CHAPTER - II

SPATIAL DISTRIBUTION OF SERVICE CENTRES

- Introduction
- Influencing factors on the distribution of service centres
- Distribution of service centres in different size groups
- Co-rrelation between area
- Settlements, population and distribution of service centres
- Levels of development and distribution of service centres
- Spatial distribution patterns of service centres

Geographers study man's reaction to space much the same way that they examine his reaction to resources. The pattern made by the distribution of people on the earth's surface is something which is of fundamental relevance to almost any analysis of man and his behaviour. The Geographers pay more attention to the point of view of measurement and interpritation of the facts of distributional phenomena. In the real world, where the nature of demand and the technology of production is constantly changing, the nature of resource base and its distributional impact on settlements and population distribution also changes. Existance of localised resources distorts the uniform pattern of settlement, so similarly does spatial variation in the quality of the land directly affects the location of agricultural production and indirectly other types of economic activities, particularly the localisation of tertiary activities.

Concentration of intensive economic activity and development of industries are the important factors which determines the distributional patterns of service centres. The spatial distribution of service centres is to be studied in relation to their frequency of occurance, their physical setting and their locational patterns. In the distributional pattern of service centres, the other factors such as type of agriculture, market orientation, level of economic development and the transportation network facilities play significant role.

In this chapter, an attempt has been made to trace briefly

the factors influencing the distribution of service centres, their size, their relationship with other factors of distribution. Further attempt has also made to identify the concentration of service centres in study region.

The region under study is a progressive agricultural area of the South Maharashtra Plateau. Walwa taluka has 3,01,302 population as per 1981 census. Out of the total population 82 percent population is living in rural settlements. In all, there are 91 habited settlements in the study region. Among these only thirty five settlements are identified and classfied as service centres. These service centres account for 38.46 percent of the total settlement in the region under study (Fig.2.1).

INFLUENCING FACTORS

There are various factors responsible for the origin, growth and distribution of service centres. The physical factors are very important in the location of service centres. However, the social and economic factors also play an important role in determining whether a particular place should grow, develop and function as a service centre. Besides physical factors, administrative importance, transportational nodes and religious site are the other important attributes, which jointly or individually attracts several functions and give rise to the service centres. Exchange of goods and agricultural products and the provision of services are the important aspects for which service centre emerge. Transportation network play a vital role in the rise and growth of service centres.

RELIEF AND DISTRIBUTION OF SERVICE CENTRES

Relief play an important role in the distribution of service centres. The western dry land and northern hilly range area of the region have a rough and undulating terrain where land available for cultivation is limited and network of transportation is poor. This hilly track is the most unfavourable part for the flourishment of service centres.

The banks of the river Krishna is dotted densely by the occurance of more number of the settlements and also most favourable sites for service centres. Nearly one-third service centres are distributed either in the loops of Krishna river or in the vicinity of the river banks.

It is interesting to note that river Warna is a natural as well as administrative boundary of the study area in the south. The northern flank of the river Warna is also densely populated and is the region where one-third service centres are distributed (Fig.2.1).

The central upland track of the study area, so called Doab regions, is the area where settlements, population and service centres are distributed in a dispersed pattern.

Service centres of Walwa taluka are not evenly spaced. One-third service centres of the total, are located in the Rethare Haranax block and Walwa block of the study region. This region is highly developed in the agriculture practices because of the river Krishna and its fertile banks, irrigation facilities

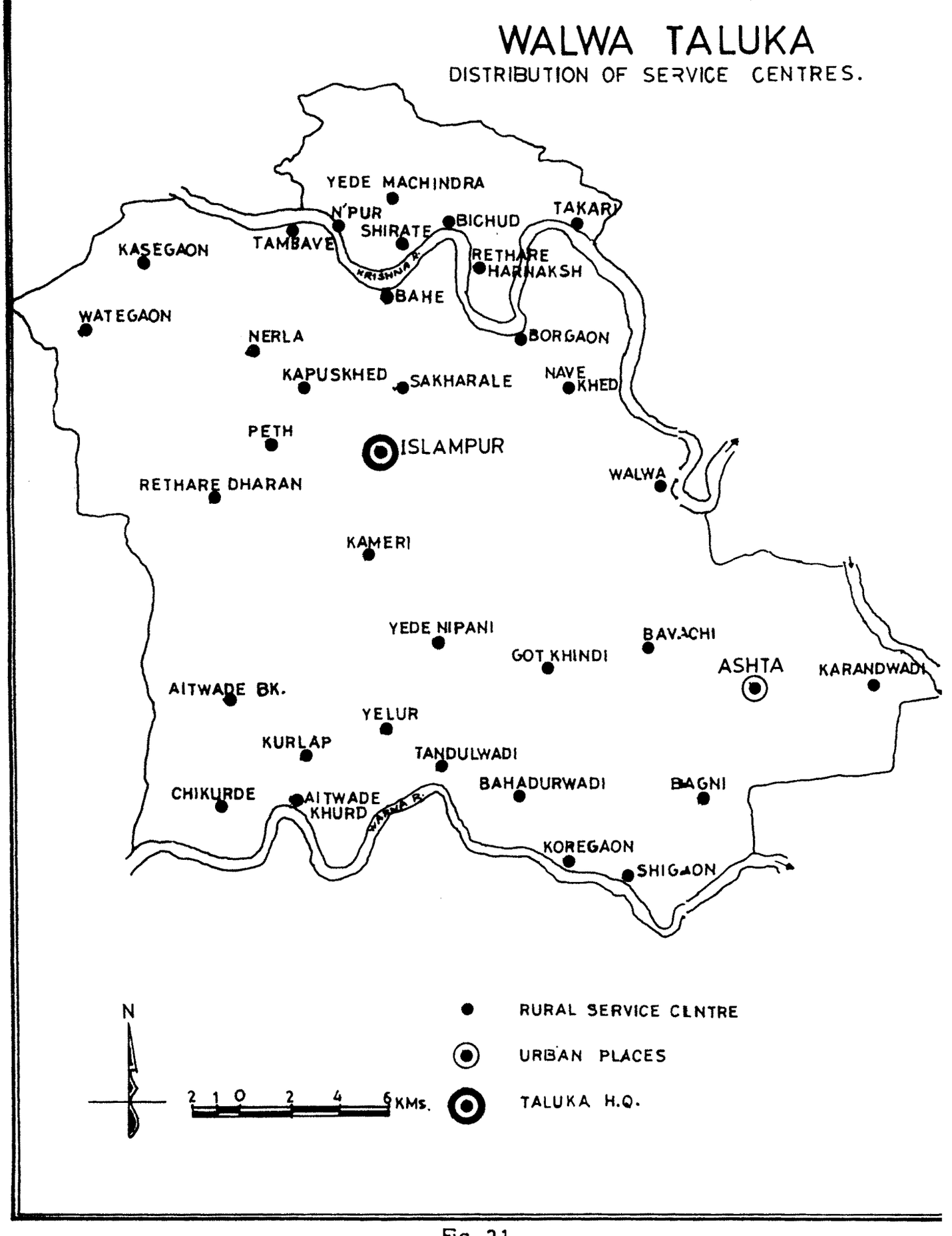

WALWA TALUKA
DISTRIBUTION OF SERVICE CENTRES.
YEDE MACHINDRA
N'PUR
SHIRATE
BICHUD
TAKARI
TAMBAVE
KASEGAON
KRISHNA R.
RETHARE HARNAKSH
BAHE
WATEGAON
NERLA
BORGAON
KAPUSKHED
SAKHARALE
NAVE KHED
PETH
ISLAMPUR
WALWA
RETHARE DHARAN
KAMERI
YEDE NIPANI
BAVACHI
GOT KHINDI
ASHTA
KARANDWADI
AITWADE BK.
YELUR
KURLAP
TANDULWADI
BAHADURWADI
BAGNI
CHIKURDE
AITWADE KHURD
KOREGAON
SHIGAON
N
2 1 0 2 4 6 KMs.
RURAL SERVICE CENTRE
URBAN PLACES
TALUKA H.Q.

Fig 2·1

and the network of state highway, district roads and south central broadgauge railway line (in between Takari to Bhavani-nagar). The administrative blocks namely Kurlap, Yelur & Bawachi, which are along the northern flanks of Warna river give rise to thirteen service centres. The centrally located blocks Kasegaon, Peth and Kameri have three service centres in each (Fig.2.2).

DISTRIBUTION OF SERVICE CENTRES IN DIFFERENT SIZE GROUPS

The distribution of service centres in different size group study shows, that a concentration of larger number of service centres is in a small size group. The smaller size group of service centre below the population of 10,000 includes thirty one service centres and account for 63.80% of the total service centres whose population ranges between 10,000 to 20,000, comprise only 2 service centres. These are Kasegaon and Walwa. The small size and medium size service centres are purely rural service centres in their character. However the large size service centres (more than 20,000 population) are urban service centres of the study area. Among the urban service centres Islampur is a taluka headquarter and the Ashta is a sub-ordinate urban service centre of the study area.

It is very interesting to note, that, the concentration of small size service centres is observed in the river sides, out of the total service centres of the region 31.43 percent of the service centres are located along the river Krishna course in the northern front of the region, where as the southern frontier

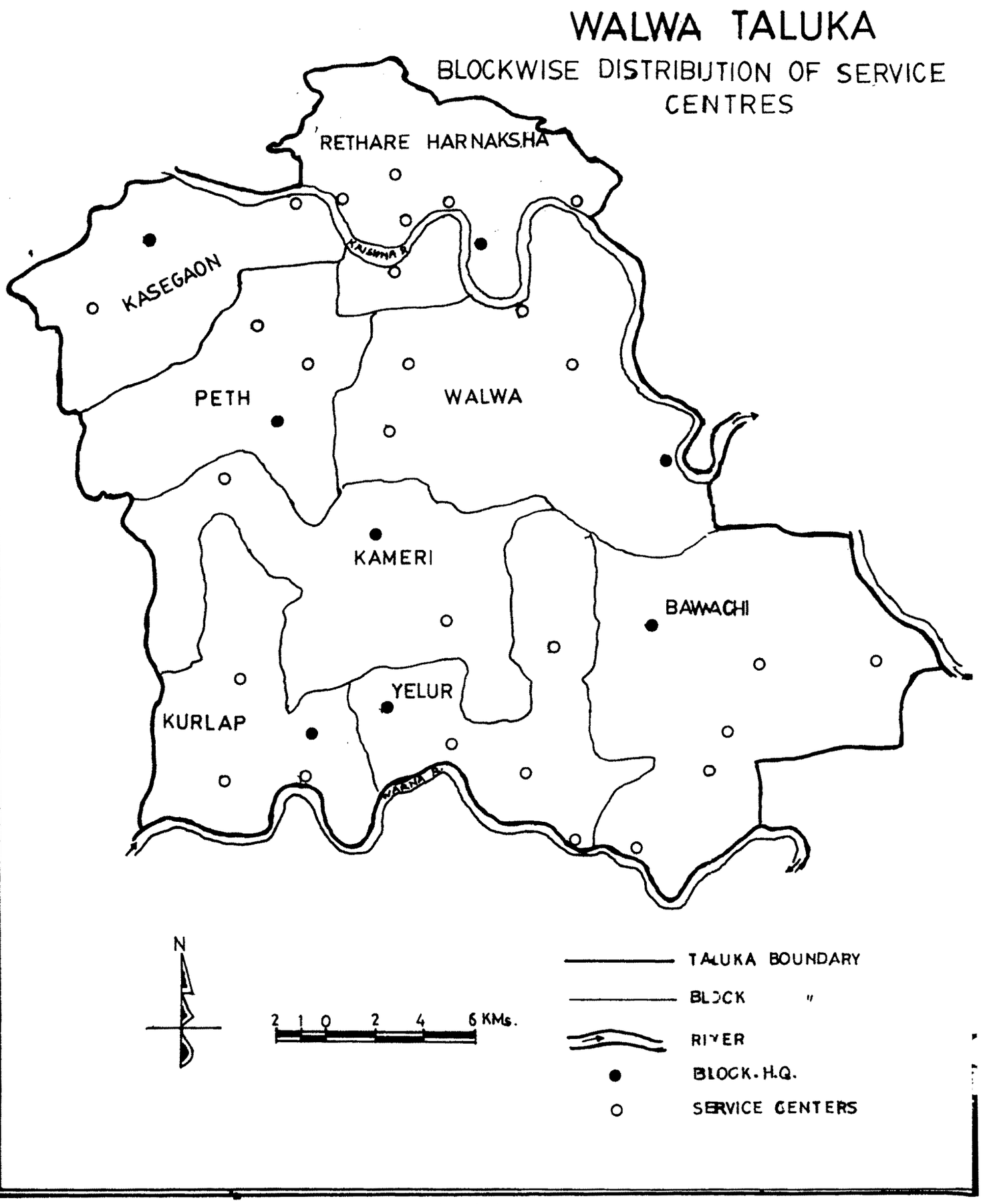

WALWA TALUKA
BLOCKWISE DISTRIBUTION OF SERVICE CENTRES
RETHARE HARNAKSHA
KASEGAON
KRISHNA R.
PETH
WALWA
KAMERI
BAWACHI
YELUR
KURLAP
VARNA R.
N
2 1 0 2 4 6 KMs.
TALUKA BOUNDARY
BLOCK "
RIVER
BLOCK-H.Q.
SERVICE CENTERS

Fig 2·2

of the region bounded by river Warna course is dotted by 28.57 percent of the service centres. The service centres distributed on the either banks of the Krishna and left bank of the Warna are by and large below 10,000 population size. The Krishna-Warna Doab region is an area where 40 percent service centres of the region are distributed. Among the 14 service centres of the central track 2 are of urban in nature and a dozen of the service centres are rural in character. An average size of the rural service centres in 10,000 population (Fig.2.3).

The concentration of service centres is measured in terms of 6 classes of population and Lorenz curve has been constructed for cumulative percentage of service centres and their population in each class (Fig.2.4). This figure shows higher concentration of service centres below the line 5 (five) which indicates that small size service centres have higher concentration as compare to large size service centres.

Table 2.1 shows population size group of service centres, number of service centre and their absolute population. It also represents cumulative percentage of service centres and cumulative percentage of population of the total service centres in the region under study. It is observed that first two class of service centres account for 88.50 percent of total service centres and 63.80 percent population of total service centres of the region. This clearly shows that small size service centres are significant in this rural landscape, which caters the needs for pesants, community adjacent to their location.

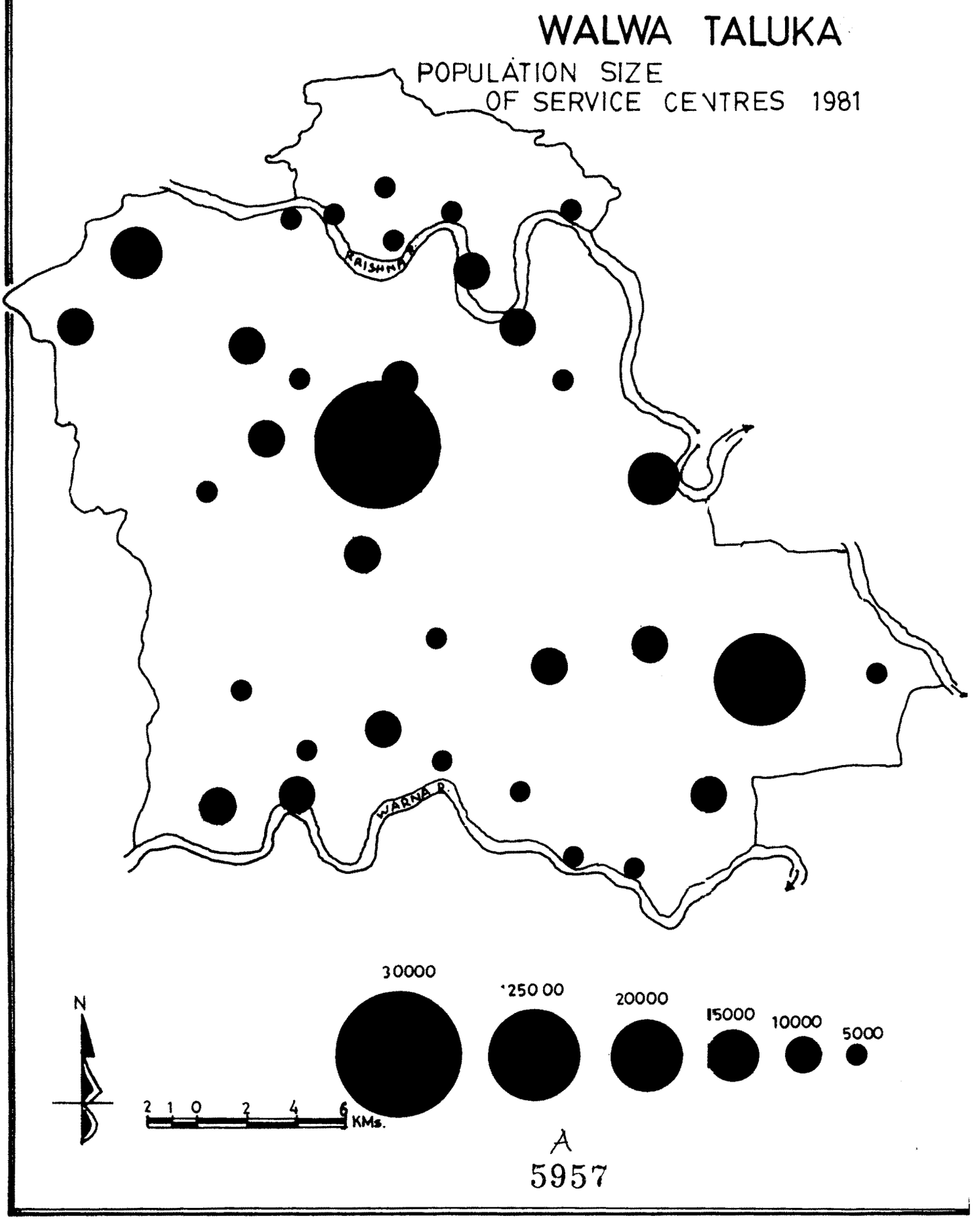

WALWA TALUKA
POPULATION SIZE
OF SERVICE CENTRES 1981
KRISHNA R.
WARNA R.
30000
25000
20000
15000
10000
5000
N
2 1 0 2 4 6 KMs.
A
5957

Fig 2·3

LORENZ CURVE

SHOWING THE CONCENTRATION OF POPULATION AND SERVICE CENTRES IN 6 GROUPS.

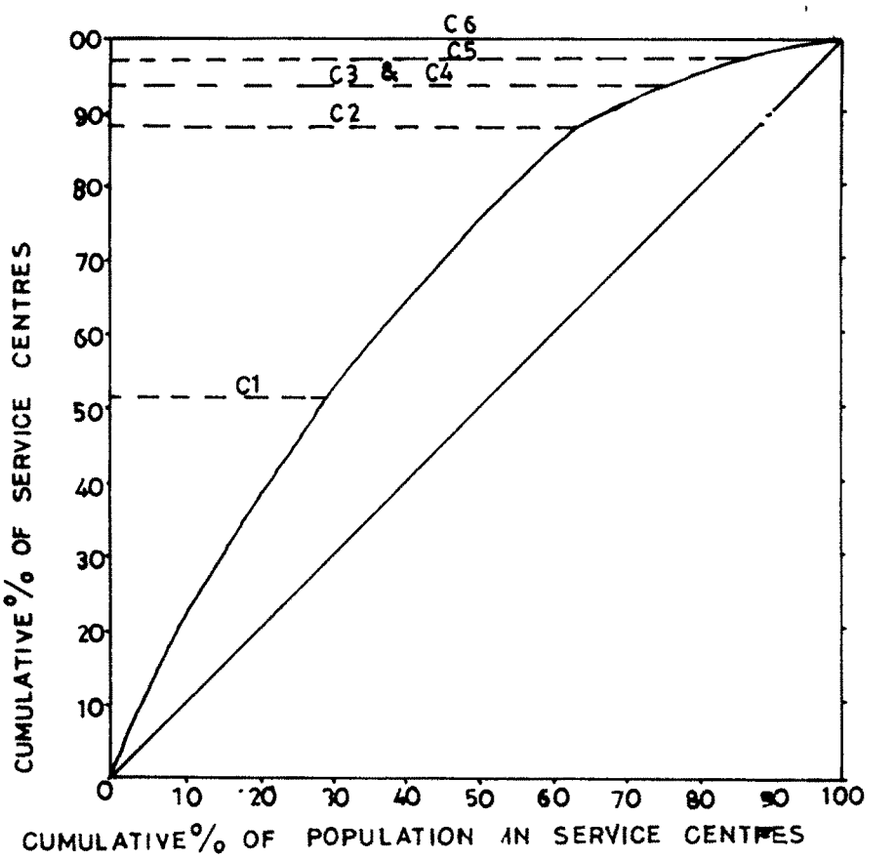


Fig 2·4

TABLE 2.1 : Classwise distribution of service centres and population concentration.

Population size Group	Number of Service Centres	% of S.C. to total S.C.	Cumulative % of S.C.	Population of S.C.	Population % of S.C.	Cumulative % of population
2,000 to 4,999	18	51.40	51.40	64,598	28.50	28.50
5,000 to 9,999	13	37.10	88.50	79,778	35.30	63.80
10,000 to 14,999	2	5.70	94.20	27,606	12.20	76.00
15,000 to 19,999	0	0.00	94.20	0	0.00	76.00
20,000 to 29,999	1	2.90	97.10	21,333	9.50	85.50
30,000 and above	1	2.90	100.00	33,016	14.50	100.00
Total	35	100.00	100.00	2,29,131	100.00	100.00

AREA, SETTLEMENTS, POPULATION AND DISTRIBUTION OF SERVICE CENTRES

As the service centres tend to grow to provide the services to the other settlements and population of the area, it would be more appropriate to study the distribution of service centres in relation to area, settlements, population and the number of service centres of the study area. An attempt is made here to study blockwise distribution of service centres along with average number of settlements and average population served by a service centre. Table 2.2 indicates blockwise service centres, average number of settlements, area and average number of settlements, area and average population served by a service centre.

TABLE 2.2 : Blockwise distribution of service centres, area served, number of settlements served and average population served by a service centres.

Blocks	Average area served in km.	No.of service Centre	Average settlements served	Average population served
Kasegaon	23.5	3	3	9,730
Peth	29.3	3	3	9,730
Yelur	15.2	5	2	5,769
Rethare Haranax	13.1	7	2	5,295
Walwa	27.8	5	3	14,258
Kurlap	17.3	4	3	6,521
Kameri	36.0	3	4	10,127
Bawachi	27.0	5	3	10,089

It is observed that within the block of Walwa there are five service centres and average area served by a service centre is 27.8 sq. kms; average number of settlements served is 3 and average population served is 14,258. The maximum size of population is served in this block, where as the minimum population is served i.e. 5,295 by a service centre within the block of Rethare Haranax. This block is having 7 service centres in all. The settlements service ratio is 1:2 and the area served by a service centre is below 15 sq.kms.

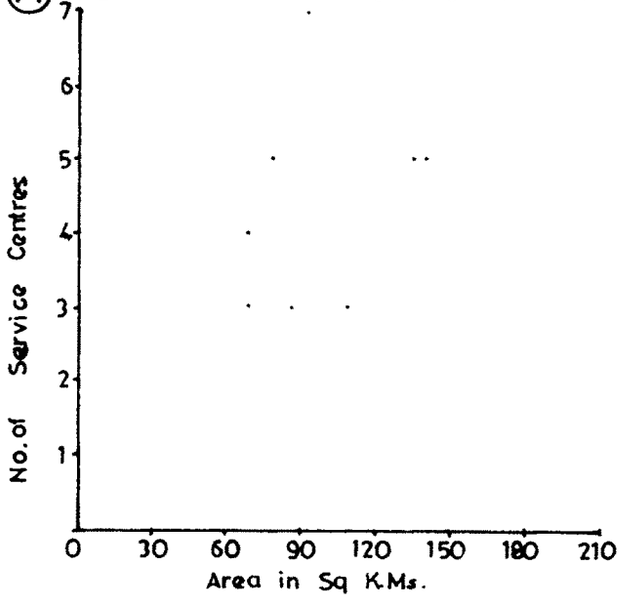
Fig.2.5-A, indicates the relationship between the area of the block and number of service centres in the block. The correlation between two variables indicates positive relationship where r = 0.69; which is significant at 5 percent level.

The service centres and their distribution when studied with the assumptions in the mind that the number of service centres would be more in the areas where the number of rural settlements is more. When it has been tested to the study region the result seems positive.

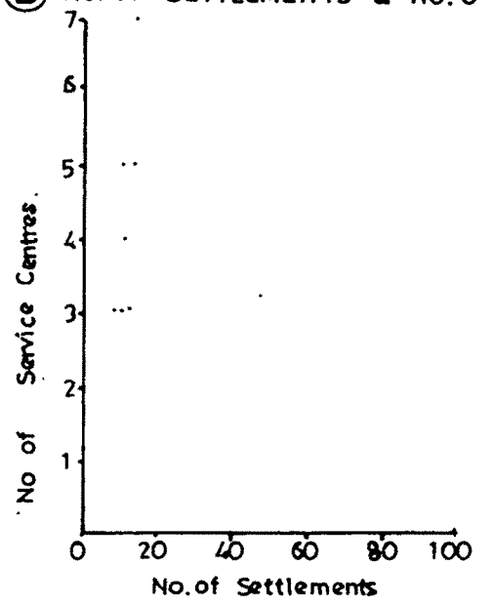
Fig.2.5, also shows the relationship between population and the development index of the block to the number of the service centres. The relationship between the population and number of the service centres which is shown in Fig.2.5-C indicates poor correlation whereas the correlation between the development index and number of service centres both the variables are positively correlated.

WALWA TALUKA CO-RELATION

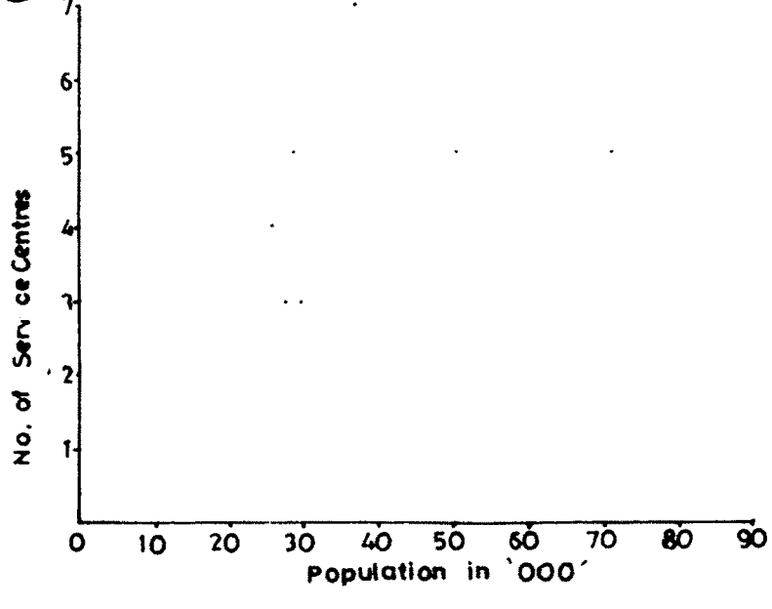
(A) AREA OF BLOCK & NO. OF SERVICE CENTRES



(B) NO. OF SETTLEMENTS & NO. OF SERVICE CENTRES.



(C) POPULATION & NO. OF SERVICE CENTRES



(D) LEVELS OF DEVELOPMENT

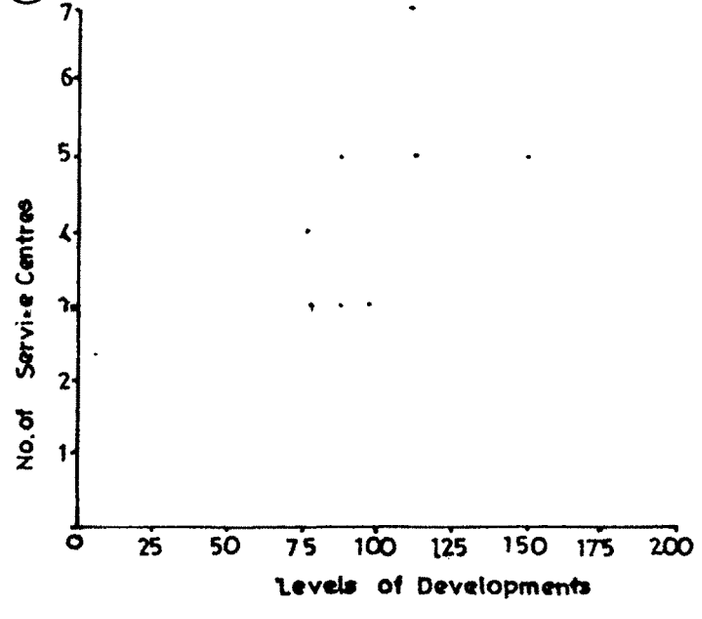


Fig 2.5

LEVEL'S OF THE DEVELOPMENT AND DISTRIBUTION OF SERVICE CENTRES

In order to find out the relationship between the levels of development and the distribution of service centres within the study region, the levels of the development were calculated in each of the block with the help of following agro-socio-economic indices.

TABLE 2.3 : Agro-socio-economic indices.

Sr.No.	Particulars
1	Percentage of literacy
2	Percentage of post office
3	Percentage of electrification
4	Percentage of land under irrigation
5	Percentage of land under cultivation
6	Percentage of tertiary population
7	Percentage of dispensaries
8	Percentage of highschool
9	Percentage of motor cycle

The method adopted to determine the levels of development essentially consist of two stages.

First - The determination of the levels of development of each block in terms of deserete variables.

Second - The integration of values obtained for descrete variables which gives a composite index of development.

The co-efficient of development of a block in terms of single variable is calculated by following equation :-

$$CDI = \frac{Pi}{PI} \times 100 \quad .. \quad .. \text{ I}$$

Where,

CDI = is the co-efficient of development for variable 'i'

Pi = is the percentage of variable 'i' in the areal unit

PI = is mean percentage of variable 'I' in the study area

When the development indices of selected variables for each unit sum up and devided it by number of selected variables; we get the composite index of development. The composite index of the development has been computed by the following equation :

$$CID = \frac{CDI_1 + CDI_2 + CDI_3 + CDI_4 + \ldots + CDIn}{N} \quad .. \text{ II}$$

Where,

CID = is composite index of development

N = is the number of variables

Levels of development are thus calculated for eight blocks of the taluka on the basis of above methodology. The composite indices of development so obtained are given in Table 2.5.

TABLE 2.5 : Composite index of development.

Sr. No.	Name of the Block	CDI	CID
1	Kasegaon	793.06	88.12
2	Peth	866.47	96.27
3	Yelur	770.51	85.61
4	Rethare Haranax	991.80	110.20
5	Walwa	1356.91	150.76
6	Kurlap	992.87	76.98
7	Kameri	697.34	77.48
8	Bawachi	1022.48	113.60

The composite indices of development for all blocks have been grouped into four levels of development as poor, moderate, high and very high levels of development. The regional levels of development have been depicted in Fig.2.6.

The spatial analysis of the levels of the development shows that 3 blocks located along the river Krishna have high level of the development and 50% of the total service centres

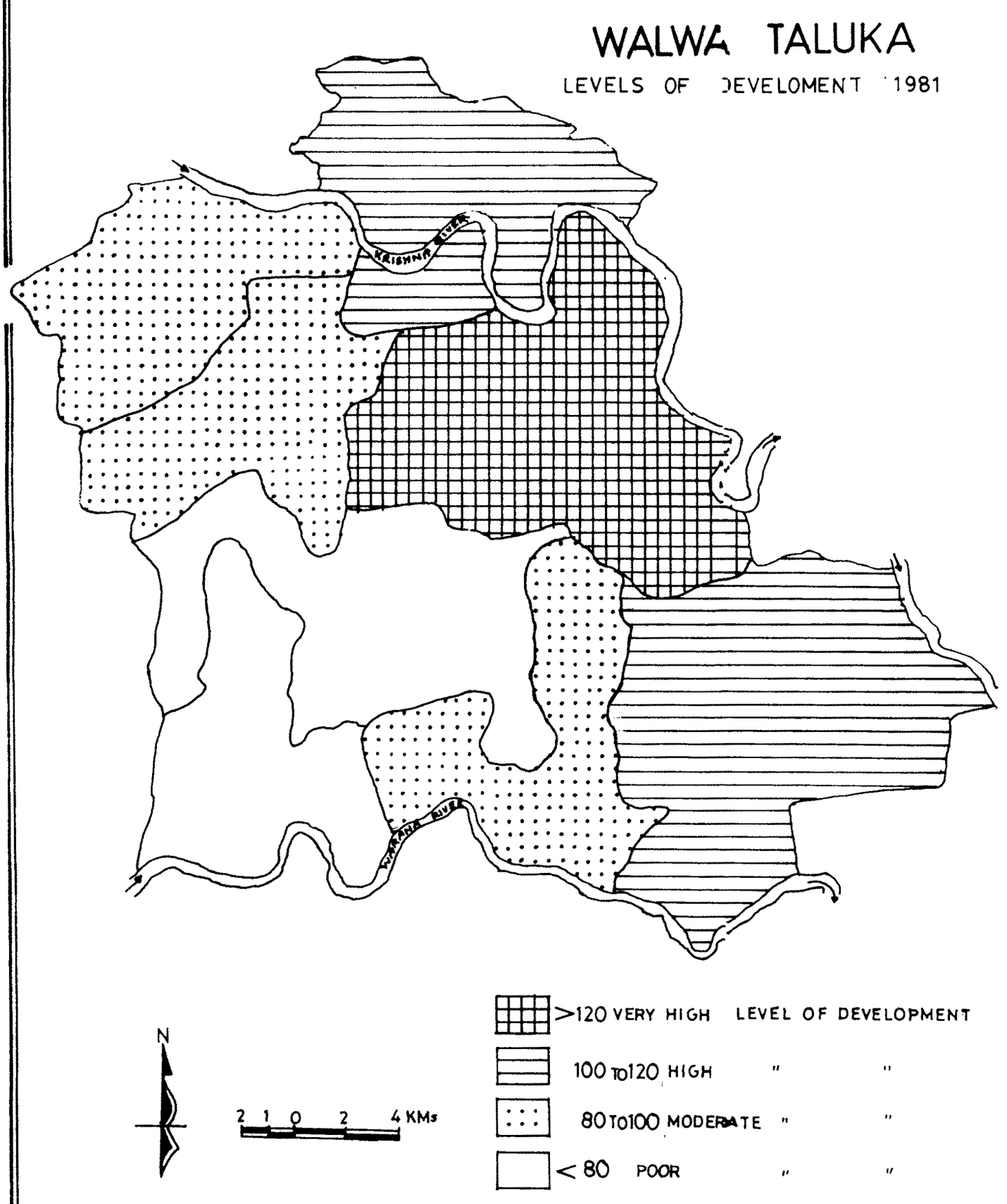

WALWA TALUKA
LEVELS OF DEVELOMENT 1981
KRISHNA RIVER
WARANA RIVER
N
2 1 0 2 4 KMs
>120 VERY HIGH LEVEL OF DEVELOPMENT
100 TO 120 HIGH " "
80 TO 100 MODERATE " "
< 80 POOR " "

Fig 2.6

of the study region are distributed in these highly developed blocks. Out of the total service centres of the region five service centres are located in the very highly developed Walwa block where average population of service centre is 12,000. Highly developed blocks i.e. Rethare Haranax and Bawachi have 7 and 5 service centres respectively.

Moderate level of the development is observed in the blocks of Kasegaon, Peth and Yelur. Out of the eleven service centres distributed in this moderate developed area three in each located in the Kasegaon and Peth blocks and five service centres are in Yelur.

Two blocks namely; Kurlap and Kameri covering 22.81 percent of area of the study region indicated poor level of development, where 7 service centres are located. The average size of these service centres is 5,000 population.

It is observed that service centres are closely spaced and relatively larger in size and are found in the areas with higher level of development and higher density of population. In contrast, in poorly developed areas service centres are smaller in size and are widely spaced.

The relationship between the level of development and number of service centres indicates high positive correlation. Fig.2.5-D indicates the relationship between these two variables.

SPATIAL DISTRIBUTION PATTERN OF SERVICE CENTRES

For the analysis of the spatial distributional pattern of the service centres nearest neighbour analysis technique developed by plant ecologist (Clark and Evans,1954) has been used. The technique of nearest neighbour analysis shows that the degree to which any observed distribution of points deviate from random distribution. Many geographers have studied the pattern of settlement distribution. In this regard the work of Decay 1962, Brush 1963, King 1962, Reddy 1970 and Mandal 1982 is worth mentioning.

The technique of nearest neighbour analysis is very useful in the study of point pattern in the given area. It is work out by following equations.

$$R = \frac{\bar{D}obs}{\bar{D}ran} \qquad \ldots \quad I$$

Where, $\bar{D}obs$ = is the measured mean distance between nearest neighbour point observed in a given area

$\bar{D}ran$ = is the expected mean distance for similar number of points randomly distributed in the same area

'R' = is the nearest neighbour index

$$\bar{D}ran = \frac{1}{2\sqrt{(N/A)}} \qquad \ldots \quad II$$

Where, 'N' = is the number of service centres in study region

'A' = is the area

$$\text{Hence,} \quad R = \frac{\bar{D}obs}{1 + 2\sqrt{(N/A)}} \qquad \ldots \quad III$$

With the application of the aforesaid technique the nearest neighbour index is calculated for the region under study considering a single unit.

Since the study area bears a visible contrast in the density and spacings of service centres. The entire region is divided into 8 blocks for the purpose of calculating 'R' values in such a situation different 'R' values will be obtained. 'R' value for the entire region has shows the cluster grouping distribution of service centres and has used to find out association of service centre's concentration in the study area.

The pattern of distribution has been studied by considering the revised 'R' value scale given in Table 2.6.

TABLE 2.6 : Revised 'R' value scale.

Sr.No.	'R' Value	Discription
1	0.00 to 0.15	Absolute clustering
2	0.16 to 0.50	Linear clustering
3	0.51 to 0.80	Clustered grouping
4	0.81 to 1.20	Random distribution
5	1.21 to 1.40	Near to uniform
6	Above 1.40	Uniform

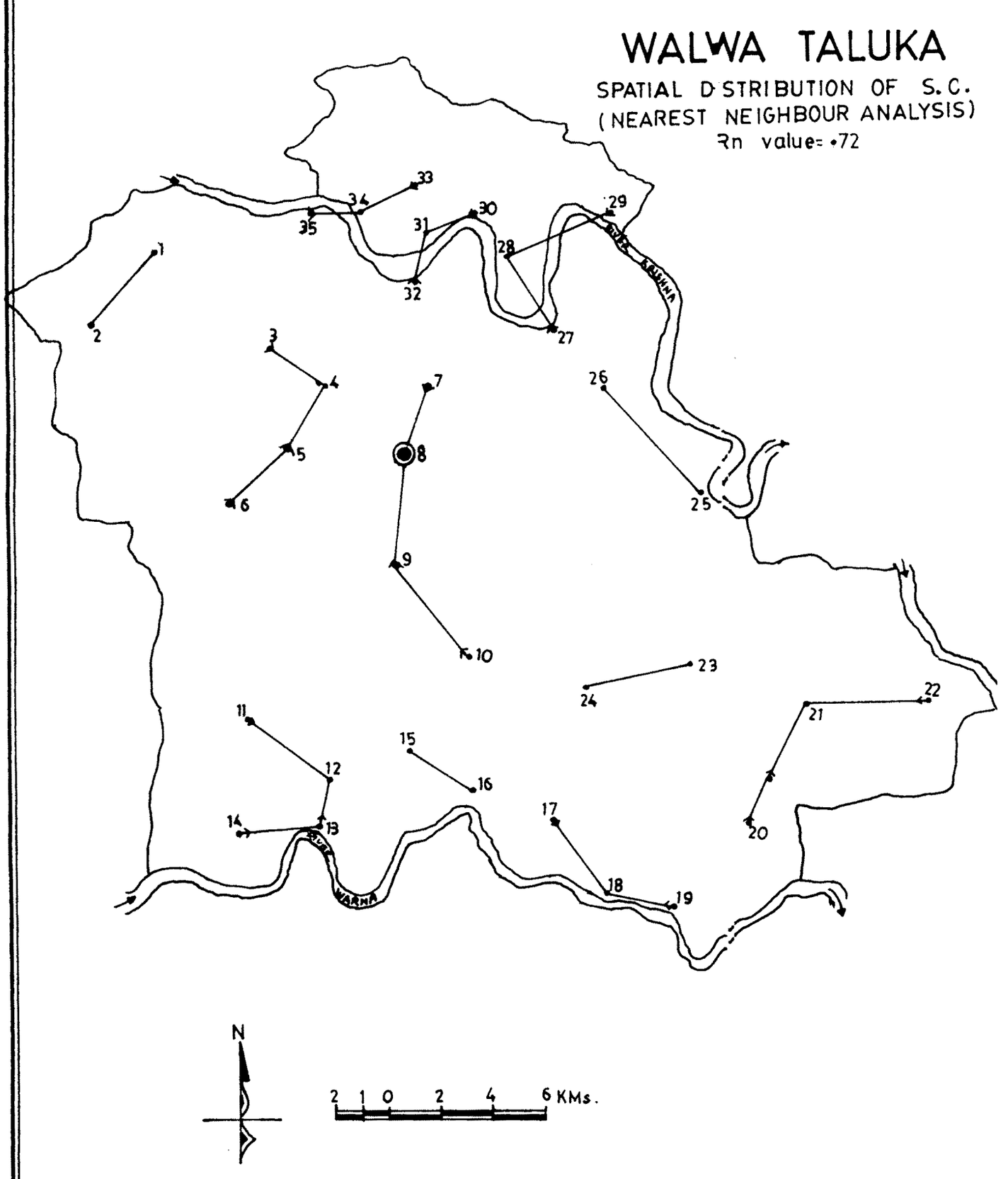

WALWA TALUKA
SPATIAL DISTRIBUTION OF S.C.
(NEAREST NEIGHBOUR ANALYSIS)
Rn value= .72
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
VARNA
N
2 1 0 2 4 6 KMs.

Fig 2·7

It is observed that random distribution of service centres is found in Kasegaon, Kameri, Yelur and Bawachi blocks. Most of the parts of these blocks are covered by upland areas.

Clustered grouping distribution is observed in the Peth, Kurlap, Walwa and Rethare Haranax blocks of the region (Fig.2.7).

DEGREE OF CONCENTRATION

Generally a close distribution is considered to be a concentration and a wide distribution as dispersion. It is easy to distinguish them if they are found in extreme cases, however it is rather difficult to differentiate in marginal cases (Reddy 1970). The concentration of service centres is determined by a simple methodology, where a distribution in a region contains a number of discrete concentration. They can be grouped together if they are related if the distance of separatior between the continuous concentration across their settlements is less than the critical distances.

The region under investigation has clustered distribution of service centres where the degree of randomness is 0.72 and the critical value of 3.5 kilometers (Fig.2.8).

The region has seven concentration groups of service centres. Out of these seven groups Rethare Haranax group indicates the highest number of the service centres. In this concentration group, 8 service centres viz. Rethare Haranax, Borgaon, Bichud, Bahe, Narsingpur, Kille-Machindragad, Sirte,

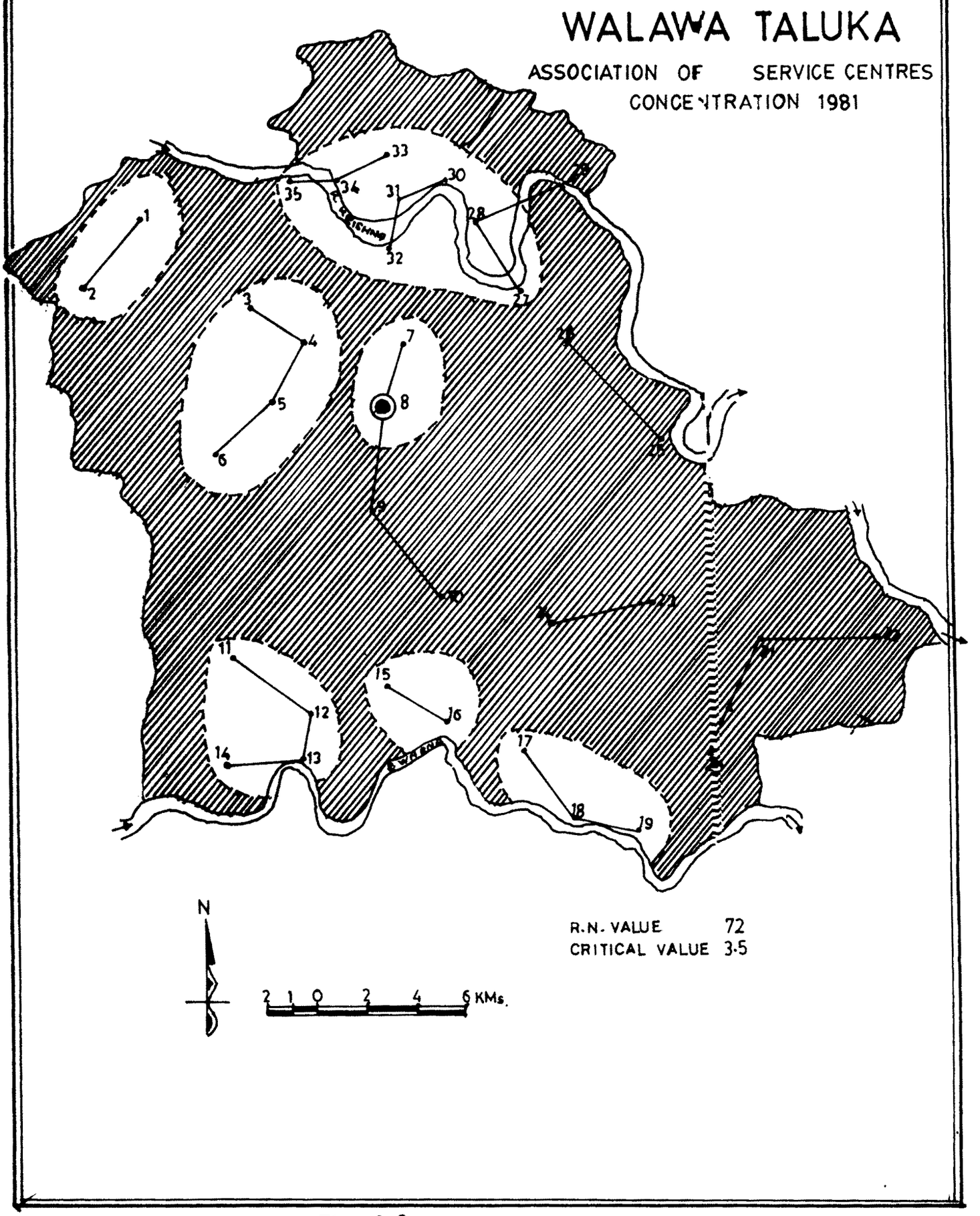

WALAWA TALUKA
ASSOCIATION OF SERVICE CENTRES
CONCENTRATION 1981
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
21
22
23
24
25
26
27
28
30
31
32
33
34
35
N
2 1 0 2 4 6 KMs.
R.N. VALUE 72
CRITICAL VALUE 3.5

Fig. 2·8

Tambave are included. Three concentration groups includes two service centres in each whereas one concentration groups includes three service centres. Peth concentration group includes 4 service centres like Peth, Nerla, Kapuskhed and Rethare Dharan, Kurlap concentration group includes 4 service centres of Kurlap, Chikurde, Aitwade Khurd and Aitwade Budruk.

Out of the total service centres 10 service centres are not associated with any concentration group in the study area. These centres namely Takari, Nave Khed, Walwa, Kameri, Yedenipani, Gotkhindi, Bawachi, Shigaon, Ashta, Karandwadi are found in complete isolation (Fig.2.8).

Summering the characteristics of the distribution of service centres one finds that, apart from the relief and surface confugaration other factors like population density and the level of Economic development play a significant role in the distribution of service centres.

It is observed that service centres are widely spaced and relatively small in size and are found in the areas of poor level of development and low density of population. At the other end of the scale in highly developed area, they are more closely spaced and their size is relatively larger.

The inter distance, size and number of service centres are largely governed by the level of the development. Economically poor area possess few service centres of small size; in contrast - economically rich areas have more service centres of larger size.

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