CHAPTER - IV

DISTRIBUTION AND TYPES OF RURAL SETTLEMENT

4.1 Distribution and Siting of Rural Settlements

Human settlements are, in fact the first adjustment of man with environment. Therefore, the distribution and siting of rural settlement is closely linked with the basic ecological requirement of shelter having comfort and efficiency for survival with the culture of the dwellers. Hence in the selection of settlement sites man is usually guided by both the attractive and restrictive forces of physical setting which is an ensemble of various elements, such as geology, relief, drainage, climate, soil and natural vegetation\(^1\). The main restrictive forces for the distribution of rural settlements in the study area are the wide extended hills and water logged or swampy areas in the southern portion of central valley. Culturally there is a little reason like superstitions or beliefs which affect the selection of site but on the economic front, markets, routes and roads have a great role in location of human habitations which cropped up in the filling in stage of the settlement process. Shortly the main objectives of the present chapter is to deal with the distribution and type of rural settlement as geographical entity emphasising physical, cultural and functional facts.

4.1.1 Distribution of Rural Settlements

The distribution of settlements in the state is uneven. The main important factors of the distribution of rural settlements in the state are the well drained and fertile central valley, the water logged or swampy areas, the surrounding hilly regions, foot hill areas and the Barak

---

basin. Being followed the above factors the distribution of settlement in the state is more convenient to study in the following three heads.

(A) Manipur Hill Region.

(B) Manipur Valley Region

(C) Size wise distribution

(A) Manipur Hill Region

The Manipur hill region includes the five districts – Tamenglong, Ukhrul, Senapati, Chandel and Churachandpur. About 90% of the total land surface of the state is comprised by these hill districts. Out of 2182 villages (total no. of villages of the state according to 1991 census) 1727 villages i.e. 79% is concentrated in the hill districts but in strength of population, only 6,07,818 (i.e. 45% of the total rural population) out of 1331504 is counted. In this case a large fluctuation is noted in between village percentage and population percentage. This is caused due to the size of villages. In the hilly districts maximum number of villages is small (below 500 persons) due to its geographical phenomena.

Table No. 4.1

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Dist/Region</th>
<th>No. of Village</th>
<th>Rural Population</th>
<th>Percentage to the total population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manipur Hill Region</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Ukhrul</td>
<td>222</td>
<td>1,09,275</td>
<td>8.21</td>
</tr>
<tr>
<td>2.</td>
<td>Senapati</td>
<td>517</td>
<td>2,08,406</td>
<td>15.65</td>
</tr>
<tr>
<td>3.</td>
<td>Tamenglong</td>
<td>194</td>
<td>86,278</td>
<td>6.48</td>
</tr>
<tr>
<td>4.</td>
<td>Churachandpur</td>
<td>502</td>
<td>1,42,518</td>
<td>10.70</td>
</tr>
<tr>
<td>5.</td>
<td>Chandel</td>
<td>292</td>
<td>61,341</td>
<td>4.61</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-total</strong></td>
<td><strong>1727</strong></td>
<td><strong>6,07,818</strong></td>
<td>45.65</td>
</tr>
<tr>
<td></td>
<td>Manipur Valley Region</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Imphal (East &amp; West)</td>
<td>323</td>
<td>4,19,579</td>
<td>31.51</td>
</tr>
<tr>
<td>7.</td>
<td>Bishnupur</td>
<td>45</td>
<td>1,17,603</td>
<td>8.83</td>
</tr>
<tr>
<td>8.</td>
<td>Thoubal</td>
<td>87</td>
<td>1,86,504</td>
<td>14.01</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-total</strong></td>
<td><strong>455</strong></td>
<td><strong>7,23,686</strong></td>
<td>54.35</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>2182</strong></td>
<td><strong>13,31,504</strong></td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Compiled and computed by the Author with the help of census data collected from Census Department, Govt. of India, Imphal.
From the analysis of the above table 4.1 it is noted that Senapati district comprises the maximum number of villages i.e. 517 and Churachanpur district stood in the second position i.e. 502. The main causes of this uneven distribution is that these two districts possess more foothills along the National Highways and state highways. Therefore, large number of settlements are concentrated immediately along these roads with convenient slopes, foot hills and level plain tracts. On the other hand the remaining three districts Chandel (292), Ukhrul (222) and Tamenglong (194) have slightly equivalent numbers of villages. In these three districts the area of foothills which is more convenient for settlement is very less. In Chandel district National Highway 39 passes through but settlements are very few due to steep slopes and less of foothills. In Ukhrul and Tamenglong districts also crossed by state highways Imphal-Ukhrul road and Imphal-Tamenglong road respectively. But the same way as it occurred in Chandel district habitation sites are very few along these roads.

(B) Manipur Valley Region

The Manipur valley comprises the three districts-Imphal, Thoubal and Bishnupur. Distribution of rural settlement in the valley region is somewhat even in comparison with the hilly region but in southern portion of this valley particularly in the Bishnupur district distribution is uneven. This is due to the extension of Loktak lake and surrounding marshes. From the table 4.1 it is observed that Imphal district counts 323 villages while Thoubal and Bishnupur districts count 87 and 45 respectively. In Bishnupur district settlements are concentrated along the Imphal-Churachandpur road while those of Thoubal and Imphal districts scattered uniformly throughout the districts.

(C) Size-wise distribution

The small sized villages (below 500 persons) have registered the highest rank comprising 1524 (69.84%) villages (Table No. 4.2) of the state with a larger volume of population of 294090 (22.09% to the total rural population) in 1991. Being reflected by the environmental
setting of the region the maximum number of these villages are in the hill districts such as Churachandpur 436 (28.61%), Senapati 412 (27.03%), Chandel 270 (17.72%), Ukhrul 156 (10.23%) and Tamenglong 135 (8.86%) while minimum numbers are in the valley districts, Bishnupur 4 (0.26%), Thoubal 11 (0.72%) and Imphal 100 (6.56%). Medium sized villages, in the population range of 500-999 dominate the uniform scene in the districts of Tamenglong, Ukhrul and Churachandpur but the largest number of villages of this size goes to Imphal district 73 (23.47%) while Senapati 58 (18.65%) ranks in the second position. Other remaining districts Chandel has 21 (6.75%), Thoubal 17 (5.47%) and Bishnupur 8 (2.57%). Further it is revealed that the large sized village (1000-1999) has a considerable position in the state, being expanded with 192 villages with a population of 269863. Very large villages (2000-4999) are distributed in different districts except Chandel district. Imphal district records the highest number 64 while Thoubal 30 in the next. The number of exceptionally large village (5000 and above) is very few in the state (19) and mostly located in the valley districts (16) while only three in the hilly districts Ukhrul, Senapati and Tamenglong. Out of 19 villages Bishnupur district covers only 7 (36.84%) and followed by Thoubal 5 (26.32%) and Imphal 4 (21.05%).

4.2 Site of Rural Settlements

The first task of a rural geographer is to determine exactly the characteristics of the site and situation of the village. It considers the spatial inter-relationships within the village, among the villages of a region and interactions of the villages in the region with their respective external areas, which affect the sizes, spacings and inherent characteristics of villages. Generally, in selecting the site of a village a central position, a healthy locality with sufficient supply of water, having advantage from defence point of view and finally an easy accessibility with its catchment area are the sources of factors which are taken into account. Stone (1995) has amply illustrated in his article the development of a focus for the geography of settlement and highlighted that
in the selection of settlement sites, man is usually guided by both the attraction and restrictive forces of physical setting such as geology, relief, drainage, climate, soil and natural vegetation. His views hold good in the case of the settlement system of Manipur as physiographic conditions like relief feature, soil conditions, availability of water and other cultural factors have cumulative effect on the growth and distribution of rural settlement of the state. Besides there are a number of cultural factors also that influence the location of human habitations and such decisive factors are analysed there in detail as under:

4.2.1 The Relief Features

The relief features like hills, plains and plateaus are the decisive factors for the siting of settlements. Hills, hilly slopes and plateau areas do not permit for good agriculture and as such they are usually avoided for the settlements. While the better sites for garrison or fortified settlements are offered by the hills that are regarded as the safety place from defence point of view. Hence hills and river barriers are considered to be the best factors of siting. Such examples of barricaded settlement on hill tops are found in the hill districts of the state. The river valleys and plains play a vital role, and provide better opportunities for human occupancy. The central part of the state where there is Imphal valley has such characteristic features. Not only such characteristics plateaus and hill slopes which are abundantly seen and suitable for vegetation and grazing permit good site for settlement. A study of toposheets supplemented by personal field-work has revealed that the plan of the villages has been mostly adjusted to the relief features of the region. Some villages are built on good lands that are slightly raised above flood level. Some are on the river levees and others along the edges of the hill slopes.

---

4.2.2 The Soil Conditions

The soil conditions are now recognised to be one of the most important series of factors in the determination of settlement sites. Agriculture is the main aspect of the rural economy. Rural population mainly depending upon cultivation, has invariably to take into account the conditions of the soil or the soil fertility. In the past, in most part of the world, soil fertility was the decisive factor in the determination of the village site. The uniform character of the transported soil in the Imphal valley and Barak valley is favourable to large human agglomerations. These soils, with few exceptions are well suited for cereal cultivation and usually associated with the clustered villages and large open field system. Their fertility and productivity, their moisture holding capacity and their extent have attracted human establishments since historic past in the central valley.

4.2.3. The Availability of Water

One of the greatest problems of large human settlement is that of water supply. Water is undoubtedly, indispensable need for man's life since the historic past and water courses have activated a potent fascination for human settlements. The water seeking sites of rural settlements in the region may be grouped into river bank, tanks, lakes and springs. Such sites are in abundance in the region in the form of natural or artificial water supply. The unequal distribution of water on the surface exerts a significant role on the location of human habitations. In the hilly regions the villages have closely followed the springs and the streams that carry certain amount of water through the years but in the plains, the selection of site for settlement is also affected by the factors other than the water. It is only, in rare cases that the settlements are located without consideration for availability of water. The distribution of sites for the settlements is often guided by the drainage patterns of the region and lakes. The water seeking sites of the villages are often referred to “Wet point villages”. Such villages are seen through the entire region as Irlung, Kangla Siphai, Itham, Pungdombam, Changamtabi along the river banks and other settlements

3 Crone, G.R. “Background to Geography”, London, p.130
LOCATIONAL ANALYSIS OF RURAL SETTLEMENTS

Canal with settlement

Hill with settlement

River with settlement

Vegetation with settlement

Tenk with settlement

Communication with settlement

Fig. 4.1
in the hills. But on the other side in the areas of water logging or in the low-lying areas of the region as the Thanga, Ithing and Karang the swamp rendered a large part unsuitable for agricultural purposes and human settlements as well. In such areas, the most favourable sites are those that provide refuse from water. Such sites are called “Dry point villages”.

4.2.3 Means of Communication

The cheap means of transport and communication facilitate the movement of commodities, people and ideas. Spale (1952), opines that “the concentration of human habitations generally side by side with the concentration of the means of communication”5. Places on main traffic routes are the favourable sites. The intersecting places of roads serve best for the siting and growth of settlements. The villages or hamlets are located mainly for such services as teastalls, restaurants, sweet and vegetable shops etc. that takes place owing to the requirements of the passengers. Transportational and communicational contacts and exchange in varying degree have had their influence on the patterning of settlements. Thus with the growth of means of communication in the state is always associated with a corresponding growth of settlements at certain sites. Similarly changes in the mode of transport show a declining trend of the settlements too. “Road is one of the most fundamental institutions of mankind. It sows seeds of life-houses, hamlets, villages and towns”6 and determines the growth of settlements in many ways.

4.3 Types of Rural Settlements

The types of rural settlements refer to relationship of number of dwellings, number of sites and space between the habitations. Rural settlements differ in size and complexity ranging from dispersed houses to the large compact villages. These settlement types are the manifestations of the social and physiographic conditions. Most of the settlement geographers like Brunches7,

4 Crone, G.R., I bid.
6 Blache, Principles of Human Geography 1959, pp. 289-301.
Enayat Ahmed⁸ and R.L. Singh⁹ have classified the types of settlements into four main types. In the state the type of settlements are largely dominated by the geographical environment and cultural factors. Keeping in the minute observation the type of settlements in the region is classified into the following main types.

Compact Settlement

Semicompact Settlement

Semi dispersed and

Dispersed or hamleted

4.3.1 Compact Settlement

The compact type of rural settlements are predominantly found in the valley districts of Manipur where the fertile soil and levelled lands are found. In the compact type of settlements almost all the residences are concentrated in one central site of a revenue village. The size and form of compact settlements may vary from small to a large village with the population of 200 to 5000 and over due to physical and cultural factors. These villages are mostly rectangular.

These nucleated settlements widely cover the valley districts of Imphal, Thoubal and Bishnupur. The compactness of the dwellings vary from one parts of the region to the other. In the neighbouring areas of the Imphal city specially in the Tahsil of Imphal east I, Imphal west I and Imphal west II the dwellings are much congested. In the two remaining districts Thoubal and Bishnupur also the congested dwellings are predominant. Khangabok, Charangpat, Sangaiyumpham, Tentha and Leishangthem in Thoubal district and Leimapokpam, Ngaikhong Khulen, Wangoo Ahallup, Sagang, Thanga, Kha Thinungei etc. in Bishnupur district are the suitable examples of such type of settlements.

TYPES OF RURAL SETTLEMENTS

Compact settlement

Semi-compact settlement

Dispersed settlement

Semi-dispersed settlement

Fig. 4.2
4.3.2 Semicompact Settlement

Semicompact the intermediate stage of settlements between compact and semidispersed is characterised with an average population of 100 to less than 200 persons and some of them having over 1000 population. The tendency of dispersal is largely fascinated by the presence of open fields, hills, grazing lands, roads, rivers and lakes etc. Such type of settlements are commonly dominated in the outside margin of the compact settlements of the three valley districts. The Jiribam sub-division of Imphal East district in the Barak valley is the suitable example which the semicompact settlements are dominated. In this valley about one third of the villages have a population below 200 persons and some of them having over 1000 population.

4.3.3 Semi-Dispersed Settlement

The semidispersed settlement is characterised by hamleted or fragmented type of settlements which are scattered over the isolated lands which dispersed from the main settlement area. In these settlement areas the infrastructures for human well being are very poor. The sites of such settlements are basically based on the agricultural activities. The village population is so fragmented into several hamlets that the main sites may not be easily marked and differentiated. The main inhabited site of the state has a weak and loosening influence on the communication of such fragmented hamlets due to the presence of wide open spaces and cultivated fields. The semidispersed habitations are seen in the southern and eastern part of Sadar Hills west sub-division, northern and southern part of Sadar Hills east-sub-division, eastern side of Imphal East I sub-division, eastern part of Imphal East II sub-division, western margin of Imphal West I and II sub-division and outskirts of Thoubal and Bishnupur districts.

4.3.4 Dispersed Settlements

The dispersed type of settlements are associated with the rocky and forested hills of the state. In these settlements of the ragged topography, one has to walk a considerable distance
from one village to reach the other. Most of the hill region settlements are distributed along the site of small cultivable lands and springs. Normally dispersed types of settlements contain between 100 and less than 500 population and some villages even reach more than 5000 population. The most dispersed type of settlement are found in the districts of Tamenglong and Chandel. Such dispersed type of settlements in the hilly regions is caused by the rough topography, diversity of soil, relative insecurity, variation in respect of altitude and fragmentation of the tribal society into large number of groups and clans. The migration of settlements in the hills is very common due to the practicing of jhooming or shifting cultivation by some groups of the hill tribes.

4.4 Size and Spacing of Rural Settlements

The study of size and spacing of rural settlements takes a great role in interpreting the intricate pattern of rural settlements. The degree of dispersion of rural habitats is closely related to their size\(^{10}\). The distributional pattern of the rural settlements in any region is the outcome of the varying economic forces such as physical conditions, demographic aspects, transport arteries and socio-economic environment. “As physical conditions may limit the possibilities of the economy, so the economy in turn by a limiting or stimulating factor in relation to size, density and stability of human settlements”\(^{11}\). In the state Manipur, physiography, vegetation, soil condition, water availability as well as transportation facilities are the most potent determinants, influencing the size and spacing of rural settlements.

4.4.1 Size of Rural Settlements

The size of settlements (based on population) of the state ranges widely region to region. The size of settlements in the valley districts is larger than that of the hilly districts. The average population size of villages comes to 618. However, there is a great fluctuation in size ranging

---

\(^{10}\) R.Y. Singh, the Malwa Region : Rural Habitat System (Structure and Change), International centre for rural habitat studies, 1978, p.83.

\(^{11}\) Forde C.D., Habitat, Economy and Society, p.465.
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>HILL DISTRICTS</th>
<th>VALLEY DISTRICTS</th>
<th>% to the total village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ukhur Tamenglong Churchandpur Senapati Chandel</td>
<td>Imphal Thoubal Bishnupur Total</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Total No. of Villages</td>
<td>222            194          502        517       292</td>
<td>323          87       45</td>
<td>2182 100</td>
</tr>
<tr>
<td>2</td>
<td>% to the total villages</td>
<td>10.17          8.89        23.01     23.69     13.38</td>
<td>14.80        3.99     2.06</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Small Villages (below 500)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>No. of villages</td>
<td>156            135          436        412       270</td>
<td>100          11       4</td>
<td>1524 69.84</td>
</tr>
<tr>
<td>(ii)</td>
<td>% of villages</td>
<td>10.23          8.86        28.61     27.03     17.72</td>
<td>6.56         0.72     0.26</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Medium villages (500-999)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>No. of villages</td>
<td>44             45           45         58        21</td>
<td>73           17       8</td>
<td>311 14.25</td>
</tr>
<tr>
<td>(ii)</td>
<td>% of the district</td>
<td>14.15          14.47       14.47     18.65     6.75</td>
<td>23.47        5.47     2.57</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Large village (1000-1999)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>No. of villages</td>
<td>18             10           16         30        1</td>
<td>82           24       11</td>
<td>192 8.80</td>
</tr>
<tr>
<td>(ii)</td>
<td>% of the district</td>
<td>9.38           5.21        8.33      15.62     0.52</td>
<td>42.71        12.50    5.73</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>Very large Village (2000-4999)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>No. of Villages</td>
<td>3              3            5          16        0</td>
<td>64           30       15</td>
<td>136 6.19</td>
</tr>
<tr>
<td>(ii)</td>
<td>% of the district</td>
<td>2.21           2.21        3.68      11.76     0</td>
<td>47.06        22.06    11.03</td>
<td>100</td>
</tr>
<tr>
<td>7</td>
<td>Exceptionally large (5000 above)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i)</td>
<td>No. of villages</td>
<td>1              1            0          1         0</td>
<td>4            5        7</td>
<td>19   0.87</td>
</tr>
<tr>
<td>(ii)</td>
<td>% of the district</td>
<td>5.26           5.26        0         5.26      0</td>
<td>21.05        26.32    36.84</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Compiled from the census of India, Manipur, 1991
from 4 in Komtam village of Senapati district to 12,925 in Khangabok (Thoubal district). It is astonishing to note that 69.84% of the total villages are included in the category of very small villages i.e. below 500 population while 23.05% of the total villages have population between 500 to 1999 the villages having population of 2000 to 4999 and above 5000 constitute only 7.10% of the total number of villages. Table 4.2 depicts a clear picture of the size of villages in population with percentage on district level.

From the Table 4.2 it is clear that the three districts viz. Imphal¹², Thoubal and Bishnupur have very low percentage of small villages i.e. 7.54% of the total number of villages of the size (below 500). On the other hand very large villages (2000-4999) are very plenty in such three valley districts i.e. 80.15% of the total villages of this size of population. Only the remaining 19.85% of the total very large villages are depicted in the five hilly districts. Medium size villages (500-999) are dispersed widely and equally both in the valley and hilly districts. This is due to the natural phenomena of the region. On the basis of population size, the villages of the state are grouped into five categories and mentioned briefly as under.

(A) **Small Villages (Less than 500 persons)**

From the analysis of the table 4.2 it is noted that the state has 1524 small villages (less than 500 persons) being distributed 7.54% in the valley districts and 92.46% in the hilly districts. This category of villages count for 69.84% of the total number of villages. The distribution of small villages has uneven significance on district levels viz. Imphal-100, Thoubal-11, Bishnupur-4, Ukhrul-156, Tamenglong-135, Churachandpur-436, Senapati-412 and Chandel-270. From this illustration it is evident that Churachandpur has the maximum number of small villages while Bishnupur district has minimum number.

---

¹² In 1997 Imphal district has been bifurcated into two districts viz, Imphal West and Imphal East district, but as the data is based on 1991 census the bifurcated new districts are not mentioned here.
(B) Medium Village (500-999)

Medium size villages count 311 i.e. 14.25% (Table 4.2) of the total number of villages in the state. Imphal district has the largest number of medium size villages i.e. 73 (23.47%) while only 8 (2.57%) in Bishnupur district. In comparison with other sizes of villages, medium size villages are more equally distributed in all districts of the study area such as Ukhrul-44 (14.15%), Tamenglong-45 (14.47%), Churachanpur-45 (14.47%), Senapati-58 (18.65%), Chandel-21 (6.75%) and Thoubal-17 (5.47%) (Table 4.2).

(C) Large Villages (1000-1999)

In the state the number of large size settlements have a considerable position by representing 192 (8.80%) villages of the total number of rural settlement. These large size villages possess a higher volume of 269,863 population (Table 4.3). Imphal, Senapati and Thoubal are the leading districts containing of such villages of the state possessing 82(42.71%), 30(15.62%) and 24(12.50%) respectively. (Table No. 4.2). The lowest number of these classes of villages are concentrated in the districts of Ukhrul 18(9.38%), Churachandpur 16(8.33%), Bishnupur 11(5.5%), Tamenglong 10(5.21%) and Chandel 1(0.52%).

(D) Very Large Villages (2000-4999)

Very large villages are mainly confined to the valley districts i.e. Imphal, Thoubal and Bishnupur. Out of 136 very large villages of the state 109 (8.15%) villages are concentrated in the valley and only remaining 27 (19.85%) are distributed in the hilly districts such as Churachandpur-5(3.68%), Ukhrul-3(2.21%), Tamenglong-3(2.21%), Senapati-16(11.76%) and no village of this size in Chandel district.
(E) Exceptionally Large Villages (5000 and above)

In Manipur the number of exceptionally large villages are very few i.e. only 19. This group of villages are not distributed to all the districts. Only 6 districts (Imphal, Thoubal and Bishnupur) in the valley and three (Ukhrul, Senapati and Tamenglong) in the hills accommodate such group of villages. Bishnupur district has the largest number of such villages i.e. 7 while 5 in Thoubal, 4 in Imphal and 1 each in the districts of Ukhrul, Senapati and Tamenglong. This group of villages are totally absent in the districts of Chandel and Churachandpur.

Table No. 4.3

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Population size</th>
<th>Size of Villages</th>
<th>No. of Villages</th>
<th>% of the total villages</th>
<th>Population</th>
<th>% to the total rural population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Below 500</td>
<td>very small</td>
<td>1525</td>
<td>69.84</td>
<td>294090</td>
<td>22.09</td>
</tr>
<tr>
<td>2.</td>
<td>500-999</td>
<td>medium</td>
<td>311</td>
<td>14.25</td>
<td>218645</td>
<td>16.42</td>
</tr>
<tr>
<td>3.</td>
<td>1000-1999</td>
<td>large</td>
<td>192</td>
<td>8.80</td>
<td>269,863</td>
<td>20.27</td>
</tr>
<tr>
<td>4.</td>
<td>2000-4999</td>
<td>very large</td>
<td>136</td>
<td>6.19</td>
<td>408760</td>
<td>30.70</td>
</tr>
<tr>
<td>5.</td>
<td>5000 and above</td>
<td>exceptionally large</td>
<td>19</td>
<td>0.87</td>
<td>140146</td>
<td>10.53</td>
</tr>
</tbody>
</table>

Source: Compiled by the author from the data of census of India, Manipur.

4.4.2 Spatial Analysis of Rural Settlements

The spacing of rural settlement has a significant place in theoretical consideration of distribution. It is the quantitative expression of dispersion. Spacing or inter village distance interprets the spacial pattern of the distribution and dispersal of the rural settlements. Thus the spacing is an areal expression which express the density pattern of the rural habitations. The concept of spacing deals with the locational arrangement of points (villages) with respect to one another.
The formula for the computation of spacing (in km) used in the preset study is HD = 1.0746 d as described Mather. In this formula “HD” represents the Hypothetical Distance between two points in hexagonal arrangement and ‘d’ is the density of settlements i.e. N/A per unit area (sq. km.).

The derivation of the above formula follows thus. In this method the study area is divided into many hexagons and the hexagons are assumed to be the villages.

In Fig. 4.3, A and B are the two points of hexagons then AB will be their Hypothetical inter point distance

In the ΔADC (right angled at D)

The area of the ΔADC = \( \frac{1}{2} \) AD.CD

and let AC = x

Now from the rt. ΔADC

\[ \sin 60^\circ = \frac{AD}{AC} \]

\[ \Rightarrow \frac{\sqrt{3}}{2} = \frac{AD}{x} \]

\[ \Rightarrow 2AD = \sqrt{3}x \]

\[ \therefore AD = \frac{\sqrt{3}x}{2} \]

Again, \( \sin 30^\circ = \frac{CD}{AC} \)

\[ \Rightarrow \frac{1}{2} = \frac{CD}{x} \]

\[ \Rightarrow CD = \frac{x}{2} \]
Fig. 4.3
Hexagonal Arrangement of Rural Settlements

From the fig. \(AB\) the Hypothetical inter village distance (HD)

\[
HD = AD + DB
\]

\[
HD = 2AD
\]

Hexagonal arrangement of Rural Settlements

\[
HD = \sqrt{3}x \quad \therefore AD = \frac{\sqrt{3}x}{2}
\]

Now, the area of the \(\triangle ADC = \frac{1}{2} \cdot AD \cdot CD\)

\[
= \frac{1}{2} \cdot \frac{\sqrt{3}x}{2} \cdot \frac{x}{2}
\]

\[
= \frac{\sqrt{3}x^2}{8}
\]

Area of the hexagon = twelve times of the area of the \(\triangle ADC\)

\[
= 12 \times \frac{\sqrt{3}x^2}{8}
\]
\[ = 3 \times \frac{\sqrt{3} \times x^2}{2} \]

The area of the hexagon should correspond to the average area of a village i.e. \( \frac{A}{N} \)

\[ \therefore 3 \times \frac{\sqrt{3}}{2} \times x^2 = \frac{A}{N} \]

\[ \Rightarrow 3x^2 = \frac{2A}{N\sqrt{3}} = 1.1547 \frac{A}{N} \]

\[ \Rightarrow \sqrt{3} \times x^2 = \sqrt{1.547} \frac{A}{N} \]

\[ \Rightarrow \sqrt{3} \times x = 1.0746 \sqrt{\frac{A}{N}} \]

\[ \therefore \text{HD} = 1.0746 \frac{1}{\sqrt{A}} \left[ \therefore d = \frac{N}{A} \right] \]

From the analysis of the Table 4.4: it is noted that the rural density correlates with the spacing of rural settlements. The rural density per sq. km in the study area (Table No. 4.4) ranges from .044 in Tamenglong district to .279 in Imphal district. Because of rugged terrain, rocky forested tracts, scarcity of water and poor soil the rural density is much lower in the hilly districts viz. Tamenglong (0.044), Ukhrul (0.049) and Chandel (0.088). In these districts the resources sparsely spread over large areas and the villages require a large area for sustenance and thus there is greater spacing. In the valley region also particularly in Bishnupur district rural density is much lower i.e. 0.098. This is caused by the extension of Loktak lake and its surrounding wastelands. Rest districts Imphal (0.279), Thoubal (0.179), Senapati (0.158), Churachandpur (90.110) have somewhat higher rural density because of having more habitable infrastructures such as road network, plains, canals, fertile soils, etc. With a view to explaining and computing the spacial density under different controlling factors the following categories are identified.
Table No. 4.4
Spacing of Rural settlements

| Name of district | No. of inhabited villages | Rural areas of the District | Rural population | Spacing \( d = N/A \) \( d^{1/2} \) | Rural density per sq.km. |
|------------------|---------------------------|----------------------------|-----------------|---------------- ---------------------|------------------------|
| Imphal (E & W)   | 323                       | 1155.80                    | 419579          | 2.035          | 0.279                  |
| Thoubal          | 87                        | 485.39                     | 186504          | 2.540          | 0.179                  |
| Bishnupur        | 45                        | 458.98                     | 117603          | 3.433          | 0.098                  |
| Senapati         | 517                       | 3271.00                    | 208406          | 2.700          | 0.158                  |
| Churachandpur    | 502                       | 4563.50                    | 142518          | 3.237          | 0.110                  |
| Ukhrul           | 222                       | 4544.00                    | 109275          | 4.862          | 0.049                  |
| Tamenglong       | 194                       | 4391.00                    | 86278           | 5.142          | 0.044                  |
| Chandel          | 292                       | 3313.00                    | 61341           | 3.618          | 0.088                  |

Source: Compiled and computed by the author with the help of census data 1991, Govt of Manipur, India.

**A) Moderate Spacing (2 to 3 km.)**

The value of spacing of this group ranges between 2.035 km (Imphal district) to 2.700 km. (Senapati district) covering Thoubal district (2.540 km) in the central valley (Tab. 4.4). It covers only 22.15% of the total rural area of the state. This area represents the three districts Imphal, Thoubal and Senapati. Imphal and Thoubal both of them are in the Manipur valley region comprising the compact settlements. In these two districts the habitable factors for human settlement are highly gratified. Thus, the spatial values for the distribution of settlement is moderate. The average size of settlements in population in these two districts is 1478. This is very high in comparison with other spatial regions but in Senapati district the average size of village is comparatively smaller i.e. 403 only but due to coverage of maximum number of villages spatial value is slightly equivalent with the two valley districts Imphal and Thoubal.
(B) Moderately High Spacing (3 to 4 km.)

The value of spacing under this category ranges from 3.24 km. (Churachandpur district) to 3.62 km. (Chandel district) being the Bishnupur district (3.43 km.) in between them. Major area comes under this category is about 37.58% of the total rural area of the state. Number of inhabited villages per 100 sq. km. is 10.06 and per village population varies between 210.07 in Chandel district and 2613.40 in Bishnupur district.

(C) High Spacing (4 to 5 km.)

This spacing ranges between 4-5 km. and cover the only Ukhrul district with a percentage of 20.48% of the total rural area of the state. The number of inhabited villages included in this category is 222 with a population of 109275. Average size of village in this region in population is 492 and inhabits only 4.9 (approximately 5) villages per 100 sq. km. This spacing is comparatively high in comparison with Imphal district which has 27 villages per 100 sq. km.

(D) Very High Spacing (5-6 km)

In the state Manipur, Tamenglong district has the highest spacing value. It has 5.14 km. of spacing value which stood in the last position among the districts of the state. This spacing value comprises about 19.79% of the total rural area of the state. Number of villages per 100 sq. km. is less than 5 villages and per village population is 444.73.

Thus from the above analysis it is noted that spacing and size do not reveal a direct correlation rather they appear to be inversely correlated in some parts. For example, in Senapati district spacing value is low due to the small size of village (403 population per village) and large number of villages (517) while in Bishnupur district has comparatively high due to the large size of villages (2613 persons per village) and number of settlements are very few i.e. only 45 villages. Usually the valley has the high concentration of population as fertile strips of land are available and on the contrary, hilly regions have the scattered distribution. Therefore, in the
districts of Imphal, Thoubal and Bishnupur have the low value of spacing while higher value in
the hilly districts. The study indicates that the areas having close spacing are favourable for
establishment of infrastructures and cheaper administration. The hilly region expands five districts
but out of this only four excluding Senapati have the high value of spacing and scattered settlements
with poor facilities of socio-economic services i.e. road, water supply, electric supply, institution
and public health facilities etc.