SOCIO - DEMOGRAPHIC AND SPATIAL INTER-RELATIONSHIPS OF LARGE SIZE VILLAGES AND ALL URBAN CENTRES IN BIHAR, 1961 .

by

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Submitted in Partial fulfilment of the requirement for the Degree of Master of Population Studies.

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I certify that the dissertation entitled "Socio-Demographic and Spatial Inter-relationships of Large Size Villages and All Urban Centres in Bihar, 1961", submitted by Shri Prasanna Kumar Sahoo, in fulfilment of six credits for the Degree of Master of Population Studies (M.P.S.) of the University, is, to the best of my knowledge, his original work and may be placed before the examiner for evaluation.

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Chapter I

(Introduction)

1.1 WHY THIS STUDY?

India has predominantly a rural population. Most of the people live in villages. These villages are based on agricultural economy. The pace of industrialization has not yet influenced these villages. However, in every state, there are number of villages with population five thousand and above. some of these settlements satisfy some of the urban criteria like thousand persons per square mile, 5000 and above population and at least 75 per cent of workers engaged in non-agricultural pursuits, etc., but, because of certain other reasons, these settlements are not classified as urban centres. Because of the lack of attention these villages sometimes are deprived off the facilities of hospital, school, entertainment centre etc., still we find them growing. Since no study has been undertaken to understand the growth and decay of these settlements, therefore, we are ignorant of many aspects of these large sized settlements. The distribution of these large sized settlements is very peculiar. Sometimes they are polarized in one region, sometimes they are isolated. This uneven distribution of these settlements has drawn attention of these researchers towards them. The present study is to investigate the spatial distribution of these settlements

along with their demographic, socio-economic and few other characteristics. In this study I have only concentrated on the state of Bihar, which was culturally the heart of India in the past, geographically a heterogeneous unit and economically still a backword state in spite of all its mineral resources and industries.

A study of literature on urban and rural studies in India indicates that no attempt has so far been made to study simultaneously the large sized villages and towns of India. There are quite a few studies of large villages of different states of India, for instance "Portrait of a Community Chitrapur Saraswat Census Report"[1] by Mavinkure. But such studies reflect the conditions of large sized villages in isolation without considering the other large sized villages of the region. In the sphere of demography very little work has been done for Bihar. So it is hoped that the present study will be one of the pioneering work to understand the interrelationship of demographic, economic and other sociological factors related to the large sized settlement of this region with those of the urban settlements.

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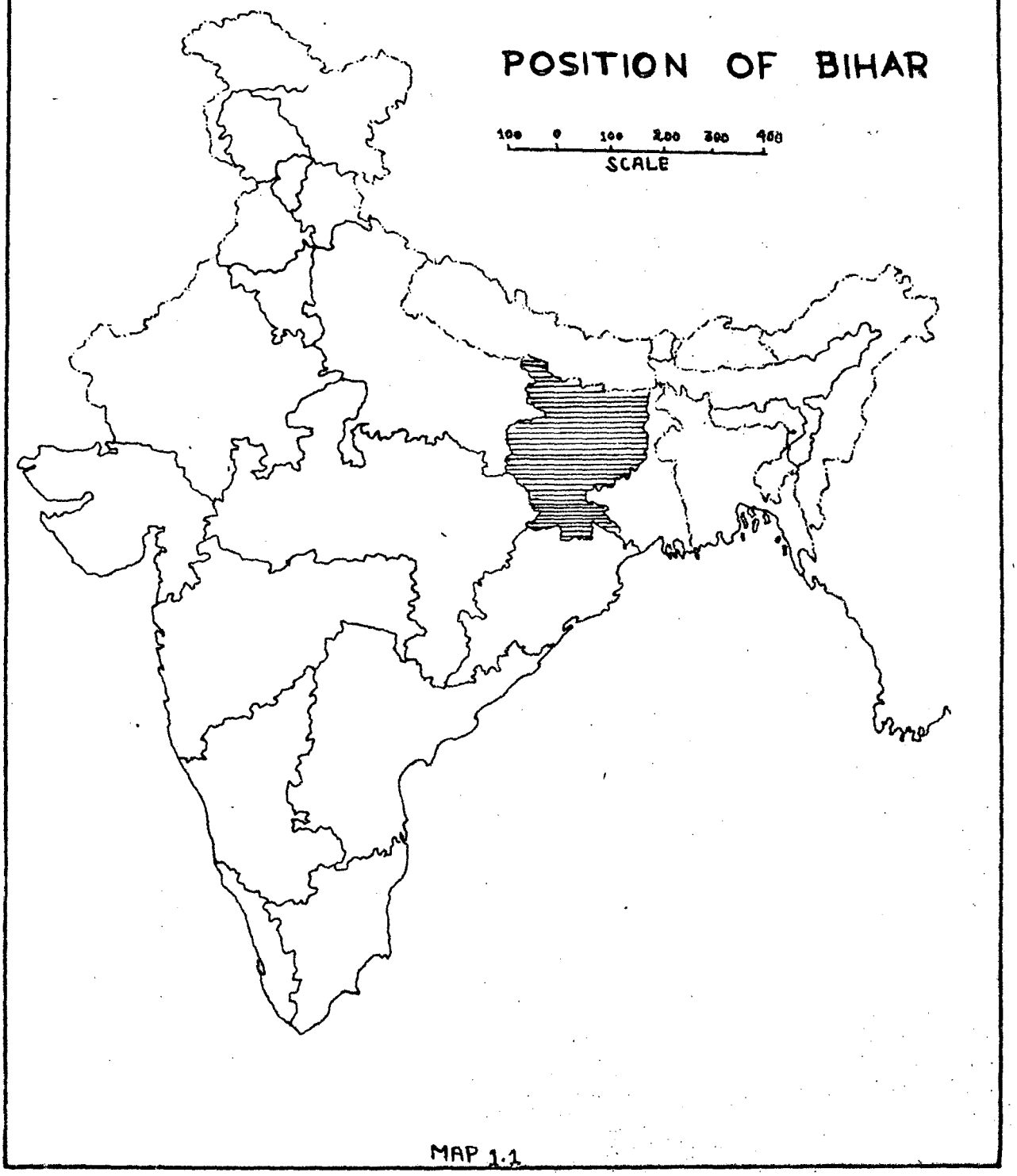
1. Mavinkure: Portrait of a Community Chitrapur Sarswat. Census Report.

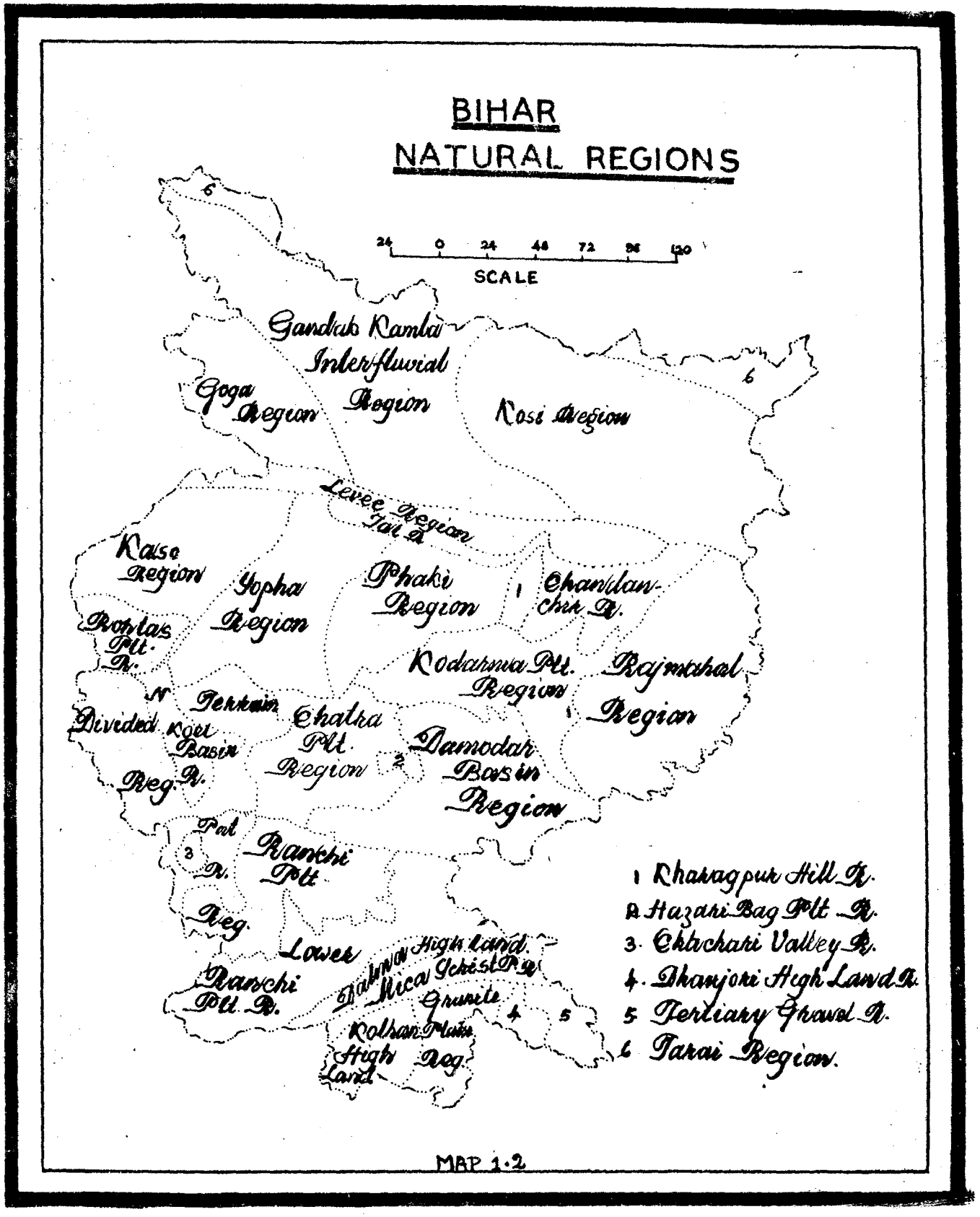


MAP 1.1

1.2 AREA OF STUDY:

Bihar is one of the states of India extending approximately from latitude 22° N to 27° 31' N and 83° 20'E to 88° 17'E. Bihar extends 605 kms from north to south and 483 kms from east to west. At its borders, it has Nepal in its north, U P and M P on its west, Orissa on its south and West Bengal in its east. Bihar covers an area of 174,000 sq. kms and has a population of 57 million (1971) covering 5.3 per cent of country's land and 10.3 per cent of the total population of India. Bihar became a separate state of British India in 1936 and since then it is functioning as an independent state of India.

Geographically, the state is divided into three macro-regions. These regions are North Bihar Plain, South Bihar Plain and Chota Nagpur Platian. North Bihar Plain consists of Champaran, Saran, Muzaffarpur, Darbhanga, Saharsa, and Purnea districts. In South Bihar Plain Shahabad, Patna, Gaya, Monghyr and Bhagalpur districts are included. These two plains commonly known as the Gangetic plain, span over 45 per cent of the area of the state. Chota Nagpur plateau consists of Palamau, Hazaribag,


BIHAR
NATURAL REGIONS
24 0 24 48 72 96 120
SCALE
Gandak Kamla Inter-fluvial Region
Goga Region
Kosi Region
Levee Region Tal R
Kaise Region
Sopha Region
Phaki Region
Chandan-chir R.
Rohtas Plt. R.
Kodarma Plt. Region
Rajmahal Region
Divided Koel Basin Reg. R.
Tehrain
Chatka Plt. Region
Damodar Basin Region
Tal
Ranchi Plt Reg.
Lower Ranchi Plt R.
Dalma High land. Mica Schist R.
Granite
Kolhan Plateau High Land Reg
1 Khasagpur Hill R.
2 Hazari Bag Plt R.
3 Chhachari Valley R.
4 Dhanjori High Land R.
5 Tertiary Gravel R.
6 Tarai Region.

MAP 1.2

Santal Paraganas, Ranchi, Dhanbad and Singhbhum districts. The high land of Bihar covers an area of about 55 per cent of the State.

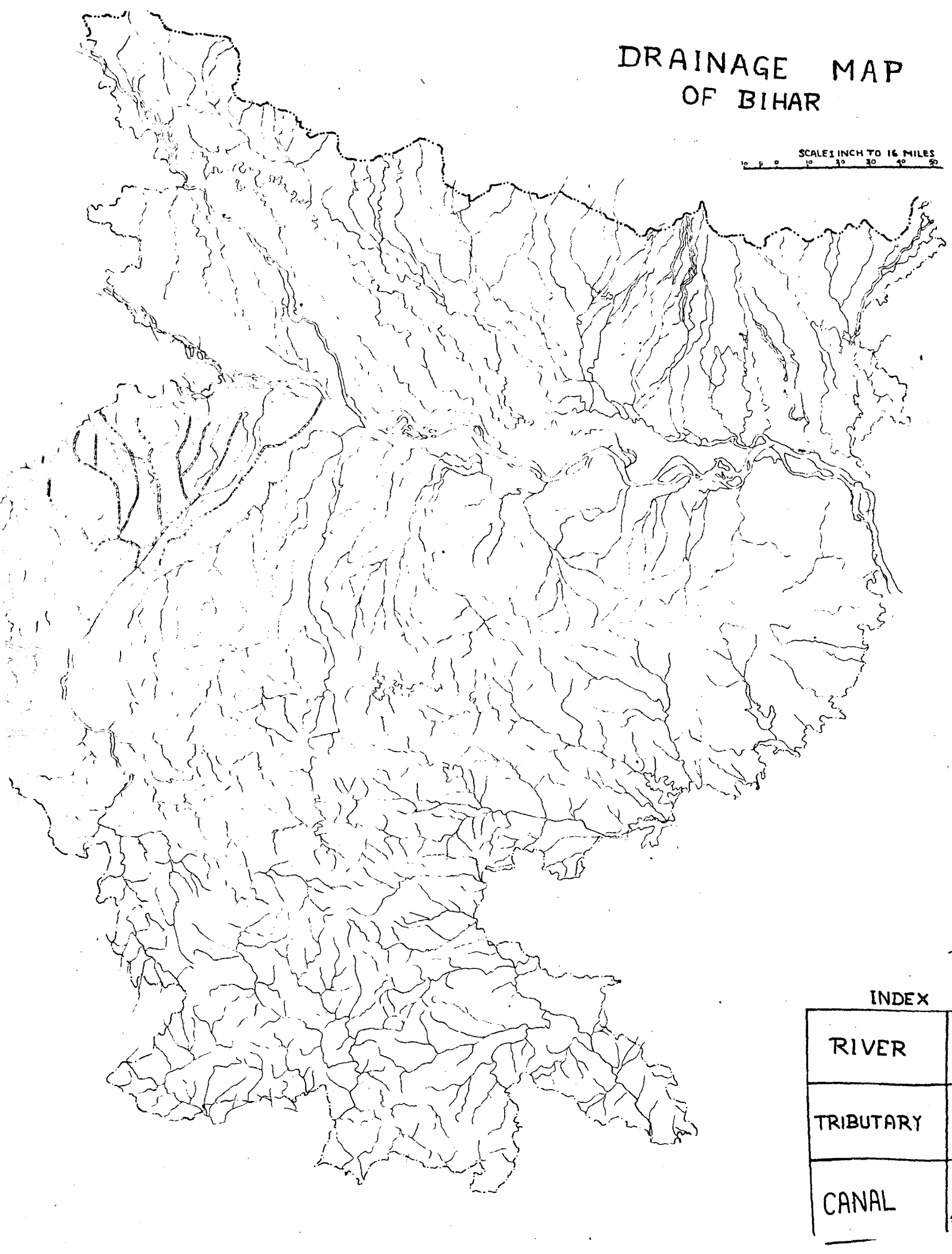
For administrative purposes, Bihar is divided into four divisions viz., Patna Division, Tirhut Division, Bhangalpur Division, and Chota Nagpur Division.

1.3 DRAINAGE:

The rivers and tributaties play a great role for the histogenesis of human settlement. Many large sized settlements of the world are seen either on the banks of rivers or near the sea shore. Bihar contains many rivers and their tributaries which drain the whole state. This is obvious from the drainage map (Map No.1.4) of Bihar. The important rivers of North Bihar plain are the Ganga, the Gandak, the Gogra, the Burhi Gandak, the Baghmati, the Kamala, the Kosi, the Mahananda etc. The Ganga collects Gogra Gandak, Burhi Gandak, Baghmati, Kosi, Mahananda and many countless smaller streams which debouch from the Himalaya to North Bihar plain.

The South Bihar plain is drained by the rivers Son, the Phalgu, the Pungun, the Karamnasa, the Sakri, the Kiul, the Man and their feeders. These rivers after draining the South Bihar merge with the river Ganga. All these rivers bring lot

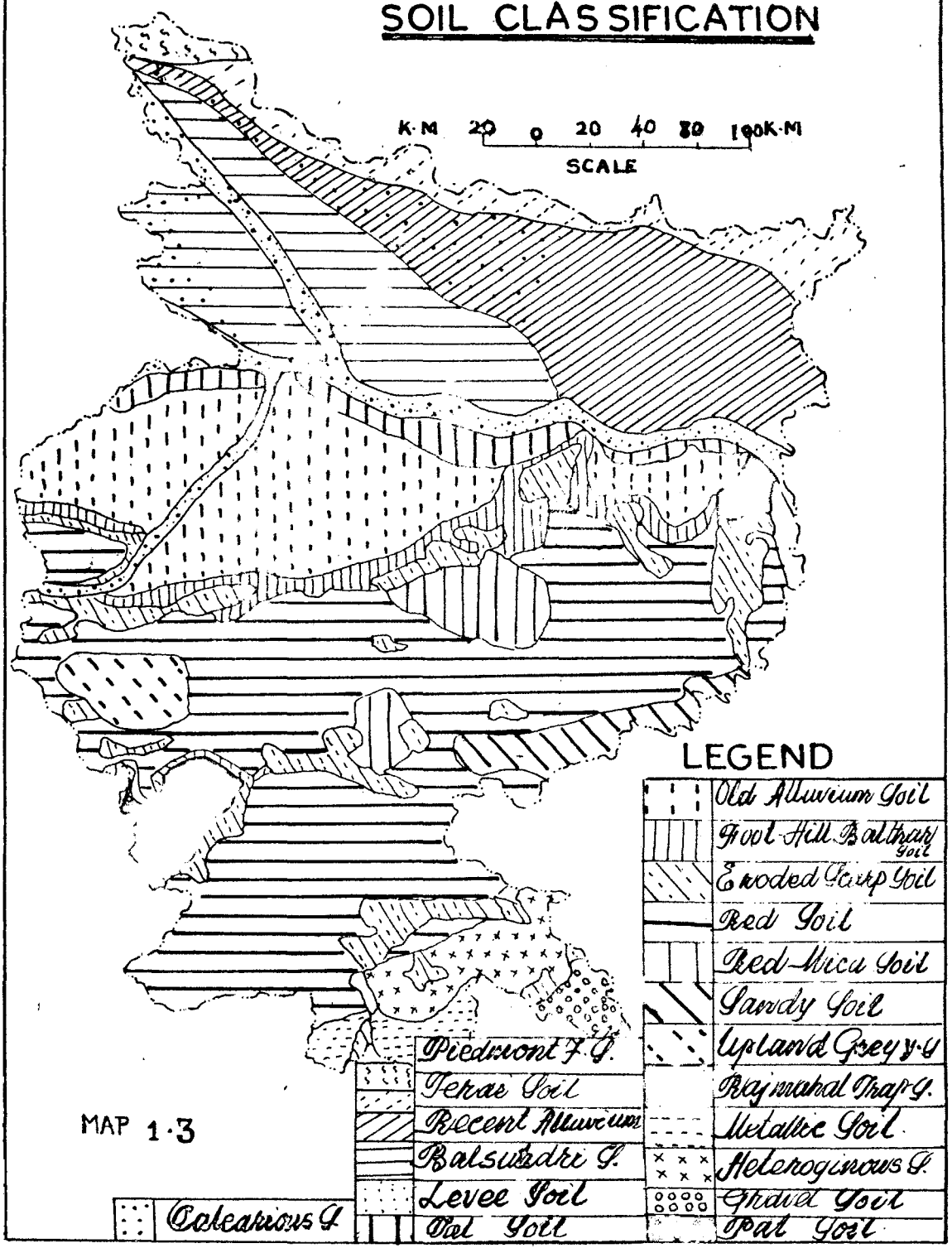
DRAINAGE MAP OF BIHAR



of water in the rainy season. They cause devastating floods in the South as well as the North Bihar plains causing severe loss to the agriculture and hence to the rural economy.

The highlands of Chota Nagpur are drained by streams. To the north the main drainage axis runs from west to east before turning to north-east in the Rajmahal Highland, forming a divide between north and south-east flowing streams. The nucleus of the drainage axis is located on an elevated tract of the platean country south of Piska near Ranchi. Three drainage axis radiate from this elevated tract of the country which divides the main river basins of the region. The east ward drainage axis forms water shed between the Damodar and the Subarnarekha basin until the Southern branch of this east ward drainage axis forms a semi circular water-parting till it takes a south-eastern loop to turn west and reaches eastern limit of the state. A narrow neck of highland links this drainage axis with the drainage axis following the northern flank of the highlands. The major axis forms the water parting of the upper Damodar and the South Koel. Its northern branch forms the divide between the Damodar and the tributaries of the North Koel.

BIHAR
SOIL CLASSIFICATION



MAP 1·3

MP

A few minor drainage axes like the Vindhyan Scrap, Pat, Rajmahal, Chanjori, etc. also in this plateau. The main rivers of this region are the Subarnarekha, South Koel, the Mor etc.

1.4 SOIL:

The soil Map (Map No. 1.3) shows the distribution of different types of soils in Bihar. The soil type of the three natural regions are different from each other. The soils of North Bihar plain can be classified into four major groups, viz., (i) Piedmont Forest Soil, (ii) Terai Soil, (iii) Recent Alluvium (iv) Balsundri. Piedmont Forest Soil is found in the Sumeshwar and Dunhills area of Champaran district. Terai soil is seen near the Bihar-Nepal border. The northern fringe of the districts of Champaran, Muzaffarpur, Darbhanga and north-eastern part of Purnea district contain this soil. The belt of recent aluvium soil extends from Purnea and Saharsa districts to the north-eastern part of Champaran district. Balsundri soil is found between the Burhi Gandak and western border of Bihar in Saran and Champaran districts.

The soils of South Bihar plain can be classified into three major Groups viz., Tal soils, Old Alluvium soils and Foot Hill Balthar soils. Tal soil is found in the back water belt of the Ganga from Buxar in the west to Pakur in the east. Old

alluvium soils occur from western border of Bihar and stretch through Shahabad, Gaya, Monghyr, Bhagalpur and Sahebganj plains. Foot hill balthar soils form a continuous narrow belt between the plain and the dissected platean fringe from the western end of Kaimur plateau to Rajmahal Highlands. Beside these soils there is another type of soil called Levee Soil found near the bank of Ganga, Gandak and Burhi Gandak.

Chota Nagpur plateau has many types of soil. The soils of this plateau can be categorized into ten major groups. These soils are Eroded scrap soils, Red soils, Red Micaceous soils, Sandy soils, Upland Grey yellow soils, Rajmahal Trap soil, Metallic soils, Heterogeneous soils, Gravel soils and Pat soils. As a whole these soils are not highly fertile and it contains many metals.

1.5 CLIMATE:

In the climate of Bihar there are three seasons, i e Hot season, Rainy season, and Cold season. Hot season extends from March to May. The mean maximum temperature varies between 73.3°F, to 79.4°F. The average temperature during May is 92.2°F in Gaya and 91.6°F in Jumshedpur. May is the hotest month in the state. In the plain Bihar, the temperature is higher than the Plateau. Rainy season extends from the month of June to

to August. The rainfall of the state varies approximately 800 to 1300 millimeters. The rainfall is more in plains of Bihar than in the Chota Nagpur plateau. Bihar gets its rain from the south-west Monsoor which originates in the Bay of Bengal.

From November to February is known as the cold season. In the month of November mean temperature varies between 67.3°F in Ranchi to 72°F in Jamshedpur. The mean temperature in Gaya and Patna in December is 61.6°F and 63.4°F. The mean temperature in the same month at Ranchi and Hazaribag is 61.2°F. January is the coldest month in Bihar. The mean minimum temperature varies from 45°F to 51°F. The average temperature in January in Bihar approximately varies from 59°F to 65.8°F .

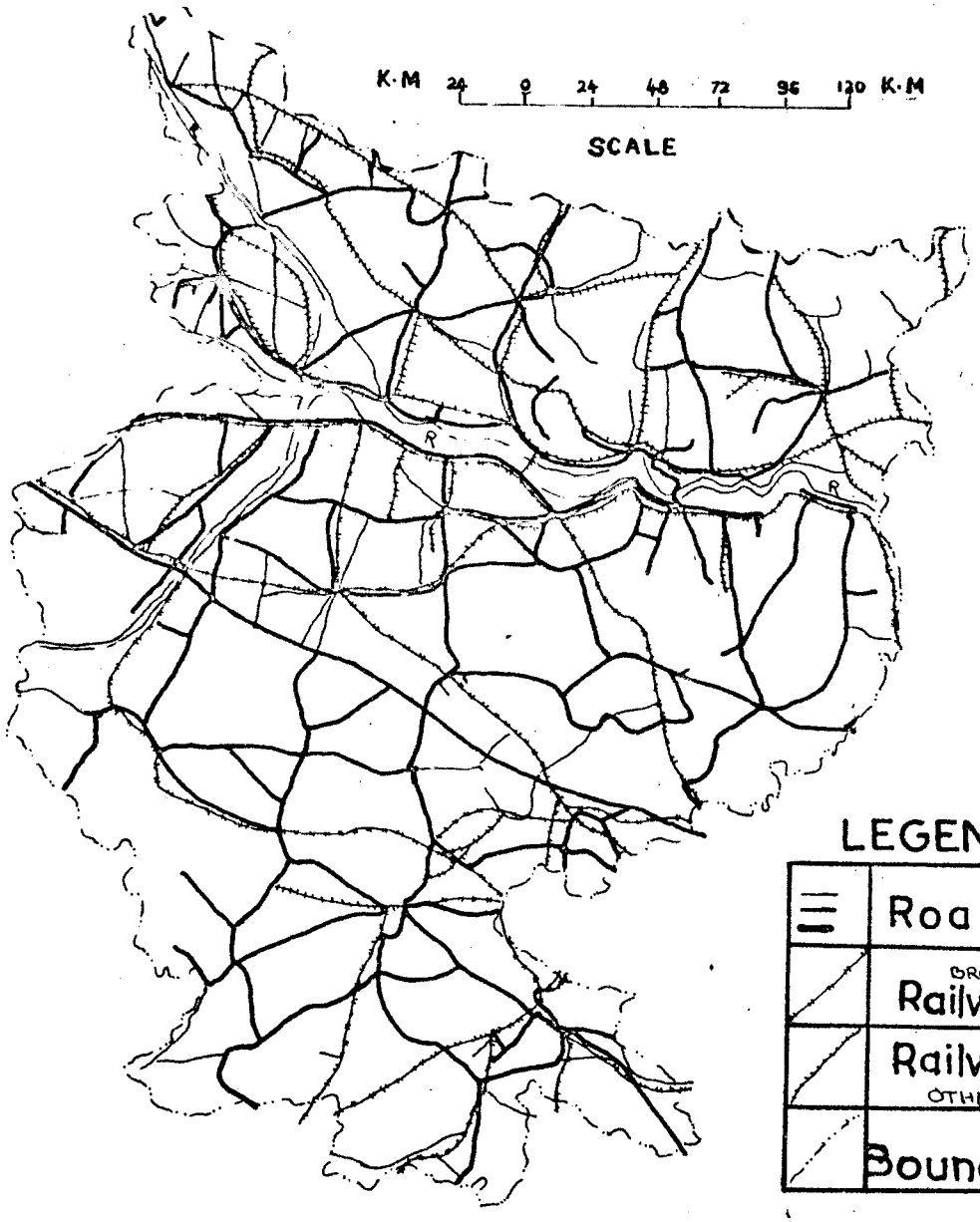
1.6 TRANSPORT AND COMMUNICATION:

The transport network depends upon the topography of the region. It also depends upon the resources available in that region. Transport can be divided into four types viz., Rail, Road, Water and Air. These various types of transport play an important role in the development of a region.

Railways:

It is a very important means of transportation. The first line in Bihar was constructed during the rule of Delhousie. In 1853 Delhousie constructed the railway line joining Calcutta

BIHAR
RAILWAY & ROADS



MAP 1·5

port and Raniganj coal field. Railways run parallel to course of rivers to avoid construction of bridges. The following are the important railway lines in Bihar, the Grand Chord Line, the Asansol-Rourkella route, Raj-Kharsawan-Gua route, Chandra Pura-Muri-Rourkella. The North-Eastern Railway terminates in Kathihar from where North-East Frontier Railway runs eastward to Assam. The East Indian Railway and South-Eastern Railway serve the south Ganga plain and Chota Nagpur plateau respectively. North Ganga plain is served by the North-Eastern Railway, but Purnea district is served by the North-East Frontier Railway.

Roads:

Roads are important for the flow of commodities and movement of population from one part to another part of the region. Its network pattern determines the level of development of the region.

In 1961 Bihar had 12,527 kms. of surface roads. Hazaribag district had the maximum amount of roads mileage with 1201 kilometers of surface roads, whereas Saharsa district had the smallest road mileage of 354 kms. in 1961.

Chota Nagpur plateau has highest density of surface road in terms of population. Damodar vally and other mining areas of Highland of Bihar have a close network of surface roads. In this region Ranchi acts as a dominant road centre.

In the plain of Bihar the road density is very low. Specially in North Bihar plain it is extremely low. The flooded Kosi valley is practically roadless and railless. The transport map of Bihar (Map No. 1.5) gives a picture of the road and railways of Bihar.

Waterways:

Southern and Northern plains of Bihar have the facility of navigation through their rivers. The Ganga has been used for navigation purposes from the ancient time. But navigation is not safe through the rivers of Chota Nagpur plateau as they have rocky beds, breaks in their courses, marked by rapids, water falls and gorges.

Air Transport:

The airways network of Bihar is not at all significant. There are only three airports in Bihar viz., Patna, Gaya and Ranchi. Besides there are quite a few aerodromes which work temporarily.

1.7 DATA BASE:

For this study secondary data were used. Districts census Handbooks of Bihar, 1961 provide the major portion of the data required for this study. From the Primary Census Abstract Population, area, male, female, literate person, all

kind of workers are collected. The social amenities like school, post office, high school, library, hospitals, cooperative society etc. are also taken down. From the tables of Levels of Regional Development data on soil, physiography, main food crop, etc. are collected. These data, sometimes are not adequate.

1.8 METHOD OF STUDY:

The method of study is mainly based on statistical computation and cartographic techniques to illustrate the statistical work. The necessary methodology of analysis will be discussed in the appropriate place. Because of the constraint of time we limited our study to one time period, viz., 1961. Therefore much importance is given to space, not to time.

Chapter II

Distribution of Settlements

Bihar is full of large sized villages. This has been observed from the period of Imperial Censuses. According to 1961 Census there were six hundred and fourteen large sized settlements which included villages with population five thousand and above and all urban centres. Of these 614 settlements, there were 153 towns and rest were villages.

Bihar is a heterogeneous geographical unit. For uniformity and homogenity the state can be divided into three major physical groups viz; (i) North Bihar plain, (ii) South Bihar plain, (iii) Chota Nagpur Plateau, the later covering 45 per cent area of the state while the North Bihar and South Bihar plains spans the rest of the area of the State. The densely populated area of North Bihar and South Bihar plains has rural oriented economy while sparse to moderately populated region of chota Nagpur plateau has mining oriented economy.

The main objective of this chapter is to know the influence of physical factors on the distribution of settlements in Bihar. There are many factors like historical factors, cultural factors and physical factors which are mainly responsible for the hestogenesis of settlements on certain geographical space. Here we shall try to look the distribution of settlements from different angles to know the importance of these factors, giving prime importance to the physical factors.

BIHAR

SPATIAL DISTRIBUTION OF VILLAGES WITH POPULATION 5000+ & ALL TOWNS IN 1961

SCALE 1 INCH TO 16 MILES

10 5 0 10 20 30 40 50

INDEX

METROPOLITAN CITY	I
1 LAKH TO 4·99 LAKH	II
50,000 TO 100,000	III
20,000 TO 50,000	IV
10,000 TO 20,000	V
5,000 TO 10,000	5
LESS THAN 5,000	6
VILLAGE	×

MAP 2·1

North and South Bihar plains have large number of large sized settlements, compared to the Chota Nagpur plateau, which is more inhospitable than the plain Bihar. The following table gives the pattern of inter-regional distribution of settlements in the State.

TABLE II.1

(Distribution of Villages and Towns in natural regions)

Natural Region	Village	Town	Total
North Bihar Plain	300	45	345
South Bihar Plain	132	43	175
Chota Nagpur Plateau	29	65	94
Bihar	461	153	614

From the table it is observed that as we come down from the north to the south of Bihar the number of villages decreases and the number of towns increases. Since the alluvium soil of Bihar plains has attracted more people in the past and since, historically and culturally, this tract was once the heart of India, it is densely populated with dominance of economy. This led to the growth of large number of large-sized villages. But the Highland of Bihar i e the Chota Nagpur plateau being inhospitable for human habitation has less number of large sized villages. But the recent exploitation of

minerals and the pace of industrialisation have given birth to many new urban centres during the fifties and the sixties.

The North Bihar plain contains more than half of the large sized settlements of Bihar. Distributional patterns of these settlements in the region carves out the zone of highest concentration in the Gandak Kamla Interfluvial Region. This region contains over 60 per cent of the settlements of North Bihar plain. The Baya, Burhi, Gandak with feeders in the North Western course, Baghmati and Kamla flow through the region. This region spans over champaran, Muzaffarpur, Dharbhanga and some part of Begusarai. This region is the most densely settled part of the state having an average density of 500 persons per square-kilometer. In short this region is fertile, dense and populous and contains large number of villages with 5,000 and above population. Zone of moderate concentration is the Kosi Region. This zone contains more than 30 per cent of the settlements of the North Bihar plain and embraces eastern margins of Dharbhanga, Saharsa, and Purnea. It has newer alluvium soil and it well drained by the rivers Kosi and Kamla. The Kosi Project has converted the waste patches and culturable tract in to green land with multiple cropping giving very high yield. This region does not have much facilities of transport-ation network. Saharsa and Purnea are almost roadless. Goga Region, which coincides with the Saran district, is found to be

the zone of least concentration. This zone contains only 22 settlements. The climate of this region is hot and dry. It is predominantly agricultural. This region has many agro based industries. It has good network of roads and railways. The zone has the highest density in the State. Rural settlement predominates the zone. 95 per cent of the population of the zone lives in the rural area.

In the South Bihar Plain the highest zone of concentration is the Sopha and Phaki Region along with Levee and Tal Regions. In this zone there are more than hundred settlements. This zone has better transport facilities and is drained by Ganga, Son, Punpun, Phalgu, Balari etc. and contains very fertile soil for cultivation. Kaso region which comprises a major part of Shahabad district forms the zone of moderate concentration. This zone is an interstream areas of the Karamnasa and the Son. The zone of least concentration is Chandanchir Region containing 22 settlements.

In the Chota Nagpur plateau, the zone of highest concentration is Damodar Basin where more than 50 per cent of settlements are found, followed by the zone of moderate concentration in Subarnrekha Basin. Sparse distribution of settlements

is found in Hazaribag plateau, Ranchi plateau, the North Koel Basin and Santal Paraganas. Other parts of the Chota Nagpur plateau are devoid of large sized settlements. South Zonal concentration in the different natural regions occures in response to the physical, cultural and historical factors.

The fertility of the soil and the rural economy of the plain Bihar has given birth to many big sized villages but the discovery of minerals in the Highland of Bihar became one of the causes of the growth of many new towns. To illustrate this the distribution of new towns in 1961 Census is given below.

TABLE II.2

(Distribution of New Towns in different natural regions of Bihar, 1961)

Name of the Region	Number of new town added.
North Bihar Plain	7
South Bihar Plain	7
Chota Nagpur Plateau	34
Bihar	58

In order to know whether the distribution of large sized villages and towns in Bihar is related with the natural regions we used the chi-square test. The chi-square is

calculated to be 6.11 which is statistically significant at 95 per cent significance level. From this test we concluded that there is an unevenness in the distribution of large-sized villages and towns in the various natural regions of the State.

II.1 DISTRICT-WISE DISTRIBUTION OF URBAN CENTRES AND LARGE SIZED RURAL SETTLEMENTS.

As we find an uneven distribution of settlements in natural regions of Bihar, so also we find a similar pattern in its districts. Dharbhanga district possesses the highest number of settlements. There are 100 large sized villages and six urban centres in this district. Monghyr ranks second with 65 settlements (52 villages and 13 towns). Next to Monghyr comes the Champaran district with 61 settlements, out of which nine are towns and rest are villages. Palamau has the lowest number of settlements. It has only one large sized village and five urban centres. Next to Palamau is the Ranchi district. It has only 11 settlements out of which, nine are urban centres and two are villages. Table 2.3 reflects the district wise distribution of large sized villages and towns of Bihar according to the 1961 Census.

TABLE II.3

(District-wise distribution of Large sized villages and Towns of Bihar, 1961).

Sr.No.	Name of District	Villages	Towns	Total
1.	Champaran	52	9	61
2.	Saran	16	6	22
3.	Muzaffarpur	52	6	58
4.	Darbhanga	100	6	106
5.	Shaharsa	42	6	48
6.	Purnea	38	8	46
7.	Shahabad	22	9	31
8.	Patna	26	10	36
9.	Gaya	11	10	21
10.	Monghyr	52	13	65
11.	Bhagalpur	21	5	26
12.	Palamau	1	5	6
13.	Hazaribag	9	10	19
14.	Santal Paraganas	2	10	12
15.	Ranchi	2	9	11
16.	Dhanbad	11	19	30
17.	Singhbhum	4	12	16
	Bihar	461	153	614

II.2 DISTRIBUTION OF SETTLEMENTS ACCORDING TO SOILS:

Fertility of the soil sometimes determines the size of a settlement. In other words we can put that the productivity of land is a measure of the size of settlement. In a fertile area a small piece of land can support a large mass of population because of its high yield, but the same amount of land in a hilly area cannot support the same number of persons, and hence the amount of land (agricultural) has to be increased. But there are limitations both physical and economic to the use of the land for cultivation. Therefore it is generally observed that hilly areas or plateau have small sized settlements where as plain or fertile soil has large sized settlements. Since soil type of region determines the type and amount of agriculture therefore it is interesting to study the distribution of settlements according to various soil types.

Bihar has many kind of soils. The map of soil shows the distribution of various kind of soils in Bihar. The various kind of soils in Bihar are: (i) Old alluvium soil, (ii) Recent alluvium, (iii) Piedment Forest Soil, (iv) Terai Soil, (v) Bal Sundri, (vi) Levee Soil, (vii) Tal Soil, (viii) Calcareous, (ix) Foothill Balthar Soil, (x) Eroded Scrap Soil, (xi)Red Soil,

Lorenz Curves for distribution of Settlements and Towns in Bihar, 1961

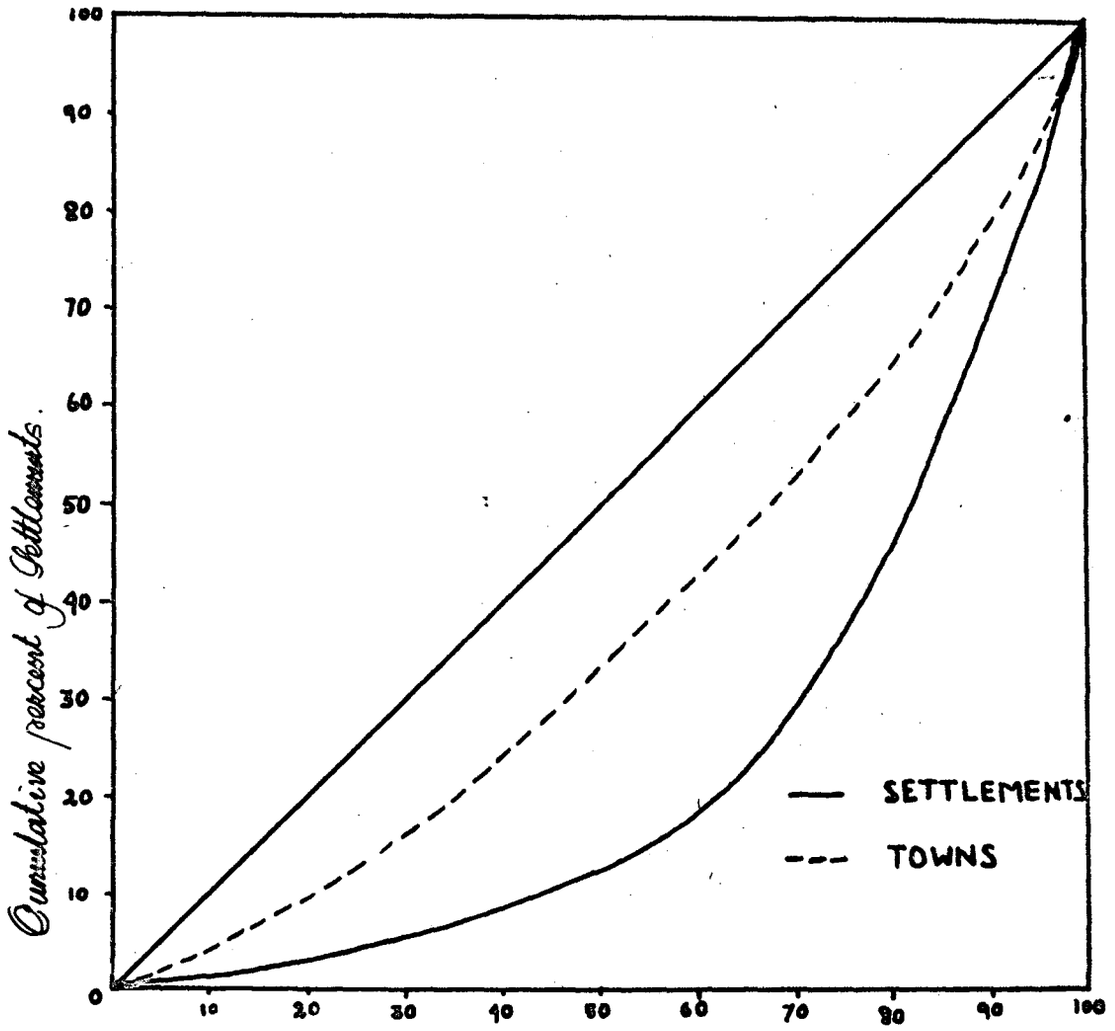


FIGURE 2.1

(xii) Red Micaceous Soil, (xiii) Sandy Soil, (xiv) Upland Grey Yellow Soil, (xv)Raj Mahal Trap Soil, (xvi) Metallic Soil, (xvii)Heterogeneous Soil, (xviii) Gravel Soil, (xix) Pat Soil.

These soils have been grouped in two major groups, called group I and group II. The group I consists of old alluvium, recent alluvium, Levee soil, Tal and Balsundri soil, The second group consists of rest of the soil. It is obvious that group I is more fertile than group II, which mainly contains different Minerals of the State. Group I contains 520 (rural and urban) settlements where as there are only 94 settlements in the second group of the soils, out of which majority are urban centres which have grown up because of mineral nresources.

II.3 CONCENTRATION OF SETTLEMENTS:

To study the concentration of the settlements we have taken recourse to Lorenz Curve and Gini's Coefficient. These two indices give us a better view of the concentration of the settlements in Bihar with respect to its area. Figure 2.1 shows that the distribution of towns and settlements are highly unequal with respect to area of Bihar. The inequality in distribution of village is more than that of the villages. The Gini's Coefficients for distribution of large sized of villages is found to be 0.239 while the same for the urban areas is 0.057

Lorenz Curves Showing the distribution of settlements in Natural Regions of Bihar

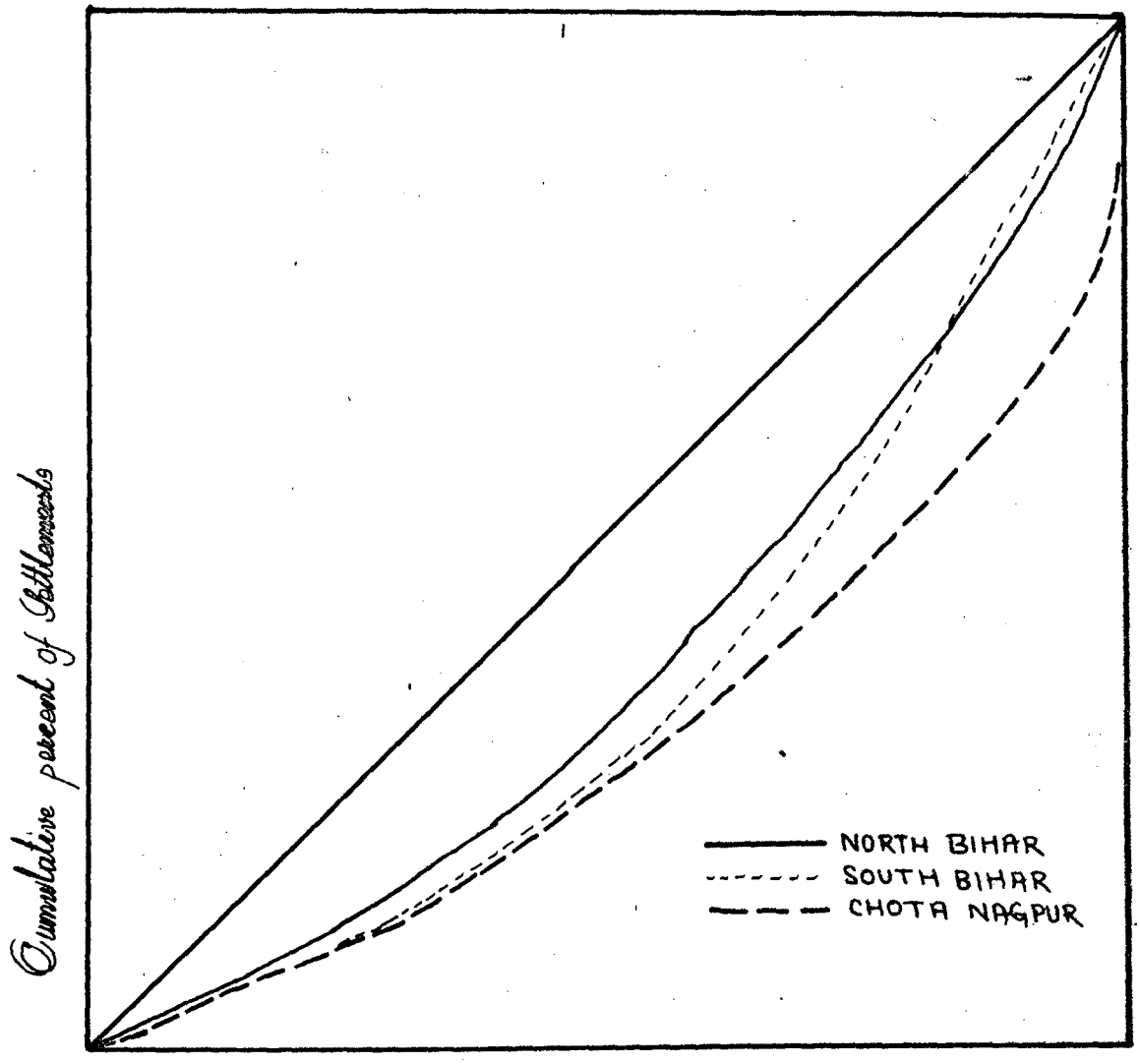


FIGURE 2.2

Lorenz Curves for distribution of towns in Natural Regions

Bihar, 1961

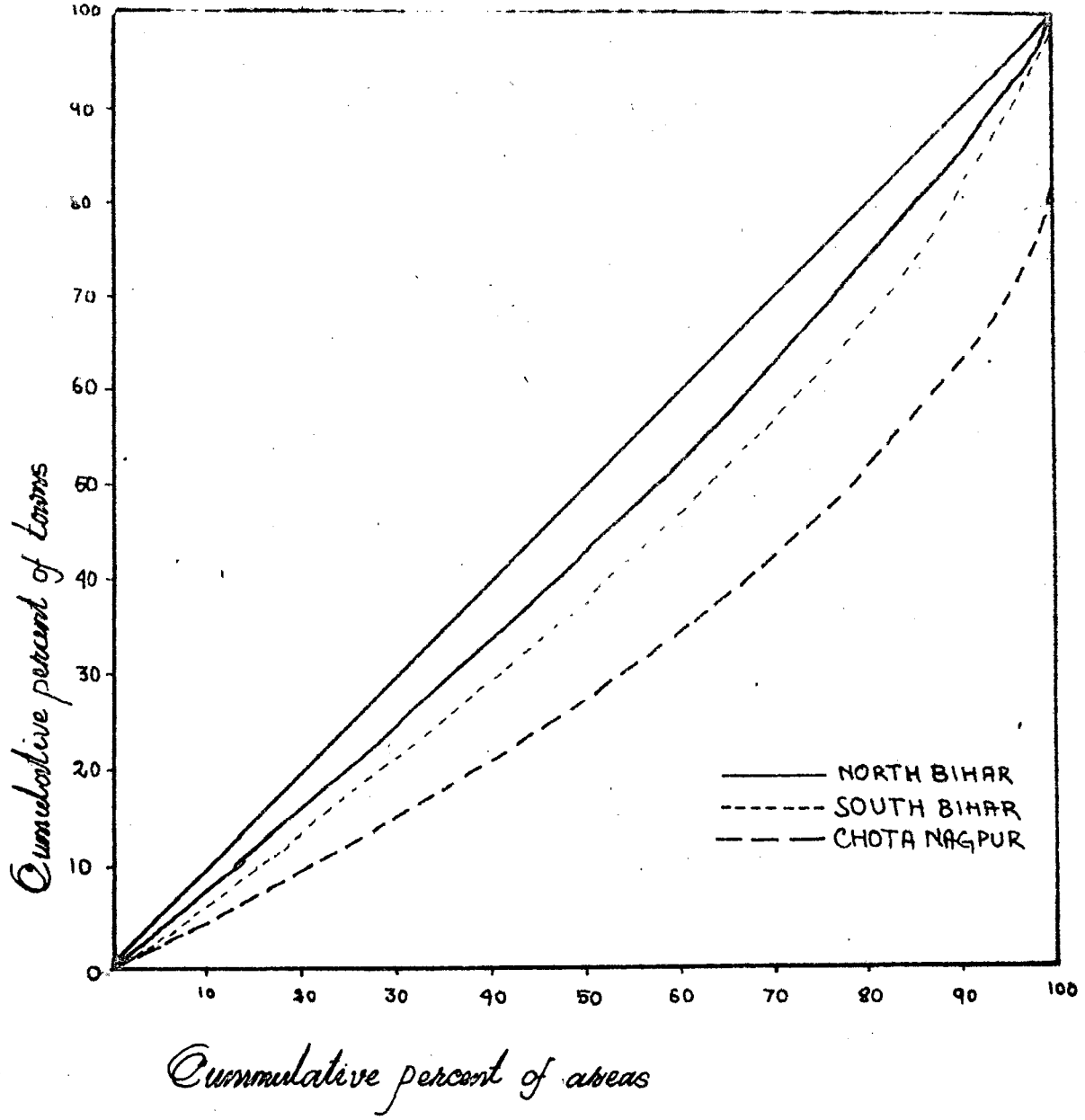


FIGURE 2·3

This shows that the distribution of towns in various districts of Bihar is highly unequal.

Figures 2.2, 2.3 and 2.4 illustrate the distribution of settlments (villages and towns), towns and large sized villages of Bihar in various natural regions of the State. If the line for any distribution on the diagonal of the square it would indicate an even distribution of settlements over the land areas of physical regions of the State. The farther from the diagonal a curve lies, the more uneven is the settlements distribution.

TABLE II.4

(Gini's Coefficients for the distribution of settlements, towns and large sized villages over the land area by natural regions)

Physical Region	Settlement	Town	Village
North Bihar Plain	0.243	0.092	0.273
South Bihar Plain	0.272	0.159	0.321
Chota Nagpur Plateau	0.398	0.362	0.561

From the above table and Lorenz Curves (Figures 2.2, 2.3, 2.4) it is obvious that the distribution of settlements, towns and villages are more uneven in Chota Nagpur Plateau. This indicates a concentration of settlements on certain areas

Lorenz Curves for distribution of large size Villages in Natural Regions of Bihar, 1961

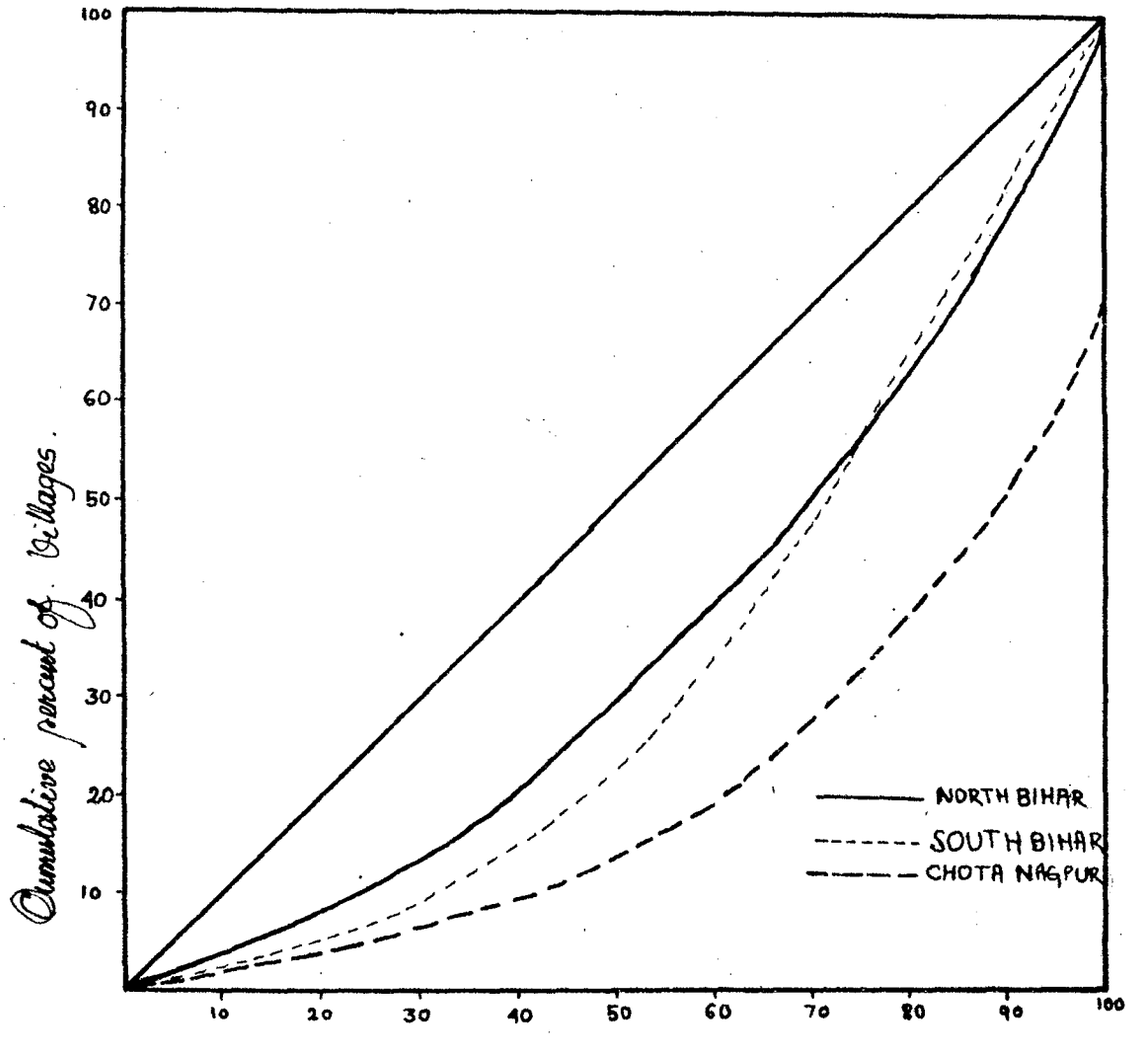


FIGURE 2·4

of the region. Also we observed that the distributions become more uneven as come from North Bihar Plain to Chota Nagpur plateau. It is found that the unevenness in distribution is more in case of large sized villages than the towns.

An effort is also made to study the distribution of towns and large sized village by the use of near-neighbourhood technique. The above said technique uses the following formula.

$$R = \bar{r}_a / \bar{r}_e$$

Where, $\bar{r}_a = \sum\sum r_{ij}/N$ and r_{ij} is the nearest distance of the settlement i from j . $\bar{r}_e = \sqrt{A/N}$ N is the total number of settlements and A is the area of the region.

Even in a million sheet map it is found difficult to measure the distance between two settlements as they are very close in some districts of the states (Dhanbad and Dharbhanga But any how from a visual impression we conclude that the distribution is clusture.

Chapter III

Demographic Profile

Demographic Profile

The demographic characteristics of the settlements help to understand the various socio-economic processes of the society. Growth rate of population, density, sex ratio, literacy rate and dependency ratio are considered for this study as demographic characteristics of large sized villages and towns of the State. In this chapter we propose to examine these characteristics of the selected settlements in different natural regions of the state and in different size of population along with the soil regions. As indicated earlier, the soils of Bihar can be categorised into two groups, viz.; (i) the alluvium soil of plain Bihar and (ii) Soils of Chota Nagpur plateau. These two soil groups coincide with the natural regions and hence the analysis of demographic characteristics of settlements with respect to soil type is not undertaken separately. Bihar is an unicrop area and, therefore, we have also excluded the analysis of demographic characteristics with respect to crop region of the state.

All urban centres of Bihar are categorized into different size classes in the following way:

Class Size	Population
I	100,000 & above
II	50,000 - 99,999
III	20,000 - 49,999
IV	10,000 - 19,999
V	5,000 - 9,999
VI	Below 5,000

All the rural settlements with population five thousands and above are treated as one group.

III.1 GROWTH RATE

It is important to know the rate at which the population of the large sized settlements is growing. The study of growth rate[1] indirectly leads to the study of its components i e fertility, mortality, and migration.

For 82 settlements, 1951 population is not available and hence their growth rates have not been calculated.

Distribution of Settlements according to their 1951-61 growth rates in the various natural regions:

There are 83 settlements in Bihar which have experienced a growth rate of more than 100 per cent (Table III-1). Out of these 83 settlements 46 settlements are in North Bihar Plain,

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1. For computation of growth rates of settlements, 1951 population is taken as base year population. The formula used for calculation is $\frac{P_{61} - P_{51}}{P_{51}} \times 100$ where, G = Growth Rate, P_{61} = Population in 1961, P_{51} = Population in 1951.

26 are in South Bihar Plain and 11 settlements are in Chota Nagpur Plateau. Improvement of health status of people, adequate medical facilities and large amount of migrants to this region, control of flood situations, execution of Kosi Project etc. are some of the causes of high growth rates of a number of settlements of North Bihar Plain. The migration of people to the mining and industrial districts of the Chota Nagpur Plateau is the main cause of the high growth of settlements of this region.

TABLE III.1

(Distribution of Settlements according to their growth rate in various physical regions of the State)

Natural Regions	Growth Rate in Percentage						
	100+	50-99.9	25-49.9	10-24.9	10	Negative	Total
North Bihar	46	47	59	121	34	11	318
South Bihar	26	27	41	29	18	13	154
Chota Nagpur	11	10	20	15	1	3	60
Bihar	83	84	120	165	53	27	532

From table III.1 it is clear that Chota Nagpur plateau has the maximum percentage of villages with growth rate more than the national average i e 25 per cent. In Chota Nagpur Plateau the exploitation of mineral resources and the pace of

industrialization have attracted a large number of people from the other districts of Bihar and neighbouring States. South Bihar plain contains 61 per cent of villages with growth rate more than 25 per cent, while North Bihar plain contains only 48 per cent of villages. From this description it is obvious that Chota Nagpur Plateau have experienced an overall high growth rate among the large sized settlements in comparison to the other two regions viz; North Bihar Plain and South Bihar Plain.

Applying chi-square test-to the figures in Table XIII we found that there is differential distribution of settlements in various natural region. The chi-square value is found to be $X^2 = 14.71$ which is statistically significant.

Distribution of Settlements according to growth rate vis-a-vis their population size;

In this section we are interested to know how the settlements of different size classes are growing. Since the bigger and older cities and towns have reached a saturation level and comparatively more job opportunities are found in smaller towns, the growth rate of large cities and towns has been low than that of the small towns. Moreover the denominator of growth rate is large in a bigger cities and towns, as a whole a small increase in population of a large city causes a marginal increase of its growth rate where as a small increase

of population of a small town causes a large increase in its growth rate. Hence we hypothesized that larger the size of city or towns smaller will be its growth rate.

TABLE III.2

(Distribution of towns and villages in different size-classes and their growth rate)

Size Class	100+	50-99.9	25-49.9	10-24.9	10	Negative	Total	Average Growth Rate
I	0	0	4	3	0	0	7	27.2
II	1	0	3	3	0	0	7	27.2
III	3	6	13	6	0	3	31	45.1
IV	2	9	11	7	4	2	35	46.1
V	1	1	9	5	2	2	20	46.8
VI	0	1	1	0	1	1	4	-
Village	76	66	80	140	49	20	431	63.1

Table III.2 gives the distribution of towns and villages in different size classes and their growth rates. It is observed that more than half of the settlements in each size class have growth rates which are above the national average. (ie 25 per cent) It is however important to note here that the average growth rate of Class I and Class II towns in Bihar is only 27.2 per cent each and this average growth rate increases with the decrease of population size of settlements. The average growth rate of large sized villages is 63.1 per cent.

Compared to urban centres large sized rural villages have registered a higher growth rate (63.1 per cent). There are 76 settlements which are not urban centres but have experienced a growth rate of 100 per cent or more. None of the Class I town have registered a growth rate more than 50 per cent.

III.2 DENSITY

The density of a settlement is determined by physical as well as economic factors. By physical factors we mean high or low attitude, the hot-wet regions, plateau and plain areas etc. These factors often govern the density of a region. Besides these factors economic factors also play a dominant role in determining the density of settlements. The various economic factors for example intensity of agriculture, mineral resources, industrialisation, transport-net work, urbanisation, etc., have a great share in determining density of a community and also of a region. In this section we intend to analyse the density of the settlements in various natural regions of the state and in the various size classes of settlements.

The population density is computed by dividing the total population by total land. In this study the unit of density is taken as population per square mile of area.

Distribution of Settlements according to their densities in the natural Regions:

Out of 614 large sized villages and towns there are 43 settlements which have a density of more than 85,000 persons per square mile, while 9 settlements have density 7000 to 8500 persons per square mile.

TABLE III.3

(Distribution of Settlements in various natural regions)

Natural Region	Density per square mile							
	8500+	7000-8500	5500 7000	4000-5500	2500-4000	1000-2500	1000	Total
North Bihar	10	1	3	3	28	204	96	345
South Bihar	13	4	9	10	28	79	32	175
Chota Nagpur	20	4	8	11	14	22	15	94
Bihar	43	9	20	24	70	305	143	614

Table III.3 shows the inter-regional distribution of settlements according to their density Chota Nagpur plateau has large number of settlements with higher density of population. There are 20 settlements (14 towns and 6 villages) comprising 21.2 per cent of all the settlements of the state whose density is more than 8500 persons per square mile. All the six villages in this category are in Dhanbad district. Migration of people to the mining villages from other villages of the state and neighbouring states is the main cause of this high density. There are 13 settlements out of 195 settlements (7.5 per cent) of the South Bihar plain with density more than 8500 persons per square mile. Only 2.9 per cent of all settlements in the North Bihar plain have density of 8500 persons per square mile.

Chota Nagpur plateau has more than 50 per cent settlementswwith density more than 4000 persons per square mile at the same time other two physical regions of the state have more than 50 per cent of settlements with density less than 4000 persons per square mile. Majority of settlements of North Bihar plain (204 settlements) have density of 1000 to 2500 prsons per square mile, while the south Bihar plain and Chota Nagpur plateau contain 79 and 22 settlements respectively.

Applying chi-square test to distribution of settlements in various natural region (table III.3) we found that there is a differential distribution of settlements according to their density. The chi-square found for this distribution is 117.14, which is statistically significant.

Density of large sized villages and towns in Chota Nagpur plateau is not only governed by the physical factors but also governed by the economic factors and the later has played a greater role in the differential density of the settlements. Incase of Chota Nagpur plateau, the urban development, the construction of new roads and rail linkages to various places of the state, the exploitation of mineral resources, the pace of industrialisation etc. are mainly responsible for the very high density of the settlements. In the South Bihar plain certain settlements have high density because of the setting up of new project like Kosi project.

Analysis of density of settlements vis-a-vis their size classes:

We are interested to find out the density pattern of settlements in the various size classes of population along with their distribution with respect to their density. We hypothesized that larger the population size, larger will be the density in case of urban areas and the village should have the smallest average density of all these size classes.

TABLE III.4

(Distribution of Settlements in various size classes and their averages)

Size Class	Density per square mile								
	8500+	8500-7000	7000-5500	5500 4000	4000-2500	2500-1000	1000	Total	Average
I	7	0	0	0	0	0	0	7	12960
II	5	0	0	1	0	1	0	7	10167
III	11	4	2	3	8	5	0	33	8960
IV	8	2	6	9	15	10	2	52	5657
V	4	3	6	3	8	19	3	46	3937
VI	0	0	0	0	3	3	2	8	1715
Village	7	0	6	8	36	271	133	461	1532

From the above table III.4 it is obvious that all class I towns (7 towns), five class II towns, 11 class III towns, 8 class IV towns and 4 class V towns have densities more than

8500 persons per square mile. There are 4 settlements of class III, two settlements of class IV and, three settlements of class V where the density of population lies between 7000 to 8500 persons per square mile.

Moreover, we find that the average density of settlements decreases as the size class of settlements decreases (Table III.4). The average density of large sized villages is found to be 1532 persons per square mile which is the lowest.

III.3 SEX RATIO:

The sex composition of population is a variable which should be considered for any demographic analysis, specially in India. A great preponderance of one sex would tend to result in lowered fertility and slower growth rate. Sex ratio can be viewed as the number of female per thousand males in a given population. Before going into the details of sex ratio of the settlements, it is fair to discuss the factors which effect the sex ratio. Indeed all variations in sex ratio in time and space are due to the relative influences of three factors: The preponderance of males at birth, the differential rates of mortality of the two sexes at different ages and sex selectivity in migration[1].

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1. Clarke, J H.

Since most of the settlements of Chota Nagpur plateau are the centre of mining activities, and as a result have contained a large amount of male migrants.

We hypothesised here that Chota Nagpur plateau has more settlements with lower sex ratio where as North Bihar and South Bihar plains have settlements with high sex ratio. Moreover the sex ratio will decrease as the size of population of a settlement will increase. To prove these two hypothesis we consider the following distributions.

Distribution of settlements by sex ratio in natural regions:

In Bihar 217 settlements (35.3 per cent) have the sex ratio of more than 1000 females per thousand males. In otherwords, these 217 settlements have sex ratio favourable to females. Majority of these settlements are in North Bihar plain (160 settlements), while 55 settlements are in South Bihar plain and only two settlements are in Chota Nagpur plateau. There are 79 settlements in North Bihar plain, 35 settlements in South Bihar plain and 6 settlements in Chota Nagpur plateau with sex ratio between 950 to 999. It is seen that 161 settlements of Bihar have sex ratio highly favourable to amale i e they have sex ratio less than 900 females per 1000 males. Most of these settlements are in Chota Nagpur plateau (77).

TABLE III.5

(Distribution of large sized villages and towns according to sex ratio by natural regions)

Size Class	Sex Ratio				
	1000+	950-999.9	900-949.9	900	Total
North Bihar	160	79	65	41	345
South Bihar	55	35	42	43	175
Chota Nagpur	2	6	9	77	94
Bihar	217	120	116	161	614

$X^2 = 195.39$

This study shows an interesting pattern of sex ratio between the plains and highlands. In the Gangetic plain most of the settlements ~~with lower~~ have high sex ratio, whereas settlements with lower sex ratio are found in Chota Nagpur plateau. Almost all the settlements of Chota Nagpur plateau have sex ratio less than 950. There are districts like Dhanbad and Singhbhum where all large sized settlements have sex ratio less than 900 females per 1000 males. This differential in the sex ratio between the plains and the Highland shows two. In different types of economy Chota Nagpur plateau the economy is mining oriented. This mining oriented economy attracts male labourers to the secondary and tertiary sectors from the Primary sector, from the neighbouring districts of the State. Because of this sex selective migration the sex ratio of Chota Nagpur plateau is highly favourable to males. The average sex ratio of settlements of Chota Nagpur region is 789 females per 1000 males, while that of the plain Bihar is 1008.

From the above distribution (table III.5) we find that sex ratio of settlements varies in natural regions. Using chi-square technique we found the X^2 for this distribution to be 195.39 which is statistically significant.

Analysis of sex ratio of settlements
Vis-a-vis their size classes:

The sex ratio of all class I and class II cities and towns of Bihar is less than 900 females per 100 males. In rest of the size classes majority (more than 60%) of the towns have sex ratio highly favourable to males i e sex ratio less than 900. But only 47 large size villages have sex ratio less than 900 females per 1000 males.

TABLE III.6

(Distribution of settlements according to sex ratio by size classes)

Size Class	Sex Ratio				Total	Average sex ratio
	1000+	950-999.9	900-949.9	900		
I	0	0	0	7	7	801
II	0	0	0	7	7	817
III	1	3	8	21	33	826
IV	4	2	10	36	52	849
V	0	5	6	35	46	809
VI	0	0	1	7	8	708
Village	213	121	90	47	461	1004

It is obvious from table III.6 that large sized villages have comparatively larger sex ratio than the towns of Bihar.

The last column of the above table reveals that the average sex ratio of settlements increases as the size class of settlements decreases. But in class V settlements the sex ratio has gone down to 809 and in class VI towns the average sex ratio has gone down still further to 708. There are 8 class VI towns highly urbanised and industrialised due to mining activities. Owing to the sex selective migration of rural people to these towns the sex ratio has becomes unfavourable to females. The average sex ratio of all rural settlements is 1004 females per thousand of males.

III.4 LITERACY

In modern age education has manifold uses. The progress of a nation in modern world is dependent upon the education of its citizens. Besides, literacy has an important role for determining some of the demographic characteristics of population. For instance literacy level of a population affects the mortality, fertility, age at marriage, attitude relevant to family size etc. So it is essential to know the educational status of people and level of literacy.

A literate is defined as a person who can read and write. The literacy rate is defined as the number of literates per hundred of population.

Here we are interested to know how the towns and large sized settlements have been distributed according to their literacy rates in natural regions. Moreover we are keen

to study the level of literacy in the various size classes of population.

Distribution of settlements according to their literacy rate by natural regions:

The literacy thrate of all the large sized villages and towns is worked out and a frequency table III.7 is generated for the purpose of analysis. From table III.7 it is noted that North Bihar plain has maximum number of settlements in comparison to South Bihar and Chota Nagpur plateau in which the literacy rate is less than 10 per cent, there being 39 such settlements (11.4 per cent) in North Bihar plain. There are only five settlements in South Bihar plain and only one in the Chota Nagpur plateau with literacy rate less than 10 per cent.

TABLE III.7

(Distribution of settlements according to their literacy rate in various physical regions, 1961).

Natural Region	Literacy Rate						
	10	10-14.9	15-19.9	20-29.9	30-39.9	40+.	Total
North Bihar	39	124	104	38	24	16	345
South Bihar	5	18	40	67	29	16	175
Chota Nagpur	1	2	2	27	22	40	94
Bihar	45	144	146	132	75	72	614

There are 40 settlements in Chota Nagpur plateau, 16 settlements each in North Bihar and South Bihar plains with literacy rates more than 40 per cent. This shows that there is differential in literacy rate of the settlements of plains

of Bihar and the highlands of Bihar. This discrepancy can be explained with respect to the degree of urbanisation. Since in Chota Nagpur plateau the urbanisation has proceeded at tremendous speed during the fifties, we find a large number of urban centres in the region. Moreover the rest of the settlements are mining villages therefore it is obvious that literacy should be high in this region. The plain Bihar is less urbanised and it has more settlements with low literacy rate.

We observed that there is a differential in literacy rate of settlements in various natural regions. This is proved from the chi-square value computed for this distribution (Table III.7). Which is found to be 240.76 and is statistically significant. The average literacy rate of the villages of plains of Bihar is only 16.71 per cent but that of the Chota Nagpur plateau is 29.50 per cent. Hence we conclude that the percentage of villages with high literacy rate is increasing as one comes down from north to south.

Analysis of Literacy of the Settlements with Respect to the Size Class of Population:

We hypothesised that higher the size of population of settlements higher will be the literacy rate. In order to justify the hypothesis we constructed the following table (Table III.8).

TABLE III.8

(Distribution of settlements by literacy in various size classes)

Size Class	Literacy Rate							
	10	10-14.9	15-19.9	20-29.9	30-39.9	40+	Total	Average
I	0	0	0	0	1	6	7	47.2
II	0	0	0	0	0	7	7	45.2
III	0	0	0	2	15	16	33	42.7
IV	0	0	0	16	19	17	52	35.9
V	0	1	1	14	19	11	46	33.8
VI	0	0	0	0	2	6	8	46.1
Village	45	143	145	100	19	9	461	18.0

None of the urban centres has literacy rate less than 10 per cent. Only 45 villages in the whole state have literacy rate less than 10 per cent. There is one settlements in class V with literacy rate 10-14.9 per cent and one settlement in the same class with literacy rate 15-19.9 per cent. A little less than 66 per cent of rural settlements have literacy rate below 20 per cent. Almost all the towns in different size classes have literacy rates that one above 30 per cent, while there are only 18 large sized villages with that high level of literacy rate.

From the last column of table III.8 it is seen that higher the size of population higher the average lateracy rate of settlements. The average literacy rate of Class I cities

is 47.2 per cent. But only in Class VI town it is 46.1 per cent which is mainly because of the pace of industrialisation along with migration. The average literacy rate of the villages is only 18.0 per cent which is smaller than the state average i e 21.75 per cent (1961).

III.5 DEPENDENCY RATIO:

Dependency ratio is a rough measure of dependency load of a population. It reflects the quantity of man-power of a given population. A very high dependency ratio suggests that the number of workers is comparatively smaller compared to non-workers. Like wise a low dependency ratio suggests that there is abundency of employed manpower.

In this section we are interested to study the distribution of settlements in various natural regions according to their dependency ratio. We hypothesised that higher the size of population higher the dependency ratio.

In the absence of age data dependency ratio is defined as the number of non-workers per hundred of workers.

Distribution of Settlements by regions according to dependency ratio:

Table III.9 reveals that most of the settlements of South Bihar plain have dependency ratios above the national average (182 per cent). There are 93 settlements comprising 53.1 per cent of all settlements of the region. Whereas the dependency ratio is more than 82 in South Bihar plain, North Bihar plains have 152 settlements and Chota Nagpur 33 settlements

with dependency ratio more than the national average. In chota Nagpur plateau, majority of settlements have dependency ratio below national average. The percentage of such settlement is 64.9. This is may be due to the availability of works in the secondary, literacy sectors of the region along with the primary sector.

TABLE III.9

(Distribution of Settlements according to their dependency ratio in various natural regions.)

Dependency ratio / Natural regions	82	82-131.9	132-181.9	182-231-9	232-282	282-331.9	.332+	Total
North Bihar	9	68	116	118	30	3	1	345
South Bihar	5	14	63	88	33	0	2	175
Chota Nagpur	7	21	33	24	8	0	1	94
Bihar	21	103	212	200	71	3	4	614

Table III.9 gives an interesting pattern of dependency ratio in the settlements of various regions. Dependency ratio as a whole depends upon the fertility, mortality and the availability of work. The high dependency ratio of the South Bihar region is due to uncontrolled fertility, improved mortality rate due to better medical facilities, and lack of work in the secondary and tertiary sectors. In case of

North Bihar plain many settlements have dependency ratio below the national average. This is due to absorption of Man power in the primary sector even through the fertility of the region is uncontrolled and slightly improved health status of the population.

We found a significant chi-square value (333.58) for this distribution. This proves that there is a regional variation in the distribution of settlements with respect to their dependency ratio.

Analysis of dependency ratio of settlements according to their size classes:

It is seen from Table III.10 that more than half of the settlements in each size class of towns have dependency ratio which is more than the national average 1 e 182 dependents per 100 of workers. But more than half of the large sized villages (56.6 per cent) lie below the national average.

TABLE III.10

(Distribution of Settlements according to dependency ratio by natural regions)

Size Class	Dependent per 100 of workers						
	82	82-131.9	132-181.9	182-231.9	232-281.9	282+	Total
I	0	0	0	2	4	1	7
II	0	0	2	2	3	0	7
III	0	1	7	16	9	0	33
IV	3	14	10	18	7	0	52
V	5	7	21	8	5	0	46
VI	0	1	4	2	1	0	8
Village	13	80	168	152	42	6	461

There are 13 villages with dependency ratio less than 82 per cent, 80 villages with dependency ratio between 82 to 131.9 per cent, 168 villages with 132 to 181.9, 152 villages 182 to 231.9 per cent, 42 villages with dependency ratio 232 to 281.9 per cent, and 6 villages with 28.2 non-workers per 100 workers found in the large sized villages of Bihar.

From Table III.10 it is clear that larger the size of population higher the dependency ratio.

III.6 SUMMARY

At the end of this chapter we summarise that there is a regional variation in all the demographic characteristics of the large sized villages and all urban centres of Bihar. Settlements of Chota Nagpur plateau have high literacy rate, low sex ratio, high density, high dependency ratio and comparatively higher growth rate, while the plains of Bihar have the reverse

The following hypotheses are found to be supported by the analysis carried out in this chapter.

1. Higher the size class of settlement lower will be its growth rate.
2. Higher the size class of settlements higher is its density.

3. Sex ratio decreases as the size of settlements increases.
4. Literacy rate increases with increase of population size of settlements.
5. Dependency ratio increases with the increase of settlements size.

Chapter IV

(Functional Classification and Economic Activities)

One of the indicators of urban-rural distinction is the type of labour force i.e. the occupational structure. An urban area can be distinguished from country-side by a critical percentage of non-agricultural workers to total workers. To declare an area to be urban, - the Census has adopted the criterion of three-fourths or more non-agricultural workers along with other criteria. In India we find many towns where a large amount of population is employed in the primary activity. Similarly there are many villages with a considerable amount of non-agricultural workers. Here we make an attempt to analyse the functional pattern of all villages and towns of Bihar with population five thousand and above, with the proportion of non-agricultural workers equal to or more than fifty per cent. There are 197 settlements which have predominantly non-agricultural population. Out of these 197 settlements 147 are urban centres and 50 are large sized villages. Table IV.1 gives the distribution of these 197 settlements in the different regions of the state. It is seen from this study that there are in all, six urban centres in the state with more than 50 per cent agricultural workers.

Table IV.1

(Distribution of villages and towns with more than 50 per cent of non-agricultural workers)

Natural Region / Size Class	North Bihar	South Bihar	Chota Nagpur	Bihar
I	2	2	3	7
II	3	3	1	7
III	14	7	11	32
IV	12	18	19	49
V	8	10	26	44
VI	2	2	4	8
Villages	5	21	24	50

IV.1 DISTRIBUTION OF PREDOMINANTLY NON-AGRICULTURAL SETTLEMENTS

A relative concentration of towns occurs in the triangle whose apices are about the points where the Ganga leaves Bihar and where the Gandak and the Son enter the State.[1] In this triangle, which was the cultural heart of the State with historical importance we find 96 settlements with more than half the workers engaged in non-agricultural pursuits. In

1. Ahmed, Enayat : Bihar, Ranchi University, Ranchi, 1965.

Chota Nagpur plateau the highest concentration is seen in the Damodar basin, followed by zone of moderate concentration in subarnrekha basin. Contrarily sparse distribution is found in Hazaribag plateau, Ranchi plateau, the N. Koal Basin and Santal

IV.2 METHODOLOGY:

Urbanlandscape and country side are two fundamental concepts in settlement - geography. The basic difference between them lies in the functions they perform. Mark Jafferson, wrote, "Cities do not grow up to themselves, country-sides set them to tasks that must be performed in central places".[1] In a town various type of functions are performed, with varying degrees. On the basis of functions performed towns can be classified into monofunctional, bifunctional and multifunctional.

Literature relating to the classification of cities and towns by their functional types reveal that there are two methods for the classification of towns and cities. A method based on general observation, assessment using no statistical data is called qualitative method. The other method is known as quantative method, which extensively used the numerical data to classify town and cities.

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1. Jafferson, M: The Distribution of World's Folk, Geographical Review, Vol.21, 1931 pp-453.

Morcel Aurrossean[2] is the Pioneer of the qualitative approach of classifying towns and cities. Weimer and Hoyt considering the source of employment classified towns into various categories viz., industrial, commercial, political, recreational, health resort, educational centres etc. Harris[3] used statistical technqiue to classify the cities and towns of United States of America. His method of classification mainly concentrates on the percentage and ratios of each function. Kneedler[4], Victor[5] etc. modified the method used by Harris to classify American towns. Pownall[6] gave a new type of classification for the towns and cities of New Zealand based on the occupational structure. According to him the dominance of a function can be ascertained only by a positive single percentage deviation from the national average for the function. Mattela and Thompson[7] have contributed a new method for the classification of urban land scape.

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2. Aurroussean, M. "The Distribution of Population, A construction Problem", Geographical Review Vol 11, 1921

3. Harris, C D Functional Classification of Cities in U.S. Geographical Review, Vol.33, 1943 pp-86-99.

4. Kneedler, G M Economic Classification of Cities and Metropolitan Areas, The Municipal Year Book, Chicago, 1945.

5. Victor, J. Economic Classification of Cities, Municipal Year Book, Chicago, 1954.

6. Pownwall, L: Functions of New Zealand's Towns, Annals of Association of American Geographers, Vol.43, 1953 pp 332-50.

7. Mattla, J.M. & Thomas, W R:The Measurement of Economic Base of the metropolitan Areas: Land Economic, Vol.31, 1955 pp-215-28.

For the functional classification of those large sized villages whose non-agricultural workers are more than fifty per cent of the total workers, triangular co-ordinate method suggested by Dr. Ashok Mitra[8] is adopted. A percentage distribution was made of all workers into the seven non-agricultural census industrial categories.((i) Mining and Quarrying, etc. (ii) Household Industry, (iii) Manufacturing, (iv) Construction, (vi) Trade and Commerce, (vi) Transport, Storage etc. (vii) Other Services.) These non-agricultural categories are further subgrouped into three rubrics viz; A, B and C to use triangular co-ordinates. The subgrouping are made as follows:

Rubrics	Census Industrial Category
A	(iii) Mining and quarrying, etc., (iv) Household Industry, (v) Manufacturing (vi) Construction.
B	(vii) Trade & Commerce
	(viii)Transport, Storage etc.
C	(ix) Other Services.

If in a town, any one of these three rubrics is more than 33.3 per cent then the town is said to be dominated by that rubric. For instance, if a town is dominated by group A then it is called Manufacturing town. Similarly a town dominated by the group B is known

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8. Mitra, Ashok: Internal Migration and Urbanisation in India (Part I-Text), Census of India Publication.

TRIANGULAR CO-ORDINATE

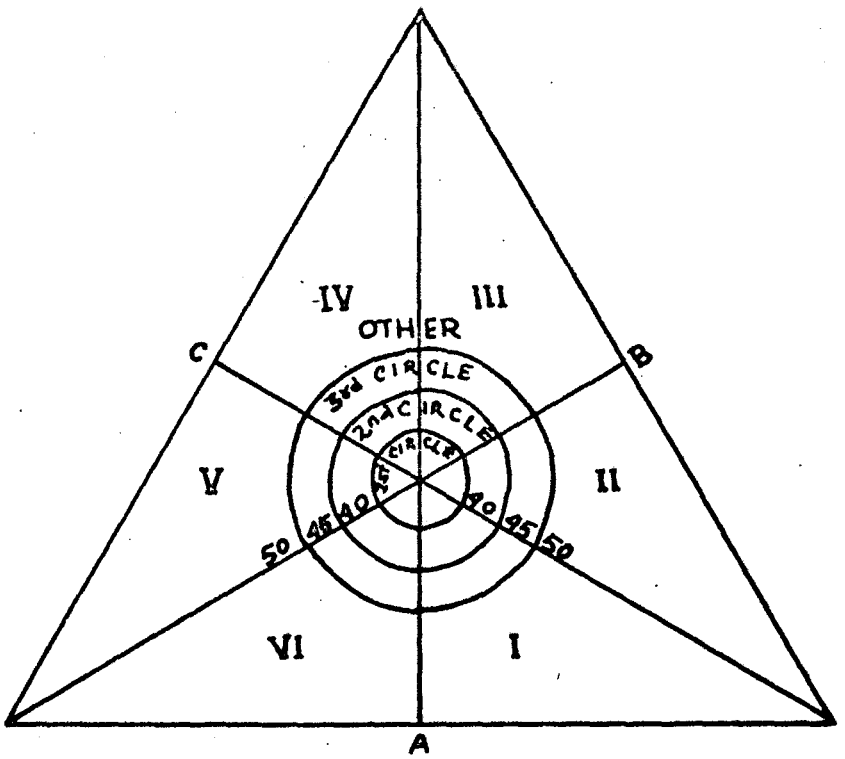

FIGURE 4·1

as Trade and Transport towns. Any town where group C is predominant over the other two groups is called service Town.

With the help of triangular co-ordinates a further stratification is made to distinguish the strong and weak strains of functional characteristics of towns. "If values of A, B and C for each town were plotted by triangular coordinates, than the position of each town in the field of an equilateral triangle would facilitate its study with reference to the position of other towns in the field. The closer the position of town to the point of intersection of the perpendiculars from the vertics, the more balanced would be the functions of a town. Further away the position of a town from the point of intersection, the more pronounced would be the function whose value pushes its position away from the point of intersection"[9].

Taking into account the point of intersection of the perpendiculars as origin we draw three concentric circles of radii $6^2/3$, $11^2/3$ and $16^2/3$ respectively. We can say them as inner most towns which lie in the area of the inner most circle have highly balanced functions or in other words we can way

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9. Mitra, Ashok. Ibid, pp

they are most diversified. Towns which lie in the inner ring are said to be towns with functions moderately balanced. If a town falls in the outer ring we call it a town whose one sector is accentuated. Lastly all towns which are out side the outer ring are known as highly accentuated towns with one function predominant.

IV. 3 FUNCTIONAL CLASSIFICATION OF TOWNS AND LARGE SIZED VILLAGES WITH PREDOMINANT NON-AGRICULTURAL WORKERS

From the table IV.2 it is seen that maximum number of towns are manufacturing town. Out of 197 settlements considered for this study with the criterian of more than 50 per cent non-agricultural workers, 86 settlements are of manufacturing type, 84 settlements are of service type and remaining 27 are Trade and Transport settlements. Out of 197 settlements, 88 settlements have predominant function which is highly accentuated. The highly accentuated settlements outnumbered the total manufacturing settlements. In this class manufacturing have largest number of settlements in its share. The number of settlements (manufacturing) which are highly accentuated are 51 i e more than 25 per cent of all settlements considered for this study. Next to the manufacturing settlements service settlements take their place. There

are 31 settlements in the state of Bihar with predominant function as other services and these settlements are highly accentuated with this function.

TABLE IV.2

(Distribution of Settlements according to their predominant functions)

Degree of Functional Diversity	Functional Type			
	Manufacturing	Trade & Transport	Service	Total
Highly Diversified	5	8	12	25
Moderately Diversified	15	7	20	42
Predominant function Accentuated	15	6	21	42
Predominant function highly accentuated	51	6	31	88
Total	86	27	84	197

42 settlements are found to be in the accentuated group. These settlements lost the equilibrium of the groups A, B and C because of the outnumbering of one group at the cost of others. We see that unlike the highly accentuated group, service settlements have mushroomed in the state widely than the manufacturing. There are only 15 settlements whose predominant function is accentuated.

There are equal number of settlements in the group of moderately diversified function to that of group of accentuated function. In this group we find 42 settlements out of which 20 settlements are service settlements, 15 settlements are manufacturing settlements and rest are trade and transport settlements.

The least number of settlements are found in the highly diversified group. There are only 25 settlements with function well-balanced, comprising only 12.6 per cent. Out of these 25 settlements 12 are service, 8 are trade and transport and 5 are manufacturing.

It is seen from table IV.2 that Trade and transport settlements are less in number compared to other two types of settlements ie. manufacturing and other services. In these settlements it is interesting to note that majority of them have diversified functions than the accentuation in the predominant function.

As a whole, it is observed that most of the settlements considered for this study have highly accentuated predominant function. In this study we find that (Appendix Table 3) a high proportion of manufacturing towns with highly accentuated predominant function are in the highlands of Bihar, where there is an abundancy of natural resources. It is also seen

that the same region has highest number of service settlements with predominant function of very high percentage. This region has many nearly unifunctional towns.

IV.4 FUNCTIONAL FLASSIFICATION OF SETTLEMENTS OF VARIOUS NATURAL REGION OF THE STATE:

Table IV.1, IV.2 and IV.3 of appendix IV show that North Bihar plain have 44 settlements which employed more than fifty per cent of workers in the non-agricultural sector. South Bihar and Chota Nagpur Plateau have 66 and 87 settlements respectively with predominant non-agricultural workers. The difference in the absolute number of these settlements can be attributed to the urbanisation of the region. Chota Nagpur is more urbanised than the plain of Bihar and it has 87 such settlements. South Bihar plain contains 66 settlements and ranks second so far as the number of settlements is concerned.

It is clearly seen that the North Bihar plain and South Bihar Plain have very high percentage of service towns. The percentage of service settlements in the North Bihar plain and South Bihar Plain are 47.72 and 50 per cent respectively. But in Chota Nagpur plateau the service towns are only 30

out of 87 settlements comprising approximately 33 per cent of all the settlements of the region.

Because of the mining and establishment of industries in recent years, Chota Nagpur plateau contains 47 manufacturing towns. But North Bihar plain and South Bihar Plain have 13 and 26 such settlements respectively.

Majority of trade and transport settlements are seen in the North Bihar plain, which is least urbanised compared to the other regions of the State. In this region there are 10 settlements which are trade and transport type. The proportion of these settlements is more than 22 per cent. There are only seven such settlements in the South Bihar plain, ten in the Chota Nagpur plateau.

IV. 5 DEGREE OF SPECIALISATION:

The degree of specialisation according to the percentage of non-agricultural workers is given by the following table IV.3. It is seen from the Table IV.3 that there are 8 settlements in Chota Nagpur plateau with 100 per cent non-agricultural workers. Moreover there are 47 settlements in Chota Nagpur with more than 90 per cent non-agricultural workers, while there are 28 settlements in North and South Bihar plain both.

TABLE IV.3

(Degree of Specialisation of Settlements)

Degree of Specialization / Natural Res.	Percentage of non-agricultural workers					
	50-60	60-70	70-80	80-90	90	100
North Bihar	7	8	8	10	11	0
South Bihar	9	12	16	12	17	0
Chota Nagpur	8	2	10	20	47	8
Bihar	24	22	34	42	75	8

From table IV.4 it is obvious that mining, manufacturing, construction and other services are predominant function of the settlements of Bihar.

TABLE IV.4

(Structure of Urban Network vis-a-vis Degree of Specialisation in terms of percentage of non-agricultural workers)

Degree of Specialization / Function	Percentage of Non-agricultural workers					
	10	10-20	20-30	30-40	40-50	50+
Mining	167	4	4	2	4	22
Household Ind.	139	45	17	2	0	0
Manufacturing	111	62	15	8	4	3
Trade & Commerce	198	4	1	0	0	0
Transport	78	98	25	2	0	0
Construction	167	24	7	2	2	1
Other Services	27	42	65	44	14	11

Two distinct structural urban halves are identified, the northern half which lies in the triangular area and Southern half which covers Chota Nagpur plateau. The former is characterized by comparatively lower order of urbanisation. The later on the other hand is highly urbanised and the urban centres are mainly specialised in mining, manufacturing and other services.

IV.6 ECONOMIC CHARACTERISTICS OF SETTLEMENTS:

Occupational composition of settlements reveals their economic condition. The objective of this section is to examine the quantity and type of labour force that exists in the large sized settlements of the State. Moreover we made an effort to study the association of participation rate with demographic indicators viz., sex ratio and literacy rate.

IV.7 PARTICIPATION RATE:

The ratio economically active population to the total population is called the economic activity rate. In this stuey the measure of economic activity rate is the number of workers per 100 population. This is also called "work participation Rate".[10]

In 1961 the participation rate of Bihar was 41.4 per cent. This participation rate was more in rural areas (42.2%) than in urban areas (33.2%). The average participation rate of the large sized villages of Bihar is 38.8 per cent. It is

10. Ambannavar, J.P. (1975), A Demographic study of Maharastra state. NIFP Report No 16, New Delhi, PP 201

obvious that the percentage of workers in large sized villages is smaller than the corresponding rural figure and greater than the urban figure. Hence, so far as the participation rate is concerned the large sized villages lie intermediate between the rural and urban areas of Bihar.

The participation rate of males in Bihar was 55.6 per cent in 1961. The male participation rate was higher in rural areas than in urban areas. Incase large sized villages the average male participation rate is found to be 55.9 per cent which is greater than the state average i e 55.6 per cent. This indicates that the large sized villages have comparatively more workers than the rural and urban areas of State. Similarly the female participation rate of large sized villages is 21.65 per cent while the same for the State was 27.1 per cent. This shows that the number of working female is less in the large sized villages than the State. But more females of large sized villages are employed in economic activities than the female of urban areas.

The participation rate of plain Bihar (South Bihar and North Bihar) is smaller than that of Chota Nagpur plateau. The participation rate (average) in plain Bihar is found to be 37.8 per cent while the average participation rate of large sized settlements of Chota Nagpur plateau is 42.4 per cent. The average participation rate of large sized settlements of

Chota Nagpur plateau is higher because of the ample job facilities, and lower sex ratio of the region. The male participation rate (58.6%) of settlements of the Chota Nagpur is also higher than that of the plain Bihar (54.8). But the large sized settlements of Chota Nagpur region have lower average female participation rate compare to the settlements of North Bihar and South Bihar plain.

TABLE IV.5

(Average participation rate of large sized settlements)

Participation Rate	State	Plain Bihar	Chota Nagpur
Participation Rate (Total)	38.8	37.8	42.4
Male P.R.	55.9	54.8	58.6
Female P.R.	21.7	20.9	20.6

IV.8 RELATIONSHIP OF PARTICIPATION RATE OF SETTLEMENTS WITH DEMOGRAPHIC INDICATORS:

The participation rate to a great extent is associated with demographic indicators viz., sex ratio, literacy rate, density, growth rate etc. Here we want to investigate the association of participation rate of the settlements with sex ratio and literacy rate.

Since women are not engaged in economic activities in the same proportion as their counter part, we hypothesised that higher sex ratio in large sized settlements will lead to lower participation rate. In otherwords, sex ratio is negatively correlated to participation rate.

The villages having high percentage of workers are likely to have low literacy level, as most of the workers of these large sized villages are employed in primary sector, where education is not so important. In other words larger the participation rate of large sized villages, lesser is the literacy rate.

Since plain Bihar and plateau areas of Bihar are quite different so far as the demographic indicators are concerned, we divide the state into two regions viz. plain of Bihar and Chota Nagpur plateau to test these hypothesis. Taking participation rate, literacy rate and sex ratio a correlation matrix is computed for both the regions separately.

TABLE IV.6

(Matrix showing the zero-order correlation between participation rate and demographic indicators Plain Bihar)

Indicators	Participation Rate	Literacy Rate	Sex Ratio
Participation Rate	1	-0.250	-0.311
Literacy Rate		1	-0.191
Sex Ratio			1

From table IV.2 it is clear that participation rate bears a negative relation with sex ratio in plain Bihar. The correlation co-efficient (r) is -0.131 which is statistically significant at 95 per cent level. Similarly in Chota Nagpur plateau the correlation coefficient is found to be -0.376. Hence the hypothesis in both the regions of Bihar is well established.

TABLE IV.7

(Matrix showing the zero-order correlation between participation rate and demographic indicators, Chota Nagpur Platean.)

Indicators	Participation Rate	Literacy Rate	Sex Ratio
Participation Rate	1	-0.364	-0.376
Literacy Rate		1	-0.060
Sex Ratio			1

In the beginning of this section we had hypothesized a negative correlation between participation rate and literacy rate. The data relating to plain Bihar and Chota Nagpur Platean have proved the hypothesis. The correlation coefficient between participation rate and literacy rate is -0.250 in Plain Bihar and -0.364 in Chota Nagpur Plateau. Both these coefficients are statistically significant at 95 per cent level, with showing the validity of our hypothesis.

The correlation coefficient between male participation rate and sex ratio is found to be statistically significant. The data relating to plain Bihar gives the correlation coefficient between male participation rate and sex ratio to be -0.218 where as in Chota Nagpur Plateau this coefficient is found to be -0.5489. Hence the hypothesis that higher the sex ratio of the large sized settlements lower will be their male participation rate is proved.

IV.9 SUMMARY

We conclude at the end of this chapter that there were 197 villages and towns with more than 50 per cent workers engaged in non-agricultural pursuits. Many of these settlements are in Highland of Bihar (88 settlements) while South Bihar Plain and North Bihar Plain contain 63 and 46 settlements respectively. There are 50 villages with more than 50 per cent non-agricultural workers. Nearly half of these are in Chota Nagpur Plateau. Mining, manufacturing, construction and other services are predominant functions of these settlements. When these settlements were classified according to Dr. Mitra's triangular co-ordinate method it is observed that there are 86 manufacturing settlements, 27 Trade and transport settlements and 84 service settlements in Bihar.

There is also a regional variation in participation rate of large sized villages. The average participation rate

of settlements of Plain Bihar is 37.8, while that of Chota Nagpur Plateau is 42.4. The average percentage of workers is found to be smaller than the participation rate of rural areas of state. A negative correlation is observed between the participation rate and sex ratio. More over it is found that participation rate has a negative association with the literacy rate in large sized settlements.

Chapter V

(Social Amenities of Settlements)

Social amenities play important role in determining some of the demographic characteristics. For instance, a settlement with a high school or college should haveaa higher level of literacy than a settlement with no educational institution. Similarly hospital, dispensary, post and telegraph office, co-operative society etc. are quite important for influencing in the demographic and economic characteristics. Therefore social amenities have great importance in Christaller's central place Theory. In this chapter we investigate the spatial distribution of amenities of the large sized villages. We hypothesized that a settlement with higher order of educational institution should have higher literacy rate.

V.I INDICATORS:

For this study following set of social amenities are selected availability of which in each village is indicated in the Primary Census Abstract of the 1969 Census.

1. Primary School
2. Middle School
3. Senior Basic School
4. Madersa
5. High School
6. Sanskrit Pathsala
7. Library
8. Mokhatab
9. Hospital/Dispensary
10. Allopathic
11. Medical Practitioner
12. Homeopath
13. Vaidya
14. Rural Vaccination Centre
15. Rural Health Centre.

16. Cane-Sugar Co-operative Society
17. Industrial Co-operative Society
18. Multipurpose Co-operative Society
19. Other Cooperative Society
20. Post Offices.

From these social amenities the following indicators are constructed by putting together some of these amenities into various groups. The indicators so constructed are (i)School, (ii)High School, (iii)College, (iv) Health, (iv) Hospital, (vi) Library (vii)Co-operative Society (viii) Post Office. The indicator school embraces all educational amenities except High School/College. The indicator High School contains only the high school of the large sized villages. Similarly the indicator "health" contains the following amenities: Alopathic medical practitioner, Homeopath, Vaidya, Rural Vaccination Centre, Rural health centre. The indicator hospital is constructed by taking the hospital/dispensary of large sized villages. The indicator Library have library and Mokhatab. The Co-operative Society is constructed by taking together the four different cooperative societies namely cane-sugar co-operative society, Industrial Co-operative Society, Multipurpose Co-operative Society, and other co-operative societies of the settlements. Rest of the indicators are constructed by taking them alone. For example post office is constructed by taking the Post offices of the settlements.

V.2 METHODOLOGY

It is necessary to give numerical value to the various social indicators on the basis of their relativeiimportance. For example if there is one primary school in a village, it will get, say, one point. The next higher level, a secondary is awarded more than the primary school. The numerical value to each indicator is known as the weightage of the corresponding indicator.

For the study of spatial distribution of amenities we follow the following methodology which considers the distribution of all functions over space. The functions are coverted into a specific numerical value. For example if a settlement has two primary schools we write 2 and of another settlement has one high school we assign 1 to it. Then these different functions are given different weightage according to their relative importance and distribution over the specified geographical area. The following formula determined the weightage of various functions.

$$W_i = S / \sum_j F_{ij}$$

Where, W_i is the weightage of ith function, S is the total number of settlements in the area of study, F_{ij} is the number of ith function in the jth settlement, $\sum F_{ij}$ is the summation of F_{ij} over all settlements, n is the total number of settlements.

A weightage of this type shows the centrality of the functions. If a function is equally distributed in the region it has a lower weightage. Any function which is sparsely distributed has a higher weightage and therefore it is a function of higher order. Higher the weightage in the heirarchy the more central function it becomes.

Using the weightage W's of the various function the composite index of social amenities for the settlement is calculated. The composite index is the centrality score of the settlement and helps to determine whether a settlement has higher or lower degree of centrality. By taking the linear combination of weightages with actual number of functions in a given settlement the composite index is calculated. Formula is used for the computation of composite index I is given below:

$$I_j = \sum_i W_i F_{ij}$$

Where, I_j is the composite index of j_{th} settlements, F_{ij} is the number of ith function in the jth settlement, wi is the weightage of ith function, M is the total number of functions.

V.3 WEIGHTAGE OF SOCIAL AMENITIES:

Using the above mentioned methodology the weightages of various functions is calculated. The table V.1 gives the numerical weight of the functions considered for this study.

Table V.1

(Weightages of various Amenities)

Sr.No.	Name of the Function	Weightage
1	School	0.223
2	High School	2.542
3	Health facilities	0.223
4	Hospital	3.001
5	Library	0.421
6	Co-dpererative Society	0.711
7	Post Office	1.859

In large sized villages Hospital has the maximum weightage (3.001) and we can call it as central function. Next to hospital we find High School whose weightage is 2.542. This function occupies the second place in the hierarchy of functions. Post Office has a weightage 1.859 i.e. next to the high school. The other functions i e Co-operative society, Library, health facilities, school come after the post office and they occupy the successive position after the third place respectively.

V.4 DISTRIBUTION OF AMENITIES

In this section we are confined to the distributional aspects of the above discussed amenities The table V.2 gives the percentage of villages with the various social amenities. We see that the percentage of villages under the function school is highest. Out of 461 villages 456 villages have school. This

TABLE V.2

(Percentage distribution of villages with Social Amenities)

Sr. No.	Name of Function	Number of Villages	Percentage of Villages.
1.	School	456	98.91
2.	High School	177	47.10
3.	Health Facilities	383	83.39
4.	Hospital	130	28.19
5.	Library	390	84.59
6.	Co-operative Society	318	68.98
7.	Post Offices	242	52.44

function is widely distributed over space and hence it occupies the least importance in the heirarchy of functions. Next we find that 390 settlements provide library facilities to the villagers. The proportion of such villages is 86.90 per cent. More than 83 per cent of villages provide health facilities to the villagers while only 130 villages have hospital or dispensary. Out of 461 villages 177 settlements have high school.

Educational Amenities:

It is necessary to know the distribution of educational amenities in the large sized villages. The spread of educational facilities determines the literacy level of settlement. Educational amenities are evenly distributed in the villages under study. Almost all the villages have the school facilities. In

the districts of Patna, Shahabad, Saran, Champaran, Dharbhanga, Monghyr, Saharsa, Purnea, Santal Pragans, Palamau and Singhbham all the villages have school. But as we move up to the higher order function i e high school we find a drastic fall in the percentage of settlements having high school. Only 47.10 per cent of villages under this study have high school. More than 50 per cent of villages provide library to the villages with only exception is in Dhanbad districts. 86.90 per cent of villages have library facilities.

So far as the regions are concerned North Bihar has highest number of villages with educational facilities. There are 98.48 per cent of villages with school which provide basic education. In this plain 43.94 per cent of total villages have high school and 90.15 per cent of total villages have the library facilities. South Bihar Plain ranks second so far as the above functions are concerned. It provides schooling facilities to 99.33 per cent of villages and high school to 36.00 per cent of villages. The percentage of villages with library is 85.33 per cent. The highland of Bihar i e Chota Nagpur plateau has the lowest numbers of educational facilities compared to other natural regions.

Distribution of Medical Amenities:

The health status of a village can be reflected by the medical facilities available to it. Here we are interested to know the distribution of medical institutions viz., hospitals,

rural health centres, homeopathic institution, rural vaccination centre, etc.

In this area out of 461 large sized villages 85.11 per cent of villages are equipped with medical facilities and 26.66 per cent of villages have hospital within them. Except district saran, Champaran, Sahrasa and Dhanbad, in almost all other districts more than 70 per cent of the large sized villages are having medical facilities. In the districts like Palamau, Ranchi, Santal Paragana all large sized villages of such villages are very small. There is no hospital in any of the large sized villages of Santal Paragana. Also in Dharbhanga district only 27.0 per cent of villages have hospital. Saharsa also comes in this group with slightly higher percentage i e 28.5 per cent.

In North Bihar plain 91.7 per cent of villages have medical facilities and 37.88 per cent of villages have hospitals while in South Bihar 80.33 per cent of villages have other medical facilities and 31.33 per cent of villages have hospital. But in Chota Nagpur Plateau, 77.8 per cent of all villages have medical facilities and 55.65 per cent of villages provide the hospital facilities to the villagers. Though there are very small number of large sized villages in Chota Nagpur plateau, yet it has maximum number of hospitals and equally good percentage of villages with medical facilities.

Co-operative Society:

Various Co-operative societies play a vital role in deriving mutual co-operation of the villagers. It helps to promote a better economic status by helping in various ways. There are different types of co-operative societies in Bihar, viz., Cane-sugar Co-operative Society, Industrial Co-operative Society, Multipurpose Co-operative Society and other Co-operative Societies. We haye considered these various societies. We have considered these various societies as a whole by Christening them as Co-operative Societies.

In the whole study region there are 318 villages with cooperative societies. The proportion of such villages is 70.66 per cent.

All the large sized villages of Santal Pargamas and Palamau have the Co-operative society. 92.3 per cent of villages in Patna district and 86.5 per cent of villages in Champaran have co-operative society. In Dhanbad only 22.2 per cent of large sized villages have co-operative society. In the district of Gaya very few villages (27.2%) have this function. In Bhamgal Pur , Saharsa Purnea, Ranchi, and Singhbhum district a little more than fifty per cent of villages have co-operative society. Rest other districts have co-operative society in majority of settlements (more than 60 per cent).

Higher percentage of villages in North Bihar plain has the co-operative society. The percentage of such villages is 68.94. South Bihar plain follows it very closely with the percentage 68.7. But there is a wide difference between the percentage of settlements with co-operative society in the plains of Ganga and the highlands of Bihar. 44.4 per cent of large sized villages in Chota Nagpur plateau have co-operative societies.

Post Office:

In Bihar half of the large sized villages have Post Office. The percentage of such villages is 53.77 per cent.

In Santal Praganas and Palamau districts all the large sized villages have Post Office. Similarly most of the villages of Ranchi and Singhbhum have Post Office. In Purnea, Monghyr, Dharbhanga less number of large sized villages are found with Post Office compared to the villages of other districts.

In the Chota Nagpur Platean 94.44 percentage of villages have Post Offices, while North Bihar Plain have only 55.30 per cent of villages with Post Office. The South Bihar Plain has 52.00 per cent of villages have Post Office.

The percentage distribution of such villages with various social amenities by regions is given below (Table V.3).

TABLE V.3

(Percentage of villages served by the different amenities in different natural naturals).

Social Amenities / Natural Region	School	High School	Health	Hospital	Library	Cooperative Society	Post Office
North Bihar	98.48	43.94	91.67	37.88	90.15	68.94	55.30
South Bihar	99.33	36.00	80.33	31.33	85.33	68.67	52.00
Chota Nagpur	77.77	22.22	77.77	55.55	61.11	44.44	94.44

Distribution of Settlements according to the heirarchy level based on centrality score:

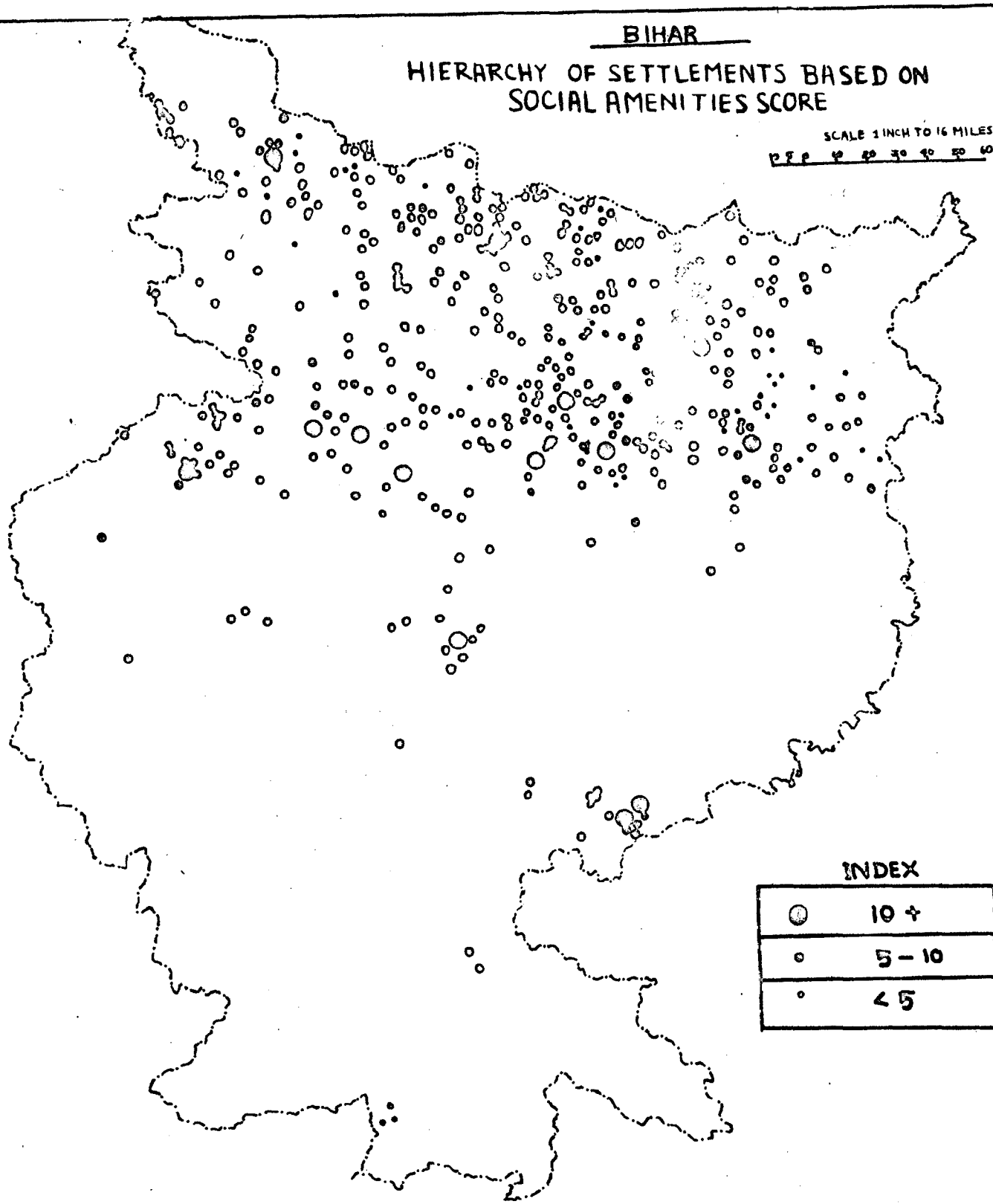
Considering the centrality score we distributed the settlements into three different heirarchy levels. Level I is the most important heirarchy level with centrality score more than 10. There are only 14 villages with centrality score more than 10. There are 403 villages with centrality score between 5 to 10. 44 villages of Bihar centrality score less than 5. These villages are practically devoid off many social amenities. The distribution of villages according to centrality score is shown below.

BIHAR

HIERARCHY OF SETTLEMENTS BASED ON SOCIAL AMENITIES SCORE

SCALE 1 INCH TO 16 MILES

0 10 20 30 40 50 60



INDEX

◎	10 +
○	5 – 10
°	< 5

TABLE V.4

(Distribution of settlements according to the centrality score)

Hierarchy Level	Centrality Score	Number of Villages
I	10+	14
II	5-10	403
III	5	44

An attempt is made to find out a relation between centrality score of the settlements and their size. It is found that there is no significant relation between the centrality score and size of population. Similarly it does not have a relation - ($r = 0.034$) with growth rate of settlements.

At the beginning we hypothesized that higher the order of educational institution in a settlement higher will be its literacy level. From table V.5 it is obvious that the hypothesis is supported to a great extent.

TABLE V.5

(Distribution of settlements with educational Institutions by Literacy rate)

Literacy rate in % / Educational Institution	10	10-14.9	15-19.9	20-29.9	30-39.9	40	Total
School	40	114	88	30	4	3	279
High School	0	29	57	70	15	6	177
No School	5	0	0	0	0	0	5
Total	45	143	145	100	19	9	461

Chapter VI

(Urbanisation)

Urbanisation

Urbanisation is a process of concentration of people who perform certain specialised functions available to urban areas. An index of urbanisation is the percentage of people living in urban areas to the total population-rural plus urban. In economic sense it means a change in the structural set up of its population.

There are 153 towns and 461 large sized villages in Bihar according to 1961 Census. It is seen that many towns of this State do not satisfy the three criteria laid down for the definition of urban centre, but they were included in the urban list during 1961 Census, because of the existance of administrative units in them. There are some towns which do not have an administrative unit but have been classified as town. (They were expecting an administrative unit in them.)

In this chapter our aim is to study the process of urbanization in Bihar. Also in this chapter we have made an effort to find out how many urban centres do not satisfy the definition on the basis of the three criteria, vis., (a) a population not less than 5,000 (b) density of population of at least 1000 per square mile, and (c) at least 75 per cent of male working population engaged in non-agricultural pursuit, and

how many villages satisfy urban definition but have not been classified as urban centre. Also we try to find out a class of population called semi urban which is likely to behave differently from rural as well as urban population.

VI.1 DEFINITION

The definition of 'urban' as adopted in 1961 Census is as follows

(i) Every municipality or notified area;

(ii) All civil lines not included within municipal limits;

(iii) every contonment; and

(iv) such other places which have(a)population of not less than 5,000 (b) density not less than 1000 persons per square mile (c) at least three fourths of the adult male population engaged in non-agricultural livelihood and (d) which have been declared to be town for Census Operations[1].

VI.2 CLASSIFICATION OF TOWN

Towns are usually classified into the following six categories according to their population range:

Class	Population
I	100,000 & above
II	50,000 - 99,999
III	20,000 - 49,999
IV	10,000 - 19,999
V	5,000 - 9,999
VI	Below 5,000

1. Census 1961, District Census Handbook, Hazaribag district, Bihar.

Class I towns or towns having population of one lakh or more are called cities. The term 'town' is however, used in this chapter in its generic sense and includes cities:

VI.3 NUMBER OF TOWNS SINCE 1901.

Bihar had only 57 towns in 1901 but their number became 153 in 1961. The increase in the total number of towns in Bihar became very much prominant after 1941. In 1941 there were 84 urban centres but in 1951 they increased to 108 and in the next Census 45 new towns were added to the urban list of 1951.

TABLE VI.1

(Number of towns of each class in Bihar, 1901-61)

Class of Town	1961	1951	1941	1931	1921	1911	1901
I	7	5	3	1	1	1	1
II	7	6	8	6	4	2	3
III	33	19	13	10	10	11	10
IV	52	37	30	21	17	16	16
V	46	30	25	26	26	24	22
VI	8	11	5	2	5	5	5
Total	153	108	84	66	63	59	57

There have been variations in the number of towns at every Census. These are due to new towns being added or old towns being declassified.

VI.4 URBAN POPULATION:

The urban population of Bihar was (3.91 millions) in 1961, while that of the nation was 78.94 million. In this State, in 1961 only 8.4 per cent of total population was living in the urban areas. This indicates that Bihar has been predominantly rural. Bihar had registered a growth of 44.8 per cent in its urban population, during 1951-61 decade.

TABLE VI.2

Census	Urban Population (in million)	Percentage of Increase
1921	12.00	21.8
1931	14.62	21.8
1941	19.62	24.2
1951	27.05	37.2
1961	39.15	44.8

This shows that from 1921 the Urban population of Bihar is growing monotonically up to 1961. The overall rise in urban population is mainly due to industrialisation, utilization of mineral resources, rise of military population in cantonment towns, and influx of refugee after the paritition of India.

The percentage of population in Urban areas of South Bihar plain to the total urban population of the State is 39.4 per cent, while Chota Nagpur plateau have 34.07 per cent of urban population in 65 towns. The percentage of Urban population of North Bihar to the total Urban population is 26.53 per cent.

TABLE VI.3
(Percentage distribution of urban Population in natural regions)

Natural Region	No.of Town	Total Urban Popp.	Percentage a to Total Pop	Urban Popn.
North Bihar	45	1,038,604	4.81	26.53
South Bihar	43	1,541,974	11.63	39.40
Chota Nagpur	65	1,333,342	11.49	34.07
Total	153	3,913,920	8.43	100.00

VI.5 PERCENTAGE DISTRIBUTION SINCE #4 1901

The percentage distribution of population in different class of towns to total urban population since 1901 is represent ed in the Table VI.4 below.

TABLE VI.4
(Percentage of population in various size class of town since 1901)

Census	Class I	Class II	Class III	Class IV	Class V	Class VI
1901	12.29	19.14	31.73	19.48	15.46	1.60
1911	12.63	12.71	36.18	20.00	16.46	2.02
1921	10.29	21.23	29.28	19.97	17.31	1.92
1931	11.23	29.50	23.62	20.71	14.66	0.28
1941	22.60	26.56	17.34	22.27	10.28	0.95
1951	32.62	16.16	21.48	19.63	8.50	1.61
1961	33.15	12.63	25.60	18.68	9.17	0.77

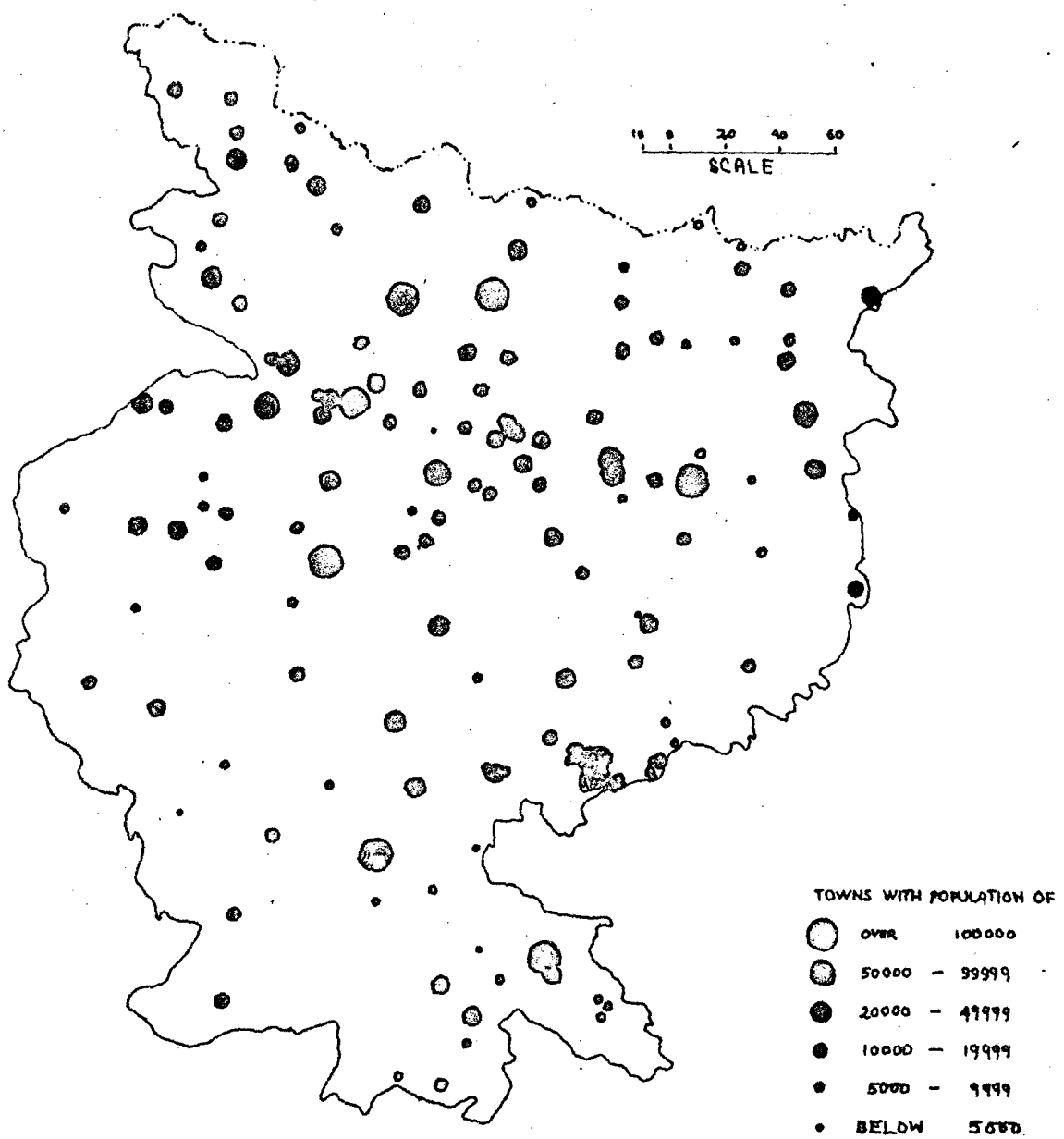
From this table it is clear that the Population of Class I towns has grown rapidly since 1941. In Class II towns we observe a decline in the urban population which is because of the promotion of Class II towns in to class I town. Class III towns reveal a variation noting changes in urban population, but there was definite rise of urban population in 1951 and 1961 Censuses on account of the shifting of towns from Class IV. There is slight variation in the percentage of urban population in size class III from 1941. In the class V towns we observed a declining trend in the percentage of population. The population of Class VI towns is pulasting as it is a transitional class between rural and urban.

The rise in urban population since 1941 had been mainly because (i) concentration in resource development (ii) greater utilisation of mineral resources (iii) Growth of industries (iv) Influx of refugee after partition.

VI.6 DECLASSIFICATION OF TOWNS in 1961.

In 1951, there are 108 towns in Bihar. Five of them belonged to Class I, 6 to Class II, 19 to Class III, 37 to Class IV, 30 to Class V and 11 to Class VI. Due to the application of the new definition of towns in 1961; five towns (1 in class IV, 2 in Class V, 2 in class VI) were dropped out from the urban list in 1961. These towns are listed below with their relevant demographic features.

DISTRIBUTION OF TOWNS , 1961



MAP 6.1

TABLE VI.5

(Towns of 1951 declassification in 1961)

Town	Dist.	Population	Size Clas	Density	% of non-agl. workers
Rajauli	Gaya	12,673	IV	2,263	35.58
Kesaria Bazar	Champaran	4,307	VI	1,595	34.26
Mow	Dharbhanga	5,695	V	1,499	51,17
Chas	Dhanbad	5,873	V	1,305	41.03
Manoharpur	Singhbhum	4,734	VI	1,125	63.57

Evidently none of these towns have more than 75 per cent of workers engaged in non-agricultural pursuit and hence they were dropped out from the urban list of 1961. In addition to these five towns, phulwaria town of 1951 was merged into Barauni town of 1961. Thus out of 108 towns of 1951 only 102 remained in 1961. Thus 51 new towns were added in 1961 and 5 were declassified. Along with all the three conditions a town should have a self governing unit viz., Municipality, or Metropolitican council, NAC etc.

Vi. 7 DISTRIBUTION OF URBAN CENTRES:

Out of 153 towns in Bihar, there are 45 towns in North Bihar plain, 43 in South Bihar plain, and 65 towns are in the Chota Nagpur plateau comprising 4.81, 11.63 and 11.49 per cent of urban population to total population of the State respectively. Bihar had 8.43 per cent of urban population during 1961 Census.

VI.8 URBAN CENTRES WHICH DO NOT FULFIL THE CONDITIONS FOR BEING URBAN:

There are 31 towns in Bihar which do not satisfy the criteria of urban area but because of the existence of administrative units they had been included in the urban list. Table VI.6 shows the name, percentage of agricultural workers, six ratio, literacy, dependency ratio and density of those towns. Out of these thirty one towns, majority are in North Bihar plain (13 Towns), 7 urban centres are in Chota Nagpur platean and remaining 10 towns are in South Bihar plain. Out of these towns 30 towns do not have 75 per cent or more of male workers engaged in non-agricultural activities. Only Bokaro has more than 75 per cent of non-agricultural male workers, but it does not have the requisite density, (it has 803 persons per sq. km). These 31 towns have administrative unit in them and so they were classified as Urban areas. These towns have average sex ratio of 914 females per 1000 males, 39.3 literate per 100 of population and 176 dependent per 100 workers. The average density of these towns is 3019 persons per square mile.

VI.9 LIRGE SIZED SETTLEMENTS THAT SATISFY THE CONDITIONS OF URBAN CENTRE:

There are 461 large sized villages in Bihar. Majority of them satisfy the following conditions i e (i) 5,000 population and (iii) 1000 person per sq. mile. The number of such

settlements is 259. But out of these 259 settlements only 25 villages satisfy all the three conditions of urban centre but since they do not have an administrative unit, they were not classified as town. Table VI.7 gives the name, population, percentage of agricultural workers, sex ratio, literacy, density, dependency ratio and growth rate. The average population size of these villages is 6726 and the average sex ratio literacy, and density are 748 female per 1000 males, 33.7 persons per 100 of total population and 71.50 persons per sq. km. respectively. The average dependency ratio of these settlements is 164 persons per 100 workers.

VI.10 ANALYSIS OF DEMOGRAPHIC CHARACTERISTICS OF TOWNS THAT DO NOT FULFIL ALL THE CONDITIONS OF URBAN CENTRES:

The average sex ratio of these towns is 914 females per 1000 males which is highest than Urban sex ratio of the State (811). The average literacy rate of these towns is 39.3 per cent. The literacy of these towns is more than the urban literacy rate of the State, which is 26.5 per cent during 1961. The density of population of urban areas of Bihar was 4960 persons per sq.km. while the average density of these 31 towns is 3019 persons per sq. mile. Similarly the dependency ratio of these towns is 176 persons per 100 workers where as the urban dependency ratio of the state was 201 persons per 100 workers. It is obvious that these towns have remarkably different demographic features.

VI.II DEMOGRAPHIC CHARACTERISTICS OF VILLAGES THAT FULFIL THE CONDITIONS OF URBAN CENTRES.

The above discussed villages which satisfy the conditions of Urban centres also have remarkably different demographic features. Their demographic features like sex ratio, literacy rate, dependency ratio etc. do not have any similarity with the corresponding rural figures. The average sex ratio of these village is 749 females per 1000 males whereas the corresponding figure of rural area is 1012 female per 1000 of males. Likewise, the average value of literacy rate is 33.07 while the literacy rate of rural Bihar is 12.4 which is almost one-third of these villages. The density of these villages is 7150 persons per square kiles while the density of Bihar was 268 (total fism). Similarly the dependency ratio of these villages is more than that of the rural areas of Bihar. The dependency ratio of these villages is 154 persons per 100 workers while the corresponding figure of rural Bihar is 143. From the table VI.8 it looks obvious that these villages resembles with the urban areas of the tstate (so far as the demographic indicators are concerned). All the demographic indicators like sex ratio, density, literacy rate, dependency ratio etc. have better value in the demographic sense.

So these villages are more urban oriented than rural and one can consider them as a special class, if not as the urban are a but as an intermediate between urban and rural areas, viz., semi-urban areas.

VI.12 POPULATION REDISTRIBUTION OF THE STATE:

Since the above discussed 31 towns in fact do not satisfy the criteria of being urban and 25 large sized villages fulfil all the conditions laid down for being urban during the 1961 Census but do not have administrative body, we can put them into one group. These towns and villages are neither towns nor village and they can be categorized as separate group. We called these groups as semi-urban. In this semi. urban settlement group are thus have 56 settlements. The population of this semi-urban areas is 588,192 comprising 1.23 per cent of total population. Because of this new class of population the original urban and rural population of the State have changed to a significant amount. The urban population of Bihar became 3.41 millions instead of 3.91 millions showing a decline of 10.74 per cent. Similarly the rural population has shown a drop of 0.40 per cent which is not a significant change with respect to the vast rural population (42.5 millions). With the change of rural and urban population owing to this new semi-urban settlements, the population distribution of the State during 1961 became:

Urban Population	3,493,880	(7.52)*
Rural Population	42,373,538	(91.25)
Semi-urban Population	588,192	(1.23)
Total	46,455,610	(100.0)

VI.13 DEMOGRAPHIC FEATURE OF SEMI-URBAN POPULATION:

Since the above discussed villages and towns do not behave demographically either as villages or as towns respectively we can group them into one category and we call them semi-urban area. These areas have 839 females per 1000 of males which is intermediate between the sex ratios of urban and rural areas of Bihar. Moreover, the literacy rate of these semi-urban population is 36.7 per cent which is higher than the rural and urban literacy rate of the State. The density of these semi-urban population is intermediate between rural and urban population, likewise the dependency ratio.

So far as the demographic features are concerned this semi-urban population behave as in between the rural and urban population.

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* Bracketed figures are the percentage to the total.

TABLE VI-6

LIST OF TOWNS WHICH DO NOT FULFIL URBAN CRITERIA OF 1961

Sr.No.	Name of Town	%age of Agl. workers	Sex Ratio	Literacy	Density	Dependency Ragio
1	2	3	4	5	6	7
1.	Raj Gir (9033)	37.0	874	31.3	408	165.5
2.	Bodh Gaya (6299)	49.4	833	44.5	1486	147.5
3.	Warisaliganj (13138)	34.5	872	32.6	2628	180.7
4.	Jahanabad (23209)	27.1	899	36.4	3192	219.2
5.	Jagdishpur (11840)	27.5	1000	24.1	5920	190.9
6.	Revelganj (12684)	51.5	943	23.8	3673	166.6
7.	Maharajganj (10800)	25.3	1005	43.0	18247	164.9
8.	Sugauli (10447)	44.4	842	22.9	2358	155.2
9.	Chakia (5962)	34.6	972	28.7	2021	217.6
10.	Chanpatia Bazar (14559)	35.9	922	22.2	2341	172.7
11.	Bagaha Town (19411)	53.4	923	22.0	1758	125.3
12.	Lalganj (13959)	31.0	987	27.6	3988	208.1
13.	Hazipur (34044)	25.2	917	32.9	3404	234.5
14.	Mahana Bazar (10138)	30.2	1056	31.3	3797	257.3

contd.....

Table VI.6 Contd...

1	2	3	4	5	6	7
15.	Barahiya (20502)	44.2	910	31.2	10099	206.3
16.	Teghra (23573)	53.2	1059	24.4	2463	253.0
17.	Jamui (24213)	40.2	954	28.1	2278	189.5
18.	Banka (12494)	32.7	888	31.9	1899	158.6
19.	Sugaul (17460)	36.6	878	25.2	2054	204.2
20.	Muraliganj (9848)	31.7	883	23.9	1993	139.6
21.	Kasba (13051)	32.9	923	28.8	1977	173.6
22.	Jasidih (4292)	27.3	899	40.7	715	195.6
23.	Barki Saraiya (8812)	40.6	908	30.6	1207	126.2
24.	Bokaro (5406)	12.7	678	45.2	803	153.8
25.	Simdega (10438)	35.1	881	41.2	530	106.5
26.	Kunti (8156)	31.6	961	43.9	1189	167.6
27.	Jaink Pani (6497)	26.5	877	24.1	984	120.5
28.	Kharsaun (4012)	31.9	943	42.9	1191	200.9
29.	Bikram Ganj (5681)	31.3	843	26.1	2040	54.7
30.	Barauni (45989)	25.1	917	48.5	3927	232.6
31.	Netarhat (2085)	22.8	516	35.6	296	89.9

Note: Bracketed figures are 1961 population.

TABLE VI.7

LIST OF VILLAGES WITH THEIR DEMOGRAPHIC CHARACTERISTICS THAT SATISFY THE URBAN CRITERIA

Sr.No.	Name of Village	Population	%age of male ag. worker	Sex Ratio	Literacy	Density	Dependency ratio
1.	Mainpur	5762	18.68	819	39.6	3640	158.7
2.	Phulwari	12262	17.87	880	35.3	4899	200.0
3.	Bihta	5494	11.36	670	40.2	4028	121.0
4.	Hilsa	6881	11.14	839	42.6	6058	222.6
5.	Gogri	5724	23.19	1003	24.7	10120	219.2
6.	Kanke	9310	7.62	708	56.1	4916	292.2
7.	Madhuban	5598	0.05	528	31.6	21199	152.2
8.	Lodana	5331	0.00	570	24.8	11526	99.4
9.	Jailgara	5035	0.09	906	25.3	9128	92.8
10.	Bhulanbari	5726	0.00	649	22.5	10637	69.4
11.	Patharidih	56221	0.97	626	44.5	18805	376.4
12.	Bhuli	6263	9.14	565	37.7	2947	141.4
13.	Baliari	6876	3.07	957	22.1	5351	89.5
14.	Bhojudih	6331	5.44	754	48.5	4998	197.4
15.	Ghasidih	7779	7.40	906	19.5	3981	146.6
16.	Kitadih	7762	015	591	28.6	6044	101.7
17.	Bagbera	5105	0.95	800	26.3	5904	148.3
18.	Bhagatdih	7762	0.15	591	28.6	6044	101.7
19.	Kendudih	6075	1.85	772	33.0	18281	184.9
20.	Saunda	9321	2.95	517	24.8	3299	78.1
21.	Deoria Bargnawa	8913	3.61	655	29.2	2918	159.4
22.	Barughuta	6746	21.71	483	29.8	2582	66.3
23.	Masauri Bazar	7494	22.39	936	39.5	4638	227.9
24.	Behea	5457	23.13	834	33.9	3482	213.1
25.	Kodarma	5732	21.71	897	43.3	1129	206.4
	Average	6726	8.62	747.6	33.7	7150	164.4

TABLE VI.8

AVERAGES OF DEMOGRAPHIC INDICATORS

Demographic Indicator	State Average			Towns that do not fulfil urban criteria	Villages that fulfil urban criteria	Semi-Urban
	Total	Rural	Urban			
Sex Ratio	994	1012	811	914	748	839
Literacy	21.7	12.4	26.5	39.3	33.7	36.7
Density	268		4960	3019	7150	4896
Dependency Ratio	142	143	201	176	164	170

Chapter VII

(Household Size of the Settlements)

HOUSEHOLD SIZE OF THE SETTLEMENTS

The study of the household is important from two points of view: the economic and the social. With regard to the first, it should be realized that in many communities these groups constitute units of production and they replace the individual as the basic unit of consumption. It is important from the sociological view point because of the processes of reproduction allocation of status etc. take place within the household.

VII.1 DEFINITION AND CONCEPT

The household is a socio-economic unit, consisting of individual who live together.[1] Dr. Agarawala defines household "as a group of persons who are taking food from a common kitchen".[2] In 1961 Indian Census the household was defined as "all the persons who occupied a house, an apartment or other group of rooms or a room, that constituted a dwelling unit."[3] Household size is nothing but the number of persons who share one household. It is computed dividing the population by the total number of households.

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1. United Nations: Multigual Demographic Dictionary (1958) pp. 4.
2. S N Agarawala: A Demographic Study of Six Urbanising Villages. pp.26
3. K. Dandekar; Size and Composition of household, Census of India Vol. I, Monograph No.9, pp.7.

VII.2 AVERAGE HOUSEHOLD SIZE:

The average household size of India from 1911 to 1961 was between 4.9 to 5.17 persons. There is a considerable variation in size between different parts of the country. In states like Bihar and Kerala the average is much higher and was 6.7 and 5.8 in 1961, while in others like Madras and Andhra Pradesh, it was much lower, being 4.6 and 4.8 respectively. In every state the average in 1961 was appreciably higher than that in 1951, only one state Andhra Pradesh registered a small decline from 4.9 in 1951 to 4.76 in 1961.

The mean household size of all settlements under this study is 5.69 persons, with the standard deviation 1.47. The plain Bihar has 5.77 persons per household in the villages and towns of population five thousands and above. The standard deviation is1.40 in this case. But the plateau of Bihar has the mean household size 4.92 with the standard deviation 1.64. In the case of plain Bihar the large sized villages and urban centres have larger household size compared to the household size of Chota Nagpur plateau. "In densely populated areas, the establishment of a new village is not an easy matter, and the growing population has to find accommodation by over crowding the existing houses of adding yet another house to the congested village site". Pace of urbanisation and industrialisation has influenced the household size in the Chota Nagpur plateau by pulling people from rural

areas. "The relatively small size household in the rural areas of Chota Nagpur plateau should be attributed mainly to two factors: first youngmen among the tribal people who constitute a large portion of total population of Chota Nagpur usually set up separate household soon after their marriage and the joint family system is not prevelent in this division to the same extent with the other two divisions, and second, in parts of this natural division, there is a sizeable migrant labour population who are not accompanied by their families in very many cases"[4]. The household size of large sized settlements with agrarian economy is higher than their counter parts.

VII.3 DISTRIBUTION OF SETTLEMENTS ACCORDING TO HOUSEHOLD SIZE BY PHYSICAL REGIONS:

The mean household size of all the settlements is computed along with the standard deviation. Different frequency classes are fixed up in the following way: the first interval lies between mean minus two standard deviations to mean minus one standard deviation, the second lies between mean minus one standard to mean, third interval lies between mean to mean plus one standard deviation and subsequent intervals are constructed by taking mean plus one standard deviation and subsequent intervals are constructed by taking mean plus one

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4. Census of India 1951, Volume V. Bihar Part I - Report, Govt. of India. pp.

standard deviation to mean plus two standard deviation and so on. A frequency table is constructed which shows the distribution of settlements as one deviates from the mean.

TABLE VII.1

(Distribution of household size of settlements in the various natural regions of Bihar)

Household Size / Natural Region	3.7-4.2	4.2-5.7	5.7-7,2	7.2-8.7	8.7+	Total
North Bihar	5	220	112	4	4	345
South Bihar	1	77	87	5	5	175
Chota Nagpur	22	49	22	0	1	94
Bihar	28	346	221	9	10	614

Table VII.1 shows that there are 28 settlements out of 614 settlements of the State whose household size varies between 3.7 to 4.2 persons. There are only one such settlement in the South Bihar plain and five in North Bihar Plain, while Chota Nagpur plateau has twenty two such settlements out of 28 settlements of the frequency class. Large number of settlements of Chota Nagpur plateau has small size household. This is out come of urbanisation and industrialisation. For better economic prospect people from other areas are pulled away to the mining villages and towns of Chota Nagpur plateau

and as a result small size households are set up as the migrants come alone or with their wavies because of the acute housing problem. The economic viability assists the young people to live separately in urban area and as a result most of urban centres and villages with mining oriented economy have smaller household size.

More than half of the settlements under consideration have household size between the mean and mean minus one standard deviation (i e 4.2 to 5.7 persons). There are 346 settlements in this ffequency class. Out of these 346 settlements, 220 settlements are in North Bihar plain, 72 settlements are in South Bihar plain and Chota Nagpur plateau has 49 settlements in this range. In North Bihar plain 63.9 per cent of settlements have household size between the mean and mean minus one standard deviation. Seventy seven settlements of South Bihar plain and half of the settlements of Chota Nagpur pleatue have household size between 4.2 to 5.7 persons.

The household size of 221 settlements of Bihar is laying falls between the mean and mean plus one standard deviation. The percentage of these settlements is 35.9. In South Bihar fifty percent of villages have household size 5.7 to 7.2 persons and a quarter of the total number of settlements of Chota Nagpur plateau is in this frequency class. There are very few settlements with household size more than 7.2 persons. There are 19 settlements with such a high household size in Bihar. Out of these 19 settlements 18 are in Bihar plain (South Bihar plain and North Bihar plain).

In a nut shell, the household size of large sized settlements of the plain areas of Bihar is higher than that of the highlands of Bihar. Agrarian economy, the system of joint family, and inconvenience to build up new houses force the plain Bihar's people to have large household size.

VII.4 Interrelationship AMONG THE HOUSEHOLD SIZE OF SETTLEMENTS AND OTHER DEMOGRAPHIC INDICATORS:

Household size is negatively correlated to the percentage of total workers of the settlements with the correlation coefficient -0.14. When for plain Bihar and Chota Nagpur plateau the correlation coefficients are calculated separately it is found that higher the percentage of worker, lower is the size of household in the Chota Nagpur region. But in the plain Bihar household size is positively correlated with the percentage of workers (0.11). But considering the percentage of male worker it is seen that household size is negatively correlated to the percentage of male worker. Correlated to the percentage of male worker. It also has a negative correlation with percentage of male worker when we consider the whole state. The correlation coefficient of household size and percentage of male worker is higher in Chota Nagpur plateau (0.287).

Table VII.2

(Correlation coefficients of household size with other variables in various natural regions)

Indicators / Natural Region	Total worker	Male worker	Female worker	Total literacy	Male Literacy	Female Literacy	Sex Ratio
Plain	0.110	-0.110+	0.106	-0.042+	-0.076+	-0.041+	0.027+
Chota Nagpur	-0.259	-0.287	-0.045+	-0.318	-0.333	-0.094	0.312
Bihar	-0.139	-0.209	-0.064+	-0.214	-0.225	-0.179	-0.024+

('+' mark shows that these values are statistically not significant).

In the Chota Nagpur plateau the correlation coefficient of household size with percentage of male worker is -0.287. It may be due to the fact that most of the workers of the Chota Nagpur plateau are migrant and mainly young. Therefore the proportion of single person household is more, as a result there is a shrinkage in the household size of the region. Whereas in the plain Bihar this is not true. The study reveals that worker has high household size than the region of low percentage of agricultural workers.

In plain Bihar literacy rate is not correlated to household size but in the Chota Nagpur plateau the total literacy rate and male literacy rate is negatively correlated, i e higher the percentage of literates lower is the household

size. The sex ratio is positively correlated to household size i e higher the sex ratio of settlements higher the household size. The correlation coefficients of household size and sex ratio for Bihar as a whole and Bihar plain are -0.0238 and 0.0268 respectively, which are not significant statistically while the correlation of household size with sex ratio in Chota Nagpur plateau is statistically significant.

VII.5 AVERAGE HOUSEHOLD SIZE IN DIFFERENT SIZE CLASSES.

In 1961 the average household size of large sized villages of Bihar was 5.69 which was less than the State average ie 6.7 persons. Interestingly the average household size of Class I town was 5.79 persons i e higher than the average household size of large sized villages. Table VII.3 shows that the household size decreases as the size of population decreases from one lakh to five thousands. But in class VI towns the average household size increases to 5.37 persons.

Table VII.3

(Average Household size in various size class of Population)

Size Class	No.of Settlements	Average Household Size.
I	7	5.79
II	7	5.68
III	33	5.54
IV	52	5.45
V	46	4.98
VI	8	5.37
Village	461	5.69

VII.6 RELATION BETWEEN HOUSEHOLD SIZE AND OTHER DEMOGRAPHIC VARIABLES IN VARIOUS SIZE CLASSES:

One of the most important purpose in studying demographic aspects of households is to gain knowledge of factors affecting their dimension and trends. Most of the studies in Eastern Europian Countries have stressed that the decline in average household size has been caused primarily by demographic factors, chiefly by declining fertility rate and by social and economic factors. Because of the lack of data on social and economic factors here we have given more stress to demographic factors like sex ratio, literacy rate and density of the settlements and towns.

To study the association between household size and other demographic variables a multiple correlation table is constructed by taking household size and demographic variables namely, sex ratio, literacy rate and density in various size classes of the selected settlements. The Table VII.3 shows the above discussed variables.

TABLE VII.3

(Correlation between household size and demographic variables

Size Class	No.of Settlements	Density	Sex Ratio	Literacy rate
I	7	0.169*	-0.350*	0.304*
II	7	0.249*	0.793	-0.506*
III	33	0.052*	0.427	-0.144*
IV	52	-0.165*	0.427	0.310
V	46	-0.273	0.595	0.115*
VI	8	0.286*	-0.451*	0.619
Villages	461	-	-0.024*	-0.214

(* denotes that the correlation coefficients are statistically not significant).

A high correlation between household size and sex ratio is found in this study which examines 153 urban towns of the State. But sex ratio is not significantly correlated to household size (r=-0.024) in the large sized villages. In fact of all the variables selected for this study, sex ratio is highly correlated to the household size and comes first in significance. In Class I and class VI towns of Bihar sex ratio is negatively correlated while in rest other size classes of town it is positively correlated. But this negative association in Class I and VI towns is not statistically significant according to t-test at five per cent significant level. This strong correlation of sex ratio with the household size may be due to the single person household in urban areas due to male selective migration, for employment, who prefer to set up their own household in a small room and do their own cooking, because of their ways of living and food habits.

Literacy rate is positively correlated to household size in all size classes of towns excluding class II and Class III towns of Bihar, where it is negatively correlated. The size of household reduces with the level of education of the head. Many studies have revealed that literacy is negatively correlated to the household size. In the present study only

incase of Class II and III towns household size is negatively correlated to literacy rate with the correlation coefficients -0.506 and -0.144 respectively. In fact of all size classes considered the correlation coefficient between household size and literacy in class II comes next to the correlation coefficient of class VI towns in significance. T-test reveals that except in class IV and VI, villages towns in other towns the relationship is not statistically significant.

Density is positively correlated to the household size only in class IV and class V town it is negatively correlated (-0.165 and -0.273) respectively. But when t-test is conducted it is found that all correlation coefficients of different size classes are insignificant, except of class V towns. ($r = -0.273$). This negative correlation shows that in class V towns the household size has a negative correlation with density of population.

Chapter VIII

(Summary and Conclusions)

SUMMARY AND CONCLUSIONS

The earlier chapters present an analysis on the spatial distribution of large sized villages and towns along with some of the demographic and other processes in them. It will be worthwhile to restate the sielent observations made in this study by way of conclusions, so that we could make few broad suggestions on the rural urban classification, and to determine what further research studies may be under taken to throw more light on the problem.

VIII.1 MAJOR FINDINGS:

It must be stated at the outset that it is not our intension to generalise the findings to other settlements of the State. These findings are confined to the large sized villages and urban centres of the State.

(a) Distribution:

High degree of inequality is found in the distribution of rural as well as urban settlements considered for this study. The unevenness in distributio is also a spread to the natural regions.

(b) Demographic Features:

There is a regional variation in demographic features viz., Growth rate, density, sex ratio, literacy and dependency ratio of the settlements. The variation is governed by

migration of people into the corresponding regions, utilisation of mineral resources and impact of urbanisation etc. In the various size classes of settlements these demographic features show some definite pattern, for instance

(i) Higher the size of settlement lower is the growth rate.

(ii) Density varies with the size of population of the settlements.

(iii) Higher the size of settlements lower is the sex ratio.

(iv) Higher the size of settlements higher is the literacy rate.

(v) Dependency ratio changes with the change of size of settlements.

(~~vi~~) ~~Growth rate is governed (to some extent) by crop region.~~

(c) Economic Features:

There is also a regional variation in participation rate of large sized villages. The average participation rate of settlements of plain Bihar is 37.8, while that of Chota Nagpur plateau is 42.4. The average percentage of workers is found to be smaller than the participation rate of rural areas of the State. A negative correlation is observed between the participation rate and sex ratio. Moreover it is found that participation rate has a negative association with the literacy rate in large sized settlements.

There were in all 197 villages (large sized) and urban centres with more than 50 per cent workers engaged in non-agricultural pursuits. Majority of these settlements are found in Highlands of Bihar (88 settlements) while South Bihar plain and North Bihar plain contains 63 and 46 settlements respectively. There are 60 large sized villages with more than 50 per cent non-agricultural workers. Nearly half of these are in Chota Nagpur plateau. Mining, manufacturing, construction and other services are predominant functions of these settlements. When these settlements were classified according to Dr. Mitra's triangular co-ordinate method it is observed that there are 86 manufacturing settlements, 27 Trade and transport settlements and 84 service settlements in Bihar.

(d) Social Amenities:

Almost all large sized villages are equiped with school, highschool and other health facilities other than hospital and dispensary. Hospital and dispensary is found in only 28.19 per cent of large sized villages. In large sized villages social amenities do not play great role to determine the growth rate and size of population. Moreover, it is found that settlements with higher order of educational institution have higher level of literacy.

(e) Urbanisation:

Urbanisation was very low in Bihar. Only 8.43 per cent of population live in urban areas of the State. The percentage of urban population is more in South Bihar plain. Next to South Bihar plain Chota Nagpur comes. It is found that there is a steady increase in urban population of Bihar since 1921.

To our utter surprise we found out that there are 41 towns which do not fulfil the definition of urban area laid down in 1961 Census. There are 22 villages in Bihar satisfying urban criteria but they have not been included into the urban list of 1961. The population of these 41 towns and 22 villages demographically behave as an intermediate between the rural and urban indicating a transitional stage between rural and urban. We christered this class of population as semi-urban population. This class of population have sex ratio density and dependency ration in between rural and urban population of State.

With the concept of semi-urban population, we redistributed the population of the State. It is found that the semi-urban population of State for 1961 was 6.6 lakh while the urban and rural population changed to 34.06 and 423.9 lakhs respectively.

(f) Household Size:

The average household size of large sized villages is found to be 5.69 which is less than the State average (6.7 persons). A regional variation in average household size of the settlement is observed. The plain Bihar has higher household size than Highlands of average Bihar. Moreover it is found that the average household size decreases as the size of the settlements (urban) decreases. Household size is found to be negatively correlated to sex ratio while it is positively correlated to the literacy rate.

VIII.2 Suggestions:

It is suggested that the two tier concept of rural and urban should be changed into a three tier concept. by including semi-urban concept of settlement. The Criteria for classifying the semi-urban settlement should be that of the urban area but a settlement should fulfil majority of the conditions but not all.

It will be worthwhile if the same study is carried out for different regions of India with various time periods to have a better knowledge of the problem.

Appendices

Appendix I

Statistical Test for Independency:

Hypothesis: In order to test the independency of two characteristics, the null hypothesis would assume that both the characteristics under consideration are independent i e not associated with each other

Test Procedure: To test the null hypothesis, we use the X^2 Statistics. This is defined as follows:

$$X^2 = (O_{ij} - E_{ij})^2/E_{ij}$$

Where, O_{ij} and E_{ij} are observed and expected frequencies respectively and $E_{ij} = r_i C_j/N$, ri stands for ith row total and Cj is the jth column total and N = total 4 number of frequencies.

Then the computed value of X^2 is compared with the theoretical value of X^2 with $(r-1)(C-1)$ as degree of freedom at the desired level of significance. If the computed value of X^2 is found less than the theoretical value we call it significant and reject the null hypothesis.

Correlation of Variables:

In order to test the associations of different variables the correlation coefficients (r) were calculated. The r's were calculated as follows:

Let X be the data matrix with 'Nobservations and 'M' variables. First of all this data matrix was normalized by substracting the mean from corresponding variables and then divided by the respective standard deviation. Let this normalised matrix be $\dot{X}$. Then the correlation matrix is computed by the below formula

$$R = \frac{\dot{X}^T \dot{X}}{N}$$

Where R is the correlation Matrix with M rows and M columns, and $\dot{X}^T$ is the transposed of normalised data matrix.

The correlation coefficients are tested by t-test using the following formula

$$t = r \sqrt{\frac{N - 2}{1 - r^2}}$$

Appendix II

Table 1

Distribution of Settlements according to their Predominant functions in North Bihar Plain

Degree of Functional Diversity	Functional Type			
	Manu-facturing	Trade & Transport	Service	Total
Highly Diversified	1	2	4	7
Moderately Diversified	4	6	7	17
Predominant function Accentuated	3	2	5	10
Predominant function Highly Accentuated	5	0	5	10
Total	13	10	21	94

Table 2

Distribution of Settlements according to their Predominant functions in South Bihar Plain

Highly Diversified	3	3	5	11
Moderately Diversified	10	0	9	19
Predominant function Accentuated	5	2	9	16
Predominant function Highly Accentuated	8	2	10	20
Total	26	7	33	66

Table 3

Distribution of Settlements according to their predominant functions in Chota Nagpur Plateau

Degree of Functional Diversity	Functional Type			
	Manu-facturing	Trade & Transport	Service	Total
Highly Diversified	1	3	3	7
Moderately Diversified	1	1	4	6
Predominant function Accentuated	7	2	7	16
Predominant function Highly Accentuated	38	47	16	58
Total	47	10	30	87

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