

CHAPTER- 2

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PHYSICAL, HISTORICAL, SOCIAL, ECONOMIC AND CULTURAL FACTORS OF THE SITE AT A GLANCE

1. LOCATION :

The district region of Bogra comprising Bogra and Joypurhat district is situated between $24^{\circ}32'$ and $25^{\circ}17'$ north latitude and between $88^{\circ}57'$ and $89^{\circ}47'$ east longitude. The total area of the old district region and new district (Bogra district) is 3888 sq.km. (1501 sq.miles) and 2922 sq.km. (1128 sq.miles) respectively. Bogra district region, the central part of the Northern Region is bounded on the north by the old district of Rangpur and Dinajpur, on the east by the Jamuna river, on the south by the old district of Pabna and Rajshahi, and on the west by the old district of Rajshahi, and West Bengal (India). The new district, i.e. Bogra district is surrounded by the new districts of Naogaon and Natore (Rajshahi), Sirajgonj (Pabna), Gaibandha (Rangpur), Dinajpur and Joypurhat (Bogra).

Bogra town was the district headquarter of old district and at present, the headquarter of the new district.

2. PHYSICAL ASPECTS :

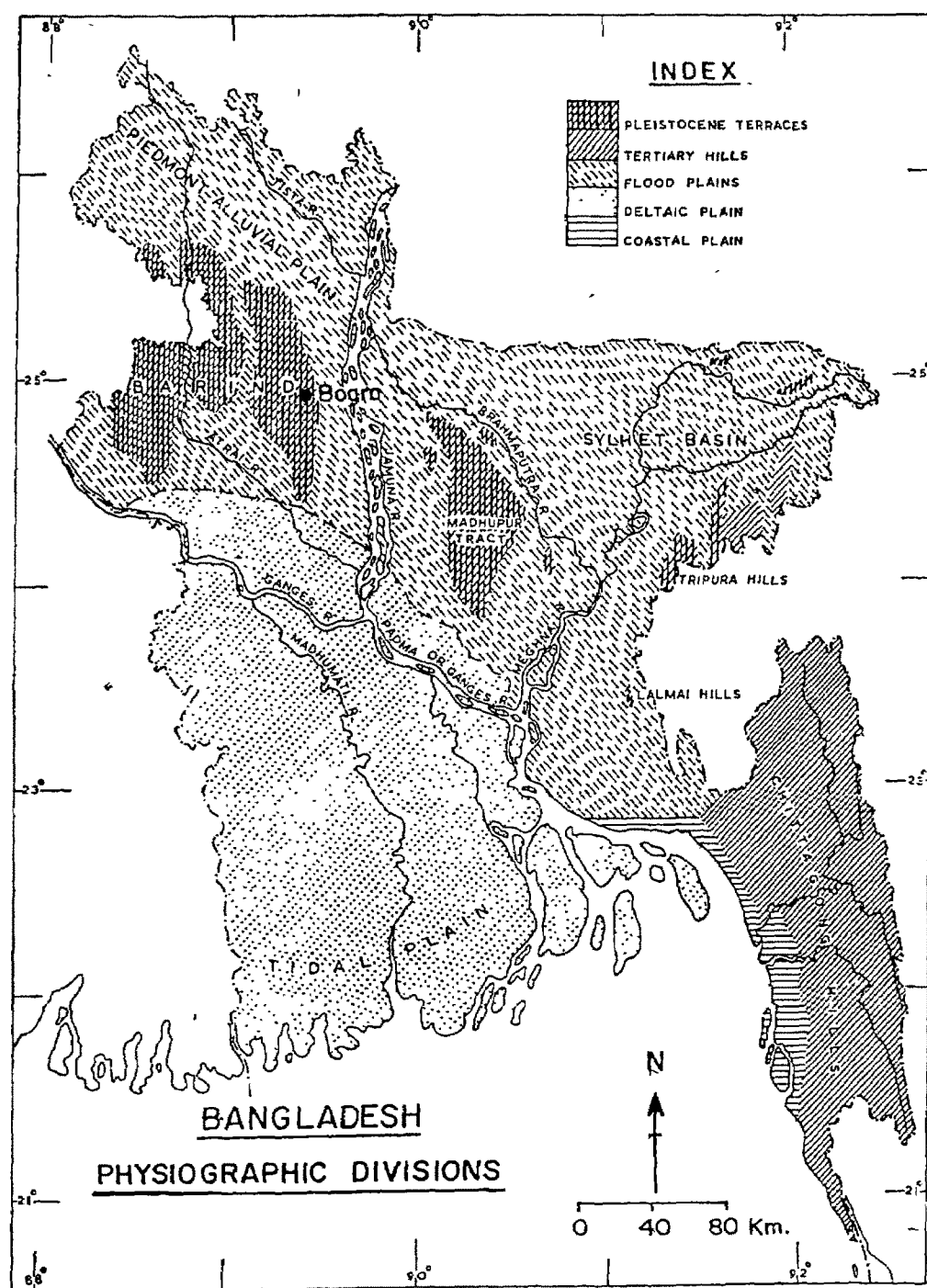
Different physical aspects namely physiography, climate, soils, river system, and flora relate to the economy of the district region, and have impact on socio-economic structure.

Physiography : Topography and Landform

Bangladesh may broadly be classified into three physiographic divisions : Pleistocene Terraces, Recent Flood Plains and Tertiary Hills. Bogra district belongs to the first two divisions (Fig 2.1).

The river Karatoya and Phuljuri divide the Barind Tract (under Pleistocene Terrace) and the recent flood plain into two dissimilar and distinct parts. The eastern portion is a physically low lying area covering 2/5th of the area of Bogra district, and comprises of swamps and marshes. The land is endowed with numerous natural drainage and channels. It is subjected to yearly inundation by the adjacent rivers and water logging. The western part is relatively higher and remains above flood level unlike eastern part. It should be mentioned that the construction of the embankment along the Jamuna river * prevented flooding over the eastern part since three decades, (Appendix IV 416) but the breach of the embankment due to under cutting has led to repeated flooding of the area once again. The land is generally flat whether on higher altitude or lower plain area, sloping towards the south.

*[According to the report of East Pakistan



Source: After Ahmad, 1768

Fig. 2.1

Water and Power Development Authority (1968 : 1-2) the Brahmaputra Flood Embankment Project was planned and constructed between 1961 and 1968. This project is to prevent overflow from the rivers Teesta and Brahmaputra (Jamuna) on to the right bank flood plain during rainy season; to provide means for diversion of overbank flood water into the reclaimed areas during years of subnormal rainfall, and to provide means for discharging run-off from local tributary stream through drainage sluices into the main river. This project area comprises four districts : Kurigram, Gaibandha, Bogra and Sirajganj. The embankment is about 135 miles (217 km.) in length extending from Kaunia on the Teesta river to the confluence of the Hursagar and Brahmaputra river south of Sirajganj J.

The socio-economic improvement of East Bogra is mainly due to the reclamation of the land and protection from flood. It is noted that government authority has no long term concrete plans to have a check on floods and erosions.

River System and Water Bodies :

Since time immemorial, the changes in the courses of rivers in the Bengal Basin or in the Barind Tract have often changed the landscape either for advantage or disadvantage. There are several rivers passing through the district, namely the Brahmaputra (Jamuna), Karatoya, Bangali, Nagar, Tulshiganga, Manos and Halhalia. Amongst these, the river Jamuna is the biggest and the mightiest which provides perennial navigation facilities. Apart from this, most of the rivers are navigable by boat during monsoon only. The river Karatoya is of historico-religious importance and known for its volume of water. Now it is almost insignificant.

Mostly the western landscape is fairly variegated with ponds and tanks and the eastern landscape with number of bils (depression).

Soils :

The soils of the district show considerable variation according to physiographic divisions and geological formations. Broadly soils are divided into two major groups, i.e. 'Poli' and 'Khlar' (local names). The whitish coloured silt laden loamy soil (Loose in nature) belongs to the flood plain area in the east and other riverine areas. On the other hand, the soil belonging to the Barind tract in the west is reddish and sticky in nature named as 'Khlar'. It is hard compact soil apparently of a Quasi Laterite formation. (Population census, Bogra, 1981 : xxvi).

Climate :

The climate of Bogra district is almost similar to the adjoining district. Out of the six seasons, three seasons are distinct during the year i.e. hot and dry summer, hot and wet monsoon, and dry winter can vividly be observed in the district. Summer starts from April and lasts till the middle of June. Monsoon (rainy season) commences from the end of June and continues till the middle of October. The winter starts from the middle of November and continues till late February. The average minimum and maximum temperature ranges between 16°C and 31°C . The average maximum rainfall was recorded in the month of July 1981 as 318 mm. (Population Census, Bogra 1981 : xxvii).

The annual total rainfall was recorded at 165 cm. as an average of 72 years (Zila Statistics, Bogra Region, 1986 : xv).

Flora :

It appears from the early literature that the district was more forested and less populated in the past. But with the expansion of agricultural practices and rise of population there was deforestation and abandonment of some wild life (District Gazetteer, Bogra 1979 : 10)

However, the fertile soils help to grow generous quantities of fruits bearing trees and some timber. Practically the district has no natural forest.

3. THE SETTING OF BOGRA TOWN : SITE AND SITUATION :

The study of site and situation of a town in relation to its foundation, growth and development, is an important task of researchers. In this respect, Dickinson (1948) opines that the first task of the geographer in an urban study is to determine exactly the characteristics of the site and situation of the settlement. Because, the 'site' embraces the precise features of the terrain in which the settlement began and over which it has spread. On the otherhand, the 'situation' is usually taken to mean the physical conditions (as for the site) over a much wider area around the settlement. At the same time, the consideration of human characteristics of the surrounding country are equally important so as to affect the character and fortunes of the urban settlement. Further, Dickinson stresses on road network in the development of situation.

Likewise, Breese (1966 : 102) views that the factors of site and situation have considerable impact upon the nature of the urban area. It is true that nuclei of towns have different natural settings. Site and situation of cities vary from one to another according to their character. By stating Smailes's (1953 : 41-42) view, we may elaborate the idea as although no two towns have sites that are exactly similar, it is not difficult to recognize well defined categories of town-sites. Certain physical features, for one region or another, have been favoured for the siting of towns, and provide a basis for

classification of towns according to site types. The site is enlarged in the process of urban growth, yet it nevertheless remains an area local and relatively restricted, and as such is only part of a much wider setting which affects the origin and growth of urban characteristics. This brings us to the conception of the situation of a town, its position in relation to its surroundings. Some elements of this wider setting are altered in the course of time, and others, while remaining permanent features of the scene, change in their significance for the life and development of the town. As with the sites of towns, so with their situation, the geographer is led to recognize categories. Towns are commonly and usefully classified on this basis.

The Study of Site of Bogra Town :

Smailes's comment is quite helpful to understand the pre-urban foundation nucleus on which urban functions gradually diffuse. According to him urban character both in respect of size and functions, emerges by growth and accretion about a pre-urban nucleus. Then it is the conditions of site which have special importance in localising the original function at a particular spot, fixing there, the nucleus. At the same time, for its subsequent growth in size and for the development of its function the wider setting or situation generally has greater importance.

In the light of the above discussion, the set up of Bogra town in its present site can be examined. In many cases it is found that innumerable towns were situated on river banks

that ensured river transport, trade and commerce, use of river water and even defense. Smailes's (1953 : 46) points out that water barrier gave protection on atleast one side and it witnessed the significance of the general siting of the river side towns founded by colonising people.

The nucleus of the Bogra town was founded on the right bank of the river Karatoya. The western part belongs to the eastern limit of the vast Barind tract comparatively higher than the recent eastern flood plain. The eastern part was always flood prone and discouraged any sort of developmental work as observed to day. From the beginning, the urban growth has been in the longitudinal direction along the river. Another advantage is the absence of embankment erosion due to comparatively hard barind soil.

Besides these factors, most probably the Britishers were also inspired to set up Bogra at its present site because of its reach above the flood, the presence of some inter regional road connections in the west, some government offices in Furan Bogra village, dating back to Muslim period, and the closely spaced villages around the present town centre.

The narrow channel 'Subil Khal' in the north formed northern town limit as people preferred to reside close to the town centre. This Subil khal and Gohail khal (in the south) formed natural drainage system in the township carrying rain water into the river Karatoya (see Appendix 414). At present, with the unplanned expansion of the urban area, adequate

arrangements to drain water from the town, are lacking in some areas.

Situation of The Town :

It has been earlier pointed out that Bogra town and Bogra district are centrally located with respect to other old districts and district headquarters in the Northern Region, this locational advantage has led to the explosion of certain urban functions. Its connection by road and rail ensures gradual development of the town and permits interaction with other towns and regions. Smailes (1953 : 54) rightly observes "unlike rural settlements, towns are only exceptionally maintained by the intrinsic resources of their sites. They exploit the possibilities of concentration at a centre, and for this purpose depend upon the use of transport. The material bases upon which they live are external, so that situation governs their growth. And situation is a matter not only of disposition of physical features as these affect canalisation and concentration of traffic but also of the political geography as it affects the extent of the territory to which the urban functions are related."

Before the rail era, the means of communication was very poor. Some regional katcha roads and river transport provided some means for interaction between Bogra and its surrounding area. The condition of Bogra like other settlements was characterised by self-sufficient economy, absence of urbanisation, adverse communication system etc. With the

changing socio-economic environment and opening up of railway in the later part of the 19th century and 1st decade of the 20th century, Bogra found herself in a new situation. New central places began to grow along the railway line or in the interior areas as centres of collecting and distributing commodities. As such movement of people, flow of commodities and interaction pattern between Bogra town and the surrounding areas began to increase.

A similar observation was cited by Dickinson (1948) on the importance of rail transport : "the advent of the railway in the middle of the 19th century added an entirely new element to the nodality factor and radically transformed the structure of the growing urban settlement. The physical conditions of situation and site which affected the beginning of the urban settlement, the Geographer examines how with the passage of time, the settlement utilizes, adapts itself, and transforms these conditions in the process of its formation and expansion."

After Partition (1947), construction of pucca national highway and development of some earthen roads gave impetus towards a new situation. Since 1970s the rapid development of road network and large scale utilisation of automobiles and other non-power driven vehicles changed the scenario of the region creating a unique situation for the town. Number of regional and national highways pass through Bogra town in the western side and other regional roads start from Bogra towards Eastern Bogra.



The situation of Bogra is strongly favoured by the high density of population in the surrounding area which provide threshold population for accelerating commercial and other urban activities. Bogra being the administrative district headquarters, its influence covers the entire district and also a wider area beyond the district limit.

4. BRIEF HISTORY OF BOGRA TOWN :

The nomenclature of Bogra has been found in some records. It is stated that the district has been named after the District Headquarter town which was named after Nasiruddin Bogra Khan, son of Sultan Ghyasuuddin Balban, who was entrusted to rule the province of Bengal from 1279 A.D. to 1282 A.D. (Population Census of Bogra, 1961 : 1-3). In the early historical records, no mention is made regarding the existence of present Bogra town except the village named 'Furan Bogra' which is situated one mile to the west of Bogra town. Provash Chandra Sen (1929: 125-126) quotes references of Bogra in two poems" (Barindra) Kayastha kulpanjee". Written by Baneswar Dev (1683 and from Barindra " Kayastha Dhakuri" written by Jadunanda (18th century)

- "Mukha Madhya Tin Sthan
Bhanki Bakhar Bagura Gram"
- "Bagurayai Jay Rahilo Dhanohen Shey Hoelo
Omulok Bhavetay Janai."

Sen in his book has mentioned that some government offices, police station which were situated in Furan Bogra village have been shifted by the Britishers to the site of the present Bogra town.

The district of Bogra occupies an important place in the legendry and the earlier historical annals of Bengal. In the ancient period, it was a part of the territory of the Fundras

or Paundras, which was known by the name of Fundravardhana. It was one of the kingdoms of eastern India. The name, Fundravardhana occurs frequently in the Mahabharata, Ramayana and various Puranas. Vasudeva, a powerful prince of Fundra family, is said to have ruled over Fundravardhan as far back as 1280 B.C. The claims of the district to antiquity, however rests chiefly on the association which centre round the old fortified town, now known as Monasthangarh" (District Gazetteer, Bogra 1979 : 27). The location of Mahasthan is seven miles to the north of present Bogra town.

EVOLUTION OF THE TOWN :

We may divide the growth of Bogra town into three periods as they display distinct characteristics in the growth of the town.

- [1] British Period,
- [2] Pakistan Period, and
- [3] Bangladesh Period.

Bogra town starts with its establishment as an administrative centre by the British. Regarding the development of the township, Population Census of Bogra (1961 : 1-6) mentions that Bogra town is comparatively of recent origin and does not appear to have been the scene of any authentic historical events, either during the period of Muslims or the British occupation of the country. Hunter (1876:187) proposes that the "Importance of Bogra town is entirely due to the fact of it being the district headquarter as it is neither a

centre of trade nor of the land holding interest. The only zaminder of important resident in it is the descendant of the Chaudhuris of Pargana Silbarsa"

British Period (upto 1947)

"The district of Bogra came under the control of the East India company in 1765 after obtaining the "Diwani of Bengal" from the weak Mughal Emperor Shah Alam" (dist. Gaz. Bogra, 1979:35).

From Hunter's report (1876:16) and the Settlement Survey Report (1920-29), it is known that the Silberries (Bogra District) was under the Control of magistracies of Rangpur, Dinajpur and Rajshahi at different times and in different ways prior to the formation of the district.

Regarding the formation of the district and its headquarter it may be quoted from the report of Hunter 1876:130) "The District of Bogra was of recent formation dating only from the year 1821. It was found necessary at that time to provide additional facilities to the administration of criminal justice in the out lying eastern police divisions of Dinajpur, Rangpur and Rajshahi, which had gained a notoriety of dacoiti or gang-roobery, and other crimes of violence. The operation of numerous European who had settled along the rivers in the east of the district as indigo and silk planters, also required supervision. With these objectives, Bogra District was vested in a new official, called the Joint Magistrate of Bogra. In 1859, the Joint-Magistracy

and Deputy Collectorate was raised to the grade of a Magistracy and collectorate and Bogra thus definitely constituted an independent District".

Developmental Work

It is observed from historical records that in the initial stage of town formation less attention was paid to developmental work rather than revenue collection. Later on, government officials, local elite, Zamindars, and the Nawab of Bogra took initiative to develop the town by establishing various government offices, judiciary department, educational and social institutions, libraries, park, theatre hall etc.

The following discussion has been summarised from the writings of Sen (1929:335) : From the beginning an attempt was made to clear, the thick bamboo bushes and other flora that made the town dark and unhealthy, then improvement and new construction of roads appeared in the developmental work. Major contribution was the construction of Karmichel road and Katnarpara road. But the roads, were all katcha and the total length of semi-pucka was less than 1 km. till 1947. Along many roads and office compounds, trees were planted to beautify the areas which still exist.

Mention may be made here about the establishments of public and other institutions which came up during that period :

Police station (1807), Agricultural farm (1818), fir Munseiff court (1832), Bongo Vidyalya (1843), Public library, Charitable hospital, English school, Collectorate building, Civil and other courts etc. (1850-54) Charitable dispensary (1856), Court building (1858), Victoria Memorial Girls' High School (1869), Pucca Jail (1883), Tahurenessa Womens' Hospital (1890), another branch of the court (1898), Bar Library (1900), Veterinary Hospital (1901), Edward park with a theatre hall (1901-05), a public library inside the park (1905-08), Edward Industrial School (1908), Assistant Session Judge Court (1911), Coronation High School (1912), Young Mens Association (1926) Azizul Haque College (1939), Excise Division (1945) and so on.

Another large establishment was the railway after 1900. It was by far the most important step of development for the region as well as for the town. Trade and commerical activities flourished, taking advantages of railway transport.

All the important public and private buildings of Bogra town, which are still existing, were situated on the Nawabbari-Malotinagar road along the western bank of the Karatoya, which represents a scenic area: the collectorate, Court, Circuit House, Zilla. School and V.M. Girls' School, Sadar Hospital, Municipal Office and District Board Office, the residence of higher officials and the Nawab of Bogra etc. are worth mentioning.

Referring to private housing, it is worth mentioning that residential houses of Bogra town were not attractive. They were an amalgum of both old mud walled C.I. huts and some buildings. Such characteristics continued even up to 1960s to a greater extent.

The municipal area was only about 2.59 sq.km. (1 sq.m.). In 1876, population of the town was 5072 that rose to 21,681 in 1941 which indicates a very insignificant population growth and probably very low rate of migration. But the migration was towards the fringe area. On the whole the British period was distinctly characterised by low rate of urbanisation.

The physical structure of Bogra has undergone changes because of devastation caused by earthquakes and fires. In 1817, a severe earthquake destroyed most of the government buildings, circuit house, and other public properties. Upto may, 1899, Judicial and other functions were carried on in some katcha houses. They were burnt in a devastating fire. Later on a sprawling collectorate building, a new circuit house, two buildings for civil court and session Judge were reconstructed.

According to the District Municipal Improvement Act of 1864, Bogra Municipality was founded on 1st July, 1876. Under the Bengal Council (Bengal Act III, of 1885), for the first time, the Zilla Board Office was formed on 1st April, 1887 at Bogra town. The Local Board started functioning to maintain

roads, rest houses, bridges, charitable dispensaries, and to manage drinking water in rural areas.

Pakistan Period (1947 -1971):

After the partition(1947),population began to increase in Bogra town following new wave of urbanisation. The 1961 population had registered 33,784 corresponding to 25,303 in 1951. It is also mentioned that the industrial development largely contributed to the fast growth of population. Industrial development took place on an accelerating scale followed by trade and commerce. The contribution of National Highway and the introduction of automobile enhanced development process of the town. The life style or socio-economic pattern of the people began to change. One after another private and public enterprises began to be set up providing ample scope for jobs. Stereotype land use patterns were given new dimension. The important establishments were General Hospital, Mission Hospital T & T Board, WAPDA (Water & Power Development Board), C & B (construction & building) including Roads and Highways Department,new building of A.H. College, State Orphanage and Dumb School, Dusthya Kalyan Somiti, Womens' college, Shah Sultan college. Government Staff Quarters, Government Housing Estate, Civil Lines etc.

In The fringe area, ribbon development started during Pakistan period which attracted migrants. The overall trend of development in the district region,the involvement of the

people in the development activities, the awareness and mental state of the people etc. ultimately influenced on the growth of Bogra town.

To this effect, Dutta (1969) observes : -

"Looking at the economic infrastructure of today's Bogra, it is found the impression of independence and versatility at all its different levels. The smallest of the country's district, without having substantial resources till of late, yet it has advanced in stages through pursuit of its own genius. As a result already it occupies a place of pride in the Northern Bengal."

The Population Census of Bogra (1961:1-15) provides a clear picture of the ethnography of people of Bogra district as follows :

"By and large the people of the district are more enterprising and active than many other parts of Northern Bengal. They are characterised by a willingness to move out of home and face hardship. There are traces of indolence and general apathy to hard work amongst a few but on the whole, both Muslims and Hindus are noted for their qualities of courage, industry and fellow feeling."

Bangladesh period (1971 onwards)

After the Liberation (1971) the rate of urbanisation has been sharply increasing. All sorts of urban functions are characterised by the fastest development. The tempo of industrial development was badly affected during and after the

Liberation war, but later on, it has come to a stable stage. Other marked developed sectors are transport and commerce. However all these aspects are being vividly highlighted in the following discussion in different chapters.

5. TREND AND DEVELOPMENT OF FRINGE AREA

To understand the process of urban growth a clear idea of the growth of urban fringe or the potential extension area is essential. The limit of the town keeps changing according to the physical growth of the town thus absorbing the fringe areas.

Wehrwein (1942) defines the rural - urban fringe as the area of transition between well recognized urban land uses and the area devoted to agriculture. At the same time he has also mentioned that people may lead urban way of life far beyond the city limit and may be performing rural way of life in the political city. So is the case of Bogra, just outside the municipal limit.

Regarding the fringe area, it is rightly mentioned in the International Geographical Union Reports (Geojournal, 1991) that the areas located within the urban hinterlands have undergone a process of functional change in recent years, from distinctive rural settings to one in which rural and urban influences are both present. However, in such cases, varying degrees of harmony and or conflict exist. Hence, we are to identify the processes of change and suggest methods of planning which promote the harmonious integration of varied and competing land uses in the rural-urban fringe.

Generally the rate of fringe development of big cities is much higher than medium or small towns. Bogra, a medium town, does not show unusual growth in the fringe except along the major routes. The growth of Bogra town is linear along the roads in the

fringe area like tentacles projecting from all directions. This type of growth is not uncommon in many settlements. In this respect Wehrwein (1942) cites that "the city itself tends to follow the lines of transportation". However, the improvement of road transport and other infrastructure have led to the expansion of Bogra in the fringe and its development. The fringe acquires prominence as it is the zone where the process of urbanisation for spatial organisation is operating. This is partly due to the natural process of urban-sprawl and partly it is the result of planned efforts to decongest the town.

Population Growth and Future Trend :

It is needless to say that population increases in the fringe or the suburban areas either by natural increase or by migration. Again, the rate of migration varies from area to area. The entire analysis in terms of population growth and land uses, is based on the statistics provided by UDA Report (1980, under BNPPP). It should be pointed out here that the provisional figures of population in 1980 was consistent with the population census of 1981. The village wise population projection was made upto 2000 A.D. From the population data, the areal distribution and variation are clearly observed.

The UDA (sponsored by BNPPP, 1980) selected 22 villages for urban expansion in the future. The entire area of some villages were taken fully, while in some cases, parts of the villages were included. The greater portion of the above mentioned villages was absorbed by the municipality in 1982/83.

Fig 2.2 depicts the location of respective village area and the existing urban limit (1980). Table 2.2 displays the varying growth rate of population in different periods. There are number of factors responsible for the variations like :

(1) physiographic condition, (2) location, (3) price of land, (4) attractiveness or fascination for places, (5) social environment and (6) other factors giving inertia to development.

TABLE 2.1 Position of Villages (1982 - 83)

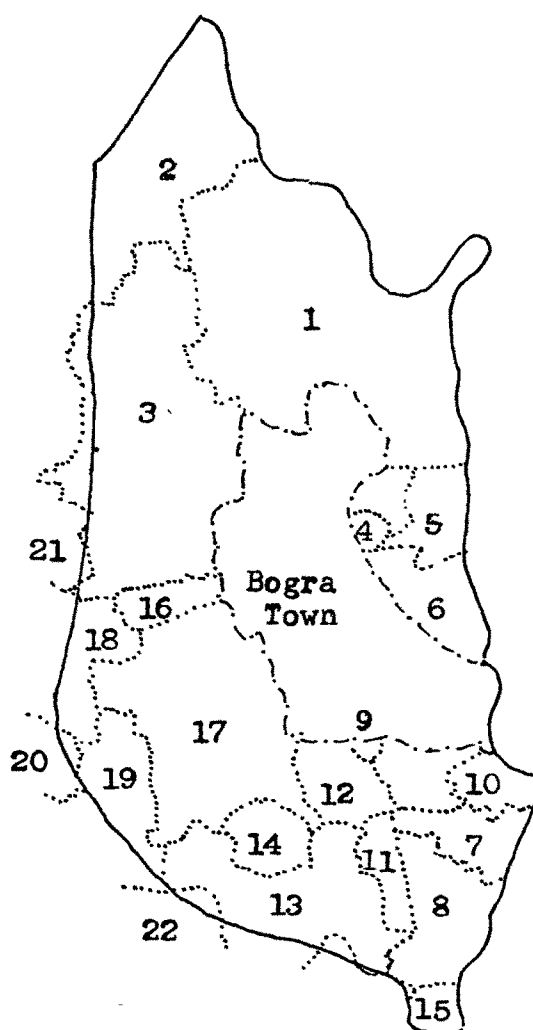
Localities under town limit		Outside of the town limit.	
In 1982 -83 (fully)	Before 1982-83 (partially)	After 1982-83	During 1982-83
Chakbrindabon	Chakbrindabon	Nisindara	Barbakpur
Chelopara	Nisindara	Puran Bogra	Naruli
Rahmannagar	Malgram	Malgram	Fuldighi
Thanthania	Rahmannagar	Latifpur	Kaigari
	Malotinagar	Natai	Silimpur
	Thanthania	Fulbari	Belail
		Malotinagar	Palsa
		Chakfarid	Shakpala.
			Betgari

Keeping aside about 2.32 % towards natural increase, the balance of population can be attributed to migration. Wherever the percentage of migrants is more, the place is more attractive to the people. As regards variation in growth rate, villages are grouped under five categories in different periods. Conditions of the villages are described according to their

LOCATION OF STUDY VILLAGES

Name of the villages

1. Fulbari
2. Barbakpur (P)
3. Nisindara (P)
4. Chelopara
5. Naruli (P)
6. Natai (P)
7. Chaklokman
8. Latifpur
9. Rahmannagar
10. Malotinagar
11. Chakfarid
12. Thanthania
13. Fuldighi (P)
14. Kaigari
15. Betgari (P)
16. Chakbrindabon
17. Malgram
18. Puran Bogra (P)
19. Silimpur (P)
20. Belail (P)
21. Palsa (P)
22. Shakpala (P)



Legend

- Municipal Boundary
- Village Boundary
- Study Area

P - indicates Part

Fig.2.2

characteristics which prevailed during the period.

A. Population Growth: (1961 - 1974)

(1) Conspicuously High Growth Rate (>7.0 %) :

The villages under this category are Chakbrindaban (10.8%), Fuldighi (10.7%), Latifpur (9.8%), Natai (8.5%) and Malgram (7.5%).

Amongst these villages, Chakbrindaban, Malgram and Natai are adjoining Bogra had favourable conditions for their growth viz.

- Chakbrindaban (F) - Sufficient inhabitable land and good infrastructural facilities.
- Fuldighi (N) - Cheap and sufficient inhabitable and agricultural land and moderate road link with the town.
- Latifpur (P) - Location besides national highway, nucleus of large scale Bihari settlement, more population due to natural increase.
- Malgram (P) - Availability of cheap land, moderate road linkage with the town.
- Natai (P) - Large scale emigrants from flood affected East Bogra, closer to CBA (Central Business Area), low to moderate land value, presence of regional road.
- Malotinagar (F) - Big mauza with low medium and high land value, attractive place for all classes of people for more or less good social environment and different infrastructural

facilities, presence of government staff quarters.

(2) High Growth Rate (5.1 - 7.0 %) :

The only village under this category is Puran Bogra (P) 5.9% cheap and vast agricultural land unique site and situation with good road facilities but comparatively away from the main town.

(3) Moderate Growth Rate (3.1 - 5.0 %) :

Villages are Palsa (3.1%), Betgari (4.7%), Nisindara (3.5%), Shakpala (3.2%), Naruli (3.8%), and Fulbari (4.0%). Shakpala, Betgari, and Palsa are considerably away from the main town as compared to others. The site and situation resemble Puran Bogra stated above, availability of by cheap land attracts people.

- Nisindara (P) - Vast area with suitable land for housing and other construction purposes, low to moderate land value, development of this area since recent past taking advantage of Santahar and old Dinajpur road facility.

- Naruli (N) - Location on the east bank of Karatoya river like Natai, closer to CBA, cheap land, attractive place for migrants from East Bogra.

- Fulbari (N) - Location on Rangpur road (national highway), plenty of cheap land for development.

- Betgari (N) - Location on Dhaka road (national highway), place of unique economic activities.

(4) Slow Growth Rate (1.0-3.0%) :

This category includes Chelopara (2.5%), Barbakpur (2.4 %).

- Chelopara (N) - small village closely connected with CBA displays intensive land use since early days, stiff competition for vacant land, comparatively high land value, predominantly natural increase of population.

- Barbakpur (N) and Chakfarid (N) - far away from main town, vast agricultural land with cheap land value and wholly rural characteristics but location on national highway.

(5) Very slow Growth Rate (upto 1.0 %) :

Lowest or minus growth rate seen/observed in villages named Rahmannagar (P), Thanthania (P) and Kaigari (N). The causes-probably evacuation of population for acquiring land for government purposes. Other villages are Chaklokman (0.3 %) and Chakfarid (0.5 %).

B. Population Growth : 1974-1980.

(1) Conspicuously High Growth Rate (> 7.0 %)

Nil

(2) High Growth Rate (5.1-7.0 %) :

The villages under this category are Shakpala (6.1%), Rahmannagar (5.7%), and Falsa (5.3%).

- Shakpala (N) and Falsa (N)- Available cheap land, presence of Bye-pass (road) available scope for future expansion.

- Rahmannagar (P) - Closer to main town, attractive area for

TABLE 2: STUDY OF POPULATION GROWTH & POPULATION PROJECTION (1961 - 2000), POPULATION DENSITY AND LAND USES (1980)
IN BOGRA TOWN AND STUDY AREA

	Population 1961	Population 1974	Growth Rate (%)	Population estimated (1980)	Growth Rate (%)	Population (Projected) 2000	Growth Rate 1974-2000	Area (in acres) 1980	Density of population	Residential	Commercial	Industrial	Educational	Public Institutional	Recreational/ Open space	Agricultural	Others.
A. Municipal Area	33,798	47,154	2.6	60,400	4.2	84,870	2.3	1119	121	44.68	1.65	3.26	1.88	12.15	8.67	23.55	4.16
B. Villages :																	
1. Fulbari	7,161	12,708	4.5	16,380	4.3	35,390	4.1	950	55	31.58	0.53	2.84	1.16	2.84	6.95	53.47	0.63
2. Nisindara (P)	2,682	4,085	3.5	5,240	4.2	31,110	8.1	642	43	19.16	-	1.87	2.80	7.63	16.04	50.62	4.98
3. Barabakpur (P)	1,207	1,639	2.4	2,120	4.4	8,600	6.7	195	53	20.51	1.03	4.10	0.26	0.26	8.20	64.10	1.54
4. Chelopara	1,214	1,665	2.5	2,160	4.4	3,210	2.6	58	127	29.31	1.72	1.72	-	-	17.24	24.13	25.86
5. Maruli (P)	486	784	3.8	1,010	4.3	5,370	7.7	113	39	23.01	-	0.86	6.19	-	7.08	62.83	7.97
6. Metai (P)	402	1,164	8.5	1,520	4.6	3,040	3.6	143	54	19.58	0.70	0.70	1.40	1.40	29.37	39.86	7.69
7. Chakobkmen	1,073	1,113	0.3	1,430	4.3	3,420	4.4	90	39	41.11	-	8.89	5.56	-	20.00	18.33	6.11
8. Latifpur	1,065	3,646	9.8	4,660	4.3	6,850	2.5	125	85	44.00	1.60	10.40	4.80	-	25.60	12.80	0.80
9. Rahmadnagar	445	165	-7.4	230	5.7	1,150	7.6	25	23	10.00	-	-	-	28.00	-	28.00	4.00
10. Malotinagar	341	1,082	8.9	1,330	4.3	5,430	6.7	79	25	67.00	-	-	-	-	11.00	19.00	3.00
11. Chakfard	643	690	0.5	870	3.9	1,990	4.2	55	51	30.91	-	1.82	40.00	33.64	12.72	3.64	7.27
12. Thanthania	982	836	-1.2	1,060	4.0	4,600	6.6	125	26	32.00	0.80	2.40	-	12.00	13.60	33.60	5.60
13. Fuldighi (P)	265	994	10.7	1,290	4.4	14,690	10.9	345	38	10.15	-	-	2.90	2.61	10.72	31.70	2.32
14. Kaigari	562	371	-3.1	460	3.7	3,510	9.0	99	31	15.15	-	-	-	6.06	14.14	58.59	6.06
15. Betgari (P)	46	84	4.7	110	4.6	162	2.3	34	55	5.88	-	-	-	85.29	5.88	11.76	-
16. Chakbrindaban	190	644	10.8	830	4.3	1,444	3.2	62	119	17.29	-	3.23	38.71	14.52	-	22.58	9.68
17. Maligram	981	2,496	7.5	3,220	4.3	21,730	8.7	505	33	12.08	0.20	1.55	0.40	10.30	17.23	51.68	6.53
18. Pura Bogra (P)	295	622	5.9	780	3.8	2,250	5.1	140	52	10.71	-	-	-	-	3.57	80.00	5.71
19. Silimpur (P)	503	796	3.6	1,010	4.1	5,370	7.6	160	67	9.38	-	-	-	-	13.75	73.12	3.75
20. Belail (P)	29	43	3.1	50	2.6	360	8.5	11	50	9.09	-	-	-	-	18.00	73.00	-
21. Palsa (P)	89	132	3.1	180	5.3	920	7.6	24	23	33.33	-	-	-	-	6.25	54.17	6.25
22. Shakkala (P)	14	21	3.2	50	6.1	330	11.2	10	100	5.00	-	-	-	-	-	85.00	10.00
C. Additional Area																	
(1 - 22)	22,665	35,578	4.3	45,800	4.3	161,770	-	4,024	51	21.76	1.43	2.13	2.66	5.18	4.35	50.67	1.84
D. Study Area	54,463	82,730	3.5	106,200	4.3	245,940	4.3	5,148	76	26.60	2.23	2.35	2.49	6.67	3.30	44.72	11.60
(A - B)																	

Source : Data compiled from UDD Report, ENPP, 1960 and Study Report No. 2 Appendix-2, ENPP, 1980

Note : F - Part of the village.

settlement, but less vacant land.

(3) Moderate Growth Rate (3.1-5 %)

The period 1974-1980 may be characterised as "boom period". All the villages except Palsa (5.3%), experienced balanced and average moderate growth rate of above 4.0 %. Only Chakfarid (N) and Puran Bogra (N) show < 4.0 % growth rate even distribution of migrants all over the area. Here population per acre ranges from 22 to 50. Only congested areas Chakbrindabon and Latifpur have a higher land-man ratio i.e. 118 and 85 persons per acre respectively.

(4) Slow Growth Rate (1.3%) :

Only sparsely populated small portion of Belail village with some industrial-commercial activities and public institutions belongs to this group, showing 2.6% growth rate.

(5) Very slow Growth Rate (<1.0%):

Nil

C. Projection of Population Growth : 1974-2000 A.D.

The trend of population growth in different areas can be understood. In areas with good infrastructural facilities, cheap land, vacant land for expansion the growth rate of population is expected to be more. Areas closer to the main town are not liable to attract more and more population. On the other hand, the areas immediate to the town, would get populated faster than the inner areas of the villages.

(1) Conspicuously High Growth Rate (>7.0%) :

Villages closer to the main town namely Nisindara (8.1%), Narjuli (7.7%), Rahmannagar (7.8%), Malgram (8.7%), and villages comparatively away from the main town such as Fuldighi (10.9%), Kaigari (9.0%), Silimpur (7.6%), Belail (8.5%), Palsa (7.8%) and Shakpala (11.2%) are under this group.

(2) High Growth Rate (5.1-7.0%) :

Except Malotinagar, villages under this group are away from main town but are relatively prospective zones for future expansion, examples are Barbakpur (6.7%) and Puran Bogra (5.1%). The growth rate of population in Malotinagar is expected to be 6.7%.

(3) Moderate Growth Rate (3.1-5.0%)

The group of villages under this category are Chakbrindaban, Chakfarid, Chaklokman, Natai and Fulbari. Where greater developmental work, flow of migrants have been taking place. Correspondingly the land value is also increasing rapidly.

(4) Slow Growth Rate (1.0-3.0%) :

Chelopara, Latifpur and Betgari are under this category. Practically, there is not much scope for further expansion.

(5) Very Slow Growth Rate (<1.0%)

Nil

Land Use in Fringe Area 1980:

"The fringe is visualized as the area of mixed urban and rural land uses between the points where agricultural land

uses predominate" (Blizzard 1954). The urban fringe area of Bogra also displays a similar pattern where agriculture has been always the dominant type of land use.

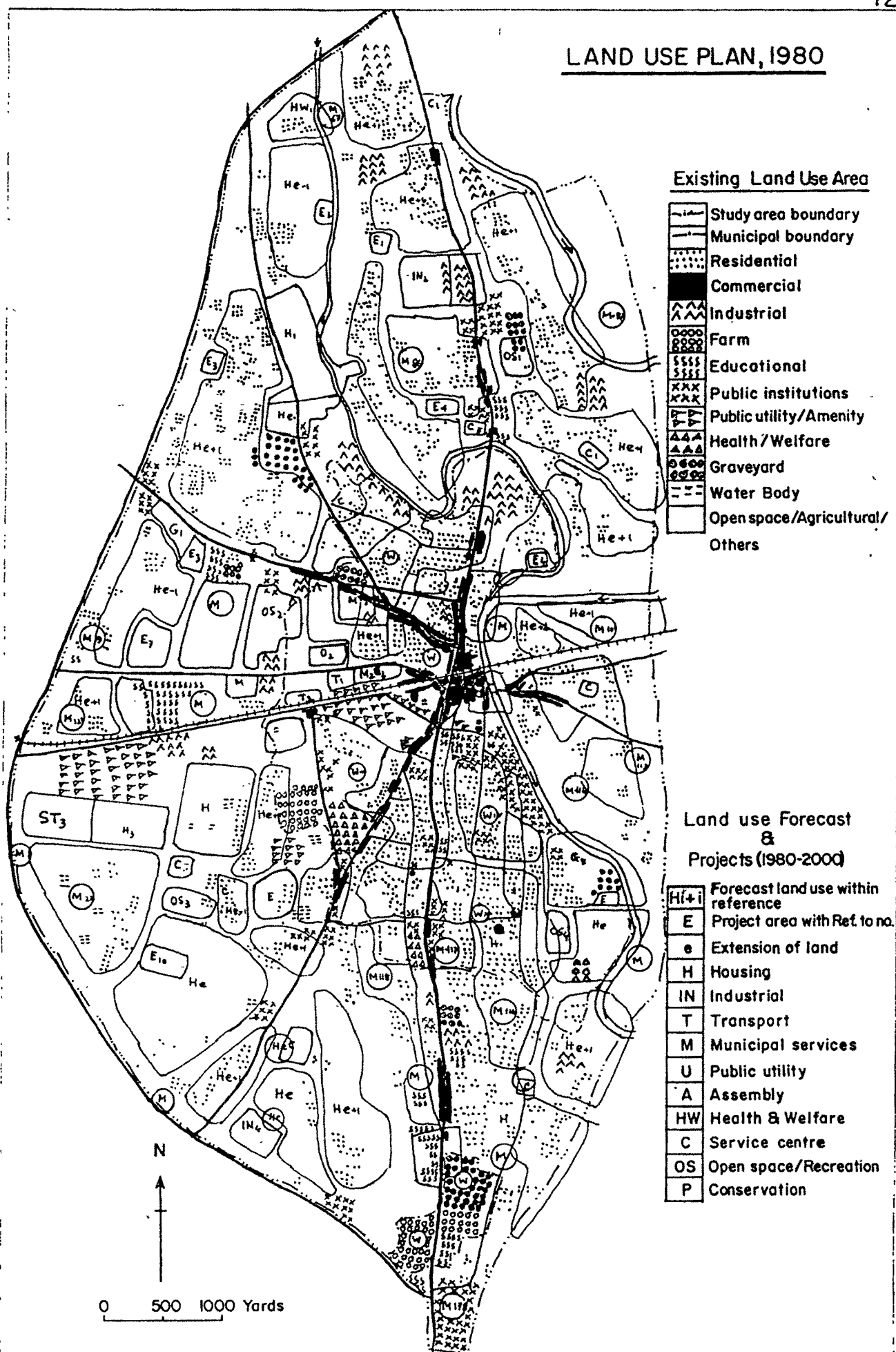
However, from the study of land use and the changes which have taken place, the spatial importance, characteristics features of growth, trend and scope of development can to a certain extent, be highlighted.

It should be mentioned here that land use data collected by UDD (under BNPPP, 1980) has been utilised for this study. Greater portions of the fringe area were partially and some were fully absorbed by the municipality in 1982-83 (Table 2.1). Hence, development of fringe area is seen by the presence of urban land use like commercial, industrial, educational, social public institutional etc. This type of development is manifested along the major roads leading out from Bogra. Table.2.2. and Fig.2.3 show the village wise land use pattern of Bogra's fringe in 1980.

(1) Residential Land Use :

Above 40% of the total area of Latifpur, Chakloakman, >30% of Chakfarid and Palsa, > 20% of Natai, Chelopara, Barbakpur, and below 20% for rest of the areas are under residential use. Localities above 30% under residential land use indicate more or less medium to high density of population. Above 40% indicates higher density. Houses in most of the villages are nucleated surrounded by trees or agricultural land. Chakbrindabon, Chelopara, Latifpur offer less scope for future

LAND USE PLAN, 1980



Source: UDD Report, 1980 (Under BNPPP)

Fig.2.3

development because of all the available area has been put under different uses.

(2) Industrial Land Use :

Except for the industrial estate of BSCIC, the other industries are dispersed along the major roads, and the outskirts of the town. Large number of small scale industries are sporadically distributed. However, more industrial establishments are found in the outskirts occupying a small portion of the total area as for example Barbakpur (8 acres-4%), Nisindara (12 acres-2%), Latifpur (13 acres-10%), Chakloakman (8 acres-1%). The largest amount of land is devoted to this sector at Fulbari (27 acres-3%) where BSCIC (Bangladesh Small and Cottage Industries Corporation) is located. At present some industries are coming up along the feeder roads and mainly on the Dhaka-Rangpur road and the By-pass.

(3) Commercial Land Use :

It is evident from the figure.2.3. that the commercial establishments are set up along the major roads, cross roads and road junctions occupying always street frontages. According to the land use report, two acres in Barbakpur, one acre in Malgram, two acres in Latifpur, one acre in Chelopara, one acre in Natai and five acres of land in Fulbari are allotted to this activity. Generally grocery and stationary, vegetable market, repair works, vulcanising/engineering workshops, motor garages, fuel stations, restaurants, banks etc. and other services are various types of

commercial activities that follow the population and vehicle movement.

(4) Educational Institutions :

Since the town centre or the middle zone is already congested with builtup area, there is not much place for expansion of any institution. Hence, institutions and establishment which require plenty of space, are shifted to the fringe area where open land is available and which is accessible. The area under this type of land use is excessively high in Chakbrindabon (24 acres-39%) and Chakfarid (22 acres-40%). Nisindara (18 acres-3%), Fuldighi (10 acres-3%), Latifpur (6 acres-5%), Chaklokman (5 acres-6%), Naruli (7 acres-6%), Fulbari (11 acres-1%), Malgram (2 acres) villages are significant. Institutions like primary and high school are distributed everywhere. All the major institutions are established along the Dhaka-Rangpur road and along the WAPDA road, Santahar road and old Dinajpur road. These areas now come under municipal limit.

(5) Recreational Land Use :

Parks, playground, open space-such land uses in the outskirts are diverse in nature. The main areas are Fulbari (66 acres), Nisindara (103 acres), Latifpur (32 acres), Fuldighi (37 acres) and Malgram (87 acres).

(6) Public Institutions :

There are public and social institutions in the fringe area like WAPDA, civil lines, training institutes, orphanage etc.

The villages Fulbari (27 acres), Nisindara (49 acres), Betgari (29 acres) occupy major share of the land uses.

(7) Other Uses :

This category includes roads, railway, graveyards, ponds etc.

For information, density of population relating to this area has been indicated in Table.2.2.

The Process and Stages of Fringe Development

The 22 localities around Bogra town selected by UDD (under BNPPP, 1980) show a close interaction with the town with varying degree. As mentioned earlier in 1982/83, a greater portion of these villages were absorbed by the municipality and taken within the town fold. The process and stages of the fringe development and later the annexation of the fringe by the town centre are seen from the following evidences. The villages on the periphery are thickly populated and possess vast agricultural and vacant land. It is observed that suburbanisation process does not affect the whole community but leads to a crystal formation. Then gradually whole community is crystalised as 'urbane'. A similar situation has been observed by Gopi (1978 : 14) in the case of Hyderabad fringe study where the peripheral villages have undergone functional and morphological changes either through a large-scale and sudden transformation of the old village milieu or through a process of evolution.

As such, varied functional characters as industrial,

commercial, residential, social, military etc. tend to exhibit varying degree of spatial integration with the central town, Bogra.

Again, sub-urbanisation process in the fringe of Bogra is largely supported by regional metalled road and power supply. Phadke and Bita (1987) rightly mention that the pattern of the fringe is determined by the "mass transit facilities".

Stages of Fringe Growth :

Transformation and absorption of the fringe area into the urban fold is a manifestation seen in all parts of the world, more so with recent rapid urbanisation. Similarly the rural landscape around the town, undergoes a process of transformation and does not remain static. The faster the growth of a town or the more attractive a town, the faster is the transformation of the fringe area.

Various examples of transformation are studied from different parts, ofcourse, the time taken and the nature of transformation may differ according to different areas. In a study on Uppal, Hyderabad, which is carried out by Gopi (1978), three distinct phases of sub-urban development have been highlighted, which to a certain extent has a strong similarity to the development of the fringe area of Bogra. They are :

- (i) Urbanising Village
- (ii) Urbanised Village
- (iii) Suburb.

Whereas ,

The developmental process for urbanisation of fringe area in the case of Bogra phased out into four distinct features. Which are *:

- (i) Primary Stage
- (ii) Diffusion Stage
- (iii) Condensing Stage
- (iv) Saturation Stage

In order to support our submission, analysis of 22 villages around Bogra with the land use data and population statistics available from UDD (under BNPPP, 1980) and personal survey reveals certain interesting features of transformation. However, the entire frame of growth process may be accommodated into the above stated four stages depicted in the Table .2.3.

Amongst the 22 villages/localities some of the localities namely, Malotinagar, Rahmannagar, Nisindara, Malgram, Thanthania etc. were partially absorbed earlier by the municipality. In 1982/83, the municipal limit was extended and number of villages were partially or fully absorbed depending upon the status to become 'urban'. In fact, different parts of a village or a whole village do not get transformed or urbanised at the same time. Hence the process of transformation is gradual and changes take place in different parts of the village or a village by stages. In most cases, fairly urbanised areas were declared as

*These terms were used in the study of innovation of diffusion carried out by Hagerstrand (1952).

urban. The authority had to demarcate the area in a systematic and linear way along roads, river, narrow channels etc. Whatever stage of transformation a village was experiencing, it was annexed into the urban limit of the town.

However, from the above, the characteristics and future trend and potentiality of the villages may be gauged (Table.2.2.) To become a fullfledged urban community, a village or a portion of the village has to pass through Primary Stage --> Diffusion Stage --> Condensing Stage or it may skip one of the stages to become urban (Saturation Stage).

The growth in the fringe area does not follow any pattern or planned development and this affects the planning of the town in question, when expansion of the urban limit takes place.

From the above discussion, it may be summed up that the process of diffusion of urban characteristics was under progress and still continuing in the fringe area projecting urbanised land use but not uniformly.

There lies a great variation in population growth (by natural increase or migration) from area to area depending upon different infrastructural facilities, topography, social environment, land value, people's fascination for place etc. and accordingly future trend of population growth follows.

From the study it is evident that in some areas developmental work started earlier and the landscape changed

specially along the major transport lines. In this regard, Dhaka-Rangpur road (national highway) has been attracting all kinds of uses more than the others. Again, more than 90% of the developmental works has been taking place in the western part of the town which we may term as the potential zone or prospective zone. Out of 22 villages selected by UDD (Under BNPPP, 1980) for planning purpose only 3 villages i.e. Chelopara, Naruli and Natai are located in the eastern part of Bogra town. Geography of the place plays an important role in this respect.

The proposed plan has not been implemented in 22 villages accordingly. After extension of municipal area limit (1982/83), the authorities have to accept the extended area, in whatever stage the village is and plan accordingly. It is to note that further extension is under process. It is true that special attention is given for the development of infrastructure in the new extension area, and the process of urbanisation also rapidly follows. But whatever unplanned growth is there that has become permanent. So, immediately zoning ordinance or planning control should be imposed not only in the new extension area but also in the outskirts of the town i.e. present fringe area.

Table 2.3 Phases of Fringe Development

A. Primary Stage :

Name of the	Morphological Characteristics	Economic Characteristics	Social System/Demographic Features
Silimpur	1. Ordinary thatched and katcha houses ;	1. Primary occupation- 70%-80% people directly engaged in agricultural and allied ;	1. Low rate of migration
Shakpala	2. Compact or dispersed segment of settlement ;	2. Little involvement in non-agricultural sector ;	2. Most traditional and conservative society
Barbakpur	3. Type according to physical condition to land ;	3. Villagers engaged in unskilled jobs, artisan works, handicrafts etc. ;	3. Low level of interaction
Palsa	4. Poor infrastructure-no laid-out drainage ;	4. Land value almost stable ;	4. Less female working force
Belail	5. Segregated residential areas ---conspicuous from design ;		5. Low literacy rate
	6. Settlement nuclei separated by vegetative and agricultural land ;		6. Unique kinship

B. Diffusion Stage

Maigram	1. Predominantly traditional type of house, some brick-buildings prevalent ;	1. Dominant agricultural activity ;	1. Increasing rate of migration -migrants from lower income group ;
Puran Bogra	2. Slightly improved infrastructural facilities -road, power supply etc ;	2. Some market oriented agricultural activity ;	2. Little demand for rented house ;
Natal	3. Some massive structures---- public institutions, industries etc. ;	3. Slight increase in non-agricultural jobs ;	3. migrants attract others to buy land and settle ;
Kaigari	4. Poor drainage	4. Family members alternately engaged in agriculture and other activities ;	4. increase in literacy rate, social segregation lessened ;
Fuldighi	5. Wide vegetative cover/ agricultural land/open space	5. Large scale commuters	5. Increasing interaction with town leads to transformation of society -values, taste, way of living etc. ;
Betgari		6. Establishments of public	6. Increase in women

- social institutions,
agricultural farms,
Government housing ;
- participation in jobs ;
7. Land value speculation,
large scale acquisition of
land by Government ;
8. Some isolated store
clusters/business thorough
fares
9. Sudden increase of land
value along the roads
and also in the interior

C. Condensing Stage

Nisindara	1. Dominant urban morpho- logical features ;	1. Moderately low number of persons in agricultural activity	1. A great demand for rented houses by lower and middle income groups ;
Thanthania	2. Built-up area along major roads ;	2. Increasing secondary and tertiary activities	2. Rapid in Migration of all classes of people ;
ChakFarid	3. Structural change in house type, random construction of buildings for different uses ;	3. More number of persons engaged in two sectors at a time-Primary, secondary and tertiary activities ;	3. Considerable increase in Literacy rate ;
Chaklokman	4. Developed infrastructures and improved drainage system ;	4. Increasing commercial activities along major roads.	4. High interaction with the town ;
Naruli	5. Huge space occupied by different organisations, civil line, Government housing estate, staff quarters etc.	5. Increasing industrial activities ;	5. Great influence of urban culture on the traditional way of life ;
Fulbari		6. Radical change in land value, excessive land value along major roads.	

Saturation Stage

Chelopara	1. Compact land uses ;	1. More than 90% people in non-agricultural activity;	1. Fully urbanised society---admixture of different social classes
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			forming different social Areas, ';
Chakbrin- bon	2. Rebuilt and renew ^{ed} of structures for housing/ commerce purposes ;	c. Intense economic integra- tion with the town ;	2. High literacy rate trend of society ;
Malotina- gar	3. Presence of narrow lanes/ by-lanes ;	3. Excessive land value in any favourable location -different types of land uses depending on land value and location ;	3. Resided by new migrants from comparatively higher income group ;
Latifpur	4. Open land cannot be vacant	4. All important roads occupied by business activities/office/small- scale industries and other services.	4. Great demand for rental houses by all classes of people ;
Rahman- nagar		5. Multistoried buildings for residential are or office premises.	5. 'Invasion' and 'Succession process observed;

6. LOCATIONAL ANALYSIS : BOGRA IN THE REGION

The significance of Bogra as the core of the Northern Region has been emphasised throughout our study or has been highlighted in the earlier chapter. To evaluate the locational attribute, means of transport and communication are largely attributed to measure this locational advantage of Bogra. We may arbitrarily examine the relative position of Bogra with other towns in the Northern Region.

When Bogra was made the District Headquarter, it could have been just a historical chance without any preplan of its centrality. With the passage of time transport system began to develop. In the beginning it started with river transport followed by railway and finally road transport. Presently road network with partial support of railway has brought major changes in regional linkages creating a new situation. Bogra serves as an 'entrance' to the district which are to the north in the Northern Region. The linkages are to such extent that all the urban centres are interlinked directly or indirectly with Bogra.

Through some empirical observations the importance of Bogra's location and the role played by Bogra during the severe flood of 1988 in Bangladesh in which the Northern Region was disconnected from Central Region may be mentioned. Bogra acted as the collecting and distributing centre to most of the areas of the region for essential items.

There are various means to evaluate the central location of a place, some of them are enumerated in the following text.

One of the methods stated by Ebdon (1977:106) for finding out central tendency in point patterns may be considered for our study. In this case, dealing with spatial distribution, the concept of a 'centre' is intuitively reasonable and the position of such a centre can be calculated each of which will give a different result. Further he advocates that there is no single correct answer to the problem of finding the centre of a spatial distribution.

However, applying Standard Distance Method, we have found out the spread of values as to measure spatial distribution of major urban centres in the region. It arbitrarily gives information regarding the areal spread of points around a centre (Fig 2.4a). The simplest equation for standard distance is :

$$\sqrt{\frac{\sum d^2}{n}} ; \text{ it may be written as } \sqrt{\frac{\sum (X - \bar{X})^2 + \sum (Y - \bar{Y})^2}{n}}$$

and more precisely it may be simplified as $\sqrt{\frac{(\sum X^2 - \bar{X})}{n} + \frac{(\sum Y^2 - \bar{Y})}{n}}$

Where x and y are coordinates. The calculation is shown in Table 2.4. From the (Fig 2.4a) mean x and mean y coordinates converge in common place that is the mean centre and standard distance has been used as the radius of a circle which provides a geographical representation of the dispersion of

points about the mean centre.

Within the circle Joypurhat is nearest to the mean centre followed by other two new district headquarters : Naogaon and Gaibandha. Amongst the five old district headquarters, Bogra is relatively near to the centre. To visualise clearly, taking 20 km. radius, another circle is drawn. On the whole, it may be stated that Bogra is not far from the mean centre. However, it is not the geographical centre which determines the centrality of a place but it is the other factors like nodality, population quality, economic activities etc. Bogra fulfils the conditions of a Central Place.

In Chapter 8, Binary Matrix has been used to measure the accessibility of Bogra. Like Binary Matrix, here figures have been arranged in Matrix to know the position or centres by measuring linear and actual route distance between the centres. ^(Table 2.5 & 2.6) 18 major urban centres of the region are taken into consideration and out of them five district headquarters are considered separately.

The total distance from the matrix reveals the position of the centre and the lower the distance the higher the rank of the centre. Measurement of linear distance between centres does not give satisfactory result. Hence, measurement has also been done along the actual route connecting the centres. ^{Fig 2.4b} By the first method, Bogra ranks third among 18 centres following the new district towns Joypurhat (1st.) and Naogaon (2nd.).

With the same methodology, by taking the five old district headquarters Bogra occupies first rank.

By applying the second method (where also 18 urban centres are taken into consideration), Bogra stands first, even though Rangpur has a marginal difference in length (km.). Due to closeness of urban centres in the extreme north, Rangpur is also enjoying the position of a central place. But Bogra's position in the hierarchy of centres has been more pronounced than other urban centres.

Table - 2.4 : Measurement of Standard Distance (in inch).

Urban centres	x	y	Urban centres	x	y
A	1.26	6.03	M	2.06	4.40
B	1.05	5.35	N	2.20	2.48
C	0.60	5.05	O	3.00	2.52
D	1.92	5.15	P	3.04	2.20
E	2.00	4.55	Q	3.75	1.57
F	1.45	4.45	R	3.42	1.27
G	2.00	4.47	S	2.67	0.60
H	2.80	4.65	T	2.15	1.52
I	3.23	5.10	U	1.34	1.40
J	3.64	4.83	V	0.63	2.00
K	3.40	3.60	W	3.33	0.90
L	2.32	3.10			

$$\begin{aligned} \sum x &= 53.26 & \sum y &= 77.44 \\ \bar{x} &= 2.32 & \bar{y} &= 3.37 \\ N &= 23 \end{aligned}$$

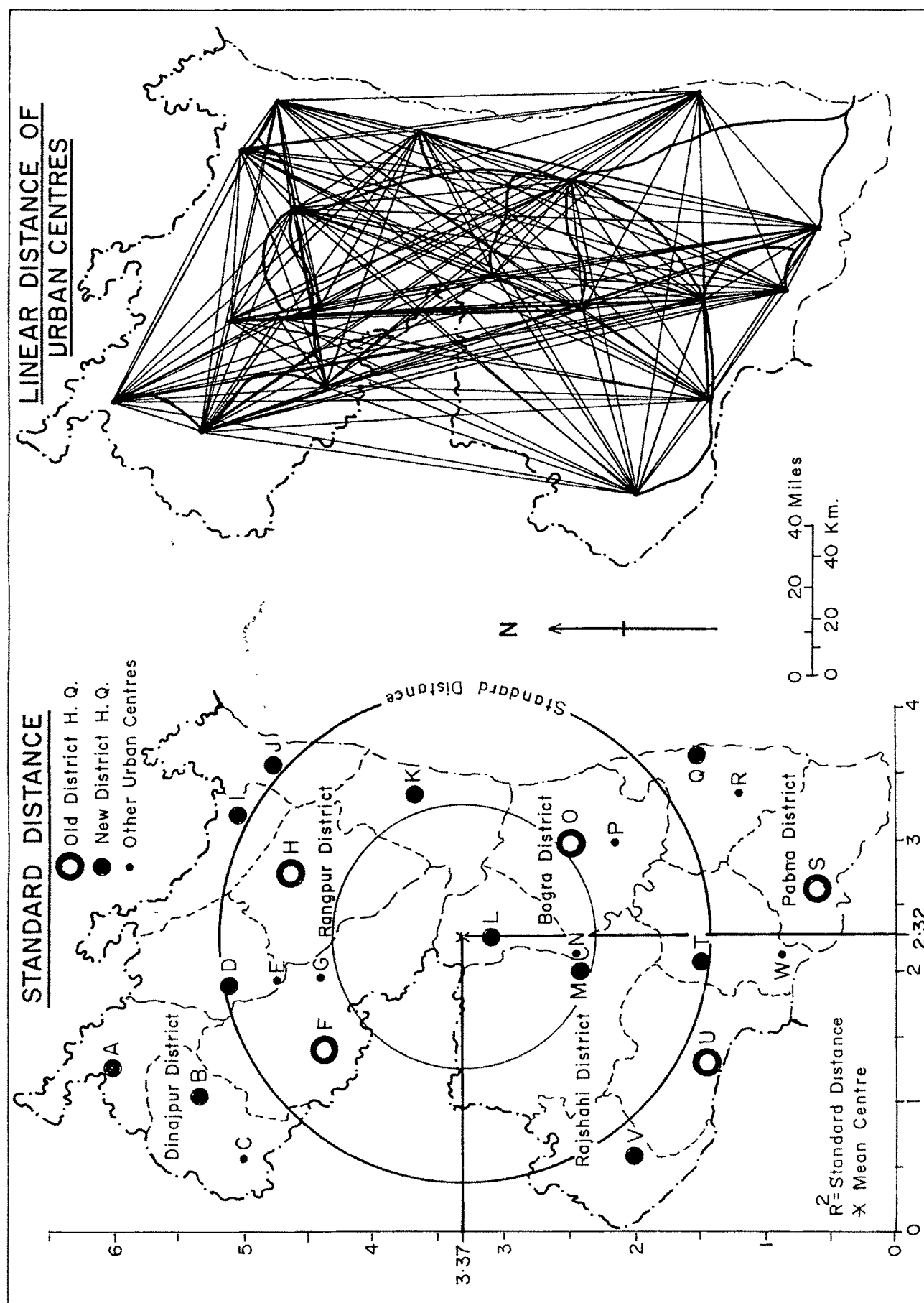


Fig. 2.4

Table 25 A Matrix showing Linear Distance between Urban Centres
(Distance in Km.)

To -->	Bogra	Jaypur	Rajshahi	Naogaon	Natore	Nawalgonj	Rangpur	Kurigram	Nilphamery	Gaibanda	Lalmonirhat	Syedpur	Dinajpur	Thakurgaon	Panchagarh	Patna	Sirajgonj	Iswardi
From																		
Bogra	0	2.29	5.21	2.41	3.43	6.35	5.59	6.10	7.16	3.12	6.65	6.20	6.55	8.76	10.16	5.08	3.18	4.62
Jaypur	2.29	0	5.08	1.98	4.06	5.21	4.14	5.41	5.33	3.12	5.59	4.29	4.01	6.58	8.13	6.60	5.38	5.79
Rajshahi	5.21	5.08	0.00	3.12	2.24	2.29	9.14	10.40	9.60	7.80	10.57	6.64	7.62	10.11	11.81	4.19	6.15	3.05
Naogaon	2.41	1.28	3.12	0.00	2.54	3.99	6.10	7.32	6.86	4.70	7.49	5.84	5.21	7.87	9.40	5.08	4.83	4.11
Natore	3.43	4.06	2.24	2.54	0.00	4.06	8.26	9.14	9.37	6.45	9.63	8.26	7.62	10.16	12.07	2.79	4.06	1.78
Nawalgonj	6.35	5.21	2.29	3.99	4.06	0.00	8.89	10.46	6.64	8.26	10.41	7.72	6.60	8.64	10.41	6.48	8.13	5.33
Rangpur	5.49	4.14	9.14	6.10	8.26	8.89	0.00	2.08	2.54	3.10	1.53	2.03	3.56	4.57	5.21	10.54	8.38	9.66
Kurigram	6.10	5.41	10.41	7.32	9.14	10.46	2.08	0.00	4.57	3.00	1.22	4.06	5.59	6.55	6.73	11.16	8.38	10.62
Nilphamery	7.16	5.33	9.60	6.86	9.37	6.64	2.54	4.57	0.00	5.38	3.30	1.09	2.24	2.24	2.84	11.91	10.34	10.97
Gaibanda	3.12	3.12	7.80	4.70	6.45	8.26	3.10	3.00	5.38	0.00	3.63	4.59	5.33	7.24	8.13	8.13	5.59	7.62
Lalmonirhat	6.65	5.59	10.57	7.49	9.63	10.41	1.52	1.22	5.30	3.63	0.00	3.25	4.63	5.46	5.59	11.68	9.40	10.97
Syedpur	6.20	4.29	6.64	5.84	8.26	7.72	2.03	4.06	1.09	4.59	3.25	0.00	1.63	2.84	3.66	10.74	9.23	10.00
Dinajpur	6.55	4.01	7.62	5.21	7.62	6.60	3.56	5.59	2.24	5.33	4.63	1.63	0.00	2.67	4.32	10.29	9.27	9.35
Thakurgaon	8.76	6.58	10.11	7.87	10.16	8.64	4.57	6.55	2.24	7.24	5.46	2.67	0.00	1.98	12.86	11.94	11.94	12.45
Panchagarh	10.16	8.13	11.81	9.40	12.07	1.41	5.21	6.73	2.54	8.13	5.59	3.66	4.32	1.98	0.00	14.53	13.00	13.46
Patna	5.08	6.60	4.19	5.08	2.79	6.48	10.54	11.18	11.71	8.13	11.68	10.74	10.29	12.86	14.53	0.00	3.73	1.27
Sirajgonj	3.18	5.38	6.15	4.83	4.06	8.13	8.38	8.38	10.34	5.59	9.40	9.23	9.27	11.94	13.00	3.73	0.00	3.71
Iswardi	4.62	5.79	3.05	4.11	1.78	5.33	9.66	10.62	10.97	7.62	10.79	10.00	9.35	11.94	13.46	1.27	3.71	0.00
Total	92	82	117	88	105	121	95	112	104	95	111	94	76	122	141	137	124	124
	.66	.99	.03	.85	.92	.87	.51	.62	.16	.19	.19	.09	.49	.43	.63	.10	.92	.85

Rank

Table 25 B Matrix showing Linear Distance between Five Dist. Hqs.

To From	Bogra	Rajshahi	Rangpur	Dinajpur	Patna	Total
Bogra	0.00	5.21	5.59	6.35	5.08	22.23
Rajshahi	5.21	0.00	9.14	7.62	4.19	26.16
Rangpur	5.59	9.14	0.00	3.56	10.54	28.63
Dinajpur	6.35	7.62	3.56	0.00	10.29	27.82
Patna	5.08	4.19	10.54	10.29	0.00	30.10
Rank	1	2	3	4	5	

Table 2.6. Route Distance between Urban Centres. (Distance in Kilometres)

	Bogra	Jaypur	Rajpur	Nao-shahi	Nao-goan	Natore	Govindpur	Rangpur	Nilphamary	Kurigram	Gaibandha	Lalmonirhat	Syedpur	Dinajpur	Panchagarh	Pabna	Shariatpur	Faridkot	Total
Bogra	0	58	109	48	158	100	109	161	138	176	148	142	177	241	209	124	71	111	2135
Jaypur	58	0	164	72	208	109	208	169	164	183	169	156	196	253	220	180	129	169	2720
Rajpur	109	164	0	84	45	208	208	266	243	182	253	246	274	354	314	93	201	84	3162
Nao-shahi	48	72	84	0	113	129	148	209	183	122	196	188	225	293	254	171	117	159	2711
Nao-goan	158	208	45	113	0	87	166	225	203	138	212	206	241	295	256	55	161	45	2631
Natore	100	109	208	129	0	249	249	309	286	224	296	290	325	396	357	137	235	134	3865
Govindpur	161	169	266	148	249	0	58	58	60	74	58	45	84	145	111	224	169	211	2219
Rangpur	138	164	243	183	286	60	60	114	113	137	124	21	58	111	71	283	229	270	2815
Nilphamary	148	183	182	122	224	74	74	114	113	124	34	92	130	190	156	266	201	248	2821
Kurigram	148	169	253	196	296	58	58	124	113	124	0	105	150	229	175	198	143	185	2572
Gaibandha	177	195	274	225	325	84	84	21	92	113	105	0	40	92	51	264	233	257	2988
Lalmonirhat	177	195	274	225	325	84	84	21	92	113	105	0	40	92	51	264	233	257	2988
Syedpur	241	253	354	293	396	145	145	111	130	156	150	40	93	93	55	299	254	286	3041
Dinajpur	209	220	314	254	357	111	111	71	90	229	196	92	93	0	39	373	312	357	3069
Panchagarh	124	180	93	171	137	224	224	283	266	175	164	51	55	39	0	332	275	319	3358
Pabna	71	129	201	117	235	169	169	229	201	143	233	211	254	312	332	0	111	19	3398
Shariatpur	111	169	84	159	134	211	211	270	248	185	257	251	286	357	319	19	134	0	3186
Faridkot	2135	2720	3162	2711	3865	2219	2219	2815	2821	2572	2988	2510	3042	3069	3358	2398	3186	2239	3239
Total																			