CHAPTER V

SETTLEMENT PATTERN, RANK ORDER

AND SETTLEMENT SYSTEM
I) **SETTLEMENT PATTERN**

**INTRODUCTION:**

An analysis of the rural and urban settlements in the study area indicates that the number of villages has remain constant but change in size and function of the village is noticed over the period of twenty years from 1951 to 1971. Since the village-wise census data for the year 1981 is not available it could not be incorporated in the work. (Ref. table No.5.1 to 5.3 and Fig. No.5.1 to 5.3). The maps reveal that the size of villages has grown particularly in the canal zones of Godavari river in Kopergaon and Shrirampur tahsils, along the courses of Godavari, Pravara, lower part of Mula and Dhora rivers. Some increase is also noticed along the Sina river. Secondly, significant growth in the size of rural settlements has occurred in villages located along the Poona-Manmad railway line via Daund, as well as along state highway in the district. The third factor that deserves attention is the diffusion of parcolation tanks in the district and consequent increase in the size of villages in the central and southern part during the period of study.

As regards the change in the urban settlement pattern, it is significant to note that most of the new urban centres in the district, except Ahmadnagar city have grown following agricultural development in the northern part of the district
AHMADNAGAR DISTRICT
VILLAGES BY POPULATION SIZE
YEAR-1961

Fig No. 52

LEGEND

TALUKA BOUNDARY
DISTRICT BOUNDARY
DISTRICT H.Q.
PERSONS

- Less than 500
- 500-999
- 1000-1999
- 2000-3999
- 4000-4999
- 5000-9999
- 10000-14999
- 15000-19999
- 20000 and Above

N

AHMADNAGAR DISTRICT
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from 1951 to 1981. The change from 1901 to 1951 is comparatively less impressive. In other words agricultural progress has led to rural prosperity and that in turn has been instrumental in the growth of urbanisation in the tahsils, viz. Kopargaon, Shrirampur, Rahuri and Sangamner. Ahmadnagar city is the regional centre and has grown due to rural development in the fertile tracts on the one hand and progress of industries at the M.I.D.C. area of Nagpur-Savedi. This growth of industries during past one decade at Ahmadnagar is a result of diffusion of industries from Pune inland in the larger hinterland of Greater Bombay.

A) RURAL STRUCTURE

According to 1981 census the population of the district is 27,11,216 persons is spread over the district area of 17035 sq.kms. The rural area of the district 1622.4 sq.kms. is populated by 2359283 persons which indicates that 87.02 percent of the total population live in the rural area and the remaining 12.98 percent is found in the 112.6 sq.kms. urban area.

There are 1312 villages in Ahmadnagar district. In 1951, the distribution of rural population according to size of villages is up to 500 population 12.14 percent, 500 to 999 population 24.12 percent, 1000 to 1999 population 30.12 percent 2000 to 2999 population 11.99 percent, 3000 to
3999 population 7.36 percent, 4000 to 4999 population 1.76 percent, 5000 to 9999 population 10.68 percent and 10,000 to 14,999 population 1.80 percent. There was not a single rural settlement with more than 15,000 population in the year 1951.

In 1961, the distribution of rural population according to size of villages is up to 500 population 6.83 percent, 500 to 999 population 19.96 percent, 1000 to 1999 population 30.79 percent, 2000 to 2999 population 14.16 percent, 3000 to 3999 population 6.60 percent, 4000 to 4999 population 3.86 percent, 5000 to 9999 population 11.92 percent, 10,000 to 14,999 population 5.88 percent. There is not a single rural settlement above 15,000 population in the year 1961.

In 1971, the distribution of rural population according to size of villages is up to 500 population 3.71 percent, 500 to 999 population 15.52 percent, 1000 to 1999 population 28.88 percent, 2000 to 2999 population 16.54 percent, 3000 to 3999 population 8.38 percent, 4000 to 4999 population 4.31 percent, 5000 to 10,000 population 14.52 percent, 10,000 to 14,999 population 5.55 percent and 15,000 to 19,999 population 0.87 percent.

These figures reveal the trend that the smallest villages are being denuded of population on the one hand and the larger villages are increasing in size. The share
of population of villages with 999 inmates has declined from 36.26 percent in 1951 to 19.23 percent in 1971. Similarly the share of villages with population 1000 to 1999 has declined from 30.12 percent in 1951 to 28.88 percent in 1971.

Tahsilwise distribution of villages according to population size and rural population according to size of villages from the year 1951 to 1971 is given in table No 5.1 to 5.3 and fig. 5.1 to 5.3. The pattern reflects the landforms, soil productivity progress in agriculture, trade commerce industries etc.

The maximum number of villages up to 2000 population occurs in 1951 (1197 villages), 1961 (1137 - villages), 1971 (1047 villages), and the maximum number of villages from 2000 to 19999 population is in 1951(115 - villages), 1961 (175 villages), 1971 (265 villages).

The growth of relatively big villages is mainly in northern part of the district. Generally speaking the large size villages (i.e. above 5000 population) occur in considerable number where some amount of economic prosperity is experienced. This is the main reason that could be attributed to the polarisation of rural population at some villages in the irrigated and prospering tract.
B) URBAN STRUCTURE

In Ahmadnagar district there is only one class I city, viz Ahmadnagar, being a district administrative headquarter and industrial, commercial, educational, market transport and communication centre, one class II (Shrirampur) Three class III (Sangamner, Kopergaon, Rahuri) according to 1981 census. Ref. table No 5.4 and fig. No. 5.4) The growth of urban centre in the district during 1901 to 1941 was slow trend however urban population started increasing from 1971 onwards with rapidly after 1951 onwards.

C) PATTERN OF DISTRIBUTION OF SETTLEMENTS

The principle underlying the process of functional organisation of a region is that the distributional pattern of human settlements in a region is disorderly. The spatial arrangement of settlements in its earliest stage of organisation follows certain landform and landuse features. The evolution of nodal centres of the lowest order than takes place according to certain regularities. There would also be certain regularity in the number and rank order of settlements. The initial pattern, whether it is uniform, clustered or random would prove a basis for analysis of the evolution of a system of nodal centres and to formulate a framework of settlement's hierarchy. Here an attempt is made to analyse the spatial pattern of distribution of settlements using the approach suggested by Clerk and Evans to measure the
distributional pattern of the settlements of Ahmadnagar district.

NEAREST NEIGHBOUR ANALYSIS

For measurement of spatial pattern of distribution by nearest neighbour method of analysis, the formula used for actual average distance:

\[
(\bar{r}_a) = \frac{\text{Total distance}}{\text{Total settlements}}
\]

- and formula used expected average distance:

\[
(\bar{r}_e) = \frac{1}{2n} \left( \frac{1}{2} \cdot \frac{n}{A} \right)
\]

Where: \(n\) = Number of settlements

\(A\) = Actual area

and then calculated \(R\) = divergence from randomness values using following formula.

\[
R = \frac{\bar{r}_a}{\bar{r}_e}
\]

Where: \(R\) = Divergence from randomness

\(\bar{r}_a\) = Actual average distance

\(\bar{r}_e\) = Expected average distance.
When we get R value for each tahsil, where the R value is more than 1 the settlements are dispersed and where the R value is less than 1 the settlements are compacts, (Ref, table No 5.5).

The application of the nearest neighbour technique in Ahmadnagar district and in its thirteen tahsils reveals that the distribution is random. In the district out of thirteen tahsils the five tahsils have compact settlements and four tahsils dispersed settlements and in remaining four tahsils have nearly dispersed settlements. The Ahmadnagar district as a whole also nearly dispersed settlements (R = .94).

By this analysis it is possible to throw light on the pattern of organisation of rural economy around the lowest order central places and causes for the distribution of the natural processes of organisation. Relative homogeneity in terrain, landuse pattern and productivity in Ahmadnagar area explains the nearly uniform pattern of distribution of rural settlements. The distortions leading to random distribution of the lowest order central places are either due to local variations or the influence of major transport routes which induce the growth of rural settlements situated on or near them as the central places. The co-existence of uniform and random distributional pattern would therefore influence the future strategy of
settlements hierarchy and space relations—an other feature of the settlements and size is the packing of the highest nodal centre, like Ahmadnagar, Shrirampur, Kopergaon Rahuri, etc. This has tendency to distort the emergence of well-defined hierarchic system of settlements.

D) FUNCTIONAL CLASSIFICATION OF SETTLEMENTS ABOVE 5000 POPULATION

INTRODUCTION

Every settlement is a composite entity of the functions by which it is characterised. The functional characteristics of the surrounding area that sustains them. The Ahmadnagar district being essentially agricultural the function basis of settlements can be explained largely by the processes of development of agriculture. The spatial arrangement of important settlements of Ahmadnagar district is axial and nodal with reference to Ahmadnagar Shrirampur, Kopergaon, Rahuri, Shrigonda, etc. as the main focus of its convergence.

Since, it is the countryside that sets tasks to be performed by towns, therefore, functional analysis of towns throw light upon the functional needs of the countryside as well as indirectly the conditions of socio-economic development. Invariably the rural centres with population exceeding 5000 persons but classified as rural according to census definition functions as rural service
centres and also generally enjoy S.T. Bus service facility
credit facility and such other facilities needed by farmers.
(Ref. fig. No.5.5). Although some of the these settlements
are not classified as urban centres, even though these
settlements provide some services to the rural folk, like
supply of agricultural implements, seeds, fertilizers,
educational facilities, Hotelling, Wholesaling, collection
of milk, vehicle servicing centres etc. Agriculture is
the dominant function of all these settlements that support
secondary and tertiary services. Therefore, these
settlements have been treated here as urban and classified
functionally.

Classification can be based on geographical location,
stages of life cycle of city and size of population. But
in many ways the most meaningful basis of classification
is that of function determined mainly by occupational
structure. Functions are determined by the site, situation
and environmental conditions of settlements in which they
are located. The functional interpretation of settlements
has become significant aspect of study as it provided a
good basis for the regional planning.

In the present study an attempt has been made to
select and suitable statistical method for the functional
AHMADNAGAR DISTRICT
LOCATION MAP OF SETTLEMENTS
(Population above 5000 P.)
According to Census of 1971

Fig. No. 5-5
classification of the settlements of this region. It further attempts to find out their distinguishing functional character and their correlation with geographical conditions. The census of 1971 classified the settlements into nine groups of occupation viz. (i) cultivators, (ii) Agricultural labourers, (iii) livestock, forestry, fishing, hunting, plantation, orchards and allied activities (iv) mining and quarrying, (v) Household industries, other than household industries, (vi) construction, (vii) Trade and commerce, (viii) Transport storage and communication, (ix) other services, (I-IX) categories of workers. The census of occupational structure has been used for the functional classification of settlements in Ahmadnagar district.

(a) METHOD USED FOR FUNCTIONAL CLASSIFICATION OF SETTLEMENTS

Several methods have been used for classification of urban settlements according to functions. Important contribution have been made in this regard by Aurousseau, McKenzie, Hall, Weimer and Hoyt, James, Nath, Chauney, Harris, Alexander and Sharma.

In the present study Howard Nelsons method of classification is used with slight modification. Nelsons service classification of American cities is based on stated statistical procedure. He calculates the standard deviation from the mean in each of the activity groups and
classifies towns and cities according to the degree of variation from the mean. In this type of classification a city might provide more than one type of service in outstanding proportions. The data he used for his classification is the proportions of the labour force in a city engaged in a particular service. Nelson has worked out eight functions to analyse the main services performed by the cities in U.S.A. Nelson further uses the national average and the standard deviation for each activity group is calculated from the national means.

The study takes into consideration while calculating the means and the standard deviation of 53 settlements (urban settlements and large size settlements together) of Ahmadnagar district as listed in the 1971 census. Nelson in his classification has completely disregarded agriculture and considers it an insignificant function in towns. However it is an important function in some Indian towns. Janaki A.V.\textsuperscript{12} has applied the same method of Nelson for functional classifications of towns in Gujarat as well as for functional classifications of urban settlements in Kerala, and Prof. Kenkure K.B.\textsuperscript{13} has also applied the same method of Nelson for functional classifications of towns in Marathwada. In the census of 1971 the gainfully employed persons have been grouped in nine categories. All these
these nine categories have been used in the present classification except that the two agricultural groups (cultivators and agricultural labourers) have been combined to make them one group. Therefore, there are eight groups of activity which have been considered in the analysis. After this, the percentage of each activity group to the total workers in each of the 53 settlements of Ahmadnagar district, and the mean for each of the activity groups were calculated. The mean percentage of workers in the various activity groups in the 53 settlements is given in the table No. 5.6. The average values of percentage for the eight activity groups show variation with respect to the settlements under consideration. It is significant that the group of other services, which includes Teachers, Doctors, Government officers, persons employed in the personal services etc., has the minimum percentage (i.e., 8.58) in the region and group of cultivators and agricultural labourers has the maximum percentage in the region, (66.43%). Nelson's simple percentages and averages do not allow precise measurements for a satisfactory functional classification of settlements. The problem he says' is how large a percentage of labour force must be employed in particular category to make the performance of the service for enough above the normal, to justify separate classification for this purpose Nelson uses the standard deviation it is calculated with the help of following formula :-
\[ sd = \sqrt{\frac{\sum d^2}{N}} \]

\[ sd = \text{standard deviation} \]
\[ d = \text{Difference between each value and mean} \]
\[ N = \text{Number of values} \]

It is simple and widely used method. Standard deviation from the means have been therefore, calculated for each of the eight activity groups of Ahmadnagar district settlements and these have been presented in table No.5.7

Using the standard deviation and means the settlements grouped according to their appropriate functional categories, e.g. settlements with more than one degree of variation from the mean in agriculture are classed as agricultural settlements. The same procedure is followed in the case of other occupational groups. Table No.5.8 gives mean standard deviation, and degree of variation groups.

All settlements which have one S.D. (one standard deviation) more than the average are classed in the appropriate group and then plotted on the map. Settlements which do not have a percentage of workers above the mean +1S.D. in any of the occupation groups are classified as diversified settlements and the following symbols are used to represent the occupational groups.

1) A = Agriculture  
2) B = Mining forestry etc.  
3) C = Household industries  
4) D = other than household industries.  
5) E = Construction  
6) F = trade and commerce
vii) G = Transport and communication
viii) H = other services
ix) I = Diversified

b) **CLASSIFICATION**

The details of functional classification of settlements in Ahmadnagar district using the above method are presented in the table No 5.9 and fig. No 5.6 some settlements have more than one predominant function.

A) **AGRICULTURAL SETTLEMENTS**

Agricultural is the main function in Ahmadnagar district. The percentage of workers required to classify a settlements as agricultural is however 88.37 percent of the total workers in agriculture. There is very less construction and less development in transport, communication and in industrial function so the agricultural settlements are more.

Thirteen settlements out of fifty three settlements are classed as agricultural. This is so in spite of the fact that 88.37 percent of the workers in a settlement have to be agriculturists and or agricultural labourers together before it can be classified as an agricultural settlement. This is the largest class of settlements as expected due to the predominantly agricultural nature of the economy of the region.
FUNCTIONAL CLASSIFICATION OF SETTLEMENTS
(POPULATION ABOVE 5000) (YEAR 1971)

LEGEND
A- AGRICULTURAL
B- MINING FORESTRY ETC.
C- HOUSEHOLD INDUSTRIES
D- OTHER THAN HOUSEHOLD
E- CONSTRUCTION
F- TRADE & COMMERCE
G- TRANSPORT & COMMUNICATION
H- OTHER SERVICES
I- DIVERSIFIED ▲

Fig.No-5-6
Most of these settlements are rural service centres and classified as rural. Four of the thirteen agricultural settlements are in Kopergaon tahsil, two in Shrirampur tahsil, two in Jamkhed tahsil and one in each Pathardi, Pamer, Nevasa, Karjat, and Shrigonda tahsil.

(B) MINING AND OTHER PRIMARY SERVICE SETTLEMENTS

Eleven settlements out of the fifty three are classified as mining and other primary services settlements. The percentage of workers required to classify mining and other primary service settlements is however only 3.45 percent of the total workers in mining and primary service settlements. In this category services of mining quarrying, livestock, forestry, fishing, hunting etc. are combined, quarrying is a widespread activity in Ahmadnagar but on a small scale because of availability of building material, in many parts. Three of these settlements are in Rahuri, tahsil two in Shrirampur tahsil, two in Shrigonda tahsil, two in Kopergaon tahsil and one in each Nevasa and Karjat tahsils.

Mining is not practiced in the study region but other primary services such as quarrying, forestry, reading hunting etc. are included under this category. In Ahmadnagar district cattle reading, collection of forest produce are significant activity of Karjat, Kolgaon and Mandaogaon so these centres are classified as mining and other primary service
settlements in the same way Vambori, Haregaon, Ranjankhol Nevasa, Sanvatsar, Puntamba etc. are also grouped in this category due to quarrying activity practiced at these centres.

C) HOUSEHOLD INDUSTRIES

Ten settlements out of fifty three settlements are predominantly engaged in household industries. The distribution of household industries settlements is uneven. Two of these settlements are in Kopergaon tahsil and one in each Rahuri, Shrirampur, Nevasa, Sheogaon, Patherdi, Karjat, Akola, and Shrigonda, tahsils. The percentage of workers required to classify household industry is however only 7.53 percent to the total workers in the household industry. Household industries such as weaving, rope making, bidi making, repairing workshops etc. are mostly concentrated at tahsil places. Belapur, Raheta, and Mirajgapn are rural service centres that perform such functions for their surrounding villages, as there is no bigger centre nearly.

D) OTHER THAN HOUSEHOLD INDUSTRIES

The settlements classed as other than household industries settlements. The percentage of workers required to classify settlements as other than household industry is however only 16.68 percent of the total workers in other than household industry. Out of these ten settlements five
are in Shrirampur tal, two in Kopergaon tal, one in each Ahmadnagar, Sangamner, and Rahuri tal. All these settlements are either connected by roads or railways to the neighbouring towns or settlements. Ahmadnagar is a commercial and industrial centre. Industries such as oil expelling power looms units, Gerware nylons, agricultural implements manufacturing units, electrical appliances, iron rolling mills, ball bearing, saw mills, Luna moped factory, clutches and brakes units etc. are located at and in the environment of the Ahmadnagar, Kopergaon, Shrirampur, Rahuri and Sangamner also have different types of small and big industries such as oil expelling units, ginning and pressing factories, cement pipe industry and sugar factories etc.

(E) CONSTRUCTION

Only three settlements are classed as construction settlements. The percentage of workers required to classify settlements as construction settlements is however only 4.17 percent of the total workers in construction. Out of these three settlements one in each Rahuri, Akola and Kopergaon tal. Kopergaon is one of the developing tal headquarters of the region where different government construction and private construction work is in progress. In the same way, Baragaon Nandur and Deothan are growing rural
market centres. At these centres working population is engaged more in construction so they are included in this group of functional classification considerable construction work is in progress at Bargaon mandure owing to its nearness to Mula dam side.

(F) TRADING AND COMMERCIAL SETTLEMENTS

Eleven settlements out of fifty three are classed as trading and commercial centres. Trade includes both wholesaling and trading the later on a very small scale like selling of pan-bidi, sweets etc. the proportion of workers required to classify centres in this category is 12.33 percent of the total workers in the settlements in trade. Out of these eleven settlements, seven settlements are tahsil headquarters and one a district headquarters. They are connected either railways or roads to the neighbouring towns. The trading function of settlements is expressed in the form of a large number of shops. They deal in a variety of things like food grains, fertilizers, agricultural implements, cloth, machine tools, vegetables and fruits, and a list of other commodities. The wholesaling activity at Ahmadnagar, shirampur, Kopergaon, Sangamner, Rehuri is connected with turnover of food grain, cotton sugar, oil seeds, etc. Out of these eleven settlements three in Kopergaon tahsil, two in shirampur tahsil, and one in
each Ahmadnagar, Sheogaon, Pethardi, Karjat, Sangamner and in Nevasa tahsils. So a considerable number of them occurs in the irrigated tract.

(G) TRANSPORT AND COMMUNICATION SETTLEMENTS:

There are seven transport and communication centres in Ahmadnagar district. The percentage required to classify a settlements as transport and communication is 3.46 percent of the total workers in transport and communication. Out of these seven settlements two are in each Shrirampur, Kopergaon tahsils and one is in each Ahmadnagar, sheogaon, and Sangamner tahsils. These settlements are linked by railways highways, with neighbouring towns or settlements. The connectivity is more by S.T. bus services and truck transporting services at above mentioned places which are included in this function.

(H) OTHER SERVICE SETTLEMENTS:

This is a bundle of several services. This function claims Ten settlements. Except Kharda, all remaining eight settlements are tahsil headquarters (i.e. Shrirampur, Sheogaon, Jamkhed, Shrigonda, Akola, Kopergaon, Sangamner, Nevasa) and one district headquarters (i.e. Ahmadnagar). The percentage of the total labour force in the settlements is 16.30 percent is required to work in this activity group before it can be classified under this category. As mentioned
before, this functional group includes Teachers, Doctors, Lawyers etc., and other engaged in professional and personal services. Out of these ten settlements two in Jamkhed tahsil and one in each Ahmadnagar, Shrirampur, sheogaon, Shrigonda, Akola, Kopergaon, Sangamner and Nevasa tahsils. Other services include mainly quaternary services which are the important urban services. Except Kharda other centres are administrative units of the region. At these centres quaternary services are more so they are grouped in this category.

(I) DIVERSIFIED SETTLEMENTS

Nine settlements comes under this category and it is the fourth largest group. A diversified settlements is one where the percentage of workers to total workers does not reach above the mean + 1 S.D. in any of the occupation groups. Out of these nine settlements three in Shrirampur tahsil, two in Ahmadnagar tahsil, two in Parner tahsil and one in each Shrigonda, and Nevasa tahsils. Only rural service centres are grouped in this category. At these centres there are no any special activities and all functions are of equal importance so they are grouped in this head.

Above discussed functional classification shows that there are different special functions at various central places. The number of special functions varies from one function to five functions. This classification shows that the central places with one function are twenty seven in
number, they are relatively small central places specialised only in one function. Out of 53 central places ten central places have two functions which follows by diversified class of town with nine central places. As much as five settlements have four functions each. There is only one settlement each with three functions and five functions. The settlements with four functions and with five functions are mostly big size settlements and are relatively developed settlements where as the settlements with three functions and less than three functions are small size settlements and relatively less developed.

The list of settlements with number of functions is given below.

I) One function. 1) Taklibhan, 2) Kharawandi, 3) Nanna
4) Jawale  5) Nighoj  6) Dhamori
7) Chande kasare, 8) Ashtagaon, 9) Vakadi
10) Chande, 11) Rashin, 12) Kashti
13) Vambori, 14) Karjat, 15) Kolgaon
16) a Takalimiga, 17) Mandagaon
18) Rahuri B.K.  19) Loni. B.K.
20) Nipandi Vadgaon, 21) Savalvihir
22) Ranjen khol.Kh.  23) Deolali
24) Deothan  25) Shirdi
26) Jamkhed  27) Kharda
II) Two functions

1) Savatsar
2) Baragaon nandur
3) Haregaon
4) Ranjankhol
5) Puntamba
6) Pathardi
7) Mirajgaon
8) Akole
9) Shrigonda
10) Rahate

III) Three functions

1) Belapur

IV) Four functions

1) Nevase
2) Shegoan
3) Ahmadnagor
4) Shrirampur
5) Sangamner

V) Five functions

1) Kopergaon

VI) Diversified

1) Jeur
2) Akolner
3) Kolhar B.K.
4) Under-gaon
5) Padhegaon
6) Sonai
7) Belvandi
8) Konhur
9) Parner

II) RANK ORDER OF SETTLEMENT

INTRODUCTION

The hierarchy of settlements denotes the ranking of centres into successive groups on the basis of size of some other selected basis. These groups of centres or settlements are functionally organised in a suitable pattern and are arranged in such a manner that lower order centres occur within the influence areas of higher
order urban centres. The higher order centres occur at a greater distance than the lower order centres.

The hierarchy of settlements in Ahmadnagar district is determined by the application of a suitable statistical method. This analysis presents some interesting features in the spatial arrangement of central places and rank size relations which are directly controlled by physio-cultural setting. The uneven topography, irregular distribution of agricultural land and forest bring in great contrasts in the spatial distribution of service centres. The most uneven areas of the district possess irregular distribution of centres.

The hierarchical concept is based on population size of settlements and their functional structure. The centres/settlements generally perform three basic types of functions i.e. primary activities, secondary activities, and tertiary activities. The primary functions are performed in varying amounts by all centres. Hence hierarchical concept is based on the idea of central place which is centrally located in a relatively homogeneous area which supports it to provide goods and services for that area. This central place performs initially a single function that culminates into a group of functions in course of time.
Under ideal conditions, the central places are arranged in a hexagonal pattern as suggested by Christaller.

The ideal pattern of spatial distribution is disordered due to physiographic elements of western ghat and Balaghat spur, adverse climatic conditions over large area, intensive agricultural activities in river valleys and Canal zones, forested area of western ghats, concentration of industrial activity at only one place viz. Ahmadnagar.

(A) CONCEPT AND CRITERIA OF CENTRALITY

According to Jefferson, M. (1931) central place denotes a place of manifold activities for the surrounding countryside. Walter Christaller considered a central place as a centre of central functions, performed for the surrounding areas. This system gives origin to functional organisation of sub-regions of different orders functionally interbound together. As a functions needed to serve the umland. Dickinson R.E. 15 in his study depends upon provisions of goods and services to tributary areas. Similarly Smiles A.E. 16 in his study takes into account the essential functions and institutions of different degrees of importance such as banks, secondary schools, hospitals, cinemas and newspapers. Godskund S. 17 deals with the change in the centrality of places and their effect on the service area. Green F.H. W. 18 considered centrality of places by
capacity of transport, such as bus traffic generation and termination.

Walter Christaller has made use of an (or region serving) number of telephone connections existing at the centres for determining the centrality of service centres in southern Germany. According to him "the number corresponds rather exactly to the importance of a place" Assessment of central services and institutions existing at the centre has been one of the most popular and adequate indicator of centrality, and this method has been used by Dickinson for East Anglia, by Sailes for England and Wales and by Brush J.E. for south-western Wisconsin. Careter H.C. has used almost the same method for his tripartite gradation of service centres in Wales. Another method for measuring centrality is the measurement of the area of region depending for various goods and services upon the centres. This method has been applied in a numerical way by Bracey H.E. for southern England.

(B) CRITERIA OF HIERARCHY

A review of the previous literature shows that the concept of hierarchy of settlements has been approached in various ways. The German Geographers concentrated their attention on the classification of settlements as central places and their relationship to their service areas.
Brush's study of the urban hierarchy in southwestern Wisconsin is based on assessment of the business and services existing in all urban centres. He considered retail and whole sale business banks and their other financial agencies, trade and personal services and various other services.

Smailes (1944) in his study of urban hierarchy in England and Wales took account of the essential functions and institutions of various urban importance such as secondary schools, Hospitals, Cinemas, Newspaper and recognised five categories of centres like major cities, minor cities or major towns, towns and sub towns.

Keeping in view the complexity of the physical, agricultural, and cultural landscape of the region, it will not be correct to take centrality of a single function as a hierarchy index. The great variation in the functions of the centres has led us to adopt "centrality of tertiary workers" as a whole as the determining factor because almost all centres of the region have significant population engaged in tertiary occupation.

V.N.P. Sinha has considered the population engaged in tertiary occupation for calculating centrality and hierarchy index. In the present study same method is applied
for calculating centrality and hierarchy index. On account of its logical suitability as indicated earlier.

(C) CENTRALITY INDEX

The centrality of the settlements has been calculated by adding together all working population engaged in tertiary occupations by the formula noted below, and shows in table No. 5.10 A.B. and Fig. No. 5.7.

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

Where:
- \( T \) = number of persons dependent upon tertiary services of a centre.
- \( P \) = The total regional tertiary population
- \( C \) = The desired centrality of the place

The method neglects undue advantage of single function such as bus services, telephone, trade and commerce or others. In our developing country the determination of centrality by the number of bank insurance, good hotels, seems to be unrealistic as these things are not commonly found in most of the medium and small towns. These services are found in larger towns in our country.

In the study region most of the central places except Ahmadnagar are small, rural in character. The centrality value of Ahmadnagar, Shrirampur, Kopargaon, and Sangamner is more because these central places are relatively more developed settlements in the region where as other
central places are less developed and of agricultural oriented economy so the centrality of other central places is less. In agriculturally developed areas economic development is more which has affected the development of central places viz. Ahmadnagar, shirampur, kopergaon, and Sangamner, it is due to irrigation facilities and fertility of soils. The existence of sugar and allied industries in the irrigated tracts and location of modern industrial units at Ahmadnagar have also contributed to it. The location of centres with relatively higher values of centrality occurs mostly along the north-south oriented railway line and along national or state highways.

(D) HIERARCHY INDEX

Hierarchy has been calculated by the formula noted below and shown in table No.5.10 B and fig. No 5.8

\[
\text{Hierarchy index} = \sqrt{\frac{\text{TWP}}{\text{WP}}} \times 100
\]

Where: C = centrality

\text{TWP = The tertiary population of a settlements.}
\text{WP = Total working population of the settlement.}

Standard deviation has been calculated from the mean of the hierarchy index to find out ranks of the settlements. All settlements in this region/district came up to 1 S.D. further five categories of central places have been indentified based on the standard deviation such as (1) Large regional centres. (2) Regional centres.
(3) sub-regional centres, (4) large market centres and
(5) small market centres. (Ref., table No. 5,10 B and fig.
No. 5,9). Only one centre viz. Ahmadnagar falls in the first
category being a large regional centres. Sangamner and
Kopargaon fall in the third category as sub-regional centres.
There are eleven centres falling in the fourth category as
large market centres, and remaining 38 out of 53 centres
fall into the fifth category as small market centres.
The fifth category centres do not have higher types of
educational institutions, large hospitals, telephone
connections etc.

1) THE LARGE REGIONAL CENTRES

This class includes only the district headquarter
i.e. Ahmadnagar. Ahmadnagar city contains a large
concentration of tertiary services. It has a concentration
of wholesale and retail trading activity, primary to
college education, medical college, large Hospitals,
(private and Government) and other number of facilities.
It occupies the highest rank in the hierarchy of centres.

ii) REGIONAL CENTRES

There is one regional centre i.e shrirampur, which
is tahsil headquarter. This regional centre is relatively
less developed than the large regional centre, but
agriculturally more developed. Shrirampur has more
population engaged in trade and commerce, other than household
industries, agriculture and other services.
AHMADNAGAR DISTRICT
HIERARCHY OF SETTLEMENTS
(ABOVE 5000 POPULATION)
(Year-1971)

LEGEND
● LARGE REGIONAL CENTRE
● REGONAL CENTRE
● SUB REGIONAL CENTRE
● LARGE MARKET CENTRE
● SMALL MARKET CENTRE

Fig.No-5.9
iii) **SUB REGIONAL CENTRES**

There are two regional centres viz. Sangamner and Kopergaon and are relatively small and less developed in comparison to the large regional centres and regional centres. They command small service areas, both these centres are tahsil headquarters. These centres also have educational facilities, Hospitals and other facilities.

iv) **LARGE MARKET CENTRES**

There are ten centres include in this category. These centres include eight tahsil, Jamkhed, Karjat, Shrigonda, and Akola. They have highschool, colleges, cinemas, theatres and small workshops, repairing services, petrol pumps etc.

v) **SMALL MARKET CENTRES**

There are 38 small market centres in the district they are on the whole widely distributed in the district. These centres do not have many services but possess educational institutions as highschool, only at Parner in this category there is a college, Parner is a tahsil headquarter but could not be included in the above discussed four categories for obvious reasons. This is the typical example and it shows the backwarness of the area
surrounding it. The table No 5.11 reveals that the
there is direct correlation between the centrality value
and the size and importance of settlement.

E) RANK SIZE RULE

Rank size rule refers to an order observed with
respect to study of settlements (above 5000 population)
by size. The procedure followed is that all the 53
settlements of Ahmadnagar district have been arranged and
ranked in decending order; as per their population of 1971
and then plotted as the census data for year 1981, is not
available for large size villages therefore data accoding
to 1971 census only has been used. The size relationship
in this case takes the form.

\[ pr \times r^q = k \]

where:  
- \( q \) and \( k \) are constant
- \( r \) = rank of the community
- \( pr \) = population of the community.

In absolute graph the trend of the line has been
observed to be not regular, when plotted on a logarithmic
scale. The trend seems to be regular from Ahmadnagar to
Shitrampur and Shriramour to Rahuri, means the trend
seems to be regular from Ahmadnagar to Rahuri. Then this
graph shows a horizontal stretch which represents nearly same
population size of almost three settlements and then graph


slightly declines. This is followed by a uniformly declining trend of lower order central places. (Ref. Table No 5.12 and Fig. No.5.10).

First there is sharp rise from Ahmadnagar to Sangamer followed by slow rise. The slow rise indicates a slow decline in hierarchy values. It also represents that number of higher order central place are less and lower order central places are more. It is because of rural nature of study region.

III) SETTLEMENT SYSTEM:

INTRODUCTION :- Settlement system can be the vehicle for adjusting the economic and social aspects of development to each other. The mainstream of progress in the economic social and political spheres has taken place in the settlements system. In future the function of distributing these benefits more equitably will also taken place in settlement systems. 24

The settlement system of Ahmadnagar district is well defined and firmly oriented towards Ahmadnagar, the headquarter of the district as well as the economic centre of the district. The rise and success of Ahmadnagar, as a leading industrial and commercial node, in the district is of relatively recent origin.
RANK SIZE RULE IN AHMADNAGAR DISTRICT

---

**RANK**

**SIZE**

**RULE**

1. **180 18000**
2. **160 16000**
3. **11 000**

**CUMULATIVE GRAPH**

**ABSOLUTE GRAPH**

---

**Fig. No-5-10**

**Population**
The rise of Shrirampur, Kopergaon, Rahuri, and Sangamner is due to commercial and industrial growth.

A settlement system may be recognised as a dynamic entity that functions as a whole because of the interdependence of its parts, is an open system and as it is linked up with the district, state, as well as national settlements system and depends upon them in several ways. The shape of a settlement system is the function of its physical and cultural constraints as the shape of each district and tahsil are different. The ingredients of the settlement system of Ahmednagar district are of the following types. (Ref. fig. No. 5.11 to 5.15).

A) Ahmednagar city is characterised by the concentration of higher order central services of the region. The immediate umland of this higher order regional centre covers not only the entire study region but also comes in a part of Beed district. Shrirampur is the sub-regional centre of the regions which is class II town. Kopergaon and Rahuri are class III towns with a considerable number of central services.

B) In regional settlement system Jamkhed, Karjat Shrigonda, Parner, Akola, Pathardi, Sheogaon, and Nevase have relatively less concentration of central services and less economic development in their umlands. The intensity of their interactions with lower order centres.
is less when it is compared with those of class I or class II towns.

C) The medium and small size settlements are tahsil headquarters if they are rural services centres occur at the bottom of the regional urban hierarchy.

D) The villages are recognised as functional centres. They constitute the roots of the regional settlement system.

If is logical to conceive of a meso system or a regional system as an aggregation of such micro-system having diversified functions and fortunes as well as enjoying a mutual relationship of complementarity. The district settlements system therefore could be recognised as micro-system in the context of state. Generally speaking every settlement system has an origin it is structured and functional it has boundaries and occurs in an environment. It is a two dimensional spatio-temporal entity of an extremely dynamic nature. Depending upon degree of economic development in the region and the consequent degree of intensity of interactions amongst its components it is identified as a strong or a weak system.
A) **STRUCTURE OF SETTLEMENT SYSTEM:**

The settlement system of Ahmadnagar district is an old mature system that came into existence in Pravara Godavari river basins. The first urban centre arose in the Pravara river basin as a result of diffusion of technologies and Indus Valley civilization in this part in c. 2500 B.C. In course of time new centres developed performing varied functions as trading, religious, defensive, etc. Some new centres were added i.e., Shirdi, Rahata, Sevalvihar, Puntamba, Sonai, Belvandi, Pathardi, Jamkhed, Pernar, Karjat, Shrigonda Akola, etc.

The structure of settlement system is conditioned by the physical and cultural attributes of the region. The main physical factors affecting the settlement pattern are as follows.

a) The western side i.e., Akola, tahsil, constitute the effective barrier between the Akola tahsil and the eastern part. Several rural and urban centres have emerged in this area during the last few decades.

b) The Pravara Godavari, Mula, Sina, Bhima, are the natural drainage system of the region. Kopargaon, Shrirampur, Sangamner, Nevasa, Rahuri, Shirdi, Puntamba, Rahuri, Akola
Deolali, Kolhar, etc. are located in Godavari and Pravara river basin towards north of the study region where as Vishapur, Belwandi, Kashti, and Shrigonda, are located in the Sina, and the Bhima basin to the south of region and developed mostly due to railway line.

C) The various spurs of Sahyadries viz. Harishchandra gad, Balaghat ranges are not very high but their effect on the transportation system is considerable.

D) The Ahmadnagar district comes under drought prone area. Earlier famines as well as the comparatively recent famines of 1972 and 1975 have been characterised by the outward movements of poverty stricken rural population towards Bombay and Pune industrial areas. As yet many such emigrants have not returned to their original villages for obvious reasons. Emigration process is most active only in backward tahsils of the region viz. Parner, Ahmadnagar Sangamner, Shrigonda, Karjat, and Jamkhed. The cultural factors that have guided the growth of settlements patterns and settlements are as follows:

A) The network of roads is quite dense in Ahmadnagar, Shrirampur, Kopergaon and Rahuri, when compared with the hilly areas, towards the west, i.e. Akola tahsil and Southern part of the Sangamner tahsil and northern part of the Parner tahsil.
b) The establishment of kingdoms with capital at Ahmadnagar during various periods of district history has also left its stamp on the settlement patterns.

c) The introduction of newer technology in transport and communication has effected the earlier routes of movements resulted on fast and low development of settlement.

d) Imbalanced economic growth in Ahmadnagar district has resulted in:

i) Area of relatively higher economic growth viz. Kopergaon, Shrirampur, and Rahuri, tahsils.
(northern part of district).

ii) Areas of moderate economic growth viz. Sangamner Nevasa and Ahmadnagar tahsils.

iii) Areas of poor economic growth in remaining tahsils

e) Such other factors as propagation of religious and their diffusion of Jainism, Buddhism, Islam, and Christianity as well as popularity of such modern notions as social welfare and planning are also relevant in this regard.

The contemporary settlements system of Ahmadnagar district consists of thirteen tahsils of Ahmadnagar district. The district is bounded by Nasik (in the north-west) Aurangabad (in the north-east) Pune (in the south-west) Beed (in the east) and Thane (in the west).
Presently railway communication facilities with Pune-Daund towards south and Manmad towards north and national highway goes passing through Sangamner tahsil.

The settlement system that grows along the Ahmadnagar-Pune state highway axis Daund-Manmad railway axis and in the fertile tract of Kopergaon, Shrirampur, Rahuri, tahsils. The settlements above 5000 population are found mainly in the same area. The growth of population of settlements also relatively more in them above mentioned area. Ahmadnagar city was the product of effort of Muslim rulers mainly Ahmadshaha of Nizamshahi dynasty. The city assumed administrative and military importance during his rule. However the behaviour of the system is sought to be studied with the help of growth behaviour of its cities and towns as well as large settlements during the present century and up to year 1981 is found that:

i) The population of Ahmadnagar city was 35,784 in 1901 and 1,43,937 in 1981. It increased by 75,964 persons during the 1951 to 1981 and increased 32,834 persons during the decade 1971-81 only.

ii) The number of settlements above 5000 population are more in Shrirampur, Kopergaon, Ahmadnagar, Shrigonda, and Rahuri tahsils. The high rate of growth of population of these settlements in Shrirampur, Kopergaon, Rahuri tahsil and the
growth of big settlements along the north-south exis
(i.e. in Kopergaon, Shrirampur, and Rahuri tahsils. Due
to irrigated tract in Shrirampur, Kopergaon, Rahuri, Tahsil
Ahmadnagar industrial and commercial centre and district
headquarters the big settlements are found more in the same
area.

iv) Northern tahsils (i.e. Kopergaon, Shrirampur,
Rahuri, Nevasa) are relatively more developed than southern
tahsils (i.e. Parner, Shrigonda, Karjat, Jamkhed, tahsils etc.,)

(v) In Akola tahsil the settlement are more (i.e 153)
but only three having population above 5000 due to
mountainous and hilly area there is scope for development.

Figures 5.11, 5.12, and 5.13 showing the settlement
system in 1951 and in 1961 respectively bring out how the
development of settlement (above 5000 population) in the
region gathered momentum during the period 1951 to 1961
and secondly how the regional census located in the irrigated
tract and enjoying facilities of railway and highway have
succeeded in growing fast. Fig. No 5.13 shows percentage
decade variation in different size of settlements which
reveals that relatively fast growth of settlements is only
in the accessible and economically more developed areas.
The growth of Kopergaon, and Shrirampur during 1951-61
is very fast, i.e. 100 percent and above. The growth of
Ahmadnagar District of Maharashtra

Settlements (Above 5000 Persons) (Year - 1951)

Legend:
- Dist. Boundary
- Tal. Boundary
- Roads
- Railway

Population:
- Above 20000
- 10000 - 20000
- 5000 - 10000
- 2000 - 5000
- Below 2000

Fig. No. 5-11
AHMADNAGAR DISTRICT

SIZE OF POPULATION OF SETTLEMENTS
(Above 5000 Persons)
(YEAR-1961)

Fig No: 5-12
Ahmadnagar which is the district headquarter of the region is relatively less, it is observed between 26 to 50 percent in the same decade. In agriculturally less developed areas the growth of population less than 50 percent.

The development of agriculture road and railway facilities in northern part of the district has affected growth of number of settlements viz. Deolali, Rahuri, Puntamba, Kopergaon, Shrirampur, Sonai, Sangamner etc. The settlement system reveals poor growth in the relatively backward areas of the district. Figures 5.14 and 5.15 showing the size of population and percentage decade variation (1961-71) in different size of settlements. The large sized settlement as well as those with higher values of growth occur only along railway and highway routes. In other words, an axial growth seems to have been triggered in the study region following agricultural development as well as the subsequent growth of commerce and industries. These settlements are viz. Shrirampur Kopergaon, Rahuri, Deolali, Puntamba, Ahmadnagar sonai, Sangamner etc. The growth of Shinganapur and varavandi in the year 1961-71 is very fast i.e. above 100 percent. In the decade 1961-71 the growth of settlements is observed more than past decade i.e. in 1951-61.
AHMADNAGAR DISTRICT
SIZE OF POPULATION OF
SETTLEMENTS
(Above 5000 Persons)
(YEAR - 1971)

Fig No: 5.14
AHMADNAGAR DISTRICT
GROWTH BEHAVIOUR OF SETTLEMENTS
(Population Above 5000 Persons)
(YEAR - 1961-71)

LEGEND

DIST. BOUNDARY
TAL BOUNDARY
ROADS
RAILWAY

POPULATION OF SETTLEMENTS
(YEAR - 1971)
5000 - 10000
10000 - 20000
20000 - 50000
100000 - Above

Growth of Population
(Decade Variation)
2.35
3.73
4.50
5.20
6.00

Fig. No: 5-15
B) **ROAD PATTERN** :

The historical maps of areas and settlements are extremely important and they are the authentic sources of varied information as old routes old saddles in the mountaineous areas and the principle old settlements etc. (Ref. fig.No. 5.16) and (5.17)

Maps of the deccan on quarter inch scale produced by the east India, company are based on detailed field surveys and speak of conditions prevailing during old times say 130 years back in the deccan. Introduction of new scientific innovations as railway and modern highway systems by the British rulers has drastically changed the settlement pattern as well as the fortunes of several towns and villages.

At the beginning of British rule there were no modern lines of movement fit for vehicles. roads and no traffic. The chief lines of communication were from Ahmadnagar and kopergaon.

*(table contd.)*
The chief lines of communication at the beginning of British Rule

<table>
<thead>
<tr>
<th>SrNo.</th>
<th>Chief line of communication</th>
<th>Via-</th>
<th>length kms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ahmednagar to Nasik</td>
<td>Rahuri, Sangamner, Sinner</td>
<td>155.20</td>
</tr>
<tr>
<td>2.</td>
<td>Ahmednagar to Kopergaon</td>
<td>Rahuri, Kolhar, Ashtagaon</td>
<td>97.60</td>
</tr>
<tr>
<td>3.</td>
<td>Ahmednagar to Malegaon</td>
<td>Rahuri, Puntamba, Vaijapur kasari pass</td>
<td>190.40</td>
</tr>
<tr>
<td>4.</td>
<td>Ahmednagar to Aurangabad</td>
<td>Either through the Nimbedehera or the Jeur and then through pravara Sangam, velunja.</td>
<td>120.00</td>
</tr>
<tr>
<td>5.</td>
<td>Ahmednagar to Sholapur</td>
<td>Mandra, Mirajgaon, Pategon chapadgaon, Kamala, Madha.</td>
<td>206.40</td>
</tr>
<tr>
<td>6.</td>
<td>Ahmednagar to Satara</td>
<td>Valki, the salipass, kothal, kolgaon, patas supa, Guilancha,</td>
<td>192.00</td>
</tr>
<tr>
<td>7.</td>
<td>Ahmednagar to Pune</td>
<td>Akolner, Ranhangeon, Vaghote</td>
<td>123.20</td>
</tr>
<tr>
<td>8.</td>
<td>Ahmednagar to Kalyan</td>
<td>Junnar, Malsej pass</td>
<td>208.00</td>
</tr>
<tr>
<td>9.</td>
<td>Ahmednagar to Gangakhed</td>
<td>Darur pass</td>
<td>241.60</td>
</tr>
</tbody>
</table>

Source: - Gazetteer of India, Maharashtra state
Ahmednagar district, 1976, pp. 559-560
From Kopergaon besides the Malegaon route a line passed towards Pune 190.40 kms. About 1850 the line from Bombay to calcutta also passed through Ahmādnagar and went by the Jeur pass to Aurangabad. The Pune-Ahmādnagar road was unmetalled but bridged. During the dry season it was a fair driving road, during the rains it was indifferent throughout and at many points bad. It was built for military purposes as Ahmādnagar was the head quarter of Bombay Artillery and it had proved of great advantage to trade.

The route from north Ahmādnagar which ran through Rāhuri towards Nasik had a made perform of 17.6 kms. Another fair weather road was from Sirur to Shrigonda. Two lines from Ahmādnagar west to Junner. One line from Ahmādnagar to Karmala and Solapur along the right bank of the sina.

The local fund roads existing in 1884 were as under (1) Ahmādnagar-Sheggaon road of 67.2 kms. (ii) Ahmādnagar-Karmala road of 76.8 kms. (iii) Ahmādnagar-Aneghat road of 52.8 kms. (iv) Ahmādnagar-Chinchondi road of 24 kms. (v) Shendi-Vambori road of 12.8 kms. (vi) Nandur-Kolhar road of 44.8 kms. (vii) Loni-Bori road of 92.8 kms. (viii) Perner-Supa road of 12 kms. and (ix) Perner-Chincholi road of 6.4 kms.
"Under the British besides by roads the district

communication have been improved by the opening of railways.
The above discussion in decades that the road system
converged over Ahmadnagar from all directions and market

centres & bite, where scattered through the length and
breadth of the study region. However with the
introduction of modern highways and railways the growth is
mainly concentrated along these routes and earlier important
centres as Kharda, Madha, Visapur, Kashti, supe, Nevasa
Shrigonda, etc. one either declining in importance and
growing at a very slow pace.

...
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