SPATIAL PATTERNS OF SOCIO-ECONOMIC AMENITIES IN DARRANG DISTRICT, ASSAM

By

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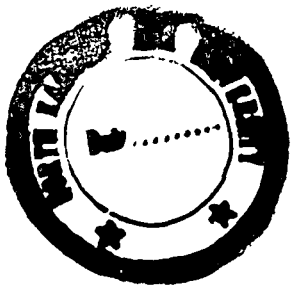
A Dissertation

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT OF THE DEGREE OF

MASTER OF PHILOSOPHY



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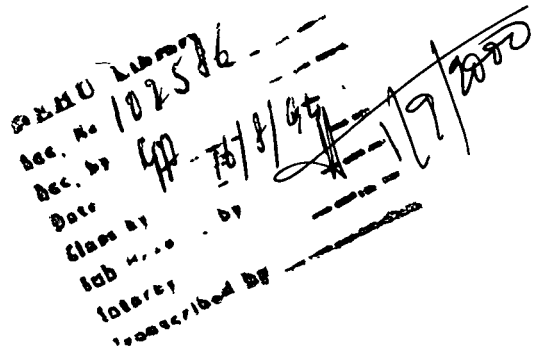

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C E R T I F I C A T E

This is to certify that, the Dissertation submitted by Binud Machahari for the Degree of Master of Philosophy at the Department of Geography, School of Environmental Sciences, North-Eastern Hill University, Shillong, Meghalaya entitled "SPATIAL PATTERNS OF SOCIO-ECONOMIC AMENITIES IN DARRANG DISTRICT, ASSAM," is a bonafide study of the author to the best of my knowledge and belief.

This study may now be placed before the examiners for evaluation.

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A C K N O W L E D G E M E N T

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(BINUD MOCHAHARI)

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INTRODUCTION

CHAPTER - I

INTRODUCTION

Generally, in each and every parts of the country like India, it is being observed that the distribution of the amenities/facilities are not being performed in a proper way. In many studies, though it has been highlighted that there is a primacy in the distribution of facilities/functions particularly in the growing rural economies where the developmental process are being operated through utilizing the local resource phenomena, there is an ample need of extension and expansion of the facilities related to local resource availability. The primacy distribution of the spatial patterns of the facilities may create various types of problems, like migration from rural to urban, areal gaps and the concentration of their spatial patterns etc. Therefore, there is a need to describe the spatial patterns of socio-economic amenities/facilities, their efficiencies/deficiencies in the study area. Further, the parametric components that are related to the general distribution of amenities, its intensity, and the transport technology for rural areas must be analysed in detail, particularly for the backward economy of the area or region.

The literal meaning of amenity is to the quality of being, that is, easily conduceive to pleasantness of social well-beings. But in the present context, the word 'amenity' is being used for the quality of being, that is easily performed to serve a particular purpose of the people living in an area/region. Therefore, amenities/facilities of an area are used in the further context to explain the locational aspects in area planning processes.

CONCEPTUAL BACKGROUND :

It is widely accepted that, the development of any area or region is mainly recognised by well formed of locational structure of the facilities/functions, its magnitude and intensities. In the spatial context, the task of regional planning in a country like India, is almost essential, in view of the ecological differences from area to area (Wanmali 1972). Planning processes have been widely accepted to promote the well being of the area and the people. They emphasize maximum of the developmental activities, in a particular region, in terms of spatio-functional interactional system with transformation and modification of socio-economic facilities, so that the gaps may be identified and filled up.

The spatial organisation here, refers to distributive aspects of socio-economic amenities/facilities in spatial context. It takes into account the magnitude as well as hierarchy of functions and are often termed as 'Central Functions'. These are generally non-ubiquitous in nature because of technological, economic or institutional constraints, and so their occurance in certain locations helps in creating a hinterlands or a chain of spatial inter-relation thereby increasing the importance of the place.

These socio-economic amenities/facilities have generally been assuming as special significance with growing emphasis on improving the quality of life at all levels, particularly in rural areas. With this perspective in view, rural development is defined as a comprehensive planning for the economic and social development of a specified geographical areas. The analysis of socio-economic facilities with reference to their spatial organisation thus is of important for preparing a comprehensive plan of a techno socio-economically backward rural areas/regions.

Thus, the main aspects of development and planning may also be studied by considering the amenities that are needed in the area and to what extent they are available in existing set up. It is accepted that the total magnitude of amenities/facilities indicates their availability, while its locational behaviour denotes the spatial patterns as an important aspect in the study.

Infact, there are two major processes of area development which are operated through the locations where the facilities/functions are available. First process is related to intensity and complex nature of the availability of the functions/facilities. It is called 'percolation process'. When the functional magnitudes are intensified on a particular location in the area/region, it attracts the people living in the surrounding areas. Thus, attractiveness is directly related to the percolation process of development. The second important process of development in the area is 'spread effect' which is directly linked with the distance factor, that is the major element of space economy. Distance factor is associated with the transport technology and road connectivity and its accessibility in the area. Indeed, cheap transport facilities, better road connectivity and higher degree of road accessibility accelerate fast the process of spread effects. Specially in Indian conditions, these factors of area development are weak and sometimes in some areas of backward economy, they have negligible effects on the spatial structure of socio-economic facilities. As a result, primacy can be seen in the distribution of socio-economic facilities.

Infact, primacy in the distribution of these facilities/functions creates various problems like, local migration, functional gaps and defficiencies which indirectly affect to the spatial structure of spatio-functional organisation with the destortion of its sequence of the area. The socio-economic facilities/functions are infact, un-ubiquitous in nature, which means that each and every settlements of the area does not perform each and every facilities/functions. Therefore, the question arises about the choice of the functions and locations for smooth working of spatio-functional organisation. This question is also related to the distance factor of spatial efficiency of the system. Incorporating these factors in space relations, the degree of spatial efficiency of locational setup of the organisation is very much important to measure. To test the validity of the facts related to these aspects of socio-economic set up of the area is the prime aim of the present study.

But various problems of development and decision-making processes are directly linked with the socio-economic and physiographic setup of the area. The statement of the concrete problems of socio-economic development of an area may be explained by keeping in view the fundamental fallacy of the norms of developmental activities as described earlier in this chapter and the geographical personality of the area which has been chosen for present study.

STATEMENT OF THE PROBLEM :

Keeping in view the above discussion, it is therefore necessary to study the distributional aspects of socio-economic facilities/amenities for development of socio-economic setup in an area or region. The aspects of the study become more relevent especially in those areas/regions where the economies are in their initial stages. In such areas, there is an ample need of intensification and expansion of socio-economic facilities/amenities for their well balanced development and self sustained growth. Many studies which are related to the spatial patterns of socio-economic setup conclude that, the concentration of socio-economic facilities/amenities is the normal phenomena in its spatial patterns especially in Indian context.

GEOGRAPHICAL PERSONALITY :

(a) Location :

The District Darrang is situated on the northern bank of the Brahmaputra river in the Assam state. Its extent is between $26^{o}9'N$ to $26^{o}52'N$. latitudes and between $91^{o}45'E$ to $92^{o}22'E$ longitudes. It is distinguished by the natural boundaries of main tributaries of Brahmaputra river in the east and west. River Panchnai separates it to the district Sonitpur in the east and to the

district Kamrup by river Barnai in the west. The southern boundary is divided by the river Brahmaputra itself. While the northern boundary of the district Darrang follows International and State boundaries of Bhutan and Arunachal Pradesh. (Fig.1.1). The district is divided into Six Police Stations (on the basis of 1971 census) which incorporates 1231 inhabited and 44 un-inhabited villages (Fig. 1.2).

(b) Area and Population :

Situated on the northern bank of the Brahmaputra river in Assam, the district Darrang covers a total area of 3465.3 sq.km. or 339915 hectare, of which 3454.7 sq.km. is rural and 10.6 sq.km. is urban with a total population of 834574(1971) comprising of 802400 rural and 32170 urban. The density of population of the district was as high as 240 persons per sq.km. during 1971, which has increased to 370 persons per sq.km. in 1991. At present, the district on the whole is accounted for about 5.77 percent of the total population of Assam, i.e. 1286633 persons out of 22294562(1991). In the district more than 64 percent of the total areas is estimated to be available for cultivation. Out of the total area, Tea garden occupy 391.87 sq.km.(1987) and Forests occupy 1597.53 sq.km.(1988-89). More than 85 per cent of the total working force are directly engaged in agricultural activities. Mangaldai and Udalguri constitute the two sub-divisions of the district.

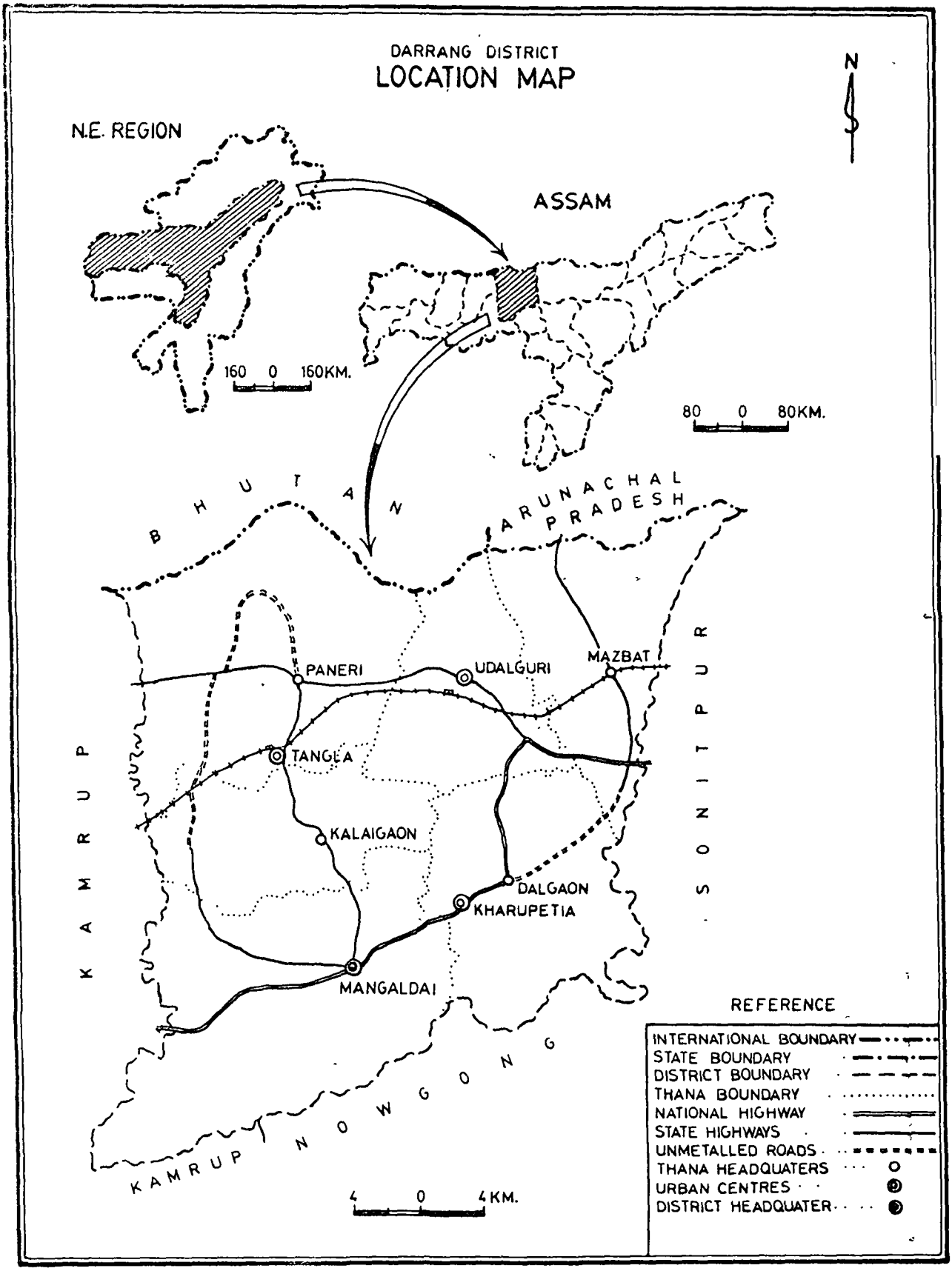

DARRANG DISTRICT
LOCATION MAP
N
N.E. REGION
ASSAM
160 0 160KM.
80 0 80KM.
BHUTAN
ARUNACHAL PRADESH
PANERI
UDALGURI
MAZBAT
TANGLA
KALAIGAON
DALGAON
KHARUPETIA
MANGALDAI
KAMRUP
SONITPUR
NOWGONG
KAMRUP
4 0 4KM.
REFERENCE
INTERNATIONAL BOUNDARY
STATE BOUNDARY
DISTRICT BOUNDARY
THANA BOUNDARY
NATIONAL HIGHWAY
STATE HIGHWAYS
UNMETALLED ROADS
THANA HEADQUATERS
URBAN CENTRES
DISTRICT HEADQUATER

Fig.1.1

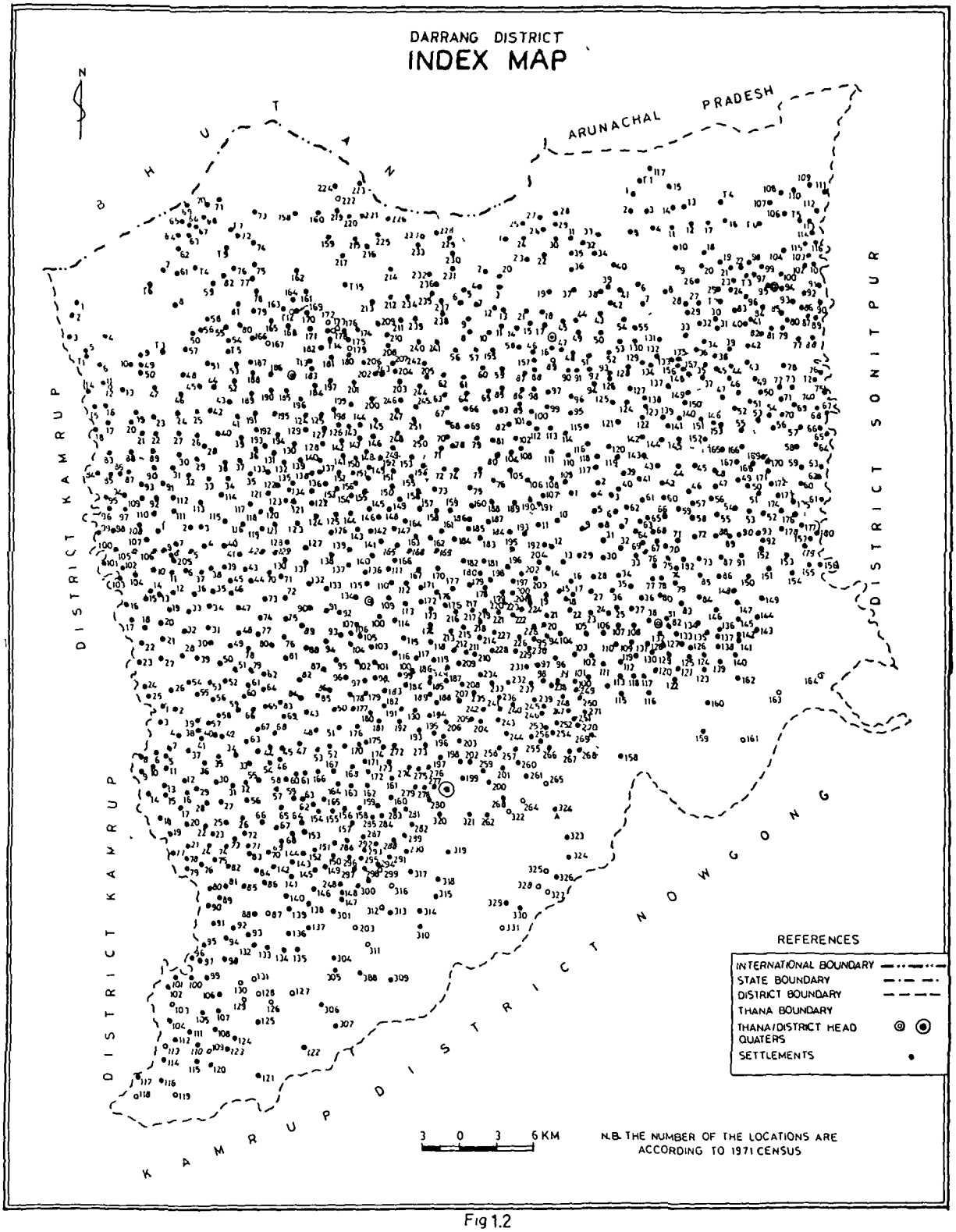

DARRANG DISTRICT
INDEX MAP
N
BHUTAN
ARUNACHAL PRADESH
DISTRICT KAMRUP
DISTRICT SONITPUR
DISTRICT NOWGONG
DISTRICT KAMRUP
REFERENCES
INTERNATIONAL BOUNDARY
STATE BOUNDARY
DISTRICT BOUNDARY
THANA BOUNDARY
THANA/DISTRICT HEAD QUATERS
SETTLEMENTS
3 0 3 6 KM
N.B. THE NUMBER OF THE LOCATIONS ARE ACCORDING TO 1971 CENSUS

Fig 1.2

(c) Physiography :

The general physical configuration of the district is a large open plain with a general slope towards the south and a few scattered 'inselbergs' of gneissic rocks not exceeding 90 to 140m. in height above mean sea level(District Gazetteers 1978). The low hills which characterises the south western parts of the district has a maximum elevation of not more than 200m above sea level. The two sub-divisions of the district however exhibits various physical characteristics.

The entire district is almost a quadrilateral block of alluvial plain, with an abrupt southward slope in the north, and the level falls in the south with a dip towards the south west. The slope of this area is steep as compared to other parts of the district. In the northern front along the sides of the foot hills of the eastern Himalayas from where the alluvial plain gradually slopes down to the Brahmaputra river, there are several low-lying mounds made up of unassorted river terraces. The average elevation in these borders blocks is approximately 350m above sea level (Fig.1.3). There is a sudden fall in slope in Udalguri sub-division. Areas with an average elevations of 200m. extenda to about 10 km. towards north western parts of Udalguri sub-division, northern Khairabari and parts of Mazbat thana. Besides local topographical variations, soils of loose texture, old alluvial as well as coarse alluvial rocky soils and sands and gravels are found in this district.

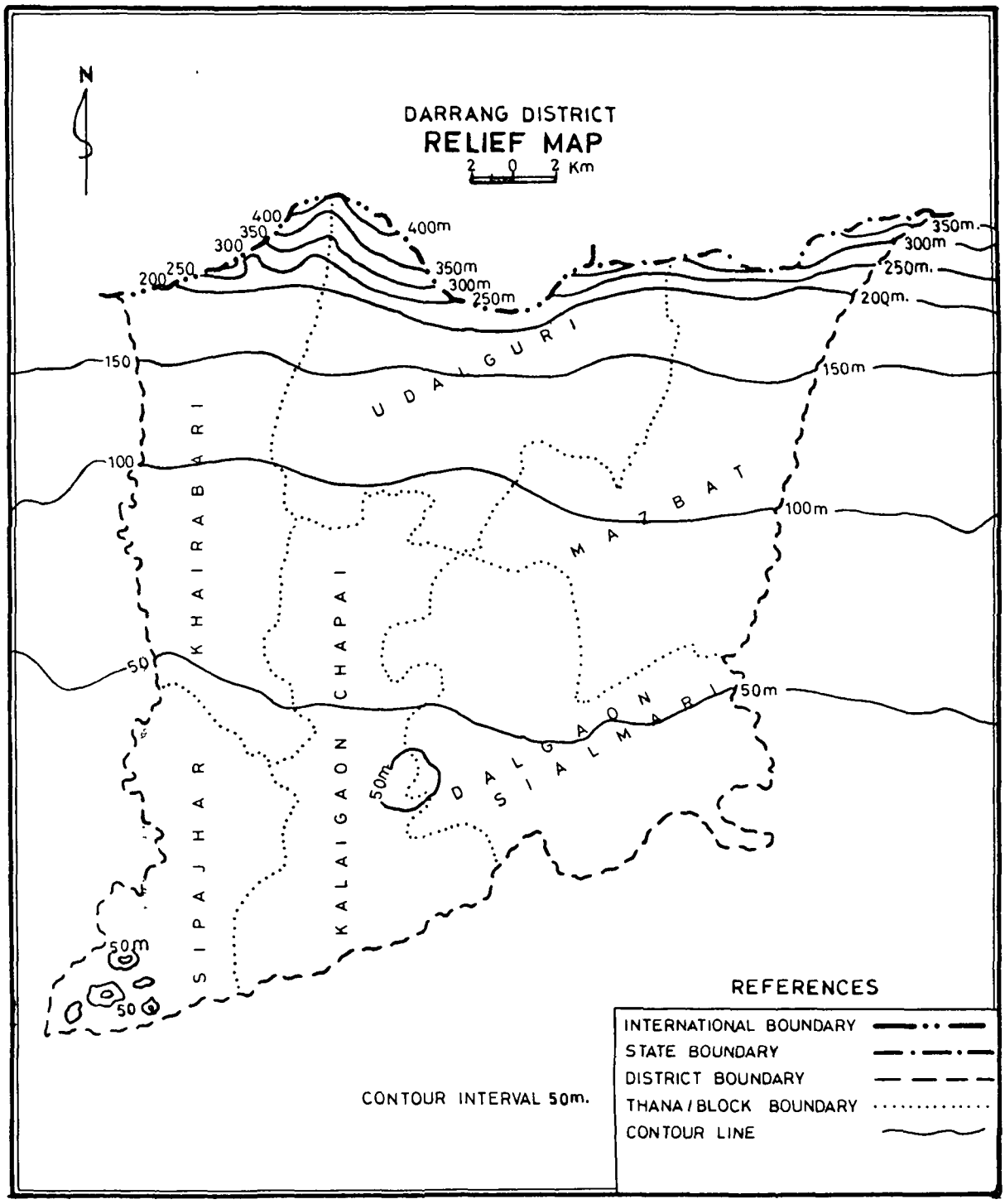

N
DARRANG DISTRICT
RELIEF MAP
2 0 2 Km
400
350
300
250
200
400m
350m
300m
250m
350m.
300m
250m.
200m.
150
150m
100
100m
50
50m
UDALGURI
MAZBAT
KHAIRABARI
CHAPAI
KALAIGAON
DALGAONARI
SIALMARI
SIPAJHAR
50m
50
REFERENCES
INTERNATIONAL BOUNDARY
STATE BOUNDARY
DISTRICT BOUNDARY
THANA / BLOCK BOUNDARY
CONTOUR LINE
CONTOUR INTERVAL 50m.

Fig.1.3

Barring the isolated hillocks exposing the Archean gneisses in the southern part and occassional outcrops of the upper tertiary sand stones at places over the northern boundary, the entire district is covered by alluvial deposits of recent and sub-recent origin. The Archean gneisses represent a complex group of biotic and hornblende gneisses with occassional small granite and pagmatitic bodies intrusive into them. The upper tertiary sand stones mainly covering the foot hills across the northern boundary consist of fine to medium grained, bluish to greenish grey ferruginous sand stones with partings of dark grey splintershales and fragments of lignite and carbonised wood and thus resemble the Tipam sand stone of upper Assam. Along the base of the foothills, these sand stones are covered by a thick accummulation of unstratified and unconsolidated terrace deposite of the sub-recent age. The older or high level alluvium, consists of a thick accummulation of unassorted sub-rounded to rounded boulders, pebbles and cobbles of quartzite, sand stones, shales, slate and gneisses embedded in a coarse sandy clay matrix. The deposits formed relatively higher relief in the northern part of the district are well exposed around the debouchment of each river into the plain.

The drainage system of Darrang district offers a unique example, when considered along with other drainage systems of Assam and India on the whole. The drainage of the district ultimately finds its way into the mighty Brahmaputra river which flows along the southern boundary of the district.

The entire district is however covered with a network of drainage and channels which originally flow from the northern hills towards south to the Brahmaputra river. The chief tributaries of the Brahmaputra river in the District are -Barnai, Noanai, Kyapani, Saktola, Nanai, Galandi, Panchnai, Sukhajani, Dhansiri, Mora-Dhansiri, Beganai and river Mangaldai (Fig.1.4). Heavy rain occurs in summer season and thereby rivers carry boulders and sand stones. Many of the rivers as well as tributaries dry up in winter season except that of Dhansiri Nanai, Burnai and Panchnai rivers. The Brahmaputra is the only nevegable river in the district and remains flowing through out the year. In the district, these rivers and tributaries are the main source of water supply for the purpose of irrigation.

(d) Climatic Conditions:

The climatic conditions of the district in general is unique in itself and are similar to that of the neighbouring districts. It is however, characterised by marked spatial varia-

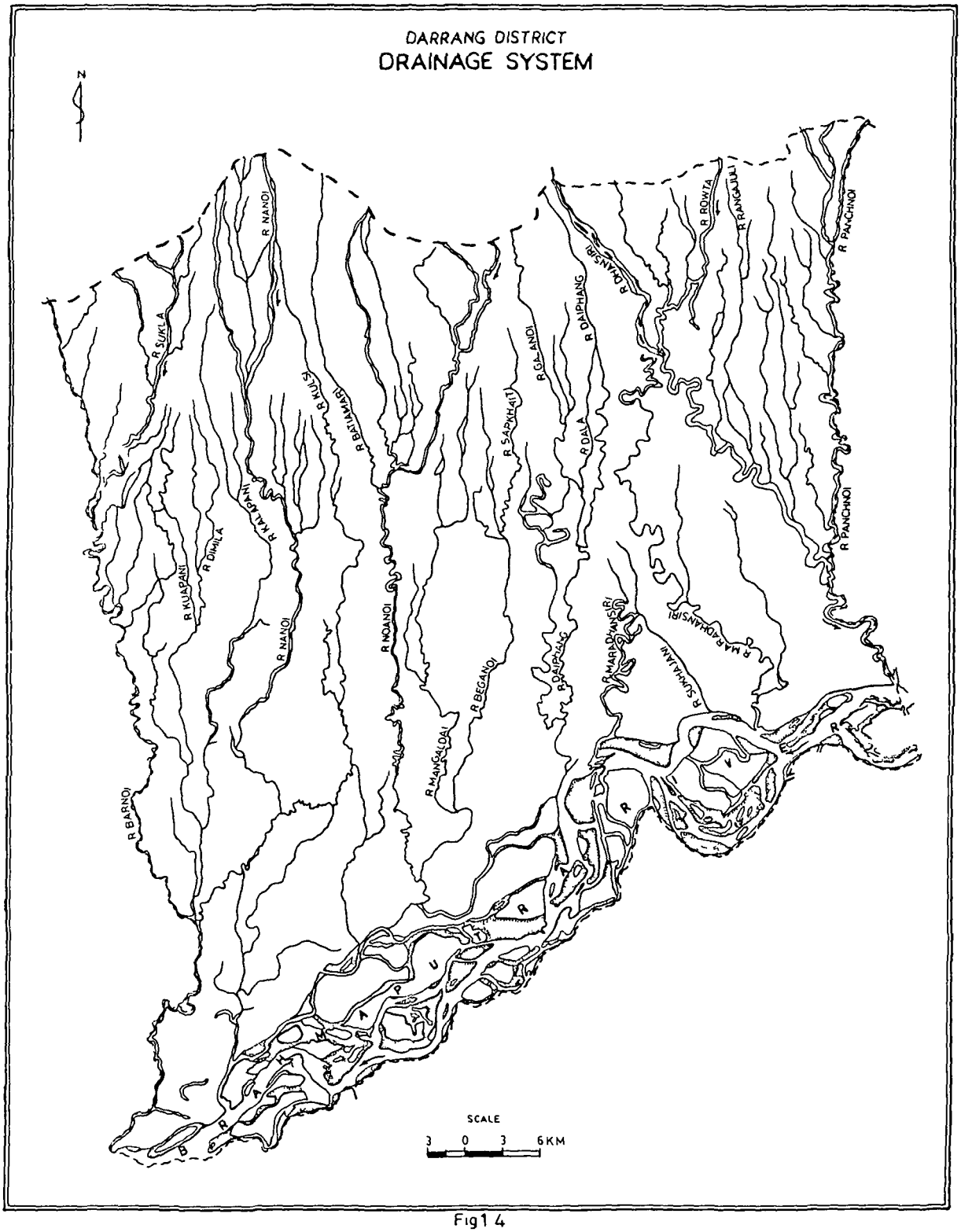

DARRANG DISTRICT
DRAINAGE SYSTEM
N
R SUKLA
R NANOI
R KUAPANI
R DIMILA
R KALGANI
R NANOI
R KULSI
R BAMARI
R BARNOI
R NOANOI
R MANGALDAI
R BEGANOI
R SARUKHAITI
R GA-ANOI
R DAIPHANG
R DALA
R DAIPHANG
R MARADHANSIRI
R MARADHANSIRI
R SUKHALANI
R PANCHNOI
R PANCHNOI
R ROWTA
R RANGAJULI
SCALE
3 0 3 6KM

Fig1 4

tions of seasons. Heavy summer monsoon rainfall is followed by draught condition in winter season. More than 75 per cent of the annual rainfall occurs between the months of May and September. The cool season starts from December to February and little thunder storms begins from March to May. Generally, the monsoon season begins from June and ends in early part of October. October and November constitute the post-monsoon season in the area.

The average annual precipitation is recorded about 1943 mm(average of the last 15 years). From the general observation it can be noted that the northern parts of the district gets substantially higher rainfall than the southern parts. The range of the maximum temperature varies from 33°C in May to minimum 24°C, i.e., recorded in January. While, minimum temperature goes upto 10°C in the month of December. Likewise, the highest relative humidity is recorded in the month of September (86%) and the lowest is recorded in March because of less rain and normal temperature.

(e) Socio-Economic Conditions :

It is generally understood that any policy for development must try to utilise the inter-relationships among various socio-economic amenities/facilities in relation to space. Large

portions of our rural areas are deprived of many basic amenities due to one or á combination of factors related to social as well as historical constraints. In the context of development of socio-economic conditions, the locational aspects become extremely important. An understanding of functional inter-relationships in space therefore, is very much essential towards the development of socio-economic conditions of an area.

The district Darrang which is situated on the northern bank of the Brahmaputra river in Assam has been taken into consideration for testing the validity of the facts, and its major socio-economic conditions of the area. In general, the district though is primarily formed of alluvial soils of the Brahmaputra river where agriculture is the main dominant activity, the entire socio-economic structure is extremely weak and are concentrated on a few locations only for which the local resources cannot easily be utilised for the development of the area. As a result, the rate of development in the district may be observed very slow rather than the rate of development of the other parts of the plain areas of the country. It is obvious that the socio-economic amenities/facilities in the district are comparatively lesser than the other parts. For instance, more than 85 per cent of the total working force of the district is engaged in primary

sector mainly in agricultural activities. While, only 2.63 per cent working force is employed in secondary sector, i.e. very weak in the district. Therefore, the main emphasis should be given to develop the facilities related to agricultural activities. On the other hand, rate of literacy in the district is also very low, i.e. 20 per cent only (1971 figure). Thus, the educational facilities are also required in the area. One important striking feature of the socio-economic setup of the district is that, the dependency ratio in the district is very high, i.e. recorded 2.58 in 1971. It means, 258 persons are dependant on 100 workers in the district. It may be because of fast growth of population in the area. The greater share of children's population in the demographic composition of the district is increasing the dependency ratio. Thus, the children population requires educational facilities which is very less in the district.

Under such situation, therefore, there is a need of describing the locational patterns of socio-economic conditions for overall development of the area. Infact the whole systems of process of development in the district should be changed in order to avail these existing amenities/facilities in orderly manner. It is highly noticeable that the road communication for instance, remains almost cut-off during rainy seasons in almost all the area except the National High way and State High ways.

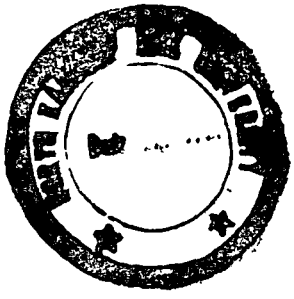
In the district, transport technology is not adequately available, even if it is available, it is not frequently applied because of insignificant number of extension services, finance and marketing facilities and so on. The availability of technology, research and demonstration on the local basis to facilitate adoptions are highly required in the district.

(f) Historical Background :

The name of the district Darrang appears to have originated from the term 'DARRANG RAJA' specifying a branch of Koch King who ruled over this area since the time of Koch King Narayana. According to D. Sharma, Balinarayana who was known as Dharmanarayana was the founder of the Dynasty of Darrang Raja (District Gazetteers 1978). It is also revealed that the Darrang district derives its name from the western part which was formally under the rule of 'DARRANG RAJA'(Gait 1967). A similar interpretation has also been given in the Census Report of 1961 as follows, "The present name of the district Darrang may have been borrowed from the 'Daflas' or the 'Bhutias' whose main 'Duar' or 'Pass' for coming to the plains from the Himalayan ranges lay along the course of the Darrang river, and they called it Duar-Ganga which after assumed to the present form of Darranga or Darrang" (District Gazetteers 1978).

Earlier, the district Darrang was the whole unit incorporating 12 Police Stations with the total area of 8775 sq.km. But recently it has been divided into two parts (Darrang and Sonitpur Districts) and at present Darrang district itself includes 10 Police Stations (With the new Police Stations notified after division) with the total area of 3465.3 sq.km. (1989-90 figure). For the present dissertation writing however, these total of 10 Police Stations have been considered as 6 Police Stations (On the basis of 1971 census) so as to eliminate the anamolies in the analysis and for the comparison of 1971 and 1991 data sheets.

At present Darrang District has six Development Blocks, Ten Police Stations (But considered as Six Police Stations), Nine Circles, Twenty seven Mauza and a total of One thousand three hundred and fortyfive(1345)Revenue Villages (1989-90 figure). These Blocks were constituted between 1952 and 1961. Udalguri and Mazbat Community Development Blocks were created in 1952, while the remaining Blocks were created between 1957 and 1961. Of the six existing blocks, Udalguri and Khairabari blocks are dominated mostly by the tribals, while other remaining Blocks are dominated by Non-tribals and Immigrants.



OBJECTIVES :

By taking into account the above points of socio-economic setup of Darrang District (Assam), proper attention is focussed on the following objectives.

They are :

(i) to describe the resource structure (both natural and human resources) of the area,

(ii) to highlight the distributional patterns of socio-economic facilities,

(iii) to find out the functional hierarchy and its locational patterns for identifying the main nodes in the study area, and

(iv) to suggest new nodal points and facilities for decentralizing the spatio-functional set up.

It is obvious that, above objectives are mainly related to the resource structure and locational setup of the socio-economic facilities of the area. Infact, resource structure and spatio-functional organisation of any area are inter-related and interdependent mutually (Hermansen 1971).

RESEARCH QUESTIONS :

The following research questions in relation to the above objectives are proposed to be investigated in the course of the present study.

(i) What are distributional patterns of socio-economic facilities and how they are related to the resource structure of the area?

(ii) How the nodal centres are emerging in the area in relation to its socio-economic background?

(iii) What ought to be the locational patterns of nodal centres?

METHODS AND DATA BASE :

To give the answer of the first question, the distributional patterns of socio-economic facilities and the resource structures of the area have been described. Due to plain topography and favourable agro-ecological conditions of the area, agriculture and its allied activities are dominant. Therefore, it is expected that, the functions related to agriculture would be prominent in the area. On the other hand, if we consider man as a resource, the population requires some social and economic facilities for the balanced development of the area. The human resources are described by taking into account the

occupational structure and demographic feature of the area, so that the required facilities for proper socio-economic development may be proposed. The simple cartographic tools have been applied for inferring the results related to the resource distribution. The distributional maps of the physiographic conditions and demographic structures of the area are prepared to understand the areal variation. On the other hand, by considering the main socio-economic facilities (namely, educational, medicals, postals, markets, administratives, and others) their availability and intensity have been interpreted police station wise. And then, the related picture of the resource distribution of these socio-economic facilities is highlighted to find out the causes of the areal variation.

The second question is directly related to the aggregation of these facilities and functions especially to identify the nodal centres and to study the functional hierarchy. Although various statistical techniques have been adopted for the measurement of functional performance and centrality criteria of the nodes where these facilities exists. Mishra and Sundaram(1980) also described methodological aspects for spatio-functional setup for micro-area planning giving the arbitrary weightages to each and every facilities/functions for aggregating their strength. Moreover, Bhat and others (1976) have applied statistical techniques for the measurement of the centrality of the main centres

of Karnal area of Haryana. They gave the weightages to the facilities/functions according to their areal strength and emphasized that lesser the number of centres having facilities/ functions in the area have greater importance and vice versa. This criteria is helpful for analysing the areal locational patterns of socio-economic conditions of the area. The same criteria has been applied in the present study for calculating the centrality scores of the nodal centres.

The functional nature of these nodal centres is analysed by distinguishing them into four orders for 1971 and 1991. The emerging patterns of those centres are studied by finding out the differences of the centrality scores. The nature of distribution of these centres is interpreted by preparing the scattered diagrams. The rank-size regularity which indicates vertical cross-section of the distribution is shown by applying Zipf's formula *. It would provide the results related to the unifications or diversification in the vertical distribution

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* According to Zipf(1949) : rank - size regularities evolving in the distribution of town-size are logarithemically marked as :

$$Pr = P_1 (r^{-q});$$

Its linear form is

$$\log Pr = \log P_1 - q \log r,$$

Where Pr = population of the centre ranked r;

P_1 = largest population of the centre where r=1;

Q = constant

of socio-economic facilities. The general patterns of the settlements/points are analysed by applying Nearest Neighbour concept given by Clerk and Evans (1954). Furthermore, the general distribution of socio-economic facilities have been shown by various graphs and diagrams.

The sources of information for this dissertation are exclusively on secondary sources. Nevertheless, there exists a wide variety as each aspect in such a spatial frame of study as this requires a separate base. The geographical personality of the area is described with the help of distribution maps for which base map is taken from district census hand book, Darrang district, 1971 (it is based on Survey of India). Similarly, for the historical aspects, gazetteers have formed the base. On social and economic aspects, the census of India, particularly, District gazetteers, District economic Statistical hand books, Provinsional population totals(paper -1 of 1991, series -4) and District status papers etc. have been the analytical base. Most of the informations have however been collected by the author by visiting various related offices which have become the primary source of latest informations. The latest maps have been collected from the related offices like, P.W.D., Engineer division at District headquarter especially for the latest route map.

However, because of lack of latest population records and statistical accounts regarding the facilities/functions and their locations, for the present study, 1971 census has been considered as analytical base especially for the population figure. Further, for the analysis of other facilities/functions like, socio-economic and functional hierarchy as well as their centrality criteria, various necessary informations have been collected from concerned department considering upto 31st March 1991.

CHAPTER SCHEMES :

The entire material is arranged systematically into Five Chapters. First chapter deals with the introduction, conceptual background, statement of the problems, objectives, relevant research questions, methods and data base and design of the study. Chapter second incorporates the geographical background and resource personality of the study area. While Chapter third deals with the distribution of socio-economic amenities/facilities and its areal variations over time. The changing patterns of socio-economic setup is described by considering 1971 as base year and 1991 as current year. Chapter fourth includes the functional organisation and centrality patterns in its spatial setup. The horizontal and vertical cross-sections of functional organisation over time have also been discussed in this chapter. In Chapter fifth, decentralisation process and some suggested measures for future growth of the socio-economic facilities and the main findings and conclusion of the present study.

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C H A P T E R - II

RESOURCE PERSONALITY

CHAPTER - II

RESOURCE PERSONALITY :

The bountiful resources are the gift of nature. They are the bases of both security and opulence; they form one of the primary assets to the nation's economy. They are infact the result of human culture; the materials of the physical environment become resources only when they fulfil a human want or need....."Natural" resources, therefore, exist only in conjunction with human culture.

Many studies on resources have largely been made by Economists and other Scientists, especially, by Geographers, yet there exist a number of misconceptions in identifying resources with substances or tangible things and invisible or intangible aspects - such as knowledge, social harmony and health etc.

Dictionary defines of the word "Resources" as (i) that upon which one relies for aid, support or supply; (ii)means to attain given ends and (iii) the capacity to advantage of opportunities or to extricate oneself from difficulties.

Evidently, resources presuppose a person. They are an expression or reflection of human apprisal. The apprisal finds that something conserve as means to given ends, that one can rely on it for aid, support, or supply. The resources do not necessarily exist outside the appraiser but can be lodged within him. Evidently, there are subjective or internal resources as well as objective or external resources.

Zimmermann (1951, p.15) defines, "Resources are not _____ they become". It is infact, 'cultural appraisals' (Saver, 1952). These "Resources are living phenomena, expanding and contracting in response to human effort and behaviour..... To a large extent, they are man's own creation" (Peach and James, 1972), Natural resources could refer to all living and non-living endowment of the earth but the traditional use confine the term to naturally occuring resources and systems that could be under plousible techno-economic, socio-environment and ecological circumstances. On the other hand,'Resources' we mean by natural resources are those mineral areas or living things considered useful or of particular value of human culture. Thus, the word "resources" does not refer to a thing or a substance, but to a function that a thing or a substance may perform"(Zimmermann, 1951, p.9). In other words, "resources" is an expression or reflecting human appraisal and relating to a function or operation. A diversity of resources, infact, may lead to variety of skills and encourage a complex division of labour(Ackerman, 1960).

According to Stringer and Davies (1966), resources are primarily classified as :

(a) Natural resources

(b) Human resources, under which both Abiotic(Non-renewable) and Biotic (Renewable) resources are classified ..

All the materials, elements and forces of the natural environment which man adopts to his own ends are called "Resources". Natural resources include soils as a basic resources; Minerals such as natural oil, coal, iron ore, gold, uranium, rocks of economic value, forests and natural grasses, animal life, fish and water.

Human resources, on the other hand, are divided in two ways - first, by a study of the actual quantity of the population and secondly, by a study of the quality of population. A quantitative assessment includes the total population, the distribution, density, age groups and sex structure, class structure and the actual percentage of working population. Whereas, a qualitative assessment includes consideration of personality, education, skill, enterprise and ethical values, all of which affect the economic development of a country or a region to a certain extent.

On the basis of distribution, amount, and frequency of occurances Zimmermann (1951, pp.80-81) classifies the resources as :

(a) Ubiquities - occuring everywhere such as, oxygen in the air,

(b) Commonalities - occuring in many places, such as tillable soil,

(c) Rarities - occuring in few places, such as tin, zinc, iron etc, and

(d) Uniquities - occuring in one place.

However, according to geographical classification, resources can be classified into three broad categories, These are :

(a) Natural resources,

(b) Land as a resource, and

(c) Human resources.

Natural resources are those materials or elements which are readily available in the natural environment, such as, soil, water, forest, wild life and minerals.

If piece of land, which includes the various environmental conditions on which quality of land is assessed, and considered as resource, the general land conditions and human interactions with them like agricultural, industrial and other activities of man for his better way of living are to be studied for understanding the existing use of available resources. The land potential of an area is also important for proposing balanced development and expanding interaction intensity through balanced spatio-functional organisation.

Human resources are both the most dynamic and the most potent, they are also the precious because, they combine the task of production agent with the end object of the entire process of development. They constitute the end values to be achieved in the process. For skill labour, educational, medical, postal and communication facilities are essential to study.

Though the study on resources has largely been made by many economists, and geographers specially on resource distribution, yet the methodological aspects in the study of resources have changed in the recent past. The study on resources in the early centuries were confined mainly to its identification and consumption only. That time emphasise were not given to their utilisation, evaluation, conservation and management in relation to man and its environment and consequently,

the development processes were never realised. The significance of the multi-dimentional nature of the development phenomena was not adequately recognised until rather recently. In the recent past, the study on resources got a new dimension in the methodological approaches. It was felt that planning of natural resources is the only solution to multi-pronged agro-economic problems and their role in the economic development. Therefore, there is a need to change the methodological approaches towards understanding the role of resources and the factors that are needed in planning and decision making processes for the balanced economic development in a region. Further, this approach highlights the emerging eco-crisis and need for conservation of resources. It helps us to understand the importance of relations between man and his activities and further helps us in understanding the existing basic resources with references to its description, analysis, utilisation and conservation.

In the present chapter, the resource personality of the district is described in detail for preparing the spatial strategy of the resource utilisation.

A. NATURAL RESOURCES

On the basis of resource availability in the study area, it can be explained in the following manner :

(a) Soils :

Soil as a renewable resource is comprised of organic materials and inorganic components such as weathered rock particles along with water, and gases, mainly oxygen and nitrogen. It provides the home for bacteria, fungi and a variety of other organisms, as soil is the craddle of all crops and plants play the utmost importance and helps in the development of the society. Both in agricultural as well as in economic activities, soils rather their types provide the bases for development. Soil is also important for all types of planning. Soils and their properties are also influenced directly by topography, geology and climatic conditions of the area.

Man as an active user of soil may use the soils with the purpose of obtaining profit and many a time without carrying much about its future fertility. The importance of soils has now been realised and, therefore, keeping the soils in sound health is the primary concern of the farmers and soil scientists all over the country.

The soils of the whole Darrang district is constituted by alluvial materials. The rivers and its important tributaries have been carrying out various kinds of soil materials from the Himalaya and depositing them on the foot hills to the river Brahmaputra. On account of the proper situation of the Darrang district in between the Himalaya foot hills in the north and the flood plains of the Brahmaputra river in the south, the northern side of the district is primarily constituted by humid soils of big boulders and stones brought down by the rivers and its tributaries which are neither suitable for cultivation nor plantation, but are suited for growing luxurious vegetation. Geologically, the district is formed of alluvial deposits of the Brahmaputra and its significant tributaries. They may be classified into three groups :

(a) Recent alluvial

(b) Old alluvial(Riverrine) and

(c) Old alluvial (Mountain Vallies).

The first group of soils is confined to the low lying tracts of the flood plains. These soils vary from sandy-loams to silt and clay loams, having less acidic contents and are suitable for the cultivation of rice, jute, pulses, mustard seeds, onion, etc. Phosphate, potash and calcium are the main contents of these group of soils. The old alluvial soils are

found at tracts where the areas are free from floods. These are confined mainly to the southern and eastern sides of Mazbat Thana and middle part of Kalaigaon Thana. Rice, sugarcane, fruits and vegetables are the primary crops grown in these group of soils. The red soils which are red-yellow loam are found scattered on the sloping hill sides and differ greatly in fertility, but has generally low fertility ratings. Crops like maize, tapioca, pine apple and fruits are the main crops grown within these type of soils. Due to the varied soil conditions, the northern part of Paneri Thana and mostly in northern part of Mazbat Thana are occupied by tea plantations. However, agricultural activities has occupied the maximum portion of the land area in the district.

(b) Water Resources :

Water as a natural resource is one of the most essential resources for man. As a physical substance, it is unique in a number of respects and is quite indispensable for the existence of life on the earth. To a large extent, the economy of the nation depends on the availability of water resources. It is not merely a chemical composition of H_2O in scientific terminology, but in its natural conditions, physical properties, types and quality and movements etc. exhibit a complex relationships. Water is found in various aggregatory, liquid and in moisture conditions which occur in different forms in different timings.

As it is one of the basic resources, it is a most important factor for development and growth of plants, fertility of soils and for agricultural production. Availability of water and application of right quantity of it at the right time are vital for profitable results from agriculture. Because of humid climatic conditions of the study area, sufficient water is available for agriculture. Underground water is also easily accessible for proper utilisation because water-table is very high. More than 60 per cent water is run off through local channels, regular streams and main rivers in the area.

It is, therefore, hardly necessary to state that, water is one of the most important element for all kinds of lives. In view of the importance of water and its better utilisation for agriculture, development of irrigation has become an issue of inescapable importance in Indian planning. Many developmental activities, management processes of the nation has to depend on water resources. As a renewable resources, it has been utilising for multidimentional activities, such as, agriculture, industries, means of transportation, generation of power, and above all, daily uses of human beings. Both surface as well as underground water resources are of immense use in a number of respects.

There are as many as five main streams and its significant tributaries in Darrang district (Fig. 1.3) which are equally the main sources of agricultural activities and human activities or survival. The entire district though is compact with the net work of streams and tributaries, one can hardly find that except one or two main streams, other streams remain almost dry during winter season for which the district has very limited and minimum water facilities. The source of water in the district is perennial in nature, but seasonal in function. The scope for taping water from these tributaries has almost been exhausted. Here the general climatic condition is humid (Table - 2.1).

The maximum temperature in the district can be recorded during the months of April to September which ranges from 30°C to 32°C. Minimum temperature is high during the month of August (26°C). Four rainy months, May to August received more than 70 per cent rain water of the whole year. As a result, the flood conditions can be seen during rainy season. It is because of runoff conditions. Mangaldai Sub-Division is, however, rich in under ground water which is used for drinking and irrigation water purposes. The surface water logged in different places creates maximum potentialities for development of fisheries. The water resources of this district are utilised through D.T.W. and lift irrigation system. The main irrigation project of the district is

Table - 2.1 Monthly Mean Temperature, Average Rainfall and Relative Humidity at Mazbat Station(Darrang District), 1989.

Month	Temperature(^{O}C) Max.	Min.	Rainfall (in mm)	Relative Humidity (in %)
January	24	11	15	71
February	25	12	45	74
March	30	17	47	63
April	30	20	141	69
May	33	23	230	74
June	32	24	454	81
July	32	25	378	85
August	33	26	212	85
September	31	25	278	86
October	31	22	49	86
November	27	16	19	79
December	26	10	11	72
Annual	-	-	1879	-

Source : Statistical Hand Book, Assam, Directorate of Economics and Statistics, Govt. of Assam, Guwahati, 1990, Tables - 2.01, 2.03 and 2.04.

Dhansiri Irrigation Project at Bhairabkunda near Bhutan. Here the immense potential for irrigation has greatly benefitted the agricultural activities.

(c) Forest Resource :

Forests are another land-based natural resources, providing such things as fuel, timber, paper wild life habitates and recreation. Forest resources are recognised as a renewal natural resource. The forests constitute a powerful ecological unit having vital environmental significance. They influence local and regional climate by moderating the same, maintaining soil mantle, purifying air and helping in ensuring continuous flow of clear water. It can therefore, be considered as the most crucial life support system as they consume water and soil on which food production depends in the region.

Prior to 1947, the area under forests was substantially higher. But during post 1947 period a large scale movement of population (Immigrants) has been recorded who cleared the forest cover in the district for settlement and for cultivation. Area under forests also declined due to population increase and there by intensifying the pressure on land.

The main forest belt is situated in the sub-montane tract at the foot of the Bhutan on the boundary of Darrang district. The Noanadi, Orang, Rowta are the main Reserved Forests found in the district. There are six important types of forests found here as :

(a) The Evergreen and Semi-evergreen forests,
(b) The Mixed Decidous forests,
(c) The Sal forests,
(d) The Riverine forests,
(e) The Savanna (h) forests, and
(f) The Bamboo and Cane forests.

Evergreen and Semi-evergreen forests flourish in alluvial soil having capacity to retain much water. Such forests are found in the Rowta Reserved Forests. Mixed Deciduous forests are found in the Bhairabkunda Reserved Forests and south-western part of Rowta Reserved Forests. There is no compactness under Sal forests. These forests are hardly found in the district except in some reserved forests areas. Riverine forests are found along the bank of the rivers on the alluvial soil, throughout the district. While Savanna (h) forests are found in the Orang, Rowta Reserved Forests areas of the district. Bamboo(Forests) are well marked all over the district. These are used for fire as well as for the construction of houses especially in the

rural areas where economic conditions and the processes of development are very tardy. Cane forests are found throughout the whole evergreen, semi-evergreen and mixed deciduous forests. The total area occupied by such type of mixed forests in the district is 1597.53 sq.km. (1988-89 figure).

(d) Mineral Resources :

Availability of minerals provides a base for the economic development of a country. Minerals are require to make tools, machines, and raw materials for manufacturing various consumer products. For rapid industrial development, modernisation of agricultural as also for modern living the significance of minerals cannot be overstated. From the angle of modern industries, the vital ones are coal, petroleum, and iron ores. Many others like ores of manganese, chronite, alluminium, copper, lead, zinc, phosphates, potash are no less important.

Being almost entirely covered by a vast alluvial tract, the district does not possess any minerals of much economic value, except for the alluvial clays, sands, gravels and boulders and the gneissic rocks in the isolated hillocks which provide suitable construction materials. Boulders of quartzite, gneissic and hard sand stones and slates form conspicuous deposits alongwith the main Himalayan rivers and their tributaries

or branches in the northern parts of the district. The deposits are suitable for road construction, railway ballats and in embankments. The gneisses expost in low hillocks in the southern parts make excellent building stones.

The alluvial sands in small pockets along the courses of the Dhansiri, Naonoi and other important tributaries of the Brahmaputra are found suitable for use in house constructions. This bands of dark grey and reddish brown somewhat steaky clays, found in small pockets along the courses of some of the rivers may be suitable for brick making and potteries (District Gazetteers, 1978).

Tertiary sand stones which are found along with the Himalayan foot hills and nests of lignite formed due to alteration of drift wood enclosed within the sand stones.

B. LAND AS A RESOURCE

Land as a renewable resource may be assessed in many ways. The basic determinants of what makes land a resource are found in the composition of soils and the environmental conditions. The land resource as a composition of soils are of great importance in landscape ecology and forms the basis for all planning in agriculture and forestry. Infact, the agricultural activities and functions related to the forests are directly associated with the land resources. Specially in the study area, the favourable soils, water and climatic conditions intensify the resource availability and its capability for its further uses. The study of land resources of the Darrang district can easily be done by interpreting the conditions of the general landuse and specially of the agricultural landuse, so that the main functions related to the agriculture and other associated activities may be identified for balanced spatio-functional organisation of the study area. The following passages analyse the main characteristics of landuse of the district.

(a) General Land Use :

The general land-use patterns have significant characteristics. The land-use patterns of any region are the outcome of geomorphic features, climatic variations, pedological differences, and socio-economic conditions, (Ali, 1984, p.32). In a given milleu, man as an active agent modifies the landscape and uses it to fulfil his needs and the types of living which are prepresented by social values and certain institutional controls tends to create different patterns of land-use within the limits imposed by different agro-ecological situations. The impact of physical factors is interwoven with socio-economic conditions from which the farmers cannot easily be spared for geographical investigation of contemporaneous land-use patterns and changes therein (Ali, 1984. p.34).

It is therefore worthwhile to define the various categories of land-use and their significant characteristics. According to Agricultural Census of India, the land as geographically accessible for major use is classified into nine broad categories, namely, Forests, Land under non-agricultural uses (like Settlements, Ponds, Lakes, Streams, Roads, etc.). Barren land, Permanent pastures and other grazing land, Land under groves and gardens, tree crops; Cultivable waste land; Fallow land (Current as well as other than fallow) and Net area sown.

But in Darrang district, five are the important categories under which most of the land is being utilised.

The details of land-use patterns of Darrang district have been explained under the five broad categories :

(i) Net area sown
(ii) Land not available for cultivation
(iii) Other cultivated land
(iv) Fallow land and
(v) Forest land.

On account of plain topography, favourable soil and climatic conditions of the study area, more than half of the total geographical area of the Darrang district is under cultivation. The Table -2.2, which depicts the changes in the General land-use conditions for the 20 years of time(1960-61 to 1980-81) reveals that Net sown area has been increased from 43.0 per cent in the early 1960's to 59.0 per cent in the early 1980's. On the other hand, there seems a gradual decay in the area under the category of Land not available for cultivation (which includes pastures and waste land) and in the Fallow land also.

Table - 2.2 : Changing Patterns of General Land-use in Darrang District (1960-61 to 1980-81)

(Area in ha.)

Land-use Categories	1960-61		1970-71		1980-81	
	Area	%	Area	%	Area	%
1.Net sown area	1,39,368	43.00	1,70,889	54.00	1,88,178	59.00
2.Land not available for cultivation	55,764	18.00	53,201	17.00	51,910	16.51
3.Other cultivated land	63,308	20.00	51,985	16.50	45,085	14.01
4.Fallow land	39,382	13.00	22,709	7.00	15,861	5.00
5.Forest land	20,283	6.00	17,121	5.50	17,121	5.48
Total	3,18,105	100	3,18,105	100	3,18,105	100

Source : Block Development Offices, Darrang District, Assam

It is observed from the above Table 2.2, that the forest area has also been declined marginally during the last two decades (during 1960 and 1970). Increasing area under cultivation indicates the agricultural intensification and changes in the cropping patterns. Infact, crop-intensity* has been increased nearly 12.00 per cent from 134.36 per cent (1960-61) to 146.25 per cent (1980-81) in the Darrang District (Table -2.3).

Table - 2.3 : Cropping Intensity in Darrang District (in per cent)

Years	1960-61	1970-71	1980-81
Darrang District	134.36	140.37	146.25

Source : Block Offices and Mangaldai Statistical Offices, Darrang.

* Crop intensity is calculated by dividing Gross cropped Area by Net Sown Area of the District. It is formulated as,

$$I = [(GCA/NSA)] 100$$

where I = Crop intensity (in %),
NSA = Net Sown Area and
GCA = Gross Cropped Area

Obviously, crop-intensity is increased by intensifying the functions and facilities related to agricultural technology. Thus, agricultural activities are playing significant role in the socio-economic setup of the district. The detail study of agricultural phenomena is although not the aim of the present study, however, the inherent characteristics of agricultural structure of the area is essential to interpret, so that the locational systems of the area can be described in this connection. The inherent agricultural characteristics are described under agricultural landuse as follows.

(b) Agricultural Landuse and Crops :

The district Darrang like other parts of Assam produces a variety of crops. These crops are mainly food crops, fibre crops, oil seeds, pulses, sugarcane, fruits, vegetables etc. among which food crops is the dominant crops. Among the food crops, paddy occupies the maximum area of land. During the early 1960's the lands occupied by paddy cultivation was more than 69.26 per cent in 1980-81. While wheat occupied 0.09 percent in 1960 and 2.10 per cent of the total cropped area in 1980-81. On the other hand, Maize occupied 0.13 per cent and 0.57 per cent in the respective years. Both winter rice and summer rice and spring rice (Boro) are grown in the district.

Among the fibre crops, Jute is the most important fibre crop which is grown mostly for commercial purposes. The land area occupied by these crops was 7.17 per cent of the total cropped area in 1961. But in the last decade the area under these crops decreased to 5.75 percent. Other fibre crops are almost insignificant as compared to jute. Apart from main foodgrains, oil seeds like rape, mustard, seasamum are found occupying quite a big land area in the district.

The total area occupied by rape and mustard oil seed crops were higher than the area occupied by wheat and maize in both the decades. According to 1960-61 figures, Rape and Mustard occupied 6.93 per cent of the total cropped area and 8.15 percent in 1980-81. In the district, varieties of pulses are also grown in both kharif and rabi seasons. Important pulses like - Blackgram(Matikalai), Greengram(Moang), Lentil(Mosur) are also grown. The area occupied by these pulses were about 5.85 per cent of the total area in 1960-61, but decreased to 4.21 per cent during the last two decades.

Although the district Darrang has limited area of land for the cultivation of sugarcane, it occupied only 1.02 per cent and 0.96 per cent of the total cropped area in 1960-61 and 1980-81 respectively. Varieties of fruits like banana, orange, pineapple,

lemon, coconut and mango etc. are also grown in the district. The total area occupied by fruits in the district was 4,376 hect in the last few decades. About 2.35 per cent of the total area under these fruits in 1961 and more than 2.80 percent of the total cropped area was put to fruits in 1981. Most of the fruit cultivation is found adjoining to the settlements.

Varieties of green vegetables are grown in both the seasons. Of the total cropped area occupied by vegetables were 2.44 percent and 2.15 per cent in 1960-61 and 1980-81 respectively.

(c) Cropping Pattern :

Cropping pattern denotes the proportion of the area under different crops at a particular period of time. The gross area under crops in the district increased from 1.88 lakh hectare in 1961 to 2.75 lakh in 1981 i.e. 46.28 per cent increased over the last two decades. The existing main cropping pattern of the district are :

(i) Paddy - Paddy
(ii) Paddy - Mustard, Pulses, Vegetables, Wheat,
(iii) Jute - Mustard, Pulses, Vegetables, Paddy and Wheat,
(iv) Paddy - Fallow.

The cropping patterns changed in Darrang District due to the importance given to food grain crops that occupy a maximum hectarage in relation to total cropped area. Within the district, rice is the dominant food crops. In 1981 out of the total cropped areas, food grains alone occupied 1.98 lakh hectare (72.00%) of the total cropped area. Whereas in 1961, it was 1.30 lakh hectare (69.16%) only. Other crops like oil seeds covered 9.14 per cent and jute 5.80 per cent of the total cropped area. On the other hand along with the changes of cropping patterns, the productivity of these crops also changed dramatically during the last two decades. Oil seeds fruits decreased from 15.82 per cent to 12.00 per cent in 1960-61 to 1980-81.

The District has mainly three varieties of rice, These are :

(i) 'AHU' (Summer rice) (ii) 'SALI'(Winter rice) and (iii) 'BORO' (Spring rice).

The principle kharif crops grown in the district are rice, maize, sugarcane, vegetable, oil seeds, and others. Nearly three-fourth of the cultivated land is put to cultivation. Amongst the principal kharif crops, rice is the most extensively cultivated crops in the district. Nearly 95 per cent of the population depend on rice.

'AHU' the summer rice is mainly sown in the month of February to April and harvested during the month of May to July. Whereas 'SALI' the winter rice (transplanting rice) cultivation is carried out in three different ways and transplanted during the month of June and July and is harvested during September to December. It covers an area of 1.8 lakh hectare of the total cropped area in the district.

'BORO' the spring rice is usually cultivated by transplanting method in the months of December and January and harvested in the months of March and April. About 0.03 lakh hectare of land has been put under this crop.

Rice covered 71 per cent of the total cropped area during 1960-61. Due to the population pressure on land, the area put to rice has been increased gradually. Other staple food of the district like maize, and cash crops like jute are almost equally cultivated in the district. Maize is mostly cultivated in the northern and north-eastern part of the district where soils are well drained, and is sown in early or middle part of June and September, October is the harvesting month. The area covered by maize increased from 0.13 to 0.57 per cent during 1960-61 to 1980-81. Jute cultivation however, decreased from 7.17 to 5.75 per cent during 1960's and 1970's. It may be noted here that the decrease in the area of jute cultivation may be due

to the fluctuation in the market price and requirement of more labour force for weeding, harvesting and rating processes of the crops. Very little land area is however put to sugarcane cultivation. The percentage share of sugarcane area to the total cropped area also marked decreased from 1.02 to 0.98 per cent during 1960-61 to 1980-81.

The district also simultaneously cultivates some of the important Rabi crops. These are wheat, pulses, rape and mustard seeds, potato, sesamum and vegetables. Amongst the important rabi crops, wheat is the dominant and most extensively cultivated in the district. Due to the rapid increase of population in the district, the process of growing alternative cereals food has become important to the peasants. The indegeneous people though were not habituated taking wheat cereal has become second primary staple food after rice. In the early 1960's, it occupied only 0.09 per cent of the total cropped area. But the area under wheat has been increased to 2.10 per cent in the last decades. The high concentration of wheat cultivation is found in Dalgaon, Mazbat and Kalaigaon areas which indicates that the area is mostly dominated by the high concentration of non-tribals and immigrants.

Over the last two decades, major pulses like black gram(matikalai), green gram(Moung), pea and lentil(Masur) were also cultivated in the district though very insignificantly. But the percentage of area to total cultivated has been decreased from 5.83 to 4.20 per cent in the same period of time. While the area occupied by rape and mustard seeds was increased from 6.93 to 8.20 per cent during 1960-61 to 1980-81. Other crops like fruits, vegetables, sesamum etc. are however grown throughout the district. The area under these green fruits, vegetables, and others is also marked increased from 2.35 to 2.79 per cent in 1960-61 to 1980-81 because of increasing its local demand.

C. HUMAN RESOURCES

The study of human resources is important not only from the point of view of economic welfare but also because of the fact that human beings are both ends and means for economic activities. At one end the number of human being is an asset and on the other, they are liability too, if the number of people is beyond the capacity of the economy to sustain. Obviously, it is essential to know about the size of population in a region at particular time, its growth rate, composition and distribution.

Human responses are no more less significant in deciding the general layout of any resource and its distribution. It plays vital role in shaping economy of a country in a particular direction. To this fact, population, in its manifestations of sex ratio, occupational structure and as a labour force (for industries and more particularly for agriculture) is considered an important element. Agriculture as a largest occupation depends upon the irrigation which is manned by human and animal power, constitute a vital link in the economic development of a region. Human resources are either directly or indirectly related to the capacity of labour force of an area. The skilled labour which can work efficiently is directly related to the educational and medical amenities/facilities available in the area. Therefore,

a proper planning of the locational setup of these facilities are important to study in relation to the population characteristics. Thus, population characteristics of the Darrang district should be described in detail.

(a) Population Characteristics :

Although the district as a whole has an area of about 3465.3 sq.km., is accounted for about 5.77 per cent of the total population of Assam, i.e. 1286633 persons out of 22,294,562 according to Census 1991. Earlier, according to 1971 census, Darrang District had a total population of about 8,34,574 as against to State's total population of about 1,46,25,152 persons. Here the main concentration of population as per 1971 census are found in Mangaldai thana, Paneri thana, Kalaigaon thana, and Dalgaon thana. But according to the census of 1991, the main concentration of population are found mainly in four emerging towns, namely -Mangaldai, Kharupatia, Tangla, and Udalguri(Town notified after 1991). Among the six considered Police Stations for the present study. Mangaldai being the Head Quarter of the District and an urban area shows the highest concentration of population.

(i) Growth and Density of Population :

The density of population though varies from Thana to Thana and from Block to Block, the District on the whole had 241 persons per sq.km. in 1971 which has increased to 370 persons per sq.km. in 1991. On account of rapid increase in density, the district has even much higher population density than the State's density (284 per sq.km.). In 1901, the district showed sparsely population figures except in the central part of the Mangaldai Thana. But in the present year, it has geared up and become quite densely populated area of the region. Roughly speaking, almost all the Thanas except in some of the major town areas namely, Mangaldai, Kharupetia, Tangla, showed very sparsely distribution of population in the last few decades. In 1971, the highest density of population however occured in Kalaigaon Thana (317 per sq.km.) followed by Mangaldai Thana(254 per sq.km.). The wide variation in the density of population in different parts of the District might have caused mainly because of opening of a vast tract in the northern belt of the district, occupation of riverine tracts by the immigrants and the growth of small towns and trade centres (Table -2.4).

Table - 2.4 : Population Density in Darrang District, 1971

Sl.No.	Police Stations	Density per sq.km.
1.	Paneri Thana	221
2.	Udalguri Thana	243
3.	Mazbat Thana	152
4.	Kalaigaon Thana	317
5.	Dalgaon Thana	250
6.	Mangaldai Thana	254
	District Darrang	241

Source : Assam District Gazetteers - Darrang District, 1978.

As the district has physiographic and socio-economic variations, the growth of population also shows a great fluctuations and variations in the district. Within the district, since 1911, the growth of population has been increasing with sudden fluctuation. During the decades 1901-11, 0.25 per cent decrease has been recorded in the growth of population of the district, while since the decades 1931-1991, the growth of population was recorded sharp increase except during 1940's when the decadal growth was only 24.13 per cent in the district. Note that this growth of population was higher than the population growth of the State (Table -2.5). The time duration of 1950's and 1960's was recorded the highest population growth period and the population growth was above 40 per cent which was higher than the popula-

tion growth of the State. It may be due to migration factor in the Assam Valley. The gradual increase of growth of population since 1911-41 decadal period may be attributed to immigration. This flow of immigration continued in the decade ending in 1931, where there were 25,000 Nepalese in the District. Besides, the influx of population was apparently due to East Bengal Colonist who settled in large numbers particularly in Mangaldai area (District Gazetteers 1978). But the decadal growth of population was recorded only 11.60 per cent in the 1980's that is far lower than the State average(23.57 per cent). It may be on account of political disturbances and awareness of the people regarding rapid population increase.

Table -2.5 : Population Growth - Darrang District, 1901 to 1991

Year	Total Population		Decadal Growth (in %)	
	Darrang	Assam(in '000)	Darrang	Assam
1901	-	3289680	-	-
1911	-	3848617	- 0.25	+ 16.99
1921	-	4636980	+11.78	+ 20.48
1931	-	5560371	+26.00	+ 19.91
1941	-	6694790	+35.30	+ 20.40
1951	402501	8028856	+24.13	+ 19.93
1961	582624	10837329	+44.75	+ 34.98
1971	834574	14625152	+43.24	+ 34.95
1981	1152900*	18041248*	+38.14	+ 23.35
1991	1286633	22294652	+11.60	+ 23.57

N.B. * Estimated Population Figures.

Source : Provisional Population Totals, Series 4, Paper - 1, Census of India, 1991.

(ii) Literacy Level:

The quality of population can be judged from life expectancy, the level of literacy and the level of technical training attained by the people of the country. The level of the literacy in the district was very low in the last few decades. According to 1971 Census, the total literate persons in the district was 166769 (20%) to the total population) only out of which 121845 persons were male and 44924 females. In 1991 Census, the total literate persons have been increased upto 444963 which is much higher as compared to 1971 Census. In both the years the male literate persons are recorded much higher than the female literates. But the percentage of male-literates has been decreased from 73.2 to 62.70 per cent in the last two decades (1971-1991) Table -2.6).

Table -2.6 : Literates in Darrang District (1971 and 1991)

Sex	Literate Persons		Percentage	
	1971	1991	1971	1991
Male	1,21,845	2,78,991	73.16	62.70
Female	44,924	1,65,972	26.84	37.30
Total :	1,66,769	4,44,963	100.00	100.00

Source : Provisional Population Totals, Series-4, Paper - 1, Census of India, 1991.

It indicates that the literacy programmes of the Government are giving more emphasis on female-education rather than males. Angan Wadies * are being held in the rural areas specially to literate the people, Women participation is noticeable in these Wadies'.

(iii) Sex Ratio :

The study of population according to sex is also important because the working force, mobility and even active participation in the programme which are also influenced by the level of literacy and sex ratio. According to 1971 Census, though the district on the whole recorded 907 females per 1000 males has increased upto 939 females per 1000 males population in 1991 (Table 2.7).

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* 'Angan Wadies' is the Illiteracy removal programme under which the local people, male and female gather at a particular place at given time and they learn writing and reading. 'Wadies' is the local name of common house where the people learn to write and read.

Table - 2.7 : Sex Ratio in Darrang District - 1971 and 1991

District/State	Sex Ratio (Female per 1000 males) 1971	1991
Darrang	907	939
Assam	896	925

Source : Provisional Population Totals, Series-4, Paper-1, Census of India, 1991.

The sex ratio in the district is 939 females per 1000 males during 1991, higher as compared to the sex ratio of the State which is 925 only. It is obvious from the above Table that the increase in the sex ratio in the district is comparatively higher than the increase of the State ratio.

(b) Occupational Structure :

The study of occupational structure is important not only in analysis of the salient features of population distribution but also important in the agricultural studies and socioeconomic activities. The overwhelming nature of the rural population of Darrang District is reflected by the fact that more than 85 per cent of the total population of the district is engaged in Primary sector as compared to 2.63 per cent in Secondary and 11.72 per cent in Tertiary sectors. There is, however, a little evidence of occupational shift from primary

to secondary/tertiary activities. According to 1971 Census, Kalaigaon Thana recorded higher percentage share of working force is engaged in Primary sector, i.e. 89.97 per cent. While in Mazbat and Mangaldai areas, the percentages of working force are lower, that is 85.9 and 83.1 per cent respectively. The rest of the percentage shares of working force is engaging in the Secondary and Tertiary activities. On account of proper infra-structural facilities and location of the main towns in Udalguri and Mangaldai areas, the Tertiary sector is seen flourishing gradually as compared to other areas in the district(Table -2.8. Fig. 2.1).

Table - 2.8 : Police Stationwise Occupational Structure in Darrang District, 1971

Name of the Police Stations	Total Working Force	Primary Sector	Secondary Sector	Tertiary Sector
Paneri	56,194	47,757(84.99)	2,024(3.60)	6,413(11.41)
Udalguri	26,895	23,129(86.00)	485(1.80)	3,281(12.20)
Mazbat	19,669	16,898(85.91)	726(3.69)	2,045(10.40)
Kalaigaon	33,640	30,265(89.97)	693(2.10)	2,682(7. 97)
Dalgaon	37,506	32,430(86.47)	1,037(2.77)	4,039(10.77)
Mangaldai	59,302	49,274(83.10)	1,159(1.95)	8,869(14.96)
District	2,33,206	1,99,753(85.66)	6,124(2.63)	27,329(11.72)
State	40,88,493	31,49,881(77.04)	16,9,283(4.14)	76,9,329(18.82)

N.B. Parentheses show Percentage to total working force,

Source : District Census Hand Book - Darrang District,Part-X -B, Primary Census Abstract, Census of India - 1971.

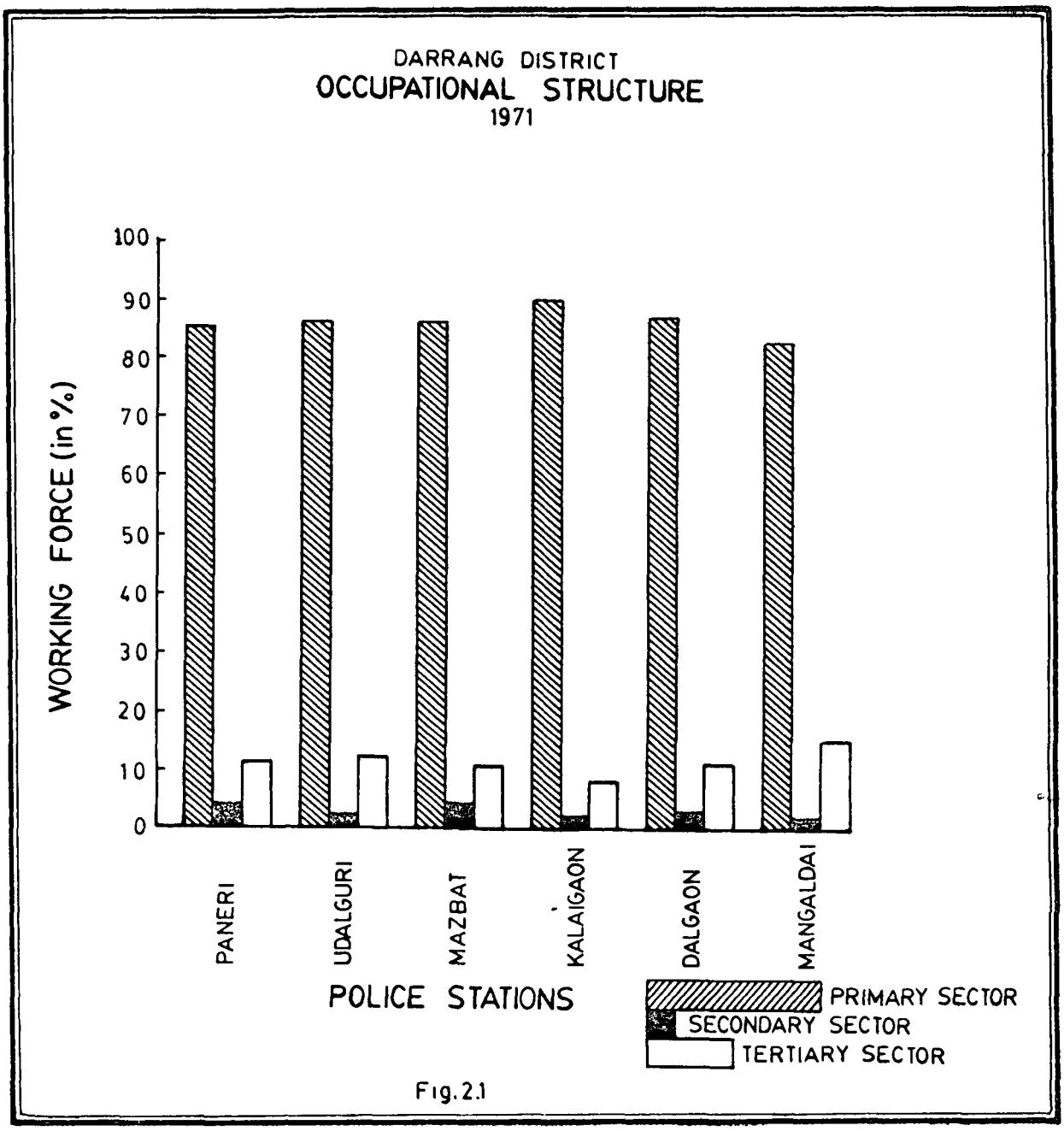
DARRANG DISTRICT
OCCUPATIONAL STRUCTURE
1971
WORKING FORCE (in %)
100
90
80
70
60
50
40
30
20
10
0
PANERI
UDALGURI
MAZBAT
KALAIGAON
DALGAON
MANGALDAI
POLICE STATIONS
PRIMARY SECTOR
SECONDARY SECTOR
TERTIARY SECTOR

Fig. 2.1

But the economy of the district is said to be agriculture-based in which more than 85 per cent working force is engaged directly. Therefore, the socio-economic setup and the locational patterns of socio-economic facilities/functions are mainly based on agricultural activities.

On the other hand, dependency ratio must be explained in order to know the non-working force burden on or over workers. In non-working class mostly children (below 15 years of age) and aged persons(above 60 years) are counted. It is found from Table - 2.9, that the dependency ratio are more or less same in each of the Thana of the Darrang District except Mazbat Thana where dependency ratio is very low (1.94). It indicates that the children and the old population is very less as compared to working population. High dependency ratio however indicates the population potential for future utilisation, in which more education and health facilities are required.

Further, the quality of working force can be assessed by describing the male/female share constituting total workers. It is obvious from the Table (2.10) that the working force is only one-fourth of the total population in the Darrang District. Infact, more than 90 per cent to the total working force is male workers. In some Thana which are situated in the northern parts

Table -2.9 : Police Stationwise Dependency Ratio in Darrang District, 1971

Name of the Police Stations	Total Population	Total workers	Total Non-workers	Dependency Ratio
Paneri	1,79,684	56,194(31.27)	1,23,490(68.73)	2.20
Udalguri	95,000	26,895(28.31)	68,105(71.69)	2.53
Mazbat	57,845	19,669(34.00)	38,176(66.00)	1.94
Kalaigaon	1,33,885	33,640(25.13)	1,00,245(74.87)	2.98
Dalgaon	1,31,462	37,306(28.53)	93,956(71.47)	2.51
Mangaldai	2,36,698	59,302(25.05)	1,77,396(74.95)	2.99
District	8,34,574	2,33,206(27.94)	6,01,368(72.06)	2.58
State	1,46,25,152	40,88,493(28.0)	1,05,36,659(72.0)	2.58

N.B. Parentheses show the Percentages to the Total Population

Source : District Census Hand Book - Darrang District, Part X-B, Primary Census Abstract, Census of India -1971.

Table -2.10 : Police Stationwise Percentage of Male working Population, 1971

Name of the Police Stations	Total Workers	Male	Female	Male % to Total Workers
Paneri	56,194	49,156	7,038	87.47
Udalguri	26,895	25,808	1,087	95.95
Mazbat	19,669	16,637	3,032	84.58
Kalaigaon	33,640	33,277	363	98.92
Dalgaon	37,506	36,557	955	97.47
Mangaldai	59,302	58,487	815	98.62
District	2,33,206	2,19,916	13,290	94.30
State	40,88,493	37,66,685	3,21,808	92.13

Source : District Census Hand Book-Darrang District, Part X-B, Primary Census Abstract, Census of India - 1971.

of the district have more than 90 per cent male working force (Table 2.10).

It has already been discussed that the major share of working force is engaging in agricultural activities. Cultivators and Agricultural labourers constitute this category. It is a fact that the cultivator-agricultural labourers ratio is lower in the district than the State of Assam. Only 6 agricultural labourers per 100 cultivators are found in the Mangaldai Thana (1971) which is the lowest figure in the district. While Udalguri Thana has the highest cultivator-agricultural labourers' ratio in the district (Table 2.11).

Table - 2.11 : Agricultural Labours per Cultivator, 1971

Name of the Police Stations	Total cultivators	Total Agricultural labourers	Agriculture Labourers per cultivator
Paneri	29,906	4,614	' 154
Udalguri	18,777	3,825	' 204
Mazbat	9,875	1,385	' 140
Kalaigaon	27,054	3,000	' 111
Dalgaon	26,291	4,606	' 175
Mangaldai	45,637	2,816	' 062
District	1,57,540	20,246	' 129
State	22,83,698	4,05,440	' 178

Source : District Census Hand Book - Darrang District, Part X-B, Primary Census Abstract, Census of India - 1971

High proportion of cultivators in the agricultural working force denotes the requirements of the functions/facilities related to the farmers. The facilities of seed and fertilizer depot and functions related to irrigation like engine-repair shops are required for agricultural development, especially in the northern paddy cultivation areas of the district.

On the other hand, social amenities are directly related to the distribution of population. For understanding the distribution of population in the district, population size-wise classification is made. It would help to explain the locational aspects of population distribution.

(c) Size-wise Distribution of Population :

According to Census 1971, the Darrang District has 1233 inhabited and 44 uninhabited villages including 3 Towns. According to population size categories given by Census of India 1971, total inhabited villages have been distinguished into five categories, namely, Extremely large (above 5000 persons),Larger (1000-4999), Medium(500-999), Small (200-499) and Very small villages(below 200 persons). Extremely large centres are three in number. But more than two-third villages come under the category of Medium and Small sizes in the district(Table 2.12).

Table - 2.12 : Size-wise Population Distribution in Darrang District, 1971

Population size	Paneri		Udalguri		Mazbat		Kalaigaon		Dalgaon		Mangaldai		District	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1.Extremely Large(above 5000)	1	0.39	-	-	-	-	-	-	1	0.56	1	0.32	3	0.24
2.Large (1000-4999)	32	12.40	23	14.74	10	8.06	25	12.14	33	18.33	63	20.39	186	14.80
3.Medium (500-999)	104	40.31	55	35.26	27	21.77	100	48.54	75	41.67	125	40.45	486	39.10
4.Small (200-499)	88	34.11	58	37.18	61	49.20	71	34.47	47	26.11	82	26.54	407	33.11
5.Very Small (less than 200)	33	12.79	20	12.82	26	20.97	10	4.85	24	13.33	38	12.30	151	12.25
Total :	258	100	156	100	124	100	206	100	180	100	309	100	1233	100

Note : Total No. of Inhabited Villages = 1233
Total No. of Uninhabited Villages = 44

N.B. 1 = Total number of the Villages
2 = Percentages to the Total Villages

Source : District Census Hand Book, Darrang District, Part X-B, Primary Census Abstract, Census of India - 1971.

If we compare the distribution in the various Thanas of the District, it is found that half of the northern part of the district which includes Kalaigaon, Mangaldai and Dalgaon Thanas, have the maximum share of medium size of villages. Here in this area, more than 40 per cent villages fall under this category(Fig. 2.2). While the entire southern parts of the district where the land areas are occupied by marshes, beels and stagnant water areas throughout the year are generally dominated by small villages. Therefore, more than 50 per cent villages in Paneri, Udalguri and Mazbat Thanas are under the small and very small categories. There are only a few settlements having larger size where most of the major socio-economic facilities/functions are located.

It is widely accepted that the population size and centrality/nodality of the settlements have a positive relationships. This hypothesis may be tested to study the distributional patterns of socio-economic amenities/facilities in relation to population distribution in the district. Thus, the spatial distribution of these amenities or facilities has been described separately in the next Chapter of the present research.

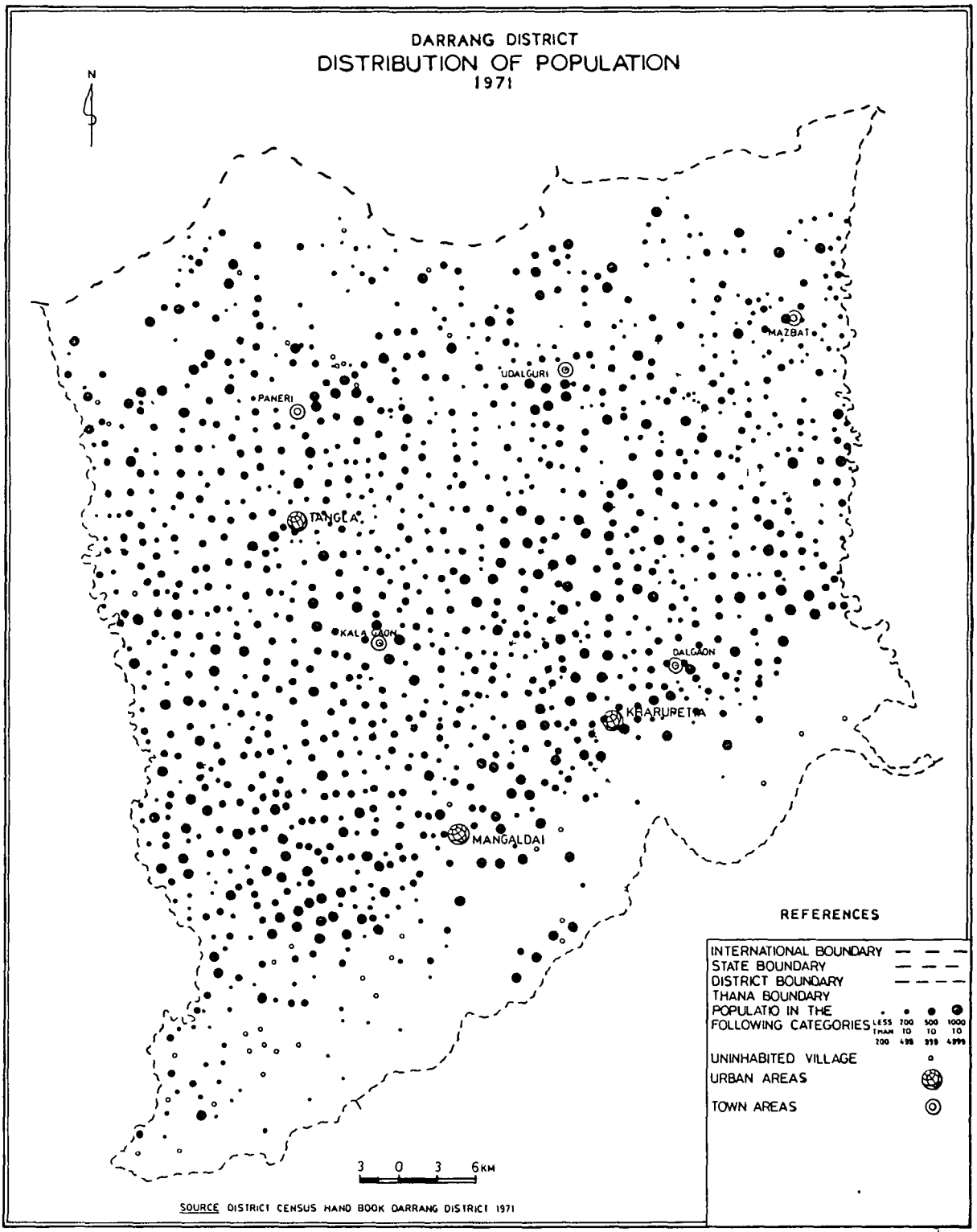
DARRANG DISTRICT
DISTRIBUTION OF POPULATION
1971
N
MAZBAT
UDALGURI
PANERI
TANGLA
KALAGAON
DALGAON
KHARUPETIA
MANGALDAI
REFERENCES
INTERNATIONAL BOUNDARY
STATE BOUNDARY
DISTRICT BOUNDARY
THANA BOUNDARY
POPULATIO IN THE FOLLOWING CATEGORIES
LESS THAN 200
200 TO 499
500 TO 999
1000 TO 4999
UNINHABITED VILLAGE
URBAN AREAS
TOWN AREAS
3 0 3 6KM
SOURCE DISTRICT CENSUS HAND BOOK DARRANG DISTRICT 1971

Fig 22

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CHAPTER - III

DISTRIBUTION OF SOCIO-ECONOMIC AMENITIES

CHAPTER - III

DISTRIBUTION OF SOCIO-ECONOMIC AMENITIES

INTRODUCTION :

It is obvious that, the study of the settlements and their space relations constitute one of the bases of regional studies at different area levels. Likewise, the distributional patterns of socio-economic amenities and their inter-relationships with various elements of resources also explain the strong base of study of overall patterns of developments of the regions at different levels. The inter-relationships among various socio-economic activities therefore depend a great deal on where they are located. The concentration of socio-economic amenities/facilities in relation to space is studied here. It is widely accepted that there is a positive relationship between population and socio-economic amenities/facilities(Waheeduddin Khan -1972). It means that the settlements which have higher population size would be performing greater intensity and availability of socio-economic facilities. This premise is examined by describing the locational patterns of socio-economic facilities in Darrang District. In case, the distribution of these facilities are deviating from normative one, the causes of the deviated features of locational patterns of these facilities are also interpreted in this Chapter.

METHODS :

To test the validity of the above premise of socio-economic setup of the area, simple cartographic methods have been adopted. First, all the socio-economic amenities/facilities are classified according to the given scheme (Table -3.1), and then their distributional patterns are shown with the help of preparing distributional maps specially for 1971 and 1991. The changing nature of the distribution of socio-economic facilities are also described. The salient features of the distribution of various socio-economic facilities have also been shown by preparing graphs and diagrams. Further, the spatial patterns are studied in relation to population size distribution and road accessibility of the study area.

The results of spatial patterns of socio-economic amenities/facilities are interpreted under the following heads :

(A) DISTRIBUTION OF SOCIO-ECONOMIC FACILITIES :

For submitting a more generalised but logical description and interpretation of spatial distribution of these socio-economic amenities/facilities and services, it is a pre-requisite to classify them into major categories. In the district under study, there are as many as six major socio-economic amenities or

facilities which have been taken into account. Other facilities related to agricultural resources of the area are not considered because of cumbersome practice of collection of data. The major socio-economic amenities/facilities are further sub-categorised for detail study (Table-3.1).

Table -3.1 : A Scheme of Classification of Socio-Economic Amenities

Major Categories	Sub Categories
(i) Education	(a) Primary Schools (b) Middle Schools (c) High Schools/Higher Secondary Schools (d) College
(ii) Medical (Health)	(a) Dispensaries (b) Hospitals (c) Maternity & Child Welfare Centres (d) Family Planning Centres (e) Health Centres
(iii) Communication Systems	
(a) Postal	(a) Post Offices (b) Post & Telegraph Offices (c) Telephones
(b) Transport	(a) Pucca Roads (b) Cutcha Roads
(iv) Market	(a) Weekly (b) Bi-Weekly (c) Daily (Regular)
(v) Power Supply	(a) Electricity
(vi) Administrative	(a) District Head Quarter (b) Block Head Quarters (c) Thana Head Quarters

The distributional aspects of these amenities/facilities are described here by considering its two major attributes :

(i) the number of specific facilities per unit of area, called density of facility*. The distribution of functional density is also comparable to the distribution of population density, and;

(ii) the locational of these amenities/facilities and their intensities **.

(a) Density of Amenities/Facilities in Darrang District :

In the present discussion, the densities of educational and medical facilities have been calculated by taking total number of facility per 100 sq.km. for each police station. The average density of primary schools in the district was 29 only per 100 sq.km. in 1971, which has increased upto 39 per 100 sq.km. in 1991. This increase in density of primary schools

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* Density is related to area. Therefore, total number of a specific facility available per unit area is calculated.

** Locational intensity of these amenities/facilities has been calculated by dividing total number of facility available by total number of locations having this specific facility in the area.

i.e., 43, 33 and 32 respectively. The density of middle schools per 100 sq.km. was recorded highest in Kalaigaon police station in 1971 as well as in 1991. Here the average density of middle schools in the district was recorded only 3 per 100 sq.km. in 1971, which has been increased to 5.6 in 1991. It is noticeable here that, the density of higher secondary schools was only 0.17 per 100 sq.km. in 1971, which has increased to 6 per 100 sq.km. in 1991(Table -3.2). It can therefore, be noted here that, the number as well as the density of educational facilities in the district are increasing significantly.

On the other hand, the overall medical facilities in the district are very less in number. According to 1991 figures, there are only 13 Hospitals, 16 Dispensaries, 3 Maternity & Child Welfare Centres, 14 Family Planning Centres and 226 Health Centres in the District. The average densities of these facilities are therefore less and are located in a few main centres only except Health Centres. Only 0.67 dispensaries per 100 sq.km. was recorded during 1971, but has decreased to 0.46 per 100 sq.km. in 1991. This decrease in the density of dispensaries in the district can be attributed mainly because of lack of data available for Tea Estates especially for 1991. Therefore, the picture of medical facilities in general seems decreasing. But the gradual increase has been marked in health centres from 0.40 in 1971 to 6.52 per

Table - 3.2 : Density of Educational Facilities in Darrang District (1971 & 1991)

(Density per 100 sq.km.

Name of the Police Stations	Area in Sq.km.	Primary Schools		Middle Schools		High Schools/Higher Secondary Schools	
		1971	1991	1971	1991	1971	1991
Paneri	813.2	26.44	32.59	1.48	4.30	0.12	6.27
Dalgaon	525.8	20.35	37.47	3.23	4.37	-	3.23
Kalaigaon	422.1	42.64	61.12	8.77	9.00	-	10.19
Mazbat	380.7	17.86	44.92	0.89	5.78	0.26	3.15
Udalguri	391.1	31.19	62.39	1.02	8.44	0.51	4.35
Mangaldai	932.4	33.03	22.95	3.43	4.72	0.22	7.51
Darrang	3465.3	28.86	38.93	3.03	5.63	0.17	6.06

100 sq.km. in 1991 in the whole district. It is obvious that, the increase in health centres in the whole district is due to the locational plans undertaken by the Ministry of Health, Govt. of India in general to setup more Health Centres rather then Maternity and Child Welfare and Family Planning Centres. In Udalguri Police Station, the density of Health Centres was recorded highest, i.e., 1.02 per 100 sq.km. in 1971. But in 1991, dramatically, the fast increase in the number of health centres was recorded in Kalaigaon Police Station where it has been recorded 11.61 per 100 sq.km. (Table - 3.3). The higher density of medical facilities is also recorded in Mazbat Police Station (10.24 per 100 sq.km.). Other medical facilities like maternity and child welfare centres and family planning dentres are marked insignificant throughout the district.

An important amenity/facility like post office also presents the picture of the socio-economic levels of development of the area. In 1971, there was only 2.2 postal services per 100 sq.km. in average in the district. In the last decade, Kalaigaon area had the highest density of about 4.03 post office per 100 sq.km. But the average density of post offices in 1991 has been increased to 4.04 per 100 sq.km. in the district. Dalgaon,

Table - 3.3 : Density of Medical Facilities in Darrang District (1971 & 1991)

Name of the Police Stations	Area in Sq.Km.	Dispensaries		Hospitals		Health Centres	
		1971	1991	1971	1991	1971	1991
Paneri	813.2	0.49	0.37	2.34	0.37	0.12	4.06
Dalgaon	525.8	1.14	0.57	0.38	0.38	0.38	6.09
Kalaigaon	422.1	2.61	0.71	0.95	0.24	0.24	11.61
Mazbat	380.7	-	0.26	2.63	0.26	0.53	10.24
Udalguri	391.1	0.26	0.51	0.26	0.51	1.02	7.67
Mangaldai	932.4	0.86	0.43	0.64	0.43	0.43	4.61
Darrang	3465.3	0.87	0.46	1.21	0.38	0.40	6.52

Paneri and Mangaldai Police Stations are the noticeable areas having highest density of postal system with the density of 4.18, 4.80 and 4.40 per 100 sq.km. respectively in 1991,(Table - 3.4).

Table - 3.4 : Density of Postal System in Darrang District (1971 & 1991)

(Density per 100 Sq.km.)

Name of the Police Stations	Area in Sq.Km.	Post Offices 1971	1991
Paneri	813.2	2.09	4.80
Dalgaon	525.8	2.09	4.18
Kalaigaon	422.1	4.03	2.84
Mazbat	380.7	1.05	3.15
Udalguri	391.1	1.53	3.58
Mangaldai	932.4	2.25	4.40
Darrang	3465.3	2.19	4.04

The market facilities in the entire district was available only on a few locations. The total number of weekly markets were 94 only in 1971 from which it decreased to 42 in 1991. Due to the lack of latest data available for Mazbat area and other Tea Estates of the district, the number of the whole market facilities seems to be decreased which has, on the other hand,

affected the density of each and every market facilities. Therefore, the average density of weekly market facilities in the district has decreased from 2.71 in 1971 to 1.21 per 100 sq.km. in 1991. The highest density of weekly market in the last two decades was recorded 4.47 per 100 sq.km. in Mazbat area, while Mangaldai area of the district had only 0.97 weekly market per 100 sq.km. during the last two decades and this figure was recorded the least in the district. It may be because of its location on the National Highway and readily available goods throughout the main town areas. On the other hand, the density of Bi-weekly markets also marked increasing in the district from 0.17 in 1971 to 0.38 per 100 sq.km. in 1991(Table 3.5).

Table -3.5 : Density of Market Facilities in Darrang District (1971 & 1991)

Name of the Police Stations	Area in Sq.Km.	Weekly 1971	Weekly 1991	Bi - weekly 1971	Bi - weekly 1991
Paneri	813.2	3.57	1.23	0.12	0.49
Dalgaon	525.8	3.80	0.57	0.95	0.57
Kalaigaon	422.1	2.84	2.37	-	0.71
Mazbat	380.7	4.47	-	-	-
Udalguri	391.1	1.79	2.30	-	0.51
Mangaldai	932.4	0.97	1.07	-	0.11
Darrang	3465.3	2.71	1.21	0.17	0.38

According to 1971 record, there was no trace of regular (daily) market service in the district. But in 1991, a few centres (locations) have imerged out few regular market centres. Overall, these existing amenities/facilities related to education, medical, postal and market etc. have great variation in densities in the district which may be cited as because of physical factors and economic status of the district.

Obviously, the present discussion reflects only the general distribution and densities of socio-economic amenities/facilities according to areal units (police-station wise), while locational aspects of the distribution are equally important. Therefore, the intensity of those amenities/facilities are calculated in relation to their locations and the general distribution of those facilities are shown by the maps.

(b) Locational Intensity of Amenities/Facilities :

The locational intensity of facilities/amenities of the district are studied under the following sub-heads :

(i) Educational Facilities :

According to the norms of Planning Commission, New Delhi proposed for primary schools, the maximum distance of primary schools from the child's home should not exceed 1.5 km. The 3.0 km. distance is proposed for middle schools accessibility

and 4.0 km. for higher secondary school in the area*.

Keeping in view, the Planning Commission's criteria for 7th Plan, the district has higher population density and dependency ratio. The population share below 15 years of age is also higher in the district. On account of higher share of children population and lower degree of locational accessibility of educational facilities in the district, it requires more number of primary as well as middle schools rather than college etc. In existing conditions, there were as much as 1000 primary schools in 1971 located on 815 locations in the area. The locational intensity of primary schools was 1.23 in 1971, in the district which varied from 1.03 in Mazbat Thana to 1.43 the highest locational intensity in Mangaldai Thana. It is noticeable remarkably that inspite of 35.0 percent in the number of primary schools during the last 20 years from 1000 in 1971 to 1349 in 1991, the average locational intensity has decreased from 1.23 to 1.10 in the district (Table - 3.6). It is because of increase in number of locations having this facilities**.

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* The Guidelines of the District Plans, 7th Plan Draft in which for educational facilities, the maximum accessible distance for various educational facilities are proposed for preparing District Plans.

** Infact, locational intensity, I, is formulated as

$$I = \frac{\text{Total number of facilities}}{\text{Total number of centres having facilities}}$$

In this fraction, increasing number of centres having the facilities will decrease the degree of locational intensity and vice-versa. Decreasing degree of intensity indicates the decentralisation or dilusion of intensity in the area.

But in the case of middle schools, the degree of its locational intensity is same during the last 20 years of time. Kalaigaon and Udalguri areas had the highest intensity recorded in the district in the last two decades. High Schools/Higher secondary Schools have however, increased rapidly in the intensity from 1.0 in 1971 to 1.25 in 1991. It was only 6 in number during early 70's but it has increased tremendously upto 210 in 1991. They are mostly established on 210 locations in the district (Fig. 3.1 and 3.2).

Similarly, locational intensity of college facility have also been marked increasing from 1.0 to 1.46 in the last two decades period in the district (Table -3.6). In Paneri Police Station area, the locational intensity of college is recorded highest (2.0 per thousand sq.km.) because of availability of two colleges at one location (i.e., on Tangla centre), while the locational intensity is 1.65 per 1000 sq.km. in Mangaldai area where the number of the colleges are 14 located on 9 centres. In the rest of the areas of the district, only one college is located one one centre. Therefore, locational intensity is one everywhere except Mazbat Police Station area (Table - 3.6).

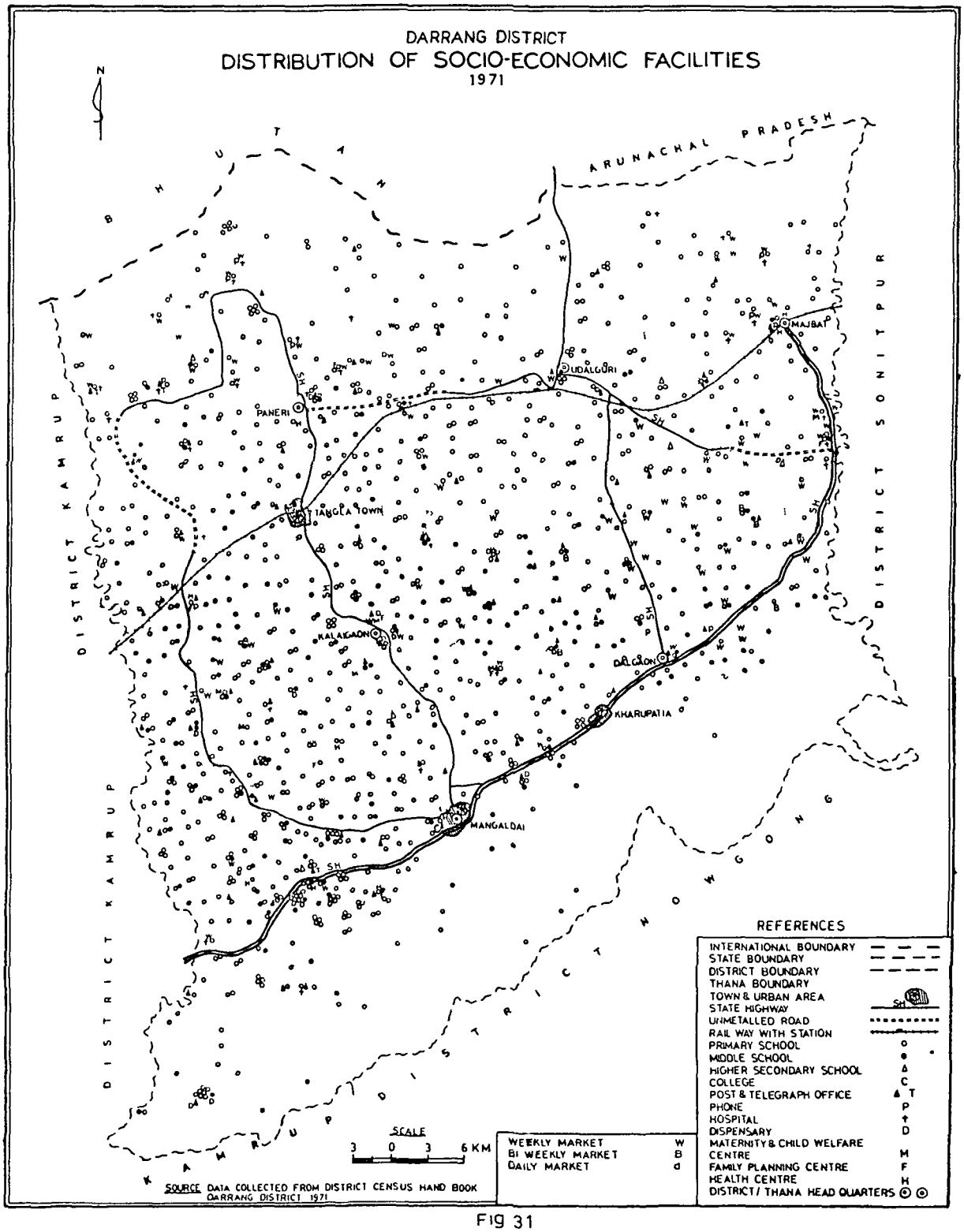
DARRANG DISTRICT
DISTRIBUTION OF SOCIO-ECONOMIC FACILITIES
1971
N
BHUTAN
ARUNACHAL PRADESH
DISTRICT KAMRUP
DISTRICT SONITPUR
DISTRICT KAMRUP
NAGAON DISTRICT
MAJBAT
UDALGURI
PANERI
TANGLA TOWN
KALAIGAON
DALGAON
KHARUPATIA
MANGALDAI
SH
SCALE
3 0 3 6 KM
SOURCE DATA COLLECTED FROM DISTRICT CENSUS HAND BOOK DARRANG DISTRICT 1971
WEEKLY MARKET W
BI WEEKLY MARKET B
DAILY MARKET d
REFERENCES
INTERNATIONAL BOUNDARY
STATE BOUNDARY
DISTRICT BOUNDARY
THANA BOUNDARY
TOWN & URBAN AREA
STATE HIGHWAY
UNMETALLED ROAD
RAIL WAY WITH STATION
PRIMARY SCHOOL
MIDDLE SCHOOL
HIGHER SECONDARY SCHOOL
COLLEGE
POST & TELEGRAPH OFFICE
PHONE
HOSPITAL
DISPENSARY
MATERNITY & CHILD WELFARE CENTRE
FAMILY PLANNING CENTRE
HEALTH CENTRE
DISTRICT/ THANA HEAD QUARTERS

Fig 31

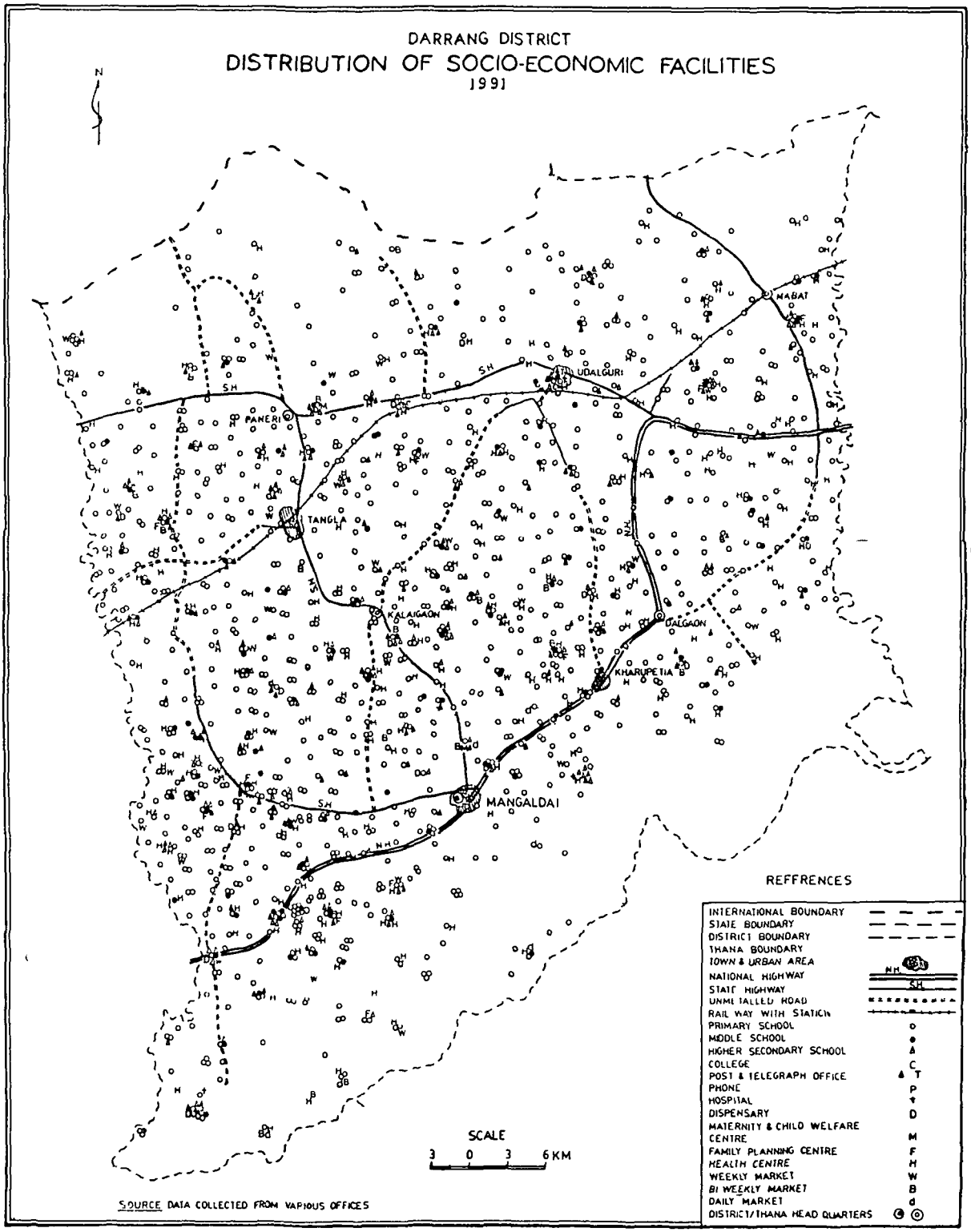
DARRANG DISTRICT
DISTRIBUTION OF SOCIO-ECONOMIC FACILITIES
1991
N
MABAT
UDALGURI
PANERI
TANGLA
KALAIGAON
DALGAON
KHARUPETIA
MANGALDAI
SH
NH
SCALE
3 0 3 6 KM
REFFRENCES
INTERNATIONAL BOUNDARY
STATE BOUNDARY
DISTRICT BOUNDARY
THANA BOUNDARY
TOWN & URBAN AREA
NATIONAL HIGHWAY
STATE HIGHWAY
UNMETALLED ROAD
RAIL WAY WITH STATION
PRIMARY SCHOOL
MIDDLE SCHOOL
HIGHER SECONDARY SCHOOL
COLLEGE
POST & TELEGRAPH OFFICE
PHONE
HOSPITAL
DISPENSARY
MATERNITY & CHILD WELFARE CENTRE
FAMILY PLANNING CENTRE
HEALTH CENTRE
WEEKLY MARKET
BI WEEKLY MARKET
DAILY MARKET
DISTRICT/THANA HEAD QUARTERS
SOURCE DATA COLLECTED FROM VARIOUS OFFICES

Fig 3 2

Table - 3.6 : Locational Intensity of Educational Facilities in Darrang District (1971 & 1991)

Name of the Police Stations	Primary Schools						Middle Schools					
	1971			1991			1971			1991		
	1	2	3	1	2	3	1	2	3	1	2	3
Paneri	215	186	1.16	265	240	1.10	12	12	1.0	35	33	1.06
Dalgaon	107	100	1.07	197	188	1.05	17	15	1.13	23	20	1.15
Kalaigaon	180	152	1.18	258	235	1.09	37	28	1.32	38	33	1.15
Mazbat	68	66	1.03	171	159	1.08	03	03	1.0	22	20	1.10
Udalguri	122	96	1.27	244	227	1.07	04	03	1.33	33	30	1.10
Mangaldai	308	215	1.43	214	189	1.13	32	31	1.03	44	35	1.26
Total	1000	815	1.23	1349	1238	1.10	105	92	1.14	195	171	1.14

Contd.

Name of the Police Stations	High Schools/Higher Secondary						Colleges					
	1971			1991			1971			1991		
	1	2	3	1	2	3	1	2	3	1	2	3
Paneri	01	01	1.0	51	41	1.24	-	-	-	02	01	2.0
Dalgaon	-	-	-	17	14	1.21	-	-	-	01	01	1.0
Kalaigaon	-	-	-	43	37	1.16	-	-	-	01	01	1.0
Mazbat	01	01	1.0	12	11	1.09	-	-	-	-	-	-
Udalguri	02	02	1.0	17	13	1.31	-	-	-	01	01	1.0
Mangaldai	02	02	1.0	70	52	1.35	01	01	1.0	14	09	1.56
Total	06	06	1.0	210	168	1.25	01	01	1.0	19	13	1.46

N.B. : 1 = Total Number of facilities
2 = Villages having facilities
3 = Intensity of the facilities/functions.

Therefore, it can be concluded from the above discussion that the locational intensity of these facilities in the district is very low and randomly distributed *. Infact, the average intensity of these facilities does not correspond to that of all the settlements and are not satisfactorily available in the district (Fig. 3.3).

(ii) Medical Facilities :

Although, medical (health) care is one of the most important indicators to measure the state of social wellbeing of an area or a region, the existing medical facilities in the study area within the administratives setup of health services of the state are so far less in number. These are mostly confined to the urban and town areas only. The existing medical facilities in the study area, infact, does not correspond to that of the all settlements of the district. Further, the district

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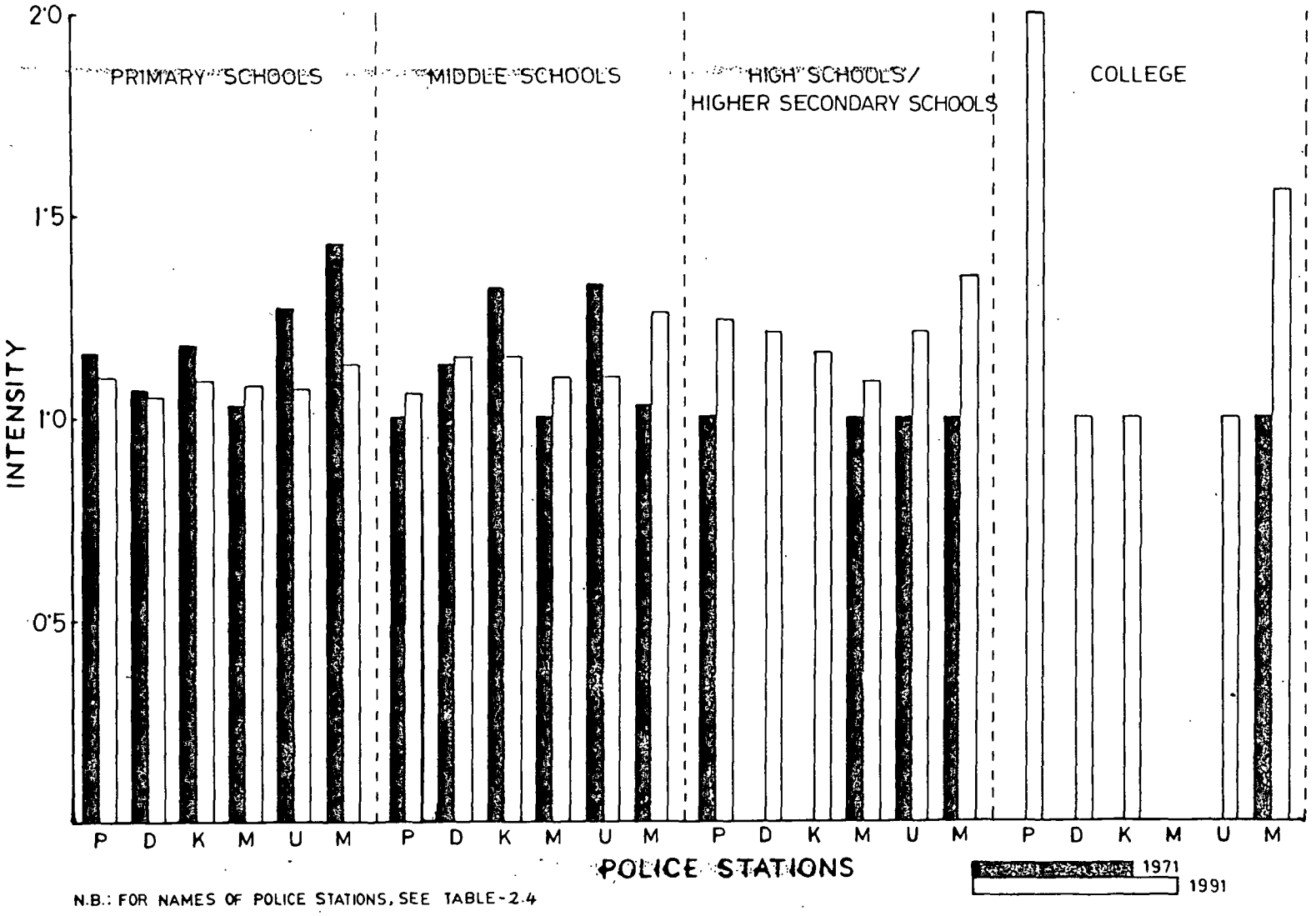
* The degree of randomness in the distribution can quantitatively be measured by applying the Nearest Neighbour Distance postulated by Clark and Evans (1954) by which Rn value is calculated as

$$Rn = \frac{\bar{D}}{.5(1/\sqrt{N/A}}$$

where $\bar{D}$ = the average nearest neighbour distance among the points,
N = total number of points/settlements, and
A = total area.

Rn Value will vary from Zero to 2.149. values near Zero denote the clusterness in the distribution. If Rn is around 1.0, the distribution becomes random, while Rn value is around 2.0, it indicates Uniformity in the distribution. But in the present study, the degree of randomness is observed from the visual appeal given in the distribution maps.

LOCATIONAL INTENSITY OF EDUCATIONAL FACILITIES



N.B.: FOR NAMES OF POLICE STATIONS, SEE TABLE-2.4

Fig.3.3

has since long time been lacking in medical facilities along with other important facilities. It is therefore, necessary to explain the distribution of the existing facilities in relation to the location of the settlements and the population density in the following manner.

In the district, under the study of medical facilities includes mainly dispensaries, hospitals, maternity and child welfare centres, family planning centres and health centres. It is observed that, almost in all the medical facilities except health centres have been seen remarkably decreased from the figure of 1971 to 1991. There were only 30 dispensaries in 1971 located in 27 settlements in the district. It varied from 1 in Udalguri area to 11 in Kalaigaon area in 1971 in the District. While the locational intensity was recorded 1.33 (highest) in Mangaldai where the total number of dispensaries were 8 in 1971 (Table 3.7). During the last two decades, the locational intensity of hospitals was increased from 1.0 in 1971 to 1.18 in 1991 in the district. In Paneri area, it was recorded the highest number of hospitals in the district, i.e., in 1971. While in 1991, Mangaldai recorded the highest number of hospitals (04). Similarly, in the case of health centres, only 14 were available in 1971 which were located on 14 locations with an average locational intensity of 1.0 in the whole district. It is noticeable however that, almost all the police stations have dramatically

increased in the number as well as locational intensity of health centres in 1991. The highest intensity is being recorded in Dalgaon and Udalguri police stations. The total number of health centres are recorded as high as 226 with its locational intensity of 1.01*. Kalaigaon and Mangaldai Police Stations have recorded the highest number of health centres in the district (Table 3.7). The locational intensity of these facilities are recorded 1.0 which indicates that one location has one facility only (Fig. 3.4).

(iii) Communication Facilities :

The movement of man, material and ideas from one place to other is the function of communication activities (Chand, 1979). Infact, the movement of ideas, goods, and of people by means, ranging from walking to telecommunication makes possible the specialisation of location. Communication

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* The rapid increase in the health centres i.e., from 14 to 226 during 1970's and 1980's may be because of definitional change. According to 1971 census, the definition of the Maternity & Child Welfare Centres and Family Planning Centres have been considered separately. But the official figures of these medical facilities have been clubbed with health centre facilities in 1991. As a result, the number of health centres have been increased rapidly.

LOCATIONAL INTENSITY OF MEDICAL FACILITIES

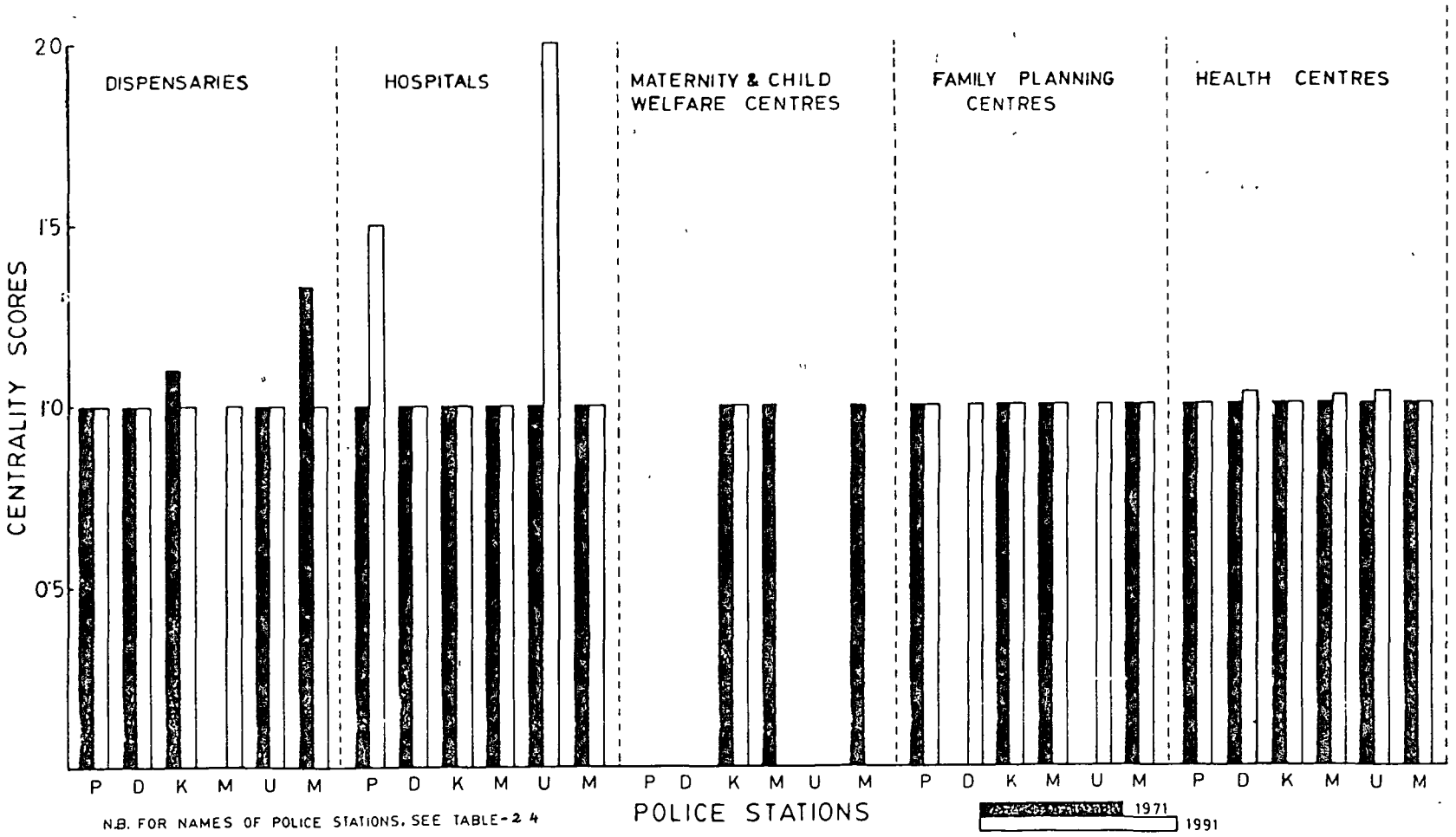

Fig. 3.4

Table - 3.7 : Locational Intensity of Medical Facilities in Darrang District
(1971 & 1991)

Name of the Police Stations	Dispensaries						Hospitals						Maternity & Child welfare centres					
	1971			1991			1971			1991			1971			1991		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Paneri	04	04	1.0	03	03	1.0	19	09	01	03	02	1.5	-	-	-	02	02	1.0
Dalgaon	06	06	1.0	03	03	1.0	02	02	01	02	02	1.9	-	-	-	-		
Kalaigaon	11	10	1.1	03	03	1.0	04	04	01	01	01	1.0	04	04	1.0	01	01	1.0
Mazbat	-	-	-	01	01	1.0	10	10	01	01	01	1.0	01	01	1.0	-	-	-
Udalguri	01	01	1.0	02	02	1.0	01	01	01	02	01	2.0	-	-	-	-	-	-
Mangaldai	08	06	1.33	04	04	1.0	06	06	01	04	04	1.0	01	01	1.0	-	-	-
Total	30	27	1.11	16	16	1.0	42	42	1.0	13	11	1.18	06	06	1.0	03	03	1.0

Contd.

Name of the Police Stations	Family Planning centres						Health centres					
	1971			1991			1971			1991		
	1	2	3	1	2	3	1	2	3	1	2	3
Paneri	01	01	1.0	04	04	1.0	01	01	1.0	33	33	1.0
Dalgaon	-	-	-	01	01	1.0	02	02	1.0	32	31	1.03
Kalaigaon	02	02	1.0	02	02	1.0	01	01	1.0	49	49	1.08
Mazbat	01	01	1.0	02	02	1.0	02	02	1.0	39	38	1.02
Udalguri	-	-	-	01	01	1.0	04	04	1.0	30	29	1.03
Mangaldai	03	03	1.0	04	04	1.0	04	04	1.0	43	43	1.0
Total	07	07	1.0	14	14	1.0	14	14	1.0	226	223	1.01

N.B. : 1 = Total Number of facilities; 2 = Villages having facilities
3 = Intensity of the facilities/functions.

logically can be classified into two broad categories : Physical and Human. Physical communication consists of roads, railways, post and telegraphs, aviation etc. While human communication comprises mass communication, institutional communication and face to face communication(Sinha, 1972). On the basis of locational aspects the available communication facilities of the district has been classified into two categories of (a)postal and (b) transport service facilities for submitting their spatial account systematically. In the present study, postal services include -post offices, post & telegraph offices and telephones. While transport services include only pucca and cutcha roads.

(a) Postal Services : The network of postal service facilities is the organisation controlled by the public sector. The foremost aim of postal services is to convey the private or public messages of various types from one location or individual to the other. On the basis of the nature of postal establishments dealing with the postal service facilities, in the present study, post, post & telegraph and telephone services have been considered as the main establishments providing services to the population of the district. Their locational intensities have been interpreted in detail.

In the district, there were as many as 76 post offices located in 76 settlements ranging from 4 in Mazbat to 21 in Mangaldai in 1971. While, only 8 post and telegraph and 16 telephones in number were recorded in the district during the last

two decades. Almost all the post offices, post and telegraph and telephone offices were recorded highest in Mangaldai and Paneri areas in 1971 (Table -3.8). It is apparent that the north-western as well as southern parts of the district were having higher number of postal services than the other parts of the district. The locational intensity recorded, however, almost same i.e., 1.0 only in the entire district. But during 1991, the number of post offices have increased upto 140 with the variations from 12 each in Kalaigaon and Mazbat to 41 in Mangaldai in the district (Table -3.8). Mangaldai area is the only area, which has the highest number of post offices in 1971 as well as in 1991. The least number of post offices is being observed in Mazbat area in both the decades.

It is therefore, apparent from the Table that, the patterns of distribution of settlement by their population size having location of post offices, post and telegraphs and telephones facilities as well as intensity does not correspond to that of all settlements of the district. It shows that the north-western as well as some parts of southern areas of the district have more postal facilities/services than the remaining areas of the district. As a result, high number of facilities are observed in areas where settlements are highly located with the higher number of population and mainly located near the main roads.

Table - 3.8 : Locational Intensity of Postal Facilities in Darrang District (1971 and 1991)

Name of the Police Stations	Post Offices						Post and Telegraph Offices						Phones					
	1971			1991			1971			1991			1971			1991		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Paneri	17	17	1.0	39	39	1.0	03	03	1.0	N.A	N.A	N.A.	08	08	1.0	N.A.	N.A.	N.A.
Dalgaon	11	11	1.0	22	22	1.0	-	-	-	-	-	-	02	02	1.0	-	-	-
Kalaigaon	17	17	1.0	12	12	1.0	01	01	1.0	-	-	-	03	03	1.0	-	-	-
Mazbat	04	04	1.0	12	12	1.0	01	01	1.0	-	-	-	03	03	1.0	-	-	-
Udalguri	06	06	1.0	14	14	1.0	01	01	1.0	-	-	-	-	-	-	-	-	-
Mangaldai	21	21	1.0	41	41	1.0	02	02	1.0	-	-	-	-	-	-	-	-	-
Total	76	76	1.0	140	140	1.0	08	08	1.0	-	-	-	16	16	1.0	-	-	-

N.B. :- 1 = Total No. of facilities
2 = Villages having facilities
3 = Intensity of the facilities/functions.

(b) Transport Facilities : An optimal spatial organisation of transport facilities infact, plays the utmost role in the process of balanced regional development over the space. According to the existing pattern of spatial distribution of transport facilities in the district, cutcha (Unmettaled) and pucca(Mettalled) roads, railways etc. can be taken as the basic forms of transport infrastructure of study area. In the existing form, the total lengths of the roads in the district is 1355.631 km. of which 143.151 km. is pucca(mettaled) and 1212.480 km. is cutcha(unmettaled) road in the district (1990 figure). One metre-gauge railway line is passing through the northern part of the district on which Paneri, Udalguri and Mazbat centres are located (Fig. -3.1).

(iv) Market Facilities :

Markets are those viable locations that deals with the movement of man and supply of finished goods among settlements. Market centres emerge only after goods begin to move to consumers in exchange system surpassing the limits of the household unit or the immediate social group(Barry, 1967). On the basis of size and functional nature, the market facilities of the district have been categorised into three broad heads : (i) Weekly, (ii) Bi-Weekly and (iii) Daily (Regular) markets.

It is obvious that the flow of goods and the sound resource base for production activities are among few of the important factors that determine the location and evolution of the market centres. A weekly market is, primarily, a weekly assemblage of local traders, held once, while Bi-weekly is held twice in a week. Here, daily market is considered as market held daily. In village, isolated retail shops however, play an important part for the fulfilment of ordinary but basic needs of the villagers.

The district had 94 weekly markets in 1971 located in 94 settlements ranging from 7 in Udalguri to 29 in Paneri. Paneri was recorded highest in market facilities in the district during 1971. While, in 1991, the total number of market facilities have decreased to 42 mainly due to non-availability of latest data especially for Tea Estates and Mazbat Block. During 1971, there was only 6 Bi-weekly markets which have increased to 13 in 1991(Fig. 3.1 & 3.2). Daily markets were available during 1971 in the district. But in 1991, 19 daily markets are recorded in the district (Table -3.9).

Table -3.9 : Locational Intensity of Market Facilities in Darrang District (1971 and 1991)

Name of the Police Station	Weekly Market						Bi-weekly Market						Daily Market					
	1971			1991			1971			1991			1971			1991		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Paneri	29	29	1.0	10	10	1.0	01	01	1.0	04	4	1.0	-	-	-	01	01	1.0
Dalgaon	20	20	1.0	03	03	1.0	05	05	1.0	03	3	1.0	-	-	-	04	04	1.0
Kalaigaon	12	12	1.0	10	10	1.0	-	-	-	03	3	1.0	-	-	-	07	07	1.0
Mazbat	17	17	1.0	N.A	N.A.	N.A.	-	-	-	N.A.	N.A.	N.A.	-	-		N.A.	N.A.	N.A.
Udalguri	07	07	1.0	09	09	1.0	-	-	-	02	2	1.0	-	-	-	01	01	1.0
Mangaldai	09	09	1.0	10	10	1.0	-	-	-	01	1	1.0	-	-	-	06	06	1.0
Total	94	94	1.0	42	42	1.0	06	06	1.0	13	13	1.0	-	-	-	19	19	1.0

N.B :- 1 = Total Number of facilities
2 = Villages having facilities
3 = Intensity of the facilities/functions

It is interesting to note that most of the weekly markets are held on Saturdays and Sundays, and bi-weekly markets are held on Sundays/Wednesdays and Tuesdays/Saturdays. Daily markets are generally held in the areas where local resource goods are available in the main towns/urban areas. In the district, however, the frequency of distribution of market facilities by settlement as well as population size does not correspond to each other. Barring few exceptions, almost all the three types of markets are located in the areas where the surplus production are available in the area.

(v) Power Supply and Other Facilities :

In addition to road linkages, one of the major prerequisites for the development of the area is electricity. The several inter-linked activities such as - industries, trade and commerce, health and educational institutional generally depends on the function of the electricity. Electricity, like water and roads thus become prerequisite for industrialisation. In the early few decades, the district though was not adequately forcilited by power supply(electricity, little progress in power supply has been seen in the district where about 1219 villages have been electrified (1981-91 figure) so far. On the other hand, other facilities like water supply facilities through various schemes have also been seen emerging out simultaneously. The 1990 records reveal that, of the total of 1216 villages already

been supplied by water facilities, about 211 villages have been covered by pipe water supply scheme and about 903 villages have been covered by hand tube well schemes in the district. Ring well facility covers only 89 villages in the whole district. The district, therefore, seems lacking in these facilities for which more electricity as well as water supply facilities are needed in the district for the future development of the area.

In the above passages, the density and locational intensity of socio-economic facilities have been described. But the discussion can be extended to corelate the distribution of these facilities with the population size of the settlements in the district which have been given in the following part.

(B) DISTRIBUTION OF SOCIO-ECONOMIC FACILITIES IN RELATION TO POPULATION :

It is generally felt, that the development of an area or region or a country, to a major extent, depends on its agricultural development. In spatial context, any element or phenomena has specific inter-relationships of its own especially in the spatial distribution of amenities/facilities. Infact, population is such a prominent factor that plays an important role in the process of development (Sharma and Shastri, 1984). On the other hand, the state of spatial distribution of social facilities in an area reflects its socio-economic development.Further, the distribution of socio-economic facilities also depends greatly on settlement size. Therefore, the size, function and distance relationships of settlements are also among those important attributes that determine the distribution of facilities.

After comparing the distribution maps of population size and the distribution of socio-economic facilities(fig.-2.2, 3.1 and 3.2), following salient features of the distribution of socio-economic facilities in relation to population size are emerged out.

(i) In 1971, most of the facilities of higher levels like Medical, Educational and Postal are located only on a few locations, where the population size of the settlements are extremely large and are well connected with pucca roads. Mangaldai, Kharupetia, Mazbat, and Sipajhar which are located on the National Highway have the higher locational intensity and higher degree of availability of each and every facilities. In the central parts of the district, Tangla, Udalguri and Kalaigaon are the main centres where these facilities are concentrated.

(ii) In the northern as well as in the southern most parts of the district, these facilities are, however, unevenly distributed mainly because of the areas occupied by Tea Estates in the northern most parts and flooded areas of the Brahmaputra river in the southern most parts in the district.

(iii) During the last decades, there has been a gradient change in the patterns of socio-economic facilities from concentrated patterns to more diversified ones. Because of rapid growth of the population especially in the settlements located on the southern parts of the district, the educational as well as medical and even postal facilities were extended in these areas. But it is noticeable that, in the northern parts of the district, a few centres are emerging out, where these facilities have been extended on the small population size.

(iv) The distribution of socio-economic facilities for 1991 as compare to population size* reveals that, most of the facilities like medical, educational, postal facilities and other important market centres are located mainly along with the National Highway and along the main roads of the district. It is noticeable that, Mangaldai, Kharupetia, Tangla, Udalguri which are located on the National as well as State Highways have the higher number of these facilities. The locational intensities of these facilities are also much higher than the other parts or areas of the district. Most of these facilities are however, highly concentrated mainly in the western parts of Mangaldai Thana area and in the central parts of the district.

In the following passages these facilities are interpreted more elaborately in relation to the transport network and road accessibility of the district.

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* Population size for 1971 is taken into account because of non-availability of population figures for 1991.

(C) DISTRIBUTION OF SOCIO-ECONOMIC FACILITIES IN RELATION TO ROAD ACCESSIBILITY :

It is well known fact that, the patterns of transport of a region deal with its nature of the existing transport network, transport road accessibility and traffic flows. Infact, the rail and road networks are the general phenomena to reflect the characteristic patterns of transport infrastructure, dealing with the layout, nodality and density of the road network. The density of roads explains the relation between the road network and the area or population of the given region. But in the present study, this transport road accessibility of the district has been taken into consideration to identify the distribution of socio-economic facilities in relation to the areas occupied by the road accessibility as well as its nature of distribution. Here, for the present study, road accessibility index have been categorised as High accessibility (upto 3 Kms.), low accessibility (3 to 6 Kms.) and inaccessibility (above 6 Kms.) (fig. 3.5 and 3.6).

On analysing the characteristics of the existing patterns of transport network in the district, it is observed that almost all the roads including National Highway and State Highways are either directly or indirectly related to the distribution of the socio-economic facilities of the district. Mangaldai, Kharupetia and Dalgaon are the three main centres

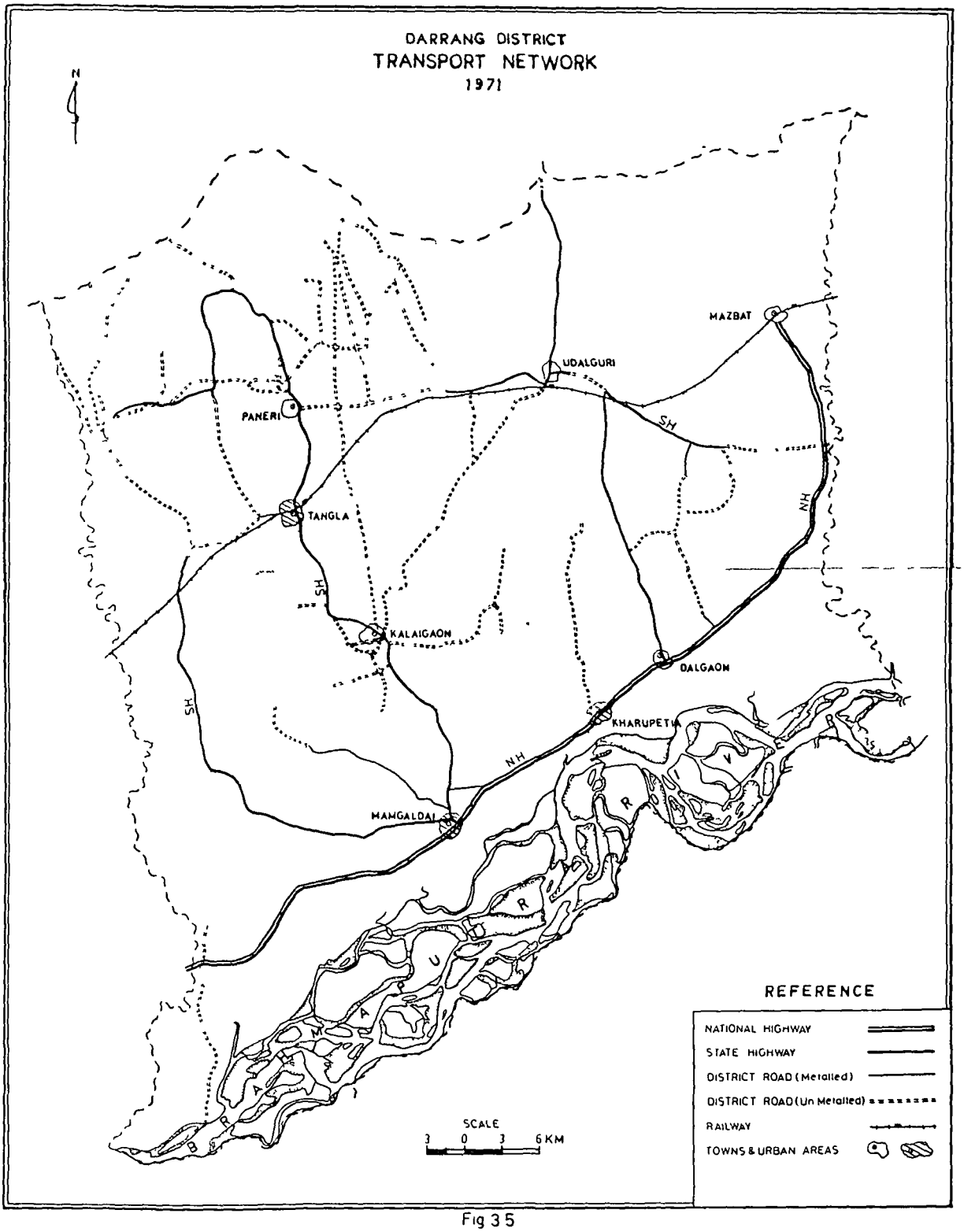
DARRANG DISTRICT
TRANSPORT NETWORK
1971
N
MAZBAT
UDALGURI
PANERI
TANGLA
KALAIGAON
DALGAON
KHARUPETIA
MANGALDAI
SH
NH
SCALE
3 0 3 6 KM
REFERENCE
NATIONAL HIGHWAY
STATE HIGHWAY
DISTRICT ROAD (Metalled)
DISTRICT ROAD (Un Metalled)
RAILWAY
TOWNS & URBAN AREAS

Fig 35

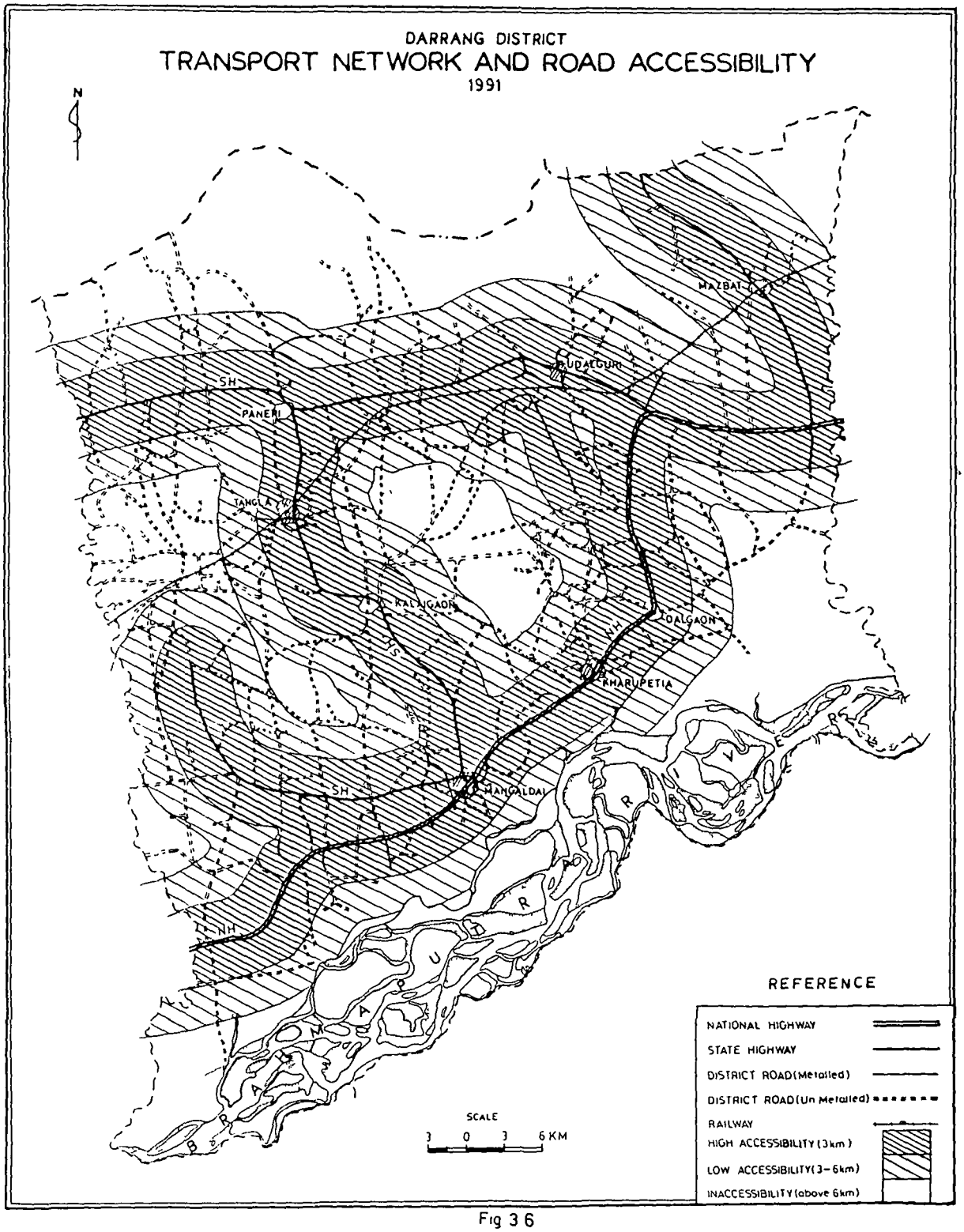
DARRANG DISTRICT
TRANSPORT NETWORK AND ROAD ACCESSIBILITY
1991
N
MAZBAT
UDALGURI
SH
PANERI
TANGLA
KALAIGAON
DOALGAON
KHARUPETIA
SH
MANGALDAI
NH
SCALE
3 0 3 6 KM
REFERENCE
NATIONAL HIGHWAY
STATE HIGHWAY
DISTRICT ROAD(Metalled)
DISTRICT ROAD(Un Metalled)
RAILWAY
HIGH ACCESSIBILITY (3km)
LOW ACCESSIBILITY(3-6km)
INACCESSIBILITY (above 6km)

Fig 3 6

located on either side of the National Highway. While, Mazbat, Udalguri, Paneri, Tangla and Kalaigaon are the centres located on the State Highways. It is clear that each of these centres have higher number of road connectivity. It is because of high degree of road accessibility. In the district, more than 50 per cent area is either under very low accessibility (3 - 6 Kms.) or inaccessibility (above 6 Kms). These inaccessible areas are located mainly along with the Brahmaputra river, most of the northern parts of the district and central parts (3-6 Km.). In these areas of low degree of accessibility mostly the primary schools are located, other facilities are not available. It is obvious from the distribution of socio-economic facilities that, more than 80 per cent of these facilities are concentrated mainly along with the roads where the degree of accessibility are remarkably high. It can therefore be said that, there is a high positive relationship between the road accessibility and the distribution of the socio-economic facilities.

In the end, it can be concluded that, the spatial distribution of socio-economic facilities have a positive relationship with the transport network and road accessibility. The synthetic view of the distribution can be explained by aggregating the centrality scores of the main centres of the district and then the nature of the distribution can be explained which would be interpreted in the next Chapter.

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C H A P T E R - IV

CHANGING CENTRALITY PATTERNS

CHAPTER - IV

CHANGING CENTRALITY PATTERN

INTRODUCTION :

In the preceeding Chapter, the distribution of each and every amenity/facility has been described in relation to its various aspects. It refers to the analytical aspects of socio-economic amenities/facilities and its areal patterns are also the better expression of the distribution. It would produce the inherent characteristics of distribution according to the functional hierarchy of the main centres existing in the district. It would give the better base to choose the strategic nodal points for the balanced development and future growth of the socio-economic facilities in the area. The centrality in this context is defined by the size of population or by the size of its catchment area and major socio-economic facilities/amenities available in the centres. Usually, the importance of a place is defined by its population as well as functional size. In the classical central place theory, centrality is defined as the functional importance of a settlements over the other settlements surrounding the centres. According to Christaller (1933), one of the key aspects of the theoretical formulations brought in the sharp focus by central place theory is the regularities of distribution and hierarchical arrangements of functions in a region. It is generally based on certain assumptions, viz., (1) Uniformity of physical and cultural landscape in the region,

(2)Unbounded unit area, (3)Equal accessibility in all directions and (4)Rationale consumer travel behaviour(Rao,1972). But, the isotrophic surface as Christaller assumed is not normative in the conditions available on the earth. Therefore, the classical theory of central places has failed to explained the real conditions of the distribution of centrality patterns.

Centrality as such, therefore, is the collective attractive power of all the central functions present on a centre. The measurement of centrality, therefore, implies a conscious consideration of the central functions. There is infact no fulproof method of selecting the variable for studying centrality. Selection of central functions from a wide range of services and activities assumes critical importance, as difficult to assess the relative role of individual function to the centrality of a settlement.

Considering the characteristics of the nodal centres of the area as defined in the above passages, the main attention in this chapter is focussed :

(i) to identify the nodal points, i.e., called centres of the area,

(ii) to find out the composite picture of amenitues/facilities available on these centres, and

(iii) to analyse the salient features of the centrality patterns, so that the strategic centres of the area may be identified.

Infact, once the functions are selected, the task involves is to rank them objectively in relation to their importance and from the standpoint of their relative contribution to the centrality of the places or centres in which they are located. Infact, functions are not obiquiteous in nature. Therefore, we will have to select some locations for the detail study. The moment we pick up certain functions from hundreds of them without protesting their credentials the central functions and services, we unintendingly, land in the unavoidable subjectivity. It is always therefore, safer to consider as many functions as possible to arrive at a composite and representative picture of centrality of the places.

METHODS :

A good number of studies conducted on central place systems of various regions have used different centrality indices suiting their own purpose and scope of investigations. The question therefore, arises their closeness with the meaning ascribed to the concept of centrality. Centrality is defined as the functional importance of a settlement over others surrounding it. There are however, no standard formula for measuring the centrality or the functional importance of the settlements or the central places. Even, Christaller's measure of importance which is based on telephone calls and weighted by telephone densities was not based upon purely objective method of ranking. Berry and Garrision (1958) correlated settlement population with number of occurances of the activities

and used the estimating equation to compute the size and which occurance should be formed. The rank of an activity was defined at its order of entry points in terms of population. Haggett and Gunwardena(1964) estimated the settlement size at which possibility of finding of an activity was greater than .5. Berry and Barnum (1962) applied the factor analysis and incidence matrix of activities and places and ranked the activities of their scores on the component for identifying the continum of activities. In India too, Datta and Banarjee(1970) have computed a composite index of transportation development which has been aquated as conforming to the hierarchy of central places in West Bengal. Singh(1968) on the other hand, has considered the number of persons engaged in secondary and tertiary activities to work out the relative and absolute centrality indices.

Keeping in view the above methods as well as centrality indices, the first and foremost step in the present study requires consideration and adoption of a suitable and objective method for ranking centrality patterns or central places in the study area. In doing so, centrality as stated in the above passages in relation to its characteristics the techniques employed in the present study fall under the broad category of methods which have used the concept of 'threshold' as the basis of functional importance and its entry points. Berry and Garrision introduced the term threshold mainly to described the amount of purchasing power to support a function or service. But here in the present Chapter, the term threshold has been used to see the lowest level of population at which a given

function occurs. By examining a number of central places and their functions and arranging the centres in decending order of population the threshold population could be work out. Threshold population of different functions/facilities usually differs but tends to increase according to the importance of the functions.

On the basis of threshold population of each and every facility, the main centres have been choosen and later on their functional significance has also been tested.

After identifying the main centres of the area, the second task is related to how the various amenities/facilities can be be added together, because they vary in their nature. For the same, various criteria of aggregation or preparing the composite centrality index have been given by many geographers. Wanmali (1972) applied arbitrary weightage method for preparing the composite index. He gave the weightages according to the standard of the facility. For instance, the primary school is the lower order facility of education than college. He assigned weight 1 for primary school and weight 4 for college. But this criterion of assigning the weightages to the facilities/functions does not seem useful because the importance of a particular function is directly related to its locational position, not its status. In one area, suppose, there is only one college and all the children of interior area are coming to avail that facility there, thus, the importance of college is much significance. If the same facility is available

at two or three centres, its significance will be less. Therefore, the importance of facility is related to its locational importance. Particularly in the studies of spatio-functional organisation, a distance is an important factor. Therefore, locational importance of a particular facility is the suitable criteria for assigning the weightages.

Bhatt and Others (1976) stated the greater the scarcity, greater the importance in terms of centrality. As a result, the higher relative weightages should be given to such facility. By dividing the total number of the settlements by the number of the centres having the facility, the relative weightage for each and every facility have been calculated. Secondly, the total centrality score of a particular location is calculated by aggregating them. The present concept of finding out the centrality scores has been statistically given by Bhatt and Others(1976) in the following manner :

$$W = (N/F_i) \text{ and } C_j = \sum_{i=1}^{k} W_i X_{ij}$$

where, $i = 1, 2, 3 \ldots k$ for centres having facilities,

$j = 1, 2, 3 \ldots N$ for total number of the settlements,

F = number of the centres having facility,

W = functional weightages,

C = composite value,

X = frequency of the facility on the centres.

The third question is related to the methodological aspects to show the distribution according to the functional hierarchy of those centres which have been included in the present study. The horizontal and vertical distribution have been shown by preparing the graphs and distributional maps. The salient features of the distribution are high-lighted by emphasising the regularities of the distribution. Although, rank-size rule has been applied intensively in the urban studies to express the features of city system; yet it explains the spatial regularities of central points. Therefore, it can be/has been employed for showing the vertical arrangements of the centres of rural areas. Infact, urban and rural centres have a continous chain of centrality which creates some regular features. Therefore, this method is applied for interpreting the results of rank-size regularities coming up in the Darrang District. Further, the centrality scores and population size attributes are put according to their ranks and the distribution is shown by the heop of graphs. The 'q' values for the distribution of centrality scores and population size are calculated with the help of applying rank-size formula, which has already been given in the Chapter-I. The horizontal distribution of these central places are also done by putting the related data on the graphs. It is obvious that the scattered diagrams of distribution of these centres would give the clear cut clusterisation. With the help of this cluster approach of the graphic method, the total centres of the district are classified into four categories. The salient features of these various functional levels have been described separately in the next part of this Chapter.

INTERPRETATION:

Spatial interaction is essentially a process in functional organisation of an area. The distributional patterns of settlements of an area, being relatively stable, set the basis of functional organisation. The location which have facilities would be selected. They would be called centres/nodes of the area. The factors that promote the formation of nodal centres and their spatial patterns of distribution and interactions are mainly based on the quality of resources and the extents of its utilisation and its variations in space over time. In the light of above methodological approaches, the changing centrality patterns have been studied in the present discussion in following manner. Infact, the size, function and distance relationships of places of location are among these important factors that determine the spatio-functional organisation of the area. The functional masses of the centres, not only reflect the functional availability, but also determine its states of development in vertical succession.

(i) Threshold Population :

In the present study, in order to overcome the theoretical difficulty in measuring the relative value of the variety of functions/facilities, the concept of population threshold indices has been followed. Generally speaking, the minimum population which is necessary for establishment of a particular service is known as the

threshold size of the service. Infact, this is the lowest level of population at which a given function occurs. Threshold population of different function varies, but tends to increase according to the importance of functions and generally increases in the number of functions with the increase in the functional size of the centres.

The concept states that, there is a range of population size for each function, value the lower limit of which all settlements lack that function, while above its upper limit all settlements possess it. Following the same criterion of the threshold population for each of all the existing 21 major socio-economic facilities/amenities distributed among settlements of the district the threshold population for each facility has been computed (Table-4.1). It ranges from 97 persons each in case of High School. Higher Secondary School, Hospital, Health Centre, Post Office, Pucca Road and Cutcha Road located in Kharupetia under the Dalgaon Police Station to 12,150 persons as maximum for the facility of the location of District Head Quarter (Table - 4.1).

Table - 4.1 : Threshold Population of Various Amenities/ Facilities

Facilities	Threshold Population	Name of the Village and Police Station
A. EDUCATIONAL :		
i) Primary Schools	97	Kharupetia (Dalgaon P.S.)
ii) Middle Schools	187	Tengabari Bagicha (Kalaigaon P.S.)
iii) Higher School/ Higher Secondary Schools	97	Kharupetia (Dalgaon P.S.)
iv) College	1,054	Duni (Mangaldai P.S.)
B. MEDICAL :		
i) Dispensary	234	Paneshuli (Paneri P.S.)
ii) Hospital	97	Kharupetia (Dalgaon P.S.)
iii) M.C.W.	291	Ramhari (Mangaldai P.S.)
iv) F.C.	393	Mazbat Station (Mazbat P.S.)
v) H.C.	97	Kharupetia (Dalgaon P.S.)
C. POSTAL SYSTEM :		
i) Post Office	97	Kharupetia (Dalgaon P.S.)
ii) P.T.O.	393	Mazbat Station(Maxbat P.S.)
iii) Phone	393	Mazbat Station(Mazbat P.S.)
D. POWER SUPPLY :		
i) Electricity	-	-
E. COMMUNICATION :		
i) Pucca Road	97	Kharupetia (Dalgaon P.S.)
ii) Cutcha Road	97	Kharupetia (Dalgaon P.S.)
F. MARKET :		
i) Weekly	119	Kowpati grant No.1(Dalgaon P.S.)
ii) Bi-weekly	291	Ramhari(Mangaldai P.S.)
iii) Daily	158	Khoirabari (Paneri P.S.)

Contd/-

Facilities	Threshold Population	Name of the Village and Police Station
G. ADMINISTRATIVE:		
i) District Head Quarter	12,150	Mangaldai (Mangaldai P.S.)
ii) Thana Head-Quarter	393	Mazbat Station (Mazbat P.S.)
iii) Block Head Quarter	420	Khairabari (Paneri P.S.)

Abbreviations : MCW = Maternity and Child Welfare Centres
F.C.= Family Planning Centres
H.C.= Health Centres
PTO = Post and Telegraph Office

The computed threshold population value for the facility of primary school is 97 persons for the district. It shows that in existing conditions, on an average, a settlement with a population of 97 inhabitants is being served by a primary school in the district. In other words, it can be stated that a settlement having a population of 97 persons is supposed to sustain the location of a primary school in the existing state of the spatial organisation of the district. Similarly, it is observed that a settlement with the population of 187 inhabitants is being served by a middle school in the district. While, college facility is available at the minimum of 1054 persons in a settlement in the district. In general, it can be stated that the lower order facilities are available upto the minimum level of 97 inhabitant centres. But the administrative facilities are available only on a few locations, namely, district head quarter and on police head quarters. As a result, the centrality of these higher order centres must always be higher than the others. The threshold population of various facilities/amenities would be helpful for identifying the centres/nodes of the area.

(ii) Identification of the Centres:

Identification of the centres, at the very outset, needs to determine some quantifiable personality of each centres or settlements existed in the area and their inter-relationships among the functions. For identifying the centres in relation to

availability of facilities, many may consider the analytical base on the actual distribution of the types of actual functions/facilities and the number of establishments under each type at every central place. But in the present study, to remove the short comings in the identification of the centres and their facilities, first of all simply the total number of the facilities of the district from which each and every considered facilities have been gathered. Secondly, percentage shares of amenities/facilities have also been computed in order to secure the composite centrality scores of the facilities in the district (Table - 4.2).

Table - 4.2: Percentage share of Amenities/Facilities incorporated in the study.

Facilities	Total No. of Facilities in the District	No. of Facilities considered	% of facilities incorporated
A. EDUCATIONAL:			
i) Primary School	349	268	19.87
ii) Middle School	195	109	55.90
iii) High School/ Higher Secondary School	210	127	60.48
iv) College	19	11	57.89
B. MEDICAL:			
i) Dispensary	16	15	93.75
ii) Hospital	13	18	61.54
iii) M.C.W.	03	03	100.00
iv) F.C.	14	13	92.86
v) H.C.	226	73	32.30

Contd/-

Facilities	Total No. of Facilities in the District	No.of Facilities considered	% of facilities incorporated
C. POSTAL SYSTEM :			
i) Post Office	140	81	57.86
ii) P.T.O.	N.A.	N.A.	-
iii)Phone	N.A.	N.A.	-
D. POWER SUPPLY :			
i) Electricity	1219	-	-
E. COMMUNICATION :			
i) Pucca Road	344	33	9.59
ii) Cutcha Road	1113	122	10.96
F. MARKET :			
i) Weekly	42	30	71.43
ii) Bi-Weekly	13	12	92.31
iii)Daily	19	07	36.84
G. ADMINISTRATIVE :			
i) District Head Quarter	01	01	100.00
ii) Thana Head Quarter	06	06	100.00
iii)Block Head Quarter	06	06	100.00

Abbreviations : MCW = Maternity and Child Welfare Centre
FC = Family Planning Centre
HC = Health Centre
PTO = Post and Telegraph Office

Having been computed the percentage shares of the facilities incorporated in the present study, it is observed that more than 80 percent shares of the facilities have emerged out in the present study. The computed Table 4.2 shows clearly that the percentage share of most of the educational facilities have recorded more than 50 percent in the district. Even in the case of medical facilities more than 60 per cent of the facilities are being considered.

For market facilities 71.4 per cent of the total location having this facilities is incorporated for weekly markets. Out of 13 total bi-weekly markets 12 have been incorporated which are available on the existing centres. But, 7 out of 19 daily markets are accounted for in the present domain of the centrality criteria. All the administrative facilities have been incorporated on 100 per cent basis, because they are higher level function and playing the significant role in the distribution in the area.

Total 97 centres have been identified for 1971 where more than 2 amenities/facilities are available. Considering the same criterion of selection of the centres, 127 centres have been choosen for 1991. Infact, these centres have more than 80 per cent strength of the total amenities/facilities available in the district. The distribution of the aggregated picture of amenities/facilities available on those centres is shown by giving the relative weightage to each and every facility and aggregating them into a single index.

(iii) Weightages :

There are several methods to work out the relative importance of functions/facilities based on the approaches of weighting and ranking the given functions according to one's choice or individual's normative decision. Here in the study, for computing the importance of functions, weightages have been worked out separately for all the 21 major amenities/facilities as given in the Table - 4.3. Considering the areal importance of a particular facility, relative weightages(W) given to each of the functions have been calculated with the help of formulae given by Bhatt and Others(1976). It has already been described in the earlier part of the Chapter.

Keeping in view the above mentioned weightages formulae, weightages for each of all the existing 21 amenities/facilities distributed among centres of the district has been computed (Table-4.3). The functional weightages ranging from 1.09 in case of primary school to 1345.00 as maximum for the administrative facility of district head quarter. Similarly, weightages value for the remaining facilities/amenities have also been calculated following the above method. It is observed that, the weightage values of particular facility decreases with the increase in the number of centres having facilities and vice-versa. An striking feature of the resultant weightages is that, higher the number of centres having facilities, lesser the value of its

Table-4.3 : Major Functions/Facilities and Weightages

Facilities	Total No.of Centres having Facilities	Total No.of Settlements = 1345 Weightages
A. EDUCATIONAL:		
i) Primary School	1228	1.09
ii) Middle School	171	7.87
iii) High School/Higher Secondary School	168	8.01
iv) College	13	103.46
B. MEDICAL :		
i) Dispensary	16	84.06
ii) Hospital	13	103.46
iii) M.C.W.	03	448.33
iv) F.C.	14	96.07
v) H.C.	223	6.03
C. POSTAL SYSTEM :		
i) Post Office	140	9.61
ii) P.T.O.	N.A.	N.A.
iii) Phone	N.A.	N.A.
D. POWER SUPPLY :		
i) Electricity	1219	1.10
E. COMMUNICATIONS :		
i) Pucca Road	344	3.91
ii) Cutcha Road	1113	1.21

Contd/-

Facilities	Total No.of Centres having Facilities	Weightages
F. MARKET :		
i) Weekly	42	32.02
ii) Bi-Weekly	13	103.46
iii) Daily	19	70.79
G. ADMINISTRATIVE :		
i) District Head Quarter	01	1345.00
ii) Thana Head Quarter	06	224.17
iii) Block Head Quarter	06	224.17

Abbreviations : MCW = Maternity and Child Welfare Centre
F.C. = Family Planning Centre
H.C. = Health Centre
P.T.O.= Post and Telegraph Office

weightages exists. For instance, the total number of centres having primary schools in the district is recorded as high as 1228 with its weightage value of 1.09 only. Similarly, in the case of electrified villages the total number of the centres having it is 1229 that are the second highest of the district, is recorded weightage only 1.10. On the other hand, the district level administrative facility has only one centre, which is district head quarter, having the maximum value of its weight, i.e., 1345.00.

(iv) Centrality Scores:

The centrality scores which are assumed by different functions are the indicative of their relative importance which can be used for inter-functional comparison of the hierarchy of central function in the study area. By adopting Bhatt's formula, the centrality scores for each and every centre have been calculated for 1971 and 1991. The formula explains that the weightages value for each and every facility is multiplied by the number of the facility available at each centre and then added together in order to secure the composite scores.

Giving the composite centrality scores of all the facilities according to their relative performance for 1971 and 1991, the centrality scores are observed higher on a few centres only. During the last two decades though the functions/facilities were insignificant in their number as well as in scores, the highest

scores was recorded upto 3231.94, while minimum scores was recorded upto 5.15. Most of these centres having higher density of population had the maximum centrality scores.

In 1971, the centres having the value of centrality scores above 1000 were recorded only in three centres, namely, Mangaldai(3231.94), Upahupara(1255.43), and Kharupetia(1120.2), where the number of the main functions/facilities were recorded 3,5,5, respectively. There was only one centre having its centrality score 586.55 in between 500-1000 scores. But there seems a gradual change in the functional status in all the centres mainly because of changing nature in the centrality scores. It is noticeable here that, most of the centres have remarkably increased in their functions as well as in centrality scores. Even the lower order centres have emerged out gradually. The computed centrality scores of 1991 as compare to 1971 scores reveals the fact that, the higher order of centrality scores has gone upto 10815.55 and minimum scores upto 16.03. It is due to the increase in number of functions/facilities that the centrality scores also increased simultaneously. The distribution of computed scores reveals that the centres having above 1000 scores in 1991 are recorded only at seven centres (APPENDIX-I). These higher order centres are mostly the urban centres and are well connected by metalled roads.

Going through the computed scores for 1971 and 1991, it is found that most of the higher order centres are located alongwith the main roads. The absolute as well as percentage changes in the centrality scores of the centres during the last two decades reveal that, 8 centres have more than 10 times increase in their centrality scores. The highest increase (69 times) has been recorded at Dual centre of which population size is only 1054. It is located on the side of the state highway. Infact, most of these centres which have very high and extremely high rate of centrality scores are located along with the main road sides. Therefore, transport routes are the main channels for the development of the socio-economic facilities in the area (Fig. 4.1 & 4.2.

Out of total 127 central places of the district, the decreasing trends of centrality scores have been recorded on 16 centres. Bhuktabari (-.8 times), Biolabari (-.74 times), Uttat Bhokelikanda (-.68 times), Khairabari(-.59 times), Dosotani(-.59 times), and Bhakatpata(-.52 times) are the noticeable centres for the decrease of the centrality scores. These centres are having above 1000 population. The decrease in the centrality scores may be observed because of changing nature of the socio-economic structure. In 1971, these centres were enjoying higher order facilities, but, are substituted/replaced by low status facilities during the last 20 years of time. The comparative picture of the regularities of distribution has been described separately in the next page of the Chapter.

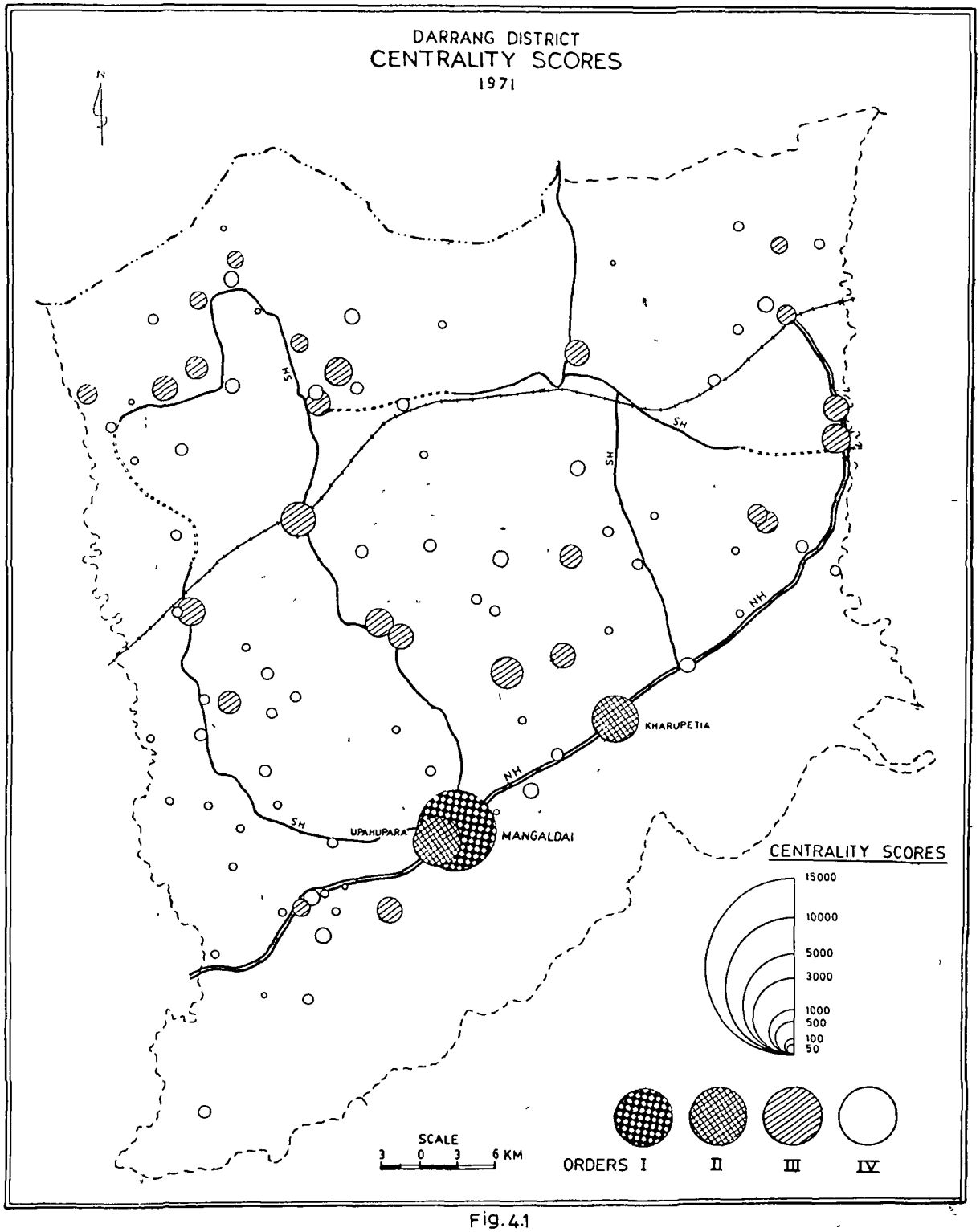
DARRANG DISTRICT
CENTRALITY SCORES
1971
N
MS
SH
SH
NH
NH
SH
KHARUPETIA
UPAHUPARA
MANGALDAI
CENTRALITY SCORES
15000
10000
5000
3000
1000
500
100
50
SCALE
3 0 3 6 KM
ORDERS I
II
III
IV

Fig. 4.1

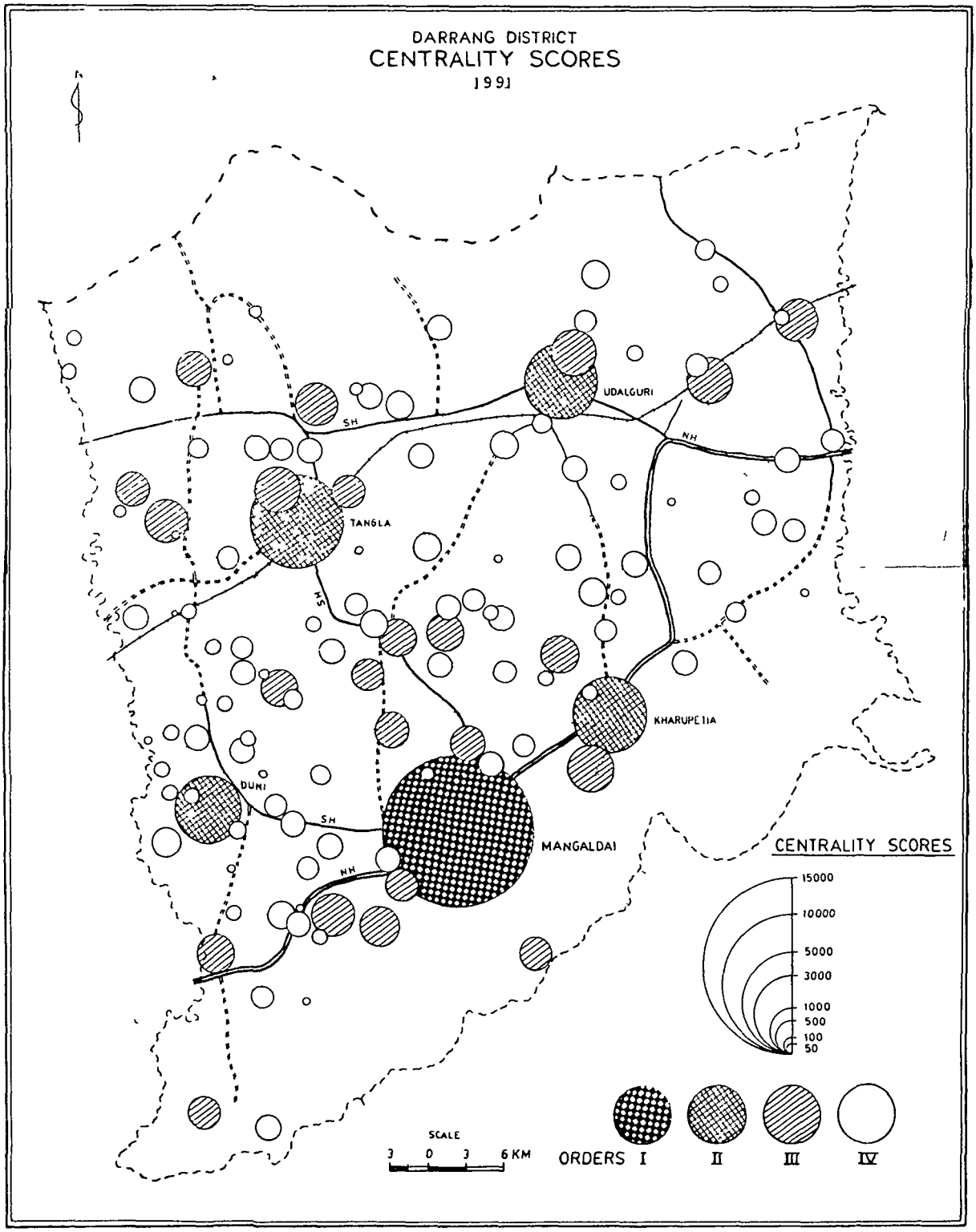
DARRANG DISTRICT
CENTRALITY SCORES
1991
UDALGURI
TANGLA
KHARUPETIA
DUNI
MANGALDAI
SH
NH
CENTRALITY SCORES
15000
10000
5000
3000
1000
500
100
50
SCALE
3 0 3 6 KM
ORDERS I II III IV

Fig. 42

(v) Regularities in Distribution :

It is assumed that the centrality scores are primarily related to the population size of the centres. For testing the validity of this fact, the rank-size rule is applied which would yield the vertical regularities of the distribution. By plotting centrality scores against population on the simple graph as well as logarithmic graph separately for 1971 and 1991, concavity patterns are found in their distribution. After putting them on logarithmic graph, the trend is seen more or less linear and concave at lower order ranks. It is observed that the lower centres are proportionately emerging fast rather than the higher order centres. The gradient of the decreasing trends of centrality scores for 1971 and 1991, which are shown by putting 'q' values show that, there is an insignificant change in the entire setup of socio-economic facilities in the area, because 'q' value of centrality score is -0.554 for 1971 which has been marginally decreased to -0.532 in 1991(Fig.4.3 & 4.4). This decreasing nature refers to the decentralisation of socio-economic facilities. It means that the rate of increase of the functions/facilities are faster at smaller centres (lower) than the bigger ones(higher order). By comparing population pattern with centrality pattern on logarithmic graph, it is found that 'q' value is only -0.355 for population distribution, while the 'q' values for centrality scores are higher. It refers that the distribution of centrality scores in the area is more concentrated on the

DARRANG DISTRICT

RANK-SIZE REGULARITIES

(ON SIMPLE SCALE)

1971 & 1991

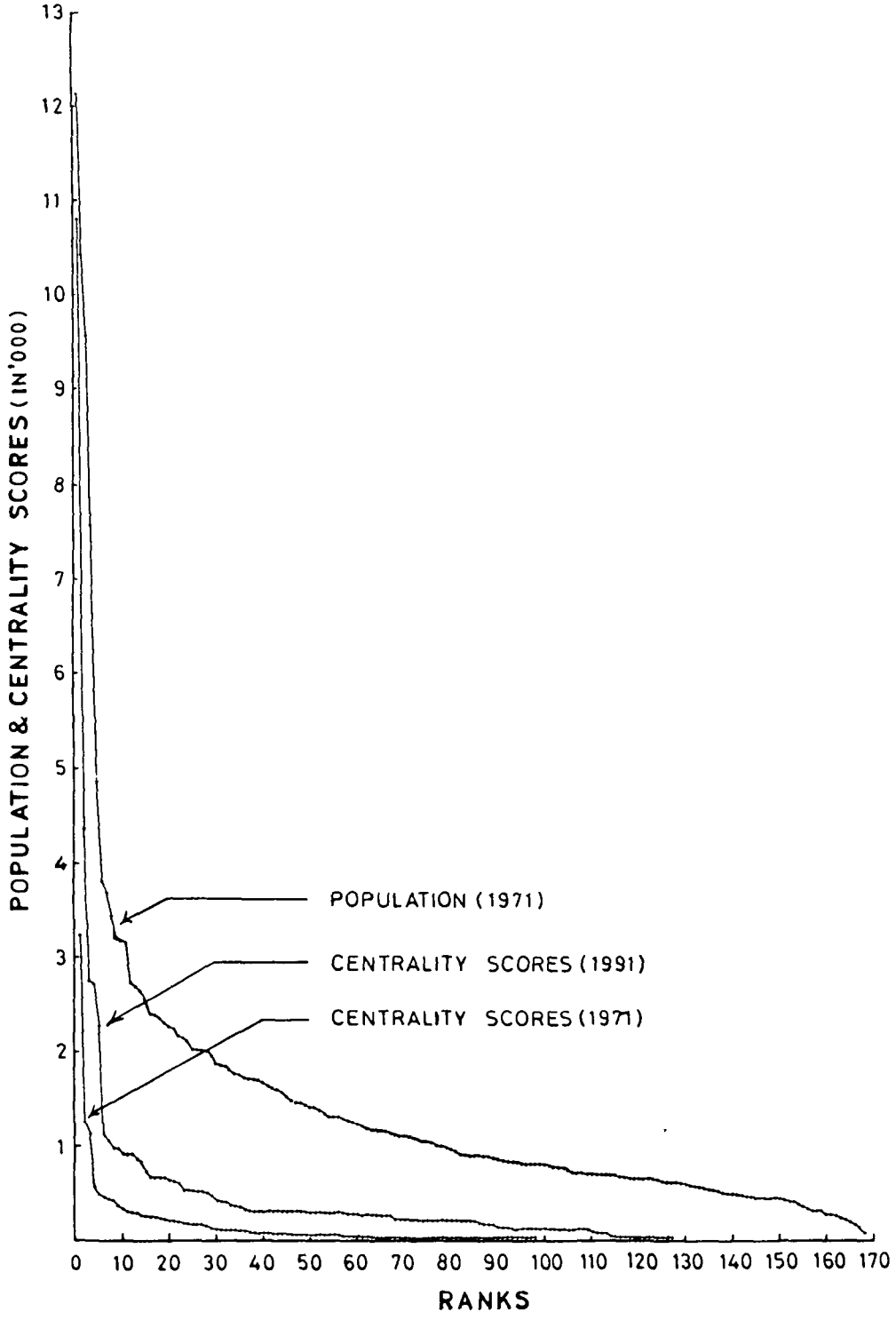

Fig 4.3

DARRANG DISTRICT

RANK-SIZE REGULARITIES

(ON LOG-SCALE)

1971 & 1991

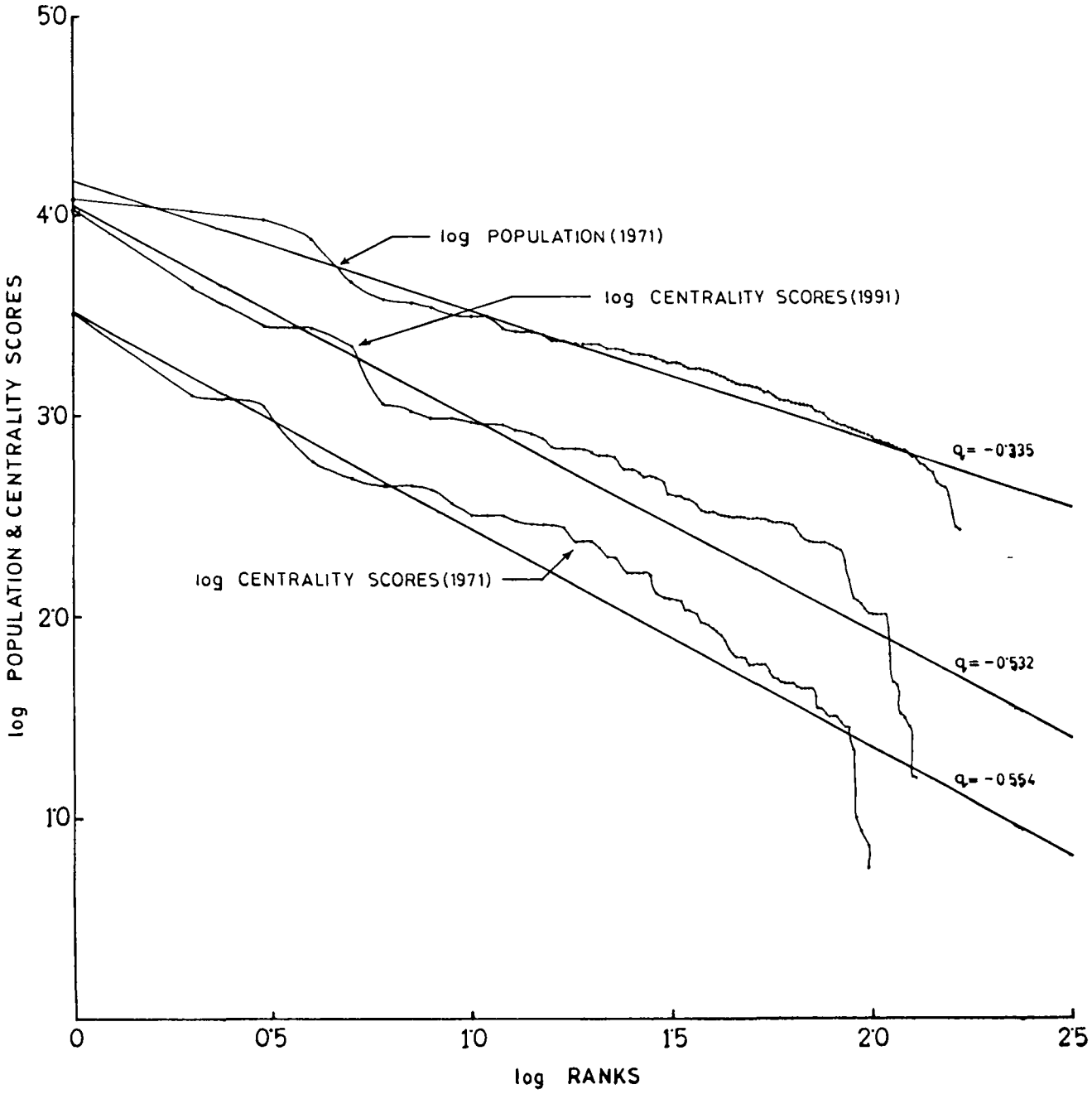

Fig. 44

higher ranked centres than the population distribution. The ranks of the centres according to their computed centrality scores have been explained in the next part of this Chapter.

)vi) Functional Hierarchy :

Infact, variety of functions produces a variety of hierarchic levels based on their individual functional gravity. Thus, the hierarchic order of a function or functions located in a centre reflect the hierarchic level of that centre. Therefore to understand the functional structure and the relative importance of centres of the study area, the identification of the functional classification of socio-economic facilities becomes a significant point of consideration. In the present study, the grouping of the centres has been made on the basis of putting their centrality scores against their population size on the scattered diagrams)Fig.4.5 & 4.6). It would give the clear picture of functional homogeneity of the centres. These diagrams shows that there are four clear cut cluster of the points. On the basis of this clusterisation emerging out in the distribution, the four levels of the functional hierarchy are identified for 1971 and 1991 (Table-4.4). The identified four hierarchic orders of centres dealing with their vertical classification in relation to their distributional and functional characteristics are explained systematically in the following succession.

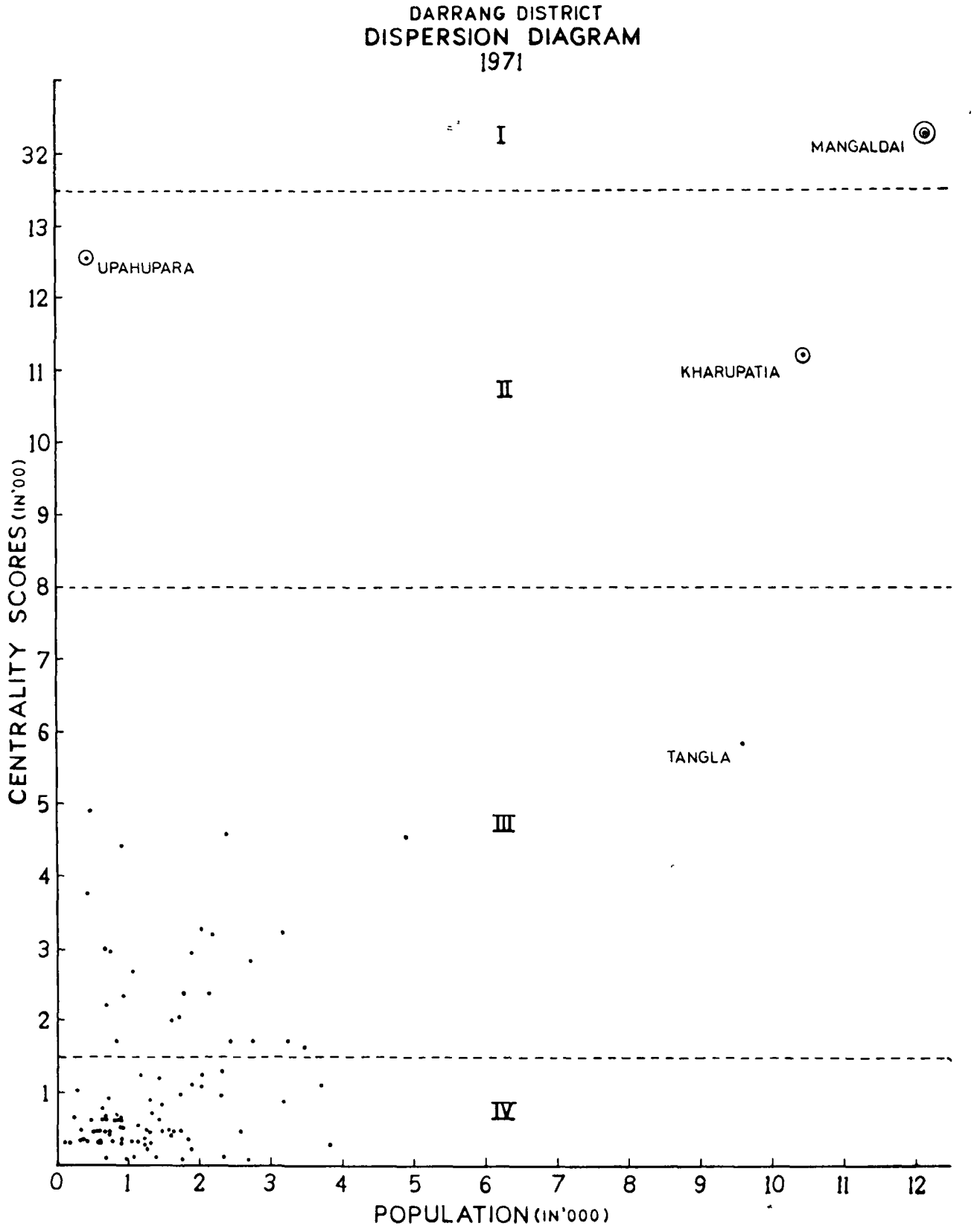
DARRANG DISTRICT
DISPERSION DIAGRAM
1971
I
II
III
IV
MANGALDAI
UPAHUPARA
KHARUPATIA
TANGLA
CENTRALITY SCORES (IN'00)
POPULATION (IN'000)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
32

Fig. 4.5

DARRANG DISTRICT
DISPERSION DIAGRAM
1991

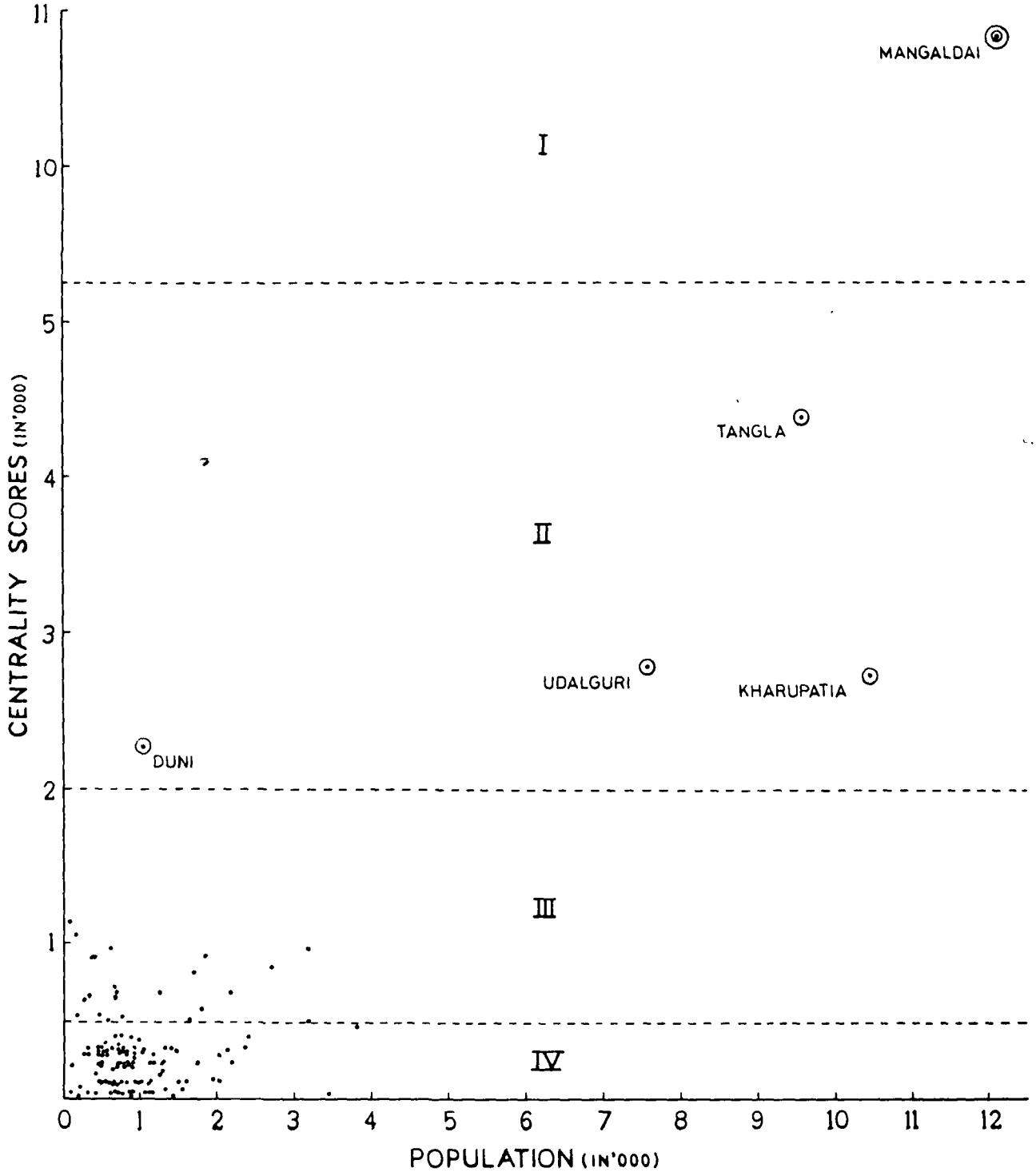

Fig. 4.6.

Table - 4.4 : Nature of Facilities at Various Levels

Orders	Nomanclature	No. of Centres		No.of the facilities available		Nature of the Facilities	
		1971	1991	1971	1991	1971	1991
I	High-Order Service Centres	1	1	10	11	PS.,MS.,HSS.,Col., Hosp.,PTO.,E.,PR., DM,	PS.,MS.,HS/HSS.,Col., Disp.,Hosp.,PTO.,Ph., E.,PR.,DM.,
II	Medium-Order Service Centres	2	4	9	13	PS.,MA.,HSS.,Col., PO.,E.,PR.,KR.,DM.,	PS.,MS.,HS/HSS.,Col., Hosp.,FC.,PO.,PTO.,Ph., PR.,KR.,WM.,DM.,
III	Low-Order Modal Centres	25	23	16	14	PS.,MS.,HSS.,Disp., Hosp.,MCW.,FC.,HC., PO.,PTO.,Ph.,E., PR.,KR.,WM.,BM.,	PS.,MS.,HS/HSS.,Hosp., Disp.,MCW.,FC.,HC.,PO., PR.,KR.,WM.,BM.,
IV	Very Low-Order emerging Nodal Centres	69	99	11	13	PS.,MS.,Disp., Hosp.,HC.,PO.,Ph.,E., PR.,KR.,WM.,	PS.,MS.,HS/HSS.,Disp., Hosp.,MCW.,FC.,HC.,PO., PR.,KR.,WM.,BM
	Total	97	127	-	-	-	-

Abbreviations :- PS = Primary School, MS= Middle School, HS/HSS = High School/Higher Secondary School, Col= College, Disp= Dispensary, Hosp= Hospital, MCW=Maternity and Child Welfare Centre, FC= Family Planning Centre, HC= Health Centre,PO=Post Office, PTO=Post & Telegraph Office,Ph= Phone, E= Electricity,PR= Pucca Road, KR= Kutcha Road,WM= Weekly Market, BM= Bi-weekly Market, DM= Daily Market

The computed Table 4.4 shows that, the highest order of centre in the district recording the 1st Order Service Centres of functional hierarchy has been the same (1) in both the decades namely, Mangaldai Centre attaining its composite score of 3,231.94 in 1971 and 10,815.55 in 1991 as their functional gravity and a population of 12,150 persons (1971). The increase in the centrality score has been recorded more than 3 times during the last two decades. It may be because of changing nature of the socio-economic facilities/functions at these centres. The total number of facilities recorded in this higher order service centre was 10 in 1971. The facilities available are Primary School, Middle School, Higher Secondary School, College, Dispensary, Hospital, Post and Telegraph Office, Phone, Electricity, Pucca Road and Daily market. But the gradual change in the number of facilities from 10 to 11 in 1991 has attained its centrality score as high as 10,815.55. It is interesting to note that the functional facilities in this higher order service centres are mostly of higher order facilities.

In the second order centre 2 out of all the 97 centres of the district in 1971 were belong to the medium-order service centres attaining its centrality scores of 1255.43 at Upahupara and 1120.2 at Kharupetia centres and a population of 468 and 10,448 persons respectively. In this category of centre however, in 1991, the number of centres have been increased to 4, namely, Tangla, Udalguri, Kharupetia and Duni. The highest centrality

scores recorded in these four second order service centres is 4,382.85 and a minimum of about 2263.39. Similarly, the number of facilities available in these centres has also been increased from 9 to 13 in 1991. These facilities are Primary School, Middle School, High School/Higher Secondary School, College, Hospital, Family Planning Centre, Post Office, Post and Telegraph Office, Phone, Pucca Road, Kutcha Road, Weekly Market and Daily Market. Of these four centres, Tangla, Udalguri and Kharupetia are belong to the urban centre while, Duni is situated along with the main road having its population of about 1054. It is emerging as a second order service centre which belong to the lower order centre during 1971.

The functional range of the third hierarchic order of centres ranging its composite scores from 162.66 to 586.55 in 1971 and from 501.7 to 1,138.0 in 1991 includes as many as 25 centres and 23 centres respectively. It is worth observing fact that, all these centres representing 16 facilities in 1971 and 14 facilities in 1991, are located along with the State as well as National High Way roads. These centres are infact, the new emerging centres having its population range upto 3,500. The major recorded facilities in this category are Primary School, Middle School, High School/Higher Secondary School, Hospital, Dispensary, Maternity and Child Welfare Centre, Family Planning Centre, Health Centre, Post Office, Post and Telegraph Office, Phone, Electricity, Pucca Road, Cutcha Road, Weekly Market and Bi-Weekly Market. It is obvious fact that, in 1971 the lower order

facilities were marked on these centres, but during the last 20 years of time, these centres leaving out the lower order facilities have attained higher order facilities/functional. Thus, the number of facilities are decreasing in their changing nature.

The computed Table - 4.4 shows that, 69 out of all the 97 centres of the district in 1971 were belong to the lowest order level, i.e. to the 4th order centre. While, in 1991, 99 centres out of 127 centres have been recorded attaining its centrality scores more than 400.00 and a population of 3,819. These centres are mostly of rural in their nature and are located mainly in the central part of the district. The main facilities recorded in this lower order category are Primary School, Middle School, High School/Higher Secondary School, Dispensary, Hospital, Maternity and Child Welfare Centre, Family Planning Centre, Health Centre, Post Office, Phone, Pucca Road, Kutcha Road, Weekly Market and Bi-Weekly Market. The functional gaps in this category from one centre to the other is remarkably greater than the other orders. It is interesting to note that the emergence of new points or centre are recorded mainly along the road sides. Increasing number of the centres at their level expresses the emergence of new nodal points in the area.

The general patterns of the growth of socio-economic facilities in Darrang District reveals that the main routes are attracting and influencing the emergence of the functional nodalities. As a result, there seems a spatial imbalances in the distribution and the remote areas are not getting rather facilitated by these nodal points. Therefore, a few strategic nodal centres can be suggested for the balanced development in the area which have been described in the next Chapter by concluding the main results of the study.

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C H A P T E R - V

CONCLUSION AND SUGGESTIONS

CHAPTER - V

CONCLUSION AND SUGGESTIONS

In the foregoing Chapters of the study, the introduction of the study area dealing with Conceptual background and Methodology; Resource Personality of the area; Distribution of Socio-economic Amenities/Facilities and Changing Centrality Patterns have been broadly described. It is observed from the avove discussion that the resource structure of the area has played utmost role in shaping the socio-economic facilities. It is also related to agricultural activities, where more than 85 per cent of the working force of the District is engaged in agricultural activities. It is obvious that the entire socio-economic setup of the area too is mainly related to the agricultural resources. Further, it is observed that the distribution of socio-economic amenities/facilities are concentrated only on a few locations, and consequently, the functional patterns are not to that of normative conditions of resource availability. Infact, there seems the functional gaps from one centre or location to the other. It is therefore, necessary to adopt some decision-making processes which can be operated by giving the salient features which would be helpful for persuing the processes related to the selection of new functions or intensification of the existing functional structure and locational choices for balanced growth and proper development of the area.

The initial findings of the present study are mainly based on the inherent characteristics of spatio-functional organisation of the Darrang District. They may be generalised for the entire lower and middle valley of Brahmaputra where the geographical conditions are more or less similar and the locational processes of socio-economic setup are based on the similar spatial organisation. After interpreting the existing spatio-functional organisation, following salient features of the study and a few but important suggestions can be drawn successfully which are described in the following heads :

1. The District Darrang is richly endowed with resources. It is largely a plain region with the hilly periphery in the north. The soil conditions of the district are alluvial and fertile. Because of favourable agro-economical conditions of the area, more than half of the total land area and more than three-fourth share of the workers are engaged in agricultural activities. Therefore, the entire socio-economic setup of the district is related to agricultural activities. It is observed from the distributional maps that, the southern and central parts of the district have intensive paddy cultivation with higher density of population. It is found that the settlements having more than 1000 population in size are located in these areas.

2. The district has long time been one of the important areas for the large scale imigrants population. Consequently, the population has been increased tremendously during the last 20 years of time. The numeral growth patterns of the settlements of the district show that the decadal growth of population since the last few decades have been increased. The patterns of settlements by levels of population density in the district display a significant variation registering the average population of density of 370 persons per sq.km. in 1991. The spatial patterns of distribution of settlements based on their size-grouped of population do not held homogeneity of distribution of phenomena, mainly because of its variations in the physio-cultural persuits in the district.

3. Due to the rapid growth of population, correspondingly, the net sown area have increased by 26 per cent in the same period of time (1970-1 to 1990-1). This increase in the availability of cultivable land was largely due to clearing of the forests, riverine, forest-tracts and reclamation of permanent fallow lands. Of the total working force, more than 85 per cent of the working force is engaged in primary sector, 2.63 per cent in secondary and 11.72 per cent in tertiary sectors.

4. Analysis of the distributional pattern of settlements and the salient demographic characteristics have brought out certain changes to this area. The proponderence of small settle-

ments(1000 persons) and variations in the ratio of small to large settlements within the study area have posed certain imbalances in the distribution of socio-economic facilities. Large size villages located either on or near the main transport lines have set the basis for inequality in their distribution.

5. On classifying as many as 21 primary existing socio-economic facilities of the district into 6 major heads, the spatial analysis determines a variety of patterns of their distribution. The settlements lying in the close vicinity of urban centres show a state of having more facilities rather than the settlements located in the remote areas. The maximum number of the facilities of the district is shared by the medium-size settlements having a population more than 1000 persons. Barring few exceptions, no higher order facilities are located in the settlements having population of less than 500 persons in the district. The urban areas being experienced high level of distribution of facilities and a high density of population have the maximum number of facilities.

6. The areas of rural in their nature of the district are poor in almost all the facilities. Even if it is available, these are mostly of lower order facilities like, primary school. On the whole, starting from the lower order of facilities to higher order facilities are located or concentrated mainly in the urban areas

and in the settlements where road communications are well connected. The northern most and also the southern most parts of the district are quite insignificantly facilitated by these facilities. Other facilities like, medical, postal service are also found located only on a few locations and are confined to some larger-size villages where the size of the population is very high. On the contrary, however, these facilities are also found available in a settlement having a minimum population of 97 persons only. In the district telephone facilities is quite meagre being confined to urban/town areas only.

7. The district also experiences a National High Way as well as State High Ways and a moderate level of roads connected all over the district. But the conditions of the roads in the district is not upto that satisfactory level. Even the railway line(metre gauge) which is crossing through the northern parts of the district shows a low intensity of facilities. The distribution of transport network and the road accessibility shows that, no facilities are available beyond 9 km. of distance either from the National or State High Ways. It is, therefore, observed that almost all the facilities are concentrated within 3 to 6 km. of distance.

8. So far as the market facilities are concerned, there are as many as 42 weekly, 13 Bi-weekly and 19 Daily markets in the district (1991). Weekly markets are held mostly on Saturdays and Sundays and are located in a larger size of settlements having high

density of population. Bi-weekly markets are however few and are held on Sundays/Wednesdays and Tuesdays/Saturdays. Other facilities like water and power supplies are also seen concentrated only on a few locations. Infact, the district is still very much in need of more and better facilities specially the power, water supplies and better communications for the development of the area.

9. But the co-efficient of co-relation between areal intensity of socio-economic facilities and population density is insignificantly negative($r = -.0.025$). It indicates that the areas of high density of population have low intensity of socio-economic facilities. The locational intensity of each and every existing facility in the district is therefore very low. In the case of primary school facilities, Mangaldai Police Station area is recorded highest (1.43 and 1.13 in 1971 and 1991) in both the decades. The district, however, on an average shows declining trend of this facility from 1.23 to 1.10 during the last two decades. Likewise, in high school/higher secondary school and College facilities, except Middle School facilities, the district has shown marginal increase in their locational intensities. Similarly, Medical, Postal Services, and Market Facilities have shown quite fluctuating nature of their locational intensities in the district.

10. There seems a change in the functional structure at various orders of facilities. Higher Order Service Centre(i.e., only one in the district), performs all the facilities related to socio-economic setup, with their high intensities, while, Middle Order Service Centres are changing in their functional structures. Even the Third and Lowest Order(4th) Centres are changing in their functional structures as well as in the number of functions/facilities. The analysis of functional hierarchy shows that there exist a total of 4 hierarchic orders of the centres in the district. The Higher Order Service Centre, i.e. Mangaldai urban centre and the Headquarter of the District which possesses 10,185.55 as the composite centrality scores. In the second order service centres there lie 4 centres out of 127 centres attaining its centrality scores 4,389.85 as the maximum and 2,263.39 as the minimum(in 1991). Of these four centres three centres, namely, Kharupetia, Tangla and Udalguri, constitute the main urban centres. While, third and fourth order service centres are of lower order centres attaining its centrality scores of more than 1,000.

11. The distributional patterns of socio-economic amenities/facilities are not uniform despite of most uniform distribution of resources of the district. As a result, the spatial organisation of socio-economic facilities is more concentrated on a few locations and is not optimal according to the norms of given by Planning Commission, New Delhi.

12. By plotting the centrality scores and population against their ranks, concavity curves/patterns are emerged out in this distribution. At the same time, putting them on the log graph, the trends are seen more or less linear and conves especially at the lower ranks. It indicates that the lower order hierarchic centres are proportionally emerging out fast rather than the higher order service centres. The gradients of these curves which are shown by 'q' values, show that there is an insignificant change in the entire socio-economic setup of the district where 'q' values are recorded as -0.554 for 1971 but marginally decreased upto -0.532 in 1991.

13. On considering the percentage change in the distribution of functional gravity of centres of the district during 1971 - 91, it is observed(Appendix-I) that, about 8 centres have more than 10 times increase in their centrality scores. The highest (69 times) is being recorded at Duni centre(under Mangaldai Thana) and a population of about 1054. On the contrary, decreasing trends of centrality scores are also being recorded at 16 centres. The highest decrease trend is being recorded at Bhuktabari(-.8 times) and a minimum of about -.25 times at Bainara Satra centre. It is also found from the analysis that, there are few centres in the district where no such functional changes have taken place.

Suggestions :

On the basis of the salient features of socio-economic patterns of the Darrang district and the initial findings of the present research as described above, the following suggestions may be put forward for smooth acceleration of locational processes of the area, so that the normative design for proper socio-economic setup can be made.

The proposed facilities by the Planning Commission norms for the year 2001 shows wide gap in a large number of facilities. Only in a few facilities the district seems to be better equiped. Following the normative proposals of the 7th Plan, Government of India, the proposed socio-economic facilities have been estimated for the district for the year 2001. The total population is proposed on the basis of past growth of the population, i.e., 3 per cent annually. According to the average growth rate, the proposed population for 2001 would be 16.72 lakhs, of which 5 lakhs children population would be available at the end of the century.

In terms of educational infra-structure, Table - 5.1 shows that the needs for resource mobilisation will be felt more for providing a large number of Middle Schools followed by High Schools/Higher Secondary Schools. The district seems to

Table - 5.1 Proposed number of Socio-Economic Facilities for 2001

Facilities	Total No.of existing Facilities (1991)	No. of Proposed* facilities for 2001	Differences
A. EDUCATIONAL :			
i) Primary School	1349	2500	1151
ii) Middle School	195	1000	805
iii)High School/ Higher Secondary School	210	500	290
iv) College	19	50	31
B. MEDICAL :			
i) Dispensary	16	35	19
ii) Hospital	13	20	07
iii)M.C.W.	03	120	117
iv) F.C.	14	120	106
v) H.C.	226	750	524
C. POSTAL SYSTEMS :			
i) Post Office	140	220	80
ii) P.T.O.	N.A.	50	50
iii)Phone	N.A.	25	25
D. POWER SUPPLY :			
i) Electricity	1219	1345	126
E. COMMUNICATION :			
i) Pucca Road	344 **	1000	656
ii) Cutcha Road	1113 **	1345	232

Contd/-

Facilities	Total No. of existing Facilities(1991)	No.of Proposed* facilities for 2001	Differences
F. MARKETS :			
i) Weekly	42	60	18
ii) Bi-Weekly	13	25	12
iii)Daily	19	100	81
G. ADMINISTRATIVE :			
i) District Head Quarter	01	01	0
ii)Thana Head Quarter	06	06	0
iii)Block Head Quarter	06	06	0

N.B. : * Proposals are made on the basis of Planning Commission norms.

** Figures are based on 1971 Census

have a well developed Primary Schools infrastructure as compared to Middle and High Schools/Higher Secondary Schools.

The existing health facilities seem to be highly inadequate compared to the requirements by the year 2001. The gap between existing facility and the requirement is phenomenal particularly for the Maternity and Child Welfare Unit as well as the Family Planning Centres. While, the hospitals are fairly distributed in the district. Much resources need to be mobilised for these two health facilities apart from health centres and dispensaries.

The Postal and Communication systems is extremely inadequate except for the Post Offices. Post and Telegraph Offices and Phones facilities are non-existent and is an absolute necessity for which planning needs to be initiated as quickly as possible. At least 80 Post Offices (branches), 50 Post and Telegraph Offices and 25 Phones Centres should be established in the district in the coming ten years period.

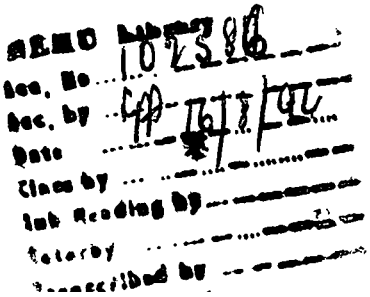
The Power supply position in the district is fairly good at the existing level. However, at least 126 more villages should be electrified, so that all the villages would be electrified in the near future.

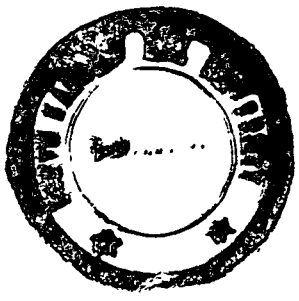
At the existing level, the facilities of Cutcha road is fairly distributed, but the district is poorly serve by pucca roads. The conversion of cutcha roads to pucca roads in the near future would be an important for the development of the district.

Marketing facilities are generally good except for daily and Bi-weekly market ones. Therefore, at least 81 locations for Bi-weekly market should be established in the coming ten years.

The administrative centres like, District Head Quarter, Thana Head Quarter, and Block Head Quarters are however, fairly distributed and are located in the proper places.

In conclusion, it can be said that the spatial organisation of socio-economic facilities in the district is not uniform and ubiquitous in their distribution and it registers a wide variations in the phenomenon of functional distribution of facilities. It further, determines that the district requires more socio-economic facilities to obtain an optimal spatial organisation of these facilities. In the end, it can be said that, the study reflects only the spatial patterns of socio-economic facilities of the district. However, the researches can be extended towards the locational decision making processes in the extended form for preparing the optimal spatio-functional organisation of the district.





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A P P E N D I X - I

Location Code	Name of the Centres	Population	No.of Amenities/ Facilities		Centrality Scores		Changes	
			1971	1991	1971	1991	Absolute	%
1	2	3	4	5	6	7	8	9
(A) PANERI POLICE STATION :								
T-14	Hatigarh T.E.	4,882	7	-	453.95	-	-	-
T-9	Orangajuli T.E.	3,709	5	-	122.17	-	-	-
T-7	Nonoipara T.E.	3,218	6	-	169.59	-	-	-
183	Paneri grant	2,709	6	8	285.88	857.83	571.95	200.07
T-6	Badlapara T.E.	2,587	4	-	45.11	-	-	-
T-12	Bhutiachang T.E.	2,414	6	-	169.59	-	-	-
10	Barangajuli	2,317	3	-	10.74	-	-	-
T-13	Paneri T.E.	2,305	5	-	96.5	-	-	-
T-15	Majuli T.E.	2,035	4	-	109.05	-	-	-
T-3	Barangajuli T.E.	2,013	8	-	327.3	-	-	-
1	Rajagarh N.C.	1,955	-	5	-	124.57	-	-
50	Uttar Dimakuchi No.1	1,783	6	6	238.23	641.95	403.72	169.47
T-1	Atherikhat T.E.	1,733	6	-	204.33	-	-	-
T-5	Dimakuchi T.E.	1,716	6	-	96.11	-	-	-
T-16	Corramore T.E.	1,609	4	-	45.11	-	-	-
104	Thakuriapara	1,407	-	6	-	325.82	-	-
180	Batiamari	1,335	5	4	69.61	66.02	(-)3.58	(-)5.14
20	Dahala chuba	1,234	4	-	31.97	-	-	-
71	Sagunbari N.C.	974	2	-	8.67	-	-	-
206	Bengbari	919	-	7	-	329.40	-	-

Contd/-

1	2	3	4	5	6	7	8	9
112	Mahaliapara	902	6	5	50.46	46:88	(-3.58	(-)7.09
55	Kalikhola N.C.	883	-	5	-	46.88	-	-
24	Pachim Pathar	834	6	-	66.7	-	-	-
T-4	Bamunjuli T.E.	836	6	-	169.59	-	-	-
124	Ratanpur	789	-	7	-	330.91	-	-
142	Parandia	765	-	6	-	531.04	-	-
195	Murmella Gaon	748	-	5	-	239.26	-	-
25	Patala Gaon	699	-	5	-	208.39	-	-
77	Niz Garuajhar No.1	696	2	-	8.67	-	-	-
204	Harishinga Station Block	692	6	9	62.09	404.15	342.06	5 50.91
88	Khagrabari	671	-	6	-	650.26	-	-
3	Atherighat Khoira Grant	647	-	4	-	108.43	-	-
9	Suklaikhuti N.C.	643	-	6	-	325.82	[illegible]	[illegible]
251	Sastrapara	587	4	6	30.66	394.87	264.21	8 61.74
75	Garuajhar No.1	587	-	5	-	312.42	-	-
T-2	Dhergaon T.E.	562	4	-	47.57	-	-	-
191	Dhopguri	533	-	5	-	313.93	-	-
115	Bogpuri	508	-	5	-	237.75	-	-
91	Bhergaon	411	-	8	-	914.47	-	-
235	Barigaon Hatkhola	338	4	6	32.25	325.82	293.57	910.30
T-8	Suola T.E.	337	4	-	47.57	-	-	-
86	Panesheli	334	-	5	-	77.64	-	-
131	Khoirabari	158	-	6	-	1,049.93	-	-

Contd/-

1	2	3	4	5	6	7	8	9
(B)	DALGAON POLICE STATION							
29	Baruajhar No.1&2	2,360	-	5	-	343.38	-	-
10	Daipanpara	2,119	5	6	237.75	325.82	88.07	37.04
82	Dalgaon Thana	2,033	8	7	125.73	286.72	160.99	128.04
103	Bahbari	1,507	-	4	-	107.12	-	-
153	Silbari	1,079	-	4	-	32.25	-	-
50	Barjhar No.1	1,043	4	5	268.51	312.42	43.91	16.35
55	Dalakali Gaon	902	4	-	29.15	-	-	-
27	Jangalpara	901	4	5	34.71	240.77	206.06	493.66
167	Nalbari	835	-	4	-	105.61	-	-
181	Borgora T.E.	814	4	-	61.42	-	-	-
43	Gerua	764	-	4	-	29.15	-	-
30	Baruajhar No.4	752	-	5	-	117.22	-	-
72	Bengali Gaon	739	-	5	-	238.98	-	-
21	Kuari Pukhuri No.2	696	7	9	301.91	714.04	412.13	136.51
174	Dakhin chuba	693	4	-	64.52	-	-	-
49	Jhargaon	685	4	-	221.53	-	-	-
95	Punia No.1	601	-	4	-	106.92	-	-
7	Bechimarimari	510	5	6	46.13	322.72	276.59	599.59
175	Pouripata	498	-	6	-	280.32	-	-
44	Deori Gaon	491	4	-	61.42	-	-	-
41	Sarbaherua	184	4	-	29.15	-	-	-
86	Kowpati grant No.1	119	4	4	29.15	221.25	192.1	659.01

Contd/-

1	2	3	4	5	6	7	8	9
(C)	KALAIGAON POLICE STATION							
135	Gerua Gaon	2,403	8	6	458.25	403.99	(-)54.26	(-)11.84
109	Singimari Bagicha	2,191	8	8	322.99	698.00	375.01	116.11
11	Barbalisitha	1,431	4	3	61.7	16.03	(-)45.67	(-)74.39
55	Santipukhuri	1,316	4	6	89.81	339.22	249.41	277.71
47	Jhar Gaon	1,304	4	5	30.66	236.16	205.5	670.25
182	Bherbheribil	1,300	5	5	45.37	239.26	193.89	427.35
137	Bholabari Gaon	1,174	-	4	-	236.44	-	-
187	Bholabari	1,167	5	4	124.82	31.97	(-) 92.85	(-)74.3
34	Barlakhat	1,164	-	4	-	106.92	-	-
132	Naharbari	1,145	-	4	-	105.61	-	-
59	Nowgaon	959	-	4	-	297.71	-	-
50	Niz Sarabari	928	5	5	239.26	121.83	(-)117.43	(-)49.0
157	Jhilkakhat	887	5	8	62.84	398.01	335.17	533.3
81	Lakhimpur	884	4	4	61.7	223.04	161.34	261.49
174	Barkala Bagicha	837	-	4	-	299.22	-	-
170	Banaguri Gaon	820	-	5	-	311.11	-	-
91	Chenga pathar	738	-	6	-	322.72	-	-
62	Senapatipara	732	4	-	48.22	-	-	-
77	Dalaipara	715	5	4	92.83	47.16	(-)45.67	(-)49.20
80	Bhakatpara	703	-	7	-	684.60	-	-
29	Salaipara	699	4	4	45.11	48.13	3.02	6.70
60	Samatiapara	683	-	4	-	105.61	-	-
26	Sareng	668	-	4	-	107.12	-	-
67	Niz Barampur	615	4	4	60.56	33.76	(-)26.8	(-)44.25
180	Chamuakhat	546	4	5	45.65	121.83	76.18	166.88
48	Bezbhageti	473	-	5	-	312.62	-	-
198	Rajapukhuri	466	-	5	-	312.42	-	-
6	Khairabari	420	6	7	374.47	153.26	(-)221.21	(-)59.07
176	Outola	355	-	6	-	667.24	-	-

Contd/-

1	2	3	4	5	6	7	8	9
25	Bainara Satra No.2	316	4	4	32.50	32.25	(-)0.25	(-)0.77
144	Uttar Bhokeli-kanda	226	4	3	64.52	20.36	(-)44.16	(-)68.44
105	Tengabari Bagicha	187	-	6	-	546.23	-	-
(D)	MAZBAT POLICE STATION							
T-6	Bahipukhuri T.E.	2,756	6	-	169.59	-	-	-
T-2	Orang T.E.	1,881	6	-	298.03	-	-	-
T-4	Lamabari T.E.	1,744	4	-	45.11	-	-	-
T-5	Betibari T.E.	1,622	4	-	45.11	-	-	-
95	Namati	1,602	6	5	199.84	122.78	(-)77.06	(-)38.56
T-7	Beteli T.E.	1,475	4	-	45.11	-	-	-
T-3	Mazbat T.E.	1,427	5	-	122.17	-	-	-
56	Gelabil Gaon	1,043	-	5	-	299.78	-	-
68	Nichalamari	916	9	7	441.29	254.54	(-)186.75	(-)42.32
12	Nasherua	813	-	4	-	223.04	-	-
36	Rowta Station No.1	641	4	10	77.19	972.42	895.23	1159.78
18	Pathakpur	512	-	4	-	106.92	-	-
33	Shillongkhuti	510	-	5	-	237.75	-	-
94	Mazbat Station	393	-	6	-	914.11	-	-
(E)	UDALGURI POLICE STATION							
45	Udalguri Station	3,175	8	7	325.37	976.88	651.51	200.24
33	Nepalpara N.C.	2,680	2	-	5.65	-	-	-
120	Ekrabari	2,026	-	4	-	111.45	-	-
54	Barigaon No.2	1,174	-	4	-	105.61	-	-
83	Barnagaon	966	-	5	-	397.67	-	-
37	Sonaigaon	800	-	4	-	225.50	-	-
98	Santipur	648	-	4	-	192.17	-	-
32	Bandargaon	556	-	7	-	373.00	-	-
114	Kajiamati	287	4	6	104.1	283.42	179.32	172.26

Contd/-

1	2	3	4	5	6	7	8	9
(F)	MANGALDAI POLICE STATION							
142	Marai	3,819	4	6	25.45	476.65	451.2	1772.89
143	Bhuktabari	3,455	5	4	162.66	31.69	(-)130.97	(-)80.52
115	Upper Kurua	3,184	5	6	86.98	511.38	424.4	487.93
257	Khataniapara	2,342	7	-	130.43	-	-	-
64	Mualimghopa	1,181	-	6	-	244.35	-	-
144	Dakhin Chuburi	1,895	4	-	109.58	-	-	-
152	Kabachuba	1,870	3	-	21.23	-	-	-
149	Hazarikapara	1,841	3	7	35.47	927.87	892.4	2515.93
132	Saneatari	1,754	2	5	7.16	239.26	232.1	3241.62
299	Niz Rangamati	1,706	-	5	-	808.67	-	-
330	Nanglichar No.5	1,664	-	5	-	515.10	-	-
193	Chamuapara	1,562	4	4	48.21	64.52	16.31	33.83
246	Paniakhat	1,490	6	-	83.17	-	-	-
204	Bezpara	1,481	-	5	-	326.02	-	-
151	Pakabhangi	1,372	3	-	10.74	-	-	-
48	Pati Darang	1,269	-	4	-	194.99	-	-
90	Dumunichowki	1,256	5	7	48.69	694.90	646.21	1327.19
31	Kenduguri	1,251	3	5	21.87	155.61	133.74	611.52
232	Batabari	1,237	5	-	35.83	-	-	-
141	Niz Sipajhar	1,172	-	4	-	299.22	-	-
146	Jhakupara	1,140	3	3	53.78	93.72	39.94	74.27
3	Bamunjhar	1,136	-	4	-	105.33	-	-
54	Chengapara No.1	1,122	4	5	30.66	236.16	205.5	670.25
259	Gelaidingi	1,094	2	-	10.74	-	-	-
36	Duni	1,054	4	10	32.25	2263.39	2231.14	6918.26
37	Govera	1,019	-	4	-	119.01	-	-
7	Hengalpara	970	-	4	-	105.61	-	-
135	Dosetani	896	4	3	49.72	20.36	(-)29.36	(-)59.05
240	Balabari	822	-	5	-	237.75	-	-
15	Burhagaon	763	4	6	32.25	413.89	381.64	1183.38
165	Bar Satrapara	746	5	7	40.36	342.42	302.06	748.41

Contd/-

1	2	3	4	5	6	7	8	9
294	Dariapara	745	6	7	296.46	300.04	3.58	1.21
184	Barumpur	725	-	5	-	313.93	-	-
183	Bengabara chuburi	589	4	5	32.25	501.7	469.45	1455.66
227	Bhakatpara	485	7	6	489.59	234.91	(-)254.68	(-)52.02
288	Chengoliapara	483	-	7	-	549.53	-	-
82	Dhekiapara	477	-	5	--	120.32	-	-
280	Upahupara	468	5	1	1255.43	-	-	-
58	Pitharighat	458	-	6	-	337.43	-	-
25	Chopeli	419	4	4	33.12	33.12	-	-
121	Kirakata Chapari N.C.	326	-	4	-	296.2	-	-
207	Ramhari	291	-	6	-	635.35	-	-
270	Kharupatia	97	-	6	-	1138.0	-	-
(G)	URBAN CENTRES							
a)	Mangaldai	12,150	10	9	3,231.94	10,185.55	7583.61	234.65
b)	Kharupetia	10,448	7	8	1,120.2	2,747.72	1627.52	145.29
c)	Tangla	9,572	7	8	586.55	4,382.85	3796.3	647.23
d)	Udalguri	7,575*	-	9	-	2,788.97	-	-

* Estimated Population Figure.