CHAPTER IV

SPATIAL DISTRIBUTION OF RURAL SETTLEMENTS

1. GENERAL DISTRIBUTION AND SITTING OF RURAL SETTLEMENTS
2. SIZE OF SETTLEMENTS
3. SPATIAL ANALYSIS
4. DISPERSION ANALYSIS
5. TYPE OF RURAL SETTLEMENTS
6. FACTORS AFFECTING THE RURAL SETTLEMENTS
The spatial distribution of any phenomenon on the earth evolves some pattern whose study in the main area of the interest for the geographers, particularly in the case of rural settlement such analysis becomes more meaningful as it is not only helps in identify the present spatial pattern but also suggest ways and means for its better planning and development. In the beginning the forest were cleared and the land made available for agriculture. And with the passage of time, not only the needs increased but also become more complex. In the earlier days when man started cultivating the land and made settlements to live, independent resulted in the establishment of closer settlements. Thus the smaller and isolated hamlets of early days were replaced by closer and compact habitats. Now a days a settlement is defined as a group of houses in which people live, work and stock or use them otherwise, and the track or street over which their movements takes place.¹ Such human dwellings include homestead, hamlets, village, town and city of varying and size and may range from an isolated habitation to a large agglomeration. Thus spatial study of settlements shows the relationship between the resources of a region and its people because settlement distribution is nothing

but a frequency in which they occur in a given space.\textsuperscript{1} The frequency is high when the resources are in plenty and easily available for exploitation and utilization. Thus, settlements distribution is an index of resources distribution of a region and its utilization by the people.\textsuperscript{2}

Here the focus attentions are on the distribution, size, type, spacing and regularity of rural settlements in the district for the present study the Panchayat Samiti and tehsil are taken as well as the unit of area and quantitative technique has been used for spatial analysis.

1 GENERAL DISTRIBUTION AND SITTING OF RURAL SETTLEMENT

The region having homogenous relief and fertile soils, has an almost uniform distribution of rural settlements. However, slight variation may be seen at micro level due to differences in local relief, source of water supply, drainage lines, soil type, pattern of land use, transport accessibility, social attribute and population density.

The rivers of the district Banganga, Gambheer and Ruparel have played a crucial role in the selection of sites for human habitation in pre-historic time. Many places in this area have been

proved to be oldest sites of human habitation dating back to around 1500 B.C. as revealed by recent archaeological excavation. The historical evidence is available in form of a number of relics features belonging to Buddhhis, Meos, Rajputs, Jats who establish their colonies in these areas.

Flat land plays a Pivotal role in pattern the settlements distribution of the district. Since most valuable resources of the district is the fertile soil deposited by rivers and tributaries, there were ample opportunities for the people to settle in the area under study. As a result, the area underwent dense population. Other factors governing the spatial distribution of rural settlement in the district included safety from flood, suitable flow system (canal) for irrigation etc. Beside the settlement distribution of the study area is related various socio-economic condition. Market (weekly / permanent), industry, education institution, hospital etc. are other important factor influencing the settlement pattern. The spread of new means of Communication and transportation is also exercising an influence on the settling and distribution of small settlements but recently developed market, roads, tracks and Communication lines have made very little on general distributional pattern of settlements, except for the growth of a few hamlets arising out of the main village to avoid congestion or to respond to new socio-economic situation, Sirond, Chokarwara
Kalan, Salempur Khurd, Ucchain etc. villages along the roads are example.

The district having some hilly track in Bayana and Rupbas, there is sparse human inhabitation. It covers the southern part of the district. On the other hand the rest area is almost plain and fertile soil so in the region the settlements is more compact them hilly part of the area.

Tank sites settlements are common in Bayana Tehsil and some tanks are found near Bharatpur. Motijheel, Keola Deo Jheel, Madal Jheel, Jheel ka Bara are the important lakes of the district. The tanks and lakes in the region together with various patches of infertile usar lands have made their impact on the distributional pattern of settlement in this area.

2. SIZE OF SETTLEMENT

The size (area and population) and density of settlements is closely relating to spacing, with an increase in distance between settlement, the density of settlement tend to decrease. In Bharatpur District the average areal size of villages is 3.560 km² but it is less than all India average (5.02 km²).

The table 4.1 clearing indicates that highest per village areal coverage (4.942 km²) in Bayana Panchayat Samiti while lowest areal size of village 2.809 km² in Nagar Pahari Panchayat Samiti.

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Weir and Nadbai have large areal size of village i.e. 4.002 km$^2$ and 3.772 km$^2$ respectively. Fig. 4.1 shows areal size of village in district per sq km at Panchayat Samiti level.

**Table 4.1**

**Distribution of Area Average per village Sq. km. At Panchayat Level (1991)**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Panchayat Samiti</th>
<th>Area Sq. km</th>
<th>No. of Settlements</th>
<th>Average Village Km$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kaman</td>
<td>535.2</td>
<td>187</td>
<td>2.862</td>
</tr>
<tr>
<td>2</td>
<td>Nagar Pahari</td>
<td>609.7</td>
<td>217</td>
<td>2.809</td>
</tr>
<tr>
<td>3</td>
<td>Deeg</td>
<td>465.2</td>
<td>120</td>
<td>3.876</td>
</tr>
<tr>
<td>4</td>
<td>Kumher</td>
<td>433.3</td>
<td>111</td>
<td>3.903</td>
</tr>
<tr>
<td>5</td>
<td>Sewar</td>
<td>438.2</td>
<td>154</td>
<td>2.845</td>
</tr>
<tr>
<td>6</td>
<td>Nadbai</td>
<td>430.1</td>
<td>114</td>
<td>3.772</td>
</tr>
<tr>
<td>7</td>
<td>Weir</td>
<td>568.3</td>
<td>142</td>
<td>4.002</td>
</tr>
<tr>
<td>8</td>
<td>Bayana</td>
<td>785.9</td>
<td>159</td>
<td>4.942</td>
</tr>
<tr>
<td>9</td>
<td>Rupbas</td>
<td>523.3</td>
<td>141</td>
<td>3.711</td>
</tr>
<tr>
<td></td>
<td>District Bharatpur</td>
<td>4789.2</td>
<td>1345</td>
<td>3.560</td>
</tr>
</tbody>
</table>

BHARATPUR DISTRICT
SIZE OF VILLAGES
(Based on area)
1991

Fig. 4.1
Table 4.2

Distribution of Population (Average village size) At Panchayat Samiti Level (1991)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Panchayat Samiti</th>
<th>Population</th>
<th>No. of Settlements</th>
<th>Average Village population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kaman</td>
<td>154287</td>
<td>187</td>
<td>825.06</td>
</tr>
<tr>
<td>2</td>
<td>Nagar Pahari</td>
<td>181672</td>
<td>217</td>
<td>837.19</td>
</tr>
<tr>
<td>3</td>
<td>Deeg</td>
<td>125627</td>
<td>120</td>
<td>1046.89</td>
</tr>
<tr>
<td>4</td>
<td>Kumher</td>
<td>129059</td>
<td>111</td>
<td>1162.69</td>
</tr>
<tr>
<td>5</td>
<td>Sewar</td>
<td>133563</td>
<td>154</td>
<td>867.29</td>
</tr>
<tr>
<td>6</td>
<td>Nadbai</td>
<td>127668</td>
<td>114</td>
<td>1119.89</td>
</tr>
<tr>
<td>7</td>
<td>Weir</td>
<td>160526</td>
<td>142</td>
<td>1130.46</td>
</tr>
<tr>
<td>8</td>
<td>Bayana</td>
<td>151810</td>
<td>159</td>
<td>954.77</td>
</tr>
<tr>
<td>9</td>
<td>Rupbas</td>
<td>166569</td>
<td>141</td>
<td>1181.34</td>
</tr>
<tr>
<td></td>
<td>District Bharatpur</td>
<td>1330781</td>
<td>1345</td>
<td>989.4</td>
</tr>
</tbody>
</table>

BHARATPUR DISTRICT
SIZE OF VILLAGES
(Based on Population)
1991

Fig. 4.2

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Table 4.3
Classification of villages by Population Ranges (1991)

<table>
<thead>
<tr>
<th>Range of population</th>
<th>Number of villages in each range</th>
<th>Percentage of village in each range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 200</td>
<td>136</td>
<td>10.11</td>
</tr>
<tr>
<td>200-499</td>
<td>335</td>
<td>24.90</td>
</tr>
<tr>
<td>500-1999</td>
<td>732</td>
<td>54.42</td>
</tr>
<tr>
<td>2000-4999</td>
<td>131</td>
<td>9.73</td>
</tr>
<tr>
<td>5000-9999</td>
<td>11</td>
<td>0.81</td>
</tr>
<tr>
<td>Total</td>
<td>1345</td>
<td>99.97</td>
</tr>
</tbody>
</table>

Source: District Primary Census Handbook (1991)
BHARATPUR DISTRICT
VILLAGES ACCORDING TO
SIZE OF POPULATION

Fig. 4.3

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Table 4.4

Density of Settlements (per 100 sq. km) (1991)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Panchayat Samiti</th>
<th>Average village Km²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kaman</td>
<td>28.8</td>
</tr>
<tr>
<td>2</td>
<td>Nagar Pahari</td>
<td>29.7</td>
</tr>
<tr>
<td>3</td>
<td>Deeg</td>
<td>27.0</td>
</tr>
<tr>
<td>4</td>
<td>Kumher</td>
<td>29.7</td>
</tr>
<tr>
<td>5</td>
<td>Sewar</td>
<td>30.4</td>
</tr>
<tr>
<td>6</td>
<td>Nadbai</td>
<td>29.6</td>
</tr>
<tr>
<td>7</td>
<td>Weir</td>
<td>28.2</td>
</tr>
<tr>
<td>8</td>
<td>Bayana</td>
<td>19.3</td>
</tr>
<tr>
<td>9</td>
<td>Rupbas</td>
<td>31.8</td>
</tr>
<tr>
<td></td>
<td>District Bharatpur</td>
<td>28.277</td>
</tr>
</tbody>
</table>

The average population of a village in the study area is 898 persons. The table 4.2 shows that in Rupbas Panchayat Samiti the average village population is highest among all the Panchayat Samiti i.e. 1181 persons. The lowest average population of villages is Kaman Panchayat Samiti i.e. 825 persons. Kumher and Weir Panchayat Samiti also have higher average population i.e. 1162
and 1130 persons respectively. Nagar Pahari and Sewar Panchayat Samiti ranks in lower categories i.e. 837 and 867 persons respectively. Fig. 3.2 shows the average population of village at Panchayat Samiti level Table 4.3 shows that only 0.80% of village of the district have population of above 5000 persons. The village having population between 500-1999 occupy the 54.42% area of the district. The village having population less than 200 persons occupy the 10.11% area of the district. And the village having population between 200-499 persons occupy the 24.90% of the total area of the district. The village having population between 2000-4999 persons occupy the 9.73% area of the district.

The classification of village of the district based on size of population has been taken into consideration while studying the spatial distribution of rural settlements. The village have been divided into six population group. The table 4.3 indicates that population having above 5000 persons is least, it means that big village is less in study area while population having 500-1999 is highest i.e. 732 villages. It is clear from the table that there is uneven distribution of population of villages between different categories and between different Panchayat Samiti of the district. Fig. 4.3 displays the distribution of population size of village at Panchayat Samiti level. The average settlements density of the district is 28.277 settlements / 100km². The table 4.4 indicates that the highest density is found in Rupbas Panchayat Samiti i.e.
BHARATPUR DISTRICT
DENSITY OF VILLAGES
(Per 100 Sq Km)

--- State Boundary
--- District Boundary

Fig. 4.4
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31.8 settlement per 100 km² and followed by Sewar (30.4) Kumher (29.7), Kaman (28.8), while the lowest density is 19.3 settlement/100km² is Bayana Panchayat Samiti. The settlement density per 100 km² i.e. 19 to 32 varies from one place to other in the study area. Fig 4.4 shows that the density of settlements per 100 sq. km.

3. SPATIAL ANALYSIS

The spacing of rural settlements denoted the locational arrangements of village with respect to one another. To analyze this dimension, classical geographers have considered spacing as a basic for the rural settlements into different types. In Sweden, Switzerland, Poland and France, geographers have used fixed spacing as a unit for the measurement of concentration and dispersion. However, no statistical tool provides a perfect various of distributional pattern because every unit has its own trend and identity as regards socio-cultural and spatial characteristics. So none of these methodological can have universal application the theoretical basis of the relationship between settlement density and spacing. It was first provide by Robinson and Barnes for the analysis of dispersed rural population of Midwest USA and Ontorio. Their formula is based on the concept of uniform

distribution formally devised by Christaller. This was first modified by Mather\(^1\) in the following manner:

\[
D = 1.0746
\]

Where \(D\) denotes the theoretical distance between points or settlements in hexagonal arrangement

\(A\) area

\(N\) denotes the Number of settlements per unit area

**Table 4.5**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Panchayat Samiti</th>
<th>Area (Sq. Km)</th>
<th>No. of Settlements</th>
<th>D Inter Village spacing (in km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kaman</td>
<td>535.2</td>
<td>187</td>
<td>1.817</td>
</tr>
<tr>
<td>2</td>
<td>Nagar Pahari</td>
<td>609.7</td>
<td>217</td>
<td>1.801</td>
</tr>
<tr>
<td>3</td>
<td>Deeg</td>
<td>465.2</td>
<td>120</td>
<td>2.115</td>
</tr>
<tr>
<td>4</td>
<td>Kumher</td>
<td>433.3</td>
<td>111</td>
<td>2.123</td>
</tr>
<tr>
<td>5</td>
<td>Sewar</td>
<td>438.2</td>
<td>154</td>
<td>1.812</td>
</tr>
<tr>
<td>6</td>
<td>Nadbai</td>
<td>430.1</td>
<td>114</td>
<td>2.087</td>
</tr>
<tr>
<td>7</td>
<td>Weir</td>
<td>568.3</td>
<td>142</td>
<td>2.149</td>
</tr>
<tr>
<td>8</td>
<td>Bayana</td>
<td>785.9</td>
<td>159</td>
<td>2.223</td>
</tr>
<tr>
<td>9</td>
<td>Rupbas</td>
<td>523.3</td>
<td>141</td>
<td>2.070</td>
</tr>
</tbody>
</table>

The computation of theoretical inter settlements distance at Panchayat Samiti level clearly indicates the pattern of spacing of the district, which according the range of spacing various between 1.801 km to 2.223 km. on the basis of this village spacing can be

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BHARATPUR DISTRICT
SPACING OF VILLAGES

Fig. 4.5

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grouped into law, moderate, high, very high spacing. The Table 4.5 and Fig 3.5 shows the inter village spacing at Panchayat Samiti level.

**Low Spacing (< 2.00 km)**

This group consists of three Panchayat Samiti i.e. Kaman, Nagar Pahari, Sewar. These cover about 33% area of the total area of the district. The average density of villages are Kaman (28.6 village/100km²), Nagar Pahari (28 village/100km²), Sewar (28.4 village/100km²). The development of transport and Communication irrigation facilities and fertile soil responsible for the growth of semi compact settlements in these area.

**Moderate Spacing (2.00 – 2.10 km)**

This group comprises two Panchayat Samiti i.e. Rupbas and Nadbai. These covers about 19 % of the total area. The average village density is (30.2 village / 100km²), (37.1 village / 100km²) of Badbai and Rupbas respectively.

**High Spacing (2.10 – 2.20 km)**

This group consists of three Panchayat Samiti i.e. Deeg, Kumher and Weir. It covers the 30% of total area of the district. The average density of village are Deeg (30.8 village / 100km²), Weir (40 village / 100km²). Kumher (39 village / 100km²).

**Very High Spacing (above 2.20 km)**
This comprises one Panchayat Samiti i.e. Bayana. It covers the area of 16040% of total area of the district. Its average density is 49 village / 100km².

The foregoing discussion reveals a direct relationship between spacing and settlement size in the different Panchayat Samiti of Bharatpur District. It is obvious that where spacing is high, villages are of large size, with small number of hamlets having higher densities of population, which results in compact structure of settlements. On the contrary in area of low spacing, settlements are generally smaller size with low pressure of population and scattered distribution pattern viz, hamleted type settlements.

4. DISPERSION ANALYSIS

Though the agrarian setup, land tenure and human influence have played a major role in modification and transformation of habitat system, yet the forces determining the present rural settlements patterns, have been mainly related to physical character of the terrain with their direct and indirect influence various statistical methods have been used to measure the nature of distributional pattern of human settlement. An attempt has been made here to measure the degree of dispersion taking base of observed of nearest inter-village straight line distance, the method being termed as nearest neighbour distance approximation analysis. It is assumed that points are distributed
randomly in accordance with a Poisson probably function, where it is supposed that each location has an equal chance of containing a point, while in the real world settlements are not always evenly spaced, nor on the other hand they are spaced in strictly random pattern. Thus, it may be defined as the degree of deviation at a set point from random to some delimited area.

The first approach towards dispersion analysis was initiated by Clark and Evans in their analysis of the distributional pattern of various species over a given space. Later Decay followed this approach and tested it in geographical context and able to enlarge the family of probability density function describing point and central place pattern. The method is known as nearest neighbour analysis which denotes the ratio of actual mean of their nearest settlement distance (r°) to expected distance (r^). 

\[ R_n = \frac{r^0}{r^\circ} \]

where 

\[ r^\circ = y^0 \sqrt{d} \]

and 

\[ d = \text{denotes the settlements density also written as} \]

\[ R_n = 2r^0 \sqrt{d} \]

For the present analysis Tehsil has been taken as the standard areal unit for measurement of R_n values and all the

inhabited settlement in the different tehsil of Bharatpur District have been taken into consideration in the present study. The index of randomness (Rn) has been calculated by applying the above mentioned formula. This provides a measure of the degree to which the distributional pattern of the observed inter village distance deviated from random exception. The value of this index ranges from 0.0 (complete concentration) through 1.0 (random) to 2.149 (ideal or normative hexagonal lattice).

Table 4.6

Nature of Dispersion of Rural Settlements

<table>
<thead>
<tr>
<th>S.No</th>
<th>Tehsil</th>
<th>d/km²</th>
<th>D</th>
<th>r⁰</th>
<th>rₑ</th>
<th>Rn</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kaman</td>
<td>0.371</td>
<td>1.817</td>
<td>1.693</td>
<td>1.347</td>
<td>1.256</td>
</tr>
<tr>
<td>2</td>
<td>Pahari</td>
<td>0.372</td>
<td>1.810</td>
<td>1.810</td>
<td>1.344</td>
<td>1.346</td>
</tr>
<tr>
<td>3</td>
<td>Nagar</td>
<td>0.372</td>
<td>1.105</td>
<td>1.105</td>
<td>1.337</td>
<td>0.826</td>
</tr>
<tr>
<td>4</td>
<td>Deeg</td>
<td>0.343</td>
<td>1.262</td>
<td>1.262</td>
<td>1.458</td>
<td>0.865</td>
</tr>
<tr>
<td>5</td>
<td>Kumher</td>
<td>0.343</td>
<td>1.373</td>
<td>1.373</td>
<td>1.459</td>
<td>0.941</td>
</tr>
<tr>
<td>6</td>
<td>Nadhai</td>
<td>0.346</td>
<td>1.362</td>
<td>1.362</td>
<td>1.445</td>
<td>0.942</td>
</tr>
<tr>
<td>7</td>
<td>Bharatpur</td>
<td>0.371</td>
<td>1.047</td>
<td>1.047</td>
<td>1.349</td>
<td>0.776</td>
</tr>
<tr>
<td>8</td>
<td>Weir</td>
<td>0.341</td>
<td>1.032</td>
<td>1.032</td>
<td>1.467</td>
<td>0.703</td>
</tr>
<tr>
<td>9</td>
<td>Bayana</td>
<td>0.335</td>
<td>1.047</td>
<td>1.047</td>
<td>1.493</td>
<td>0.701</td>
</tr>
<tr>
<td>10</td>
<td>Rupbas</td>
<td>0.347</td>
<td>1.099</td>
<td>1.099</td>
<td>1.442</td>
<td>0.762</td>
</tr>
</tbody>
</table>

The table 4.6 shows the result of the Rn values and different indices calculated with reference to the nearest neighbour analysis of each tehsil of the district. The Rn value ranging from 0.701
BHARATPUR DISTRICT
NATURE OF DISPERSION OF
RURAL SETTLEMENTS

RN VALUES

> 1.00
0.901-1.00
0.801-.900
< .800

--- State Boundary
--- District Boundary

Fig. 4.6

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(Bayana) to 1.346 (Pahari) tehsils reveals a clear tendency towards regularity. Fig 4.6 shows the nature of dispersion of rural settlement in study area.

On the basis of Rn values, dispersion in different tehsil of the district may be classified under four categories.

**Low Regularity (0.700 - 0.800)**

This group includes from tehsils i.e. Bayana (0.701), Weir, Rupbas (0.762), Bharatpur (0.776). It covers the 38% of the total area of he district. The area is inhabited by high to medium size village (being 3.50 to 4.50 km² average area of the village).

The expected inter-village distance (r^E) and Bayana (1.493), Weir (1.467), Bharatpur (1.349), Rupbas (1.442). The observed inter-village distance (r^O) are Bayana (1.047), Weir (1.032), Bharatpur (1.047), Rupbas (1.099). the village are big in southern part of the district. The village intensity is high in Bayana and Weir.

**2. Moderate Regularity (0.801 – 0.900)**

Moderate regularity comprises Nagar and Deeg tehsil of Bharatpur District. The Rn value are 0.826 and 0.865 of Nagar and Deeg respectively. It covers about 13% area of the whole district. The density of village in these tehsils per 100 km² ranges from 27 to 30. The observed inter-village of these tehsils are Nagar (1.105) and Deeg (1.262). the expected inter-village distance r^E is 1.337 and 1.458 of Nagar and Deeg respectively.
BHARATPUR DISTRICT
NEAREST NEIGHBOUR DISTANCE
OF RURAL SETTLEMENTS
1991

Fig. 4.7
3. **High Moderate Regularity (0.901 - 1.00)**

Moderate high regularity has been found in two tehsils in the district i.e. Kumher and Nadbai. They together covers the area of 18% of the whole district. The observed inter-village \((r^o)\) of Kumher and Nadbai are 1.337 and 1.362 respectively. The expected inter-village distance \((r^e)\) of Kumher and Nadbai 1.459 and 1.445 respectively.

4. **High Regularity (1.00 and above)**

High regularity has been found in two tehsils of Bharatpur District i.e. Kaman and Pahari tehsil. The observed inter-village \((r^o)\) distance of Kaman and Pahari are 1.693 and 1.810 respectively. The expected inter-village distance \((r^e)\) and 1.347 and 1.344 of Kaman and Pahari respectively.

The expansion analysis shows that the trend of dispersion has in every case been found towards regularity.

5. **TYPES OF RURAL SETTLEMENTS**

The word ‘type’ used here indicates the relationship between settlement within organized space, which provides a distinctive view of the spatial organization. The type of settlement vary according to environmental factors, important being lay-out of the land and its location, the arrangements of social stratification, stages of economic development and so on. The present classification of settlement is based on the pattern of nucleation of occupancy unit in a given space, which is an outcome of different
physico-cultural factors. The settlements are classified into three types according to the spatial arrangements of the house i.e. hamleted type according to the spatial arrangements of the house i.e., hamleted, semi compact, compact. The compact settlements shows very close spatial organization of the house while hamleted indicate scattering of occupancy unit along the, loose spatial structure. In this way, every settlement has its own distinct and unique personality.

**Table 4.7**

*Population of Villages and Percentage of each ranges in Brackets*

<table>
<thead>
<tr>
<th>S. No</th>
<th>Tehsil</th>
<th>Total village</th>
<th>Less than 200</th>
<th>200-499</th>
<th>500-1999</th>
<th>2000-4999</th>
<th>5000-9999</th>
<th>Above 10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dist. Bharatpur</td>
<td>1345 (100.00)</td>
<td>136 (10.11)</td>
<td>335 (24.91)</td>
<td>732 (54.42)</td>
<td>131 (9.74)</td>
<td>11 (0.82)</td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>Nagar Pahari</td>
<td>217 (100.00)</td>
<td>22 (10.14)</td>
<td>67 (30.88)</td>
<td>114 (52.53)</td>
<td>13 (5.99)</td>
<td>1 (0.46)</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>Kaman</td>
<td>187 (100.00)</td>
<td>21 (11.23)</td>
<td>64 (34.22)</td>
<td>89 (47.59)</td>
<td>12 (6.42)</td>
<td>1 (0.54)</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>Deog</td>
<td>120 (100.00)</td>
<td>15 (12.50)</td>
<td>30 (25.00)</td>
<td>61 (50.83)</td>
<td>12 (10.00)</td>
<td>2 (1.67)</td>
<td>--</td>
</tr>
<tr>
<td>5</td>
<td>Nadbai</td>
<td>114 (100.00)</td>
<td>10 (8.77)</td>
<td>25 (21.93)</td>
<td>61 (53.51)</td>
<td>17 (15.79)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>6</td>
<td>Bharatpur</td>
<td>154 (100.00)</td>
<td>28 (18.10)</td>
<td>31 (20.13)</td>
<td>81 (52.62)</td>
<td>13 (8.4)</td>
<td>1 (0.65)</td>
<td>--</td>
</tr>
<tr>
<td>7</td>
<td>Weir</td>
<td>142 (100.00)</td>
<td>7 (4.93)</td>
<td>27 (19.01)</td>
<td>89 (62.68)</td>
<td>19 (13.38)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>8</td>
<td>Bayana</td>
<td>159 (100.00)</td>
<td>18 (11.32)</td>
<td>36 (22.64)</td>
<td>90 (56.60)</td>
<td>13 (8.18)</td>
<td>2 (1.26)</td>
<td>--</td>
</tr>
<tr>
<td>9</td>
<td>Rupbas</td>
<td>141 (100.00)</td>
<td>5 (3.54)</td>
<td>25 (17.23)</td>
<td>94 (66.67)</td>
<td>14 (9.93)</td>
<td>2 (2.13)</td>
<td>--</td>
</tr>
<tr>
<td>10</td>
<td>Kumher</td>
<td>111 (100.00)</td>
<td>10 (9.011)</td>
<td>30 (27.30)</td>
<td>53 (47.75)</td>
<td>17 (15.31)</td>
<td>1 (0.90)</td>
<td>--</td>
</tr>
</tbody>
</table>
Hamleted Settlements

Physical environment, notably, the nature of terrain and the drainage system to be main factors which have influenced the growth of hamleted or dispersed settlements in the district. Settlements like Purabai Khera, Brahmawad, Mehmudpur, Narli etc. are located in the river loop. Another important factor appears to be caste system in which people belonging to be a particular caste prefer to live closely. Isolated settlements lime Chak bhobi, Ram nagar, Kumha, Bahaka etc. Another factor in the development of such settlement in agriculture operation. The time consumed in moving from house to agricultural implements to long distances, the watch and ward arrangement etc. have also resulted in the emergencies of hamlets.

Semi Compact Settlements

Such settlements spread all over the district except in the low lying area which are frequently inundated. Semi compact settlements are wide speared and appear to predominant the mustard and the bajra producing area. Availability of water from lakes and case of transport and Communication are other factors which help the growth of semi-compact settlement e.g. Chulhera, Nahera Chauth, Mudia Saad, Kamalpur along the road.

Compact Settlement
In the development of compact settlement, factor like level and productive agriculture land, availability of water and railway roads etc have their role but the chief determinant seems to be socio-political. For example, the big land lords or the former zamindari always live near their ancestor property and are settled in groups in order to have a strong over their territory. Big and compact settlements having a population of 10,000 or more like Siswara, Sinsini and Bayana rural. In those settlements the joint family system was popular and several families of the clan lived in these compact settlements which were enclosed by mud wall or an ancient fort built in the medieval period.

6. FACTORS AFFECTING RURAL SETTLEMENTS TYPES

The rural settlement types are the outcome of the interplay between various agglomerative and degglomerative factors.

Factors Leading to Agglomeration

1. Uniformity of Relief and Soil Fertility

Agglomerated type of rural settlement has been the chief characteristic of homogeneous leveled and fertile plains. Although soil variations are found all over the region, and even within the limits of the Panchayat Samiti boundary itself but its general productivity has enabled the rural population to live close together. The homogeneous stretch of fertile well watered alluvial plains encourages large concentrations of rural settlements. The ever-growing population in such plains leads to intensive farming,
which is also conducive to the concentration of settlements. The general sameness of the natural scene, coupled with an almost uniform fertility of the soil over most of the plain has fostered a sense of community life and motivated the people of the study area, to live in compact settlements.

II. Water Resources

The village water reservoirs, ponds and *jhils* carved out with the excavation of earth for house building and even for water supply purposes are a great source of water accumulation against the seasonal distribution of rainfall for irrigational facilities, bathing and other domestic purposes and are conducive to compact type of village settlement. In the areas of deep water table, owing to the difficulty and high cost of construction, masonry wells are infrequent and population clusters in compact villages around them; while in the zones of high water table, where such wells are more numerous because they can be cheaply constructed and there is no need to concentrate in one site so it is likely to spread out into several outlying hamlets. The need to store water against the seasonal distribution of rainfall and its vagaries is again conducive to the formation of compact settlements over higher and drier interfluves of the rivers. Near the rivers, construction of artificial embankments parallel to the streams as a protection from flood has encouraged the growth of agglomerated settlements.
Collective building of dams and irrigation channels for the storage and distribution of rain water and the construction of tanks for artificial irrigation, have also promoted the evolution of compact villages.¹

III. Cultural Factors

The following are the cultural factors responsible for the establishment of compact settlements:

1. Man is the most gregarious animal and he tends to gravitate towards his fellowmen. Forest clearing, cultivation of land and related activities centralized at one place and agricultural cooperation and practice of the past as well as present have been conducted to compact settlements. Necessity for cooperation in the regulation and control of water, digging wells, upkeep of certain public works and preparation of the environment to make it favourable to crop.²

2. Fragmentation of holdings and strip cultivation preset disadvantage to the village dweller, which are best, counterbalanced by nucleation where former avail all the amenities of close and warm communal life. Blache rightly remarks "concentration of living quarters is necessitated by the diversity of

parcels to be cultivated because their only common meeting
ground is the village, whither all paths lead.”¹

3. Jat clans have helped the settlements to grow into compact
habitations enclosed by mud walls, ditch or around a fortress
doing the process of occurrence. To these were attracted groups of
other people like priests, menials and artisans who aided in
maintaining the solidarity, and self-sufficiency of the rural
organization.²

4. The reciprocal relationships under the jajmani systems have
tended to maintain compactness since long. According to Enayat
Ahmad the social gathering in the centre of the village usually
under some shady tree or near the temple, the mutual rejoicing on
festivals, the gathering of neighbours after the days work near the
well in summer and round the fire in winter when tales are told
and talks of friends and crops exchanged, all these have
contributed their influence in the direction of compact settlement.³

5. Big cultivator or village Mahajan (money lender) exercises
centripetal force for settlers.

6. Unemployed or semi-employed labourers engaged themselves
in the subsidiary occupations, which can easily flourish in such
villages. Similarly, a host of intermediaries like petty traders find it

¹. Ibid.
³. Ahmad, E., "Rural Settlement Type in UP (United Provinces of Agra and
convenient to supply articles of everyday life and purchase grain in
time of need in compact villages.

7. Land system also associated the landlord and cultivator well
in compact villages.

8. Religious centre along river and near spring also attract
agglomerations around them. Temples in the middle of such big
settlements still signify their historical role.

9. Some villages grow as compact settlements due to definite
political bias or administrative decision.

10. Defence plays a significant role in agglomerations. During
the eighteenth century no isolated habitation was considered
secure unless protected by a fortification wall and ditch.¹

11. Hall observes that compact village from is well adapted to the
mode of life of a paddy area. Various operation lined with paddy
cultivation generate such centripetal force.²

12. According to Mukerjee that the seasonal idleness of the
peasant, especially marked in the rice region contributes to the
development of the large variety of cottage industries, which can
thrive only in compact settlement.

13. During old days, new sites were rarely selected to live
separately due to being inauspicious till it was approved by a
group of settler after getting confirmation from the priests.

¹ Growse, F.S., 'Mathura: A District', 'Memoirs', New Delhi, Asiatic
² Hall, R.B. 'Some Rural Settlement Forms in Japan', Geog. Rev. Vol. XXI,
No. 1, Jan. 1, 1931, p. 98.
Factor Leading to Dispersion

I. Physical Factors

i. The dispersion appears to increase direct proportion to the ruggedness of the land surface. The uneven nature of relief, soil and ground water results in the formation of scattered settlements. The Bharatpur district is marked by the presence of usar lands, broken terrain by small ravines, ponds and jhils, which have promoted semi-compact and helmeted types of settlements.

ii. Abundance of surface and high water table has also influenced the growth of fragmented settlements. When surface water in the form of tanks and ponds is plentiful, each one of these may have a small hamlet around it. Of course, large tanks or tals may be conductive to large settlements. In areas where water table is high the construction of masonary or non-masonary well is cheap and easy and therefore it may be a suitable location for a small settlement.

III. Floods plains of large streams are also responsible for the scattering of settlements. In low-lying areas which are annually inundated during the rainy season, elevations, within the village are selected as suitable sites for establishing small hamlets, their number depending upon the number of elevated sites.

II. Cultural Factors

i. Socio cultural factors such as castes, prejudices and the existence of low agricultural castes have been partly responsible
for the growth of hamleted settlements. The caste system based on social hierarchy divided the population into various social groups. At the lowest level of the social ladder are supposedly low caste people, so-called untouchables or Harijans, which includes castes like, the Nais, The Chamar and the Bhangis. These people have traditionally been forced to live a little away from the main site, often towards the south, while the upper castes occupied the central site. Thus the caste hierarchy has also been responsible for the dispersion of rural settlements.

ii. Land tenancy and absentee landlordism have also made their contribution towards fragmentation of settlements. Landlords use to settle near their holdings, and agricultural labourers, who were bound by loan or by cultivable lands given in return for services rendered, were required to stay a little away from the main habitation. As a result, the fragmentation of settlements took place. Besides this, most fertile fields were occupied by the landlords, while the less productive and poor lands lying away from the central sites were under the possession of tenants, who will built their houses near their fields. After the abolition of the zamindari system, the actual tillers of the soil became free to settle anywhere in the village, causing further fragmentation of settlements.

iii. Economic factors such as development of roads, railways and opening of new market service centres etc. have stimulated the tendencies towards hamletion of village.