \text{CDI}_3 + \cdots + \text{CDI}_7}{N}$$

Where,

- CID = is composite index of development.
- N = is the number of variables.

The above said equation has been calculated and the levels of development for all nine tahsils have determined. These composite indices are summarized in Table No. 4.8.

### Table No. 4.8
Parbhani District
Composite Index of Development

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Tahsil</th>
<th>CDI</th>
<th>CID</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parbhani</td>
<td>1853.49</td>
<td>123.56</td>
<td>High</td>
</tr>
<tr>
<td>2</td>
<td>Gangakhed</td>
<td>1228.79</td>
<td>081.92</td>
<td>Low</td>
</tr>
<tr>
<td>3</td>
<td>Palam</td>
<td>1103.93</td>
<td>073.60</td>
<td>Very low</td>
</tr>
<tr>
<td>4</td>
<td>Sonpeth</td>
<td>1400.77</td>
<td>093.38</td>
<td>Moderate</td>
</tr>
<tr>
<td>5</td>
<td>Purna</td>
<td>1464.85</td>
<td>097.65</td>
<td>Moderate</td>
</tr>
<tr>
<td>6</td>
<td>Pathri</td>
<td>1419.23</td>
<td>094.61</td>
<td>Moderate</td>
</tr>
<tr>
<td>7</td>
<td>Manwat</td>
<td>1530.84</td>
<td>102.05</td>
<td>Moderate</td>
</tr>
<tr>
<td>8</td>
<td>Sailu</td>
<td>1413.17</td>
<td>094.21</td>
<td>Moderate</td>
</tr>
<tr>
<td>9</td>
<td>Jintur</td>
<td>1192.29</td>
<td>079.48</td>
<td>Low</td>
</tr>
</tbody>
</table>

*Source: Compiled by the Author.*
PARBHANI DISTRICT
Levels of Development
(2001)


Fig. No.4.14
4.5.1 Spatial Analysis of the Levels of Development:-

So far as the spatial analysis of the levels of development considered the composite indices of the development treated statistically and four levels of development are comprised as high, moderate, low and very low levels of development.

4.5.1.1 High Level of Development:-

The high level of development is observed only in the central part of the study region in which only one tahsil i.e. Parbhani is recorded in high level of development. The tahsil comprises 17.09 percent of the total area and contain 22.08 percent of the total central places in the entire study region. The levels of development and the number of central places are high in this area.

It is also observed that the area is highly endowed with fertile cover. The tahsil enjoy relatively more favorable environmental conditions. It is also endowed with favorable position in regard to irrigation facilities, co-operative societies, high density and population, medical facilities, more percentage of urban population, telephone and cable connection, Post office services, percentage of people with good economic condition and transportation facilities.

4.5.1.2 Moderate Levels of Development:-

The tahsils Purna, Sonpeth, Pathri, Manwat and Sailu are in the moderate levels of development. All these tahsil comprises 45.13 percent of the area and 40.25 percent of total central places. So far as the central places in these tahsils are considered they are smaller in size and less in number than the previous category. This region is a part of river basin of Godavari and Purna and has better irrigation facilities and fertile soils. They have a well co-operative societies and transportation facilities.
4.5.1.3 Low Levels of Development:-

The low levels of development comprise two tahsils i.e. Gangakhed and Jintur. They comprise 29.06 percent area of the study region. These two tahsils also covers 29.87 percent of central places of the region. It is very noticeable that in area where the level of development is low, the number of central places is high. It is also observed that the numbers of central places are more and smaller in size. It is because of the poor irrigation facilities inadequate transportation facilities less co-operative societies and divedation of the tahsils etc.

4.5.1.4 Very Low Levels of Development:-

The very low levels of development comprise only one tahsil i.e. Palam. It is located in the south eastern part of the study region. The tahsil cover about 8.62 percent area and 7.80 percent of central places. In this area there are less central places. This is because of inadequate transportation network, lack of irrigation facilities, inadequate co-operative societies, division of tahsils etc.

With the help of the study of levels of development, it is seen that central places are larger in the area of high and moderate level of development. In contrast to it the low levels of development comprise. High number of central places and very low number of central places are observed in the area of low levels of development.

The above analysis shows that there is a keen relationship between number of central places and levels of development. The reason behind it is that the levels of development have composite effect of several factors on central places (Table No.4.8 & Fig.No.4.14).
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