

## A study on Planning of Rural Settlement: A Case Study of Baidyerbazar Union, Bangladesh

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### Abstract:

*Dhaka is a megacity it is one of the most densely populated cities in the world and forms the world's 9th largest agglomeration. Employment opportunities and other commercial activities have always attracted the largest number of people from all parts of the country towards Dhaka. As a result the population has increased tremendously compared to the expansion in the city area. Often it is observed that the existing development does not reflect the optimum utilization of land uses. Simultaneously there is gradual decrease of open and green spaces, filling up of the wet lands and natural water bodies to meet the increasing demands of land to support the ever growing population. So this is the time to exercise a proper planning in*

*rural areas to lessen the growing population pressure on Dhaka. Baidyerbazar is an agricultural based rural area. This research has been initiated to formulate a physical planning of Baidyerbazar union to make it a self-reliant entity for rural development. Baidyerbazar, being one of the examples of those rural areas where agricultural land is decreasing, is in grave need for the aid of planning. Therefore, if proper planning procedures are adopted according to the proposed plan, then Baidyerbazar union would be a better place for housing and employment for the people living within this area for a long time in the future. So rural planning should be implemented immediately to ensure better life of rural people in Bangladesh.*

**Key words:** Rural Planning, Settlement, Sustainable, Crop

## **1. Introduction**

Dhaka is a megacity and one of the major cities of South Asia. It is one of the most densely populated cities in the world and forms the world's 9th largest agglomeration. It has a population of around 13 million. Today it serves as one of the prime centers for politics, culture, education, business and economy for the whole country. Its trends of urban growth can be illustrated in terms of population growth, land uses, transportation, agricultural production, land values, activity patterns etc. So it is facing a thrust for growth. For that reason Dhaka suffers from urban problems such as pollution, congestion and lack of housing problems, food crisis and adequate services due to the rising population. At present it is needed to decentralize the growth trends of Dhaka to another suitable location. To achieve this, rural lands must be developed. Baidyerbazar is one of the most suitable sites for this purpose. It covers a large area with valuable parcel of land which can be properly utilized.

### **1.1 Background of the study**

Dhaka is the city of hope and scope for Bangladeshi people. Employment opportunities and other commercial activities have always attracted the largest number of people from all parts of the country towards Dhaka. As a result the population has increased tremendously compared to the expansion in the city area. Often it is observed that the existing development does not reflect the optimum utilization of land uses. Simultaneously there is gradual decrease of open and green spaces, filling up of the wet lands and natural water bodies to meet the increasing demands of land to support the ever growing population. So this is the time to exercise a proper planning in rural areas to lessen the growing population pressure on Dhaka. Baidyerbazar is an agricultural based rural area. This project has been initiated to formulate a physical planning of Baidyerbazar union to make it a self-reliant entity. Thus indirectly divert Dhaka's future population expansion.

### **1.2 Scope of the study**

There have been some good scopes for carrying out the study. These scopes are given below:

- The study has provided an opportunity to get an idea about the socio economic profile of Baidyerbazar union.
- There has been an opportunity to get an idea about the physical features Baidyerbazar union.
- To discover potentiality of physical planning of the study area.
- To plan for optimum utilization of land and resources.
- To reduce tendency of rural-urban migration through proper planning and upgrading
- The Study has been helpful to increase social interactions with the local people.
- Acquisition of many unknown information has been possible.

### **1.3 Limitation of the study**

Due to the requirements and scope of the project there have been some limitations involved in the study. The limitations are as follows:

- **Inadequate manpower:** The number of group members has been four and has been insufficient to accomplish the study intended for a big area like Baidyerbazar union.
- **Time limitation:** The study time has been only seven week which made it tough to study the area comprehensively.
- **Sensitive incident:** Many families have unsupportive to the study because the study area has been far away from the city.

### **1.4 Methodology**

Methodology means the steps followed to execute the study to achieve some desired objectives. The methodology followed to complete the study on the physical planning of Baidyerbazar union is described below:

#### **1.4.1 Collection of Base map:**

The base map has been collected from RAJUK. Basic data formatted in ArcGIS (e.g. shape files, MXD files) has been collected to identify the study area and to run the study.

#### **1.4.2 Field Survey:**

Before collection of necessary primary data, a field survey has been conducted by all groups. Thus the over-all idea about the project has been obtained. Information has also been collected to correct some of missing values of secondary data.

#### **1.4.3 Data collection**

Two types of sources were used to collect data. These are primary data and secondary data.

**1.4.3.1 Primary data collection:** Field Survey is one of the most vital parts of such kind of study. To achieve the goals of the study, data has been collected by field survey.

**1.4.3.2 Secondary data collection:** From ArcGIS formatted data, necessary data have been collected. Again, for successful study, relevant documents, such as theses, reports, papers, books etc have been reviewed.

**1.4.4 Data processing and analysis:** Collected data have been analyzed to find out the present land use pattern. Some data have been compiled for comprehensive analysis. Again some data have been interpreted for proper planning of the study area as well.

**1.4.5 Preparation of Proposals and Design procedure:** After the data processing and analysis some proposals have been suggested to make agricultural based development of the study area. Then a new and improved land use design of the study area has been prepared.

**1.4.6 Presentation:** Following the above a power-point presentation has been made to demonstrate the entire study and the final design proposals.

**1.4.7 Preparation of final report:** Finally all the works, analysis, findings, proposals and designs have been summarized in the report, with necessary maps, graphs and tables etc. Thus the report has been prepared.

## **2. Conceptual Framework**

This chapter enlightens about rural areas, its characteristics, necessity for rural development, rural development organizations, types of rural settlements, rural sustainability

and a brief description about the concept of cluster settlement as the planning philosophy of this study.

## **2.1 Definition of Rural area or village**

A village has been defined as a compact grouping of homesteads containing between 100 and 1500 people. Village as a group of houses in the country, larger than hamlets but smaller than a city or town (Quddus 1996,). It is a primary administrative unit, the limits and boundaries of which are defined, delimited and settled by a revenue survey or cadastral survey.

## **2.2 Characteristics of rural area**

Generally a rural area consists of some economic (e.g. agriculture, fisheries, livestock, foreign remittance etc), employment, roads and transportation system, civic amenities, welfare services and settlement pattern characteristics. One rural area differs from others from the point of view of culture, economic status and existing utility and civic facilities.

## **2.3 Rural Development**

### **2.3.1 Concept of Rural Development:**

The main purpose of rural development is to improve the quality of life of rural people. To develop a rural area it is necessary to alleviate poverty; increase income; improve education, shelter and healthcare facilities and to decrease mortality and child death rate. Optimum utilization of local available resources can also aid to improve the quality of rural life.

### **2.3.2 Resource of Rural Development**

There are 4 major resources of rural development(Katar 1986,). These are:

**Land:** In rural area main source of income is the agricultural land.

**Water:** Water is used for watering the agricultural land, fishing and drinking etc.

**Manpower:** Manpower indicates the labor forces who are engaged in earnings.

**Capital:** It can be the cash, tools or equipments which help in rural peoples business or work.

## **2.4 Necessity of Rural Development Planning**

Most of the land in Bangladesh is occupied by rural areas. But only few are urban areas. There are more employment opportunity and scope to enjoy better living condition in urban areas than in rural area. This ignites the tendency of rural to urban migration. So to reduce this tendency there is no other alternative but to develop rural areas. The main reasons behind the necessity of rural development are as follows:

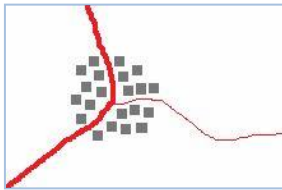
- To increase the momentum of the national development rate.
- To reach the effect of development to the grass root level and to mass population.
- To reduce the rural urban migration and to lessen the pressure on the city center.

## **2.5 Organizations working for Rural development in Bangladesh**

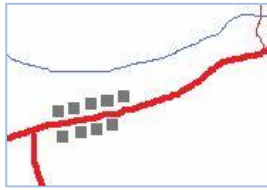
In Bangladesh many different government agencies like Bangladesh Academy for Rural Development (BARD), Bangladesh Rural Development Board (BRDB) and Rural Development Academy (RDA) are working for rural development. Besides, several NGO's are also assisting in these development projects.

## **2.6 Forms of Rural settlement**

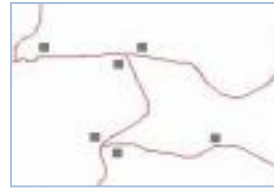
There are several types of rural settlements that vary from village to village. Different cultural patterns, local conditions, ethnic groups, physical terrain, socio-economic reasons, religion and climate affect the form of rural settlements (Quddus 1996,). Generally there are three main types of rural settlements in Bangladesh. These are as follows:



**Figure No. 2.1:**  
Nucleated Settlement



**Figure No. 2.2:**  
Linear Settlement



**Figure No. 2.3:**  
Dispersed Settlement

### **2.6.1 Nucleated settlement:**

In a nucleated village generally the dwellings with their outhouses and gardens are arranged in close interdependence with their roads. Nucleated type of settlement is found in a place of natural growth. A homestead is usually grouped around a large pond and forms a circular or even triangular nucleated form depending upon the shape of the pond.

### **2.6.2 Linear settlement:**

These types of villages expand linearly. It has an appearance of a long one street village winding its way across the landscape. They usually have an oblong shape of a relatively narrow width and much greater length. Most of these occur at the junction of roads and rivers, or on alluvial fans, at the foot of steep cliffs and along the levees in marshy lands. In this case, it is very difficult to provide services along roads as the process is costly.

### **2.6.3 Dispersed hamlets:**

In dispersed hamlet settlements the human habitations are isolated from each other. The homesteads of the dispersed

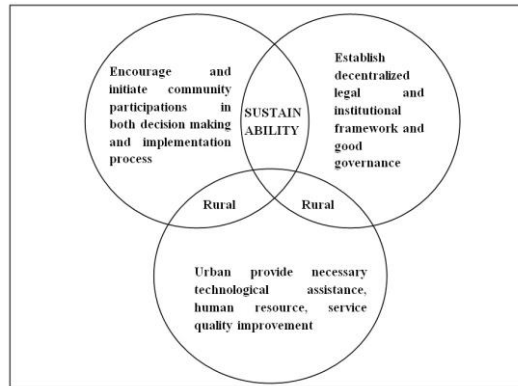


settlements are separated and built around the water tank. Some kind of dispersed settlements are also noticed in areas of recent reclaimed land of suburban. In this case more agricultural land becomes the place for living and new homes are created here and there in a scattered way.

## 2.7 Rural sustainability

Rural sustainability depends on four interrelated factors:

- Community participation factors
- The decentralized legal and institutional framework
- Good governance
- Technological assistance factors



**Figure No. 2.4: Conditions of Rural Sustainability**

## 2.8 Planning Philosophy

### 2.8.1 Concepts of Cluster settlements

Cluster settlements are also known as nucleated settlements. This pattern is identified by its dense development around a central place. A clustered rural settlement is a distribution of farmsteads and dwellings in an agricultural setting or around a trade route or main trail in a nucleated manner.

A clustered settlement zone is a partial antecedent for Compact Township. It may not have all the civic amenities and institutions like a complete compact town. But this type of settlement zones may have a self governing and self financing

agglomeration of houses, hospitals, schools, markets, rural industries and local government units to serve its population. Its main objective is to cluster the rural settlements and amenities into close proximity to gain economies of agglomeration. Consequently this releases precious agricultural land and ponds for increasing production of crops and fisheries.

### **2.8.2 Characteristics of Cluster settlements**

The characteristics of the cluster settlement zones are listed below:

- Generally forms a regular shape like circular, square or rectangular.
- Small nucleated settlements can also appear in a scattered form. These are common almost all over the central valley flat of the flood plains.
- All the houses in this zone are grouped and attached to one another.
- Its size must be small enough so that it can be well connected to every corner of the zone.

### **2.8.3 Advantage of Cluster settlements**

Clustered settlement zones have the following advantages:

- Distance between settlements and between houses within settlements is large.
- Cost of road construction is comparatively less.
- Provision of water supply and electricity is less costly.
- Utilities and service facilities are easy to provide.
- High concentration of population makes it easy to provide the farmers with an adequate level of services.
- Simplifies even and fair distribution of most suitable farmlands among farmers.
- If government or private developers build cluster settlement zones with adequate amenities and facilities (like school, market, bazaar, hospital, office, electricity,

sanitation etc) all over the country it will reduce the burden of immigration on large cities.

#### **2.8.4 Feasibility of Cluster settlements:**

- Cluster settlement zones increases savings as cost of road construction, provision of water and electricity supply, provision of utilities and services are relatively less costly settlements are located close to each other.
- Practice of such kind of settlement frees up the resources that are being used to facilitate the burden of excess population on the large cities.
- Precious land and ponds are released if rural people move to these cluster settlement zones. As a result the production of crops and fisheries increase.
- Living in these kinds of settlements facilitates easy access to education, health, business etc.
- Ultimately it will improve the overall living condition of the rural people.

#### **2.8.5 Criticism of Cluster settlements**

- Greater travelling distance between dwelling units and farm lands.
- People cannot prevent their land from theft as they do not live adjacent to their lands.
- Most of the times rural people do not want to leave their ancestral homes and enter into a new kind of place to live.

### **3. Profile of the study Area**

Baidyerbazar union of Sonargaon upazilla has been assigned to carry out the study with a view to prepare a suitable physical plan for the future. This requires a thorough analysis of the area's existing profile. This chapter includes physical demographic, housing, social characteristics, economic and

infrastructure facilities, utility facilities and agricultural development of the study area.

### 3.1 Physical Characteristics

#### 3.1.1 Location

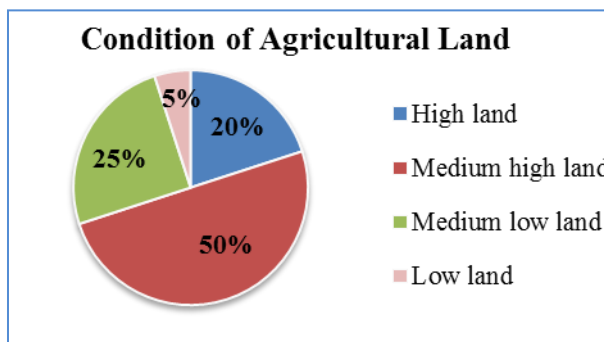
Baidyerbazar union is in Sonargaon Upazilla of Narayanganj District. It is situated at the South East side of DMDP. Its geographical location is between 23°32' and 23°46' north latitudes and between 90°31' and 90°41' east longitudes.

#### 3.1.2 Geographic Position

Baidyerbazar union is surrounded by Arai-hajar and Rupganj upazilla at the north, Munshiganj sadar upazilla at the south, Homna upazilla at the east and Gajaria upazilla and Narayanganj sadar upazilla at the west. There are many water bodies present in the area. Two main rivers Meghna and Brahmaputra pass by the union from east and west side respectively.

#### 3.1.3 Topography

Topography of Baidyerbazar Union is very well. The land is mostly suitable for rice production. The following table shows percentage of different land types of the area:



**Figure No. 3.1: Topography of Baidyerbazar Union**

Source: GIS Database

The chart shows that, 50% land of this union is medium high and 5% land is low in height.

### 3.1.4 Existing Land Use Pattern

Baidyerbazar union has a total area of 6770.42 acre and various kinds of land uses are distributed into it. The existing land use pattern of Baidyerbazar union is given below:

**Table No. 3.1: Existing Land Use pattern of Baidyerbazar Union**

Land Use	Area (acre)	Area (%)
Manufacturing & Processing Activity	12.6	0.19
Government Service	1.18	0.02
Education & Resources	71.75	1.06
Commercial Activity	32	0.47
Transport & Communication	2.37	0.04
Rural Settlement Zone	1467.77	21.68
Agricultural Zone	3174.63	46.89
Circular Network	10.2	0.15
Recreational Facility	1243.2	18.36
Service Activity	7.72	0.11
Water body	747	11.03
Total area	6770.42	100.00

Source: RAJUK. 2010

The table shows that, almost half portion of the land is used for agriculture. 21.68% of the land is being used for the rural peoples dwelling units. Recreational facilities include open spaces and play fields and contain 18.36% of the study area. Ponds, streams, lakes and portion of rivers that surpasses the total area occupies 747 acre of the land in total.

### 3.2 Demographic Characteristics

The following table shows the population of Baidyerbazar Union according to BBS 2001.

**Table No. 3.2: Demographic Characteristics of Baidyerbazar Union**

Population	Number	Percentages
Male	10250	51.78%
Female	9547	48.22%
Total	19797	100%

Source: BBS 2001

- **Density:** 2.89 persons/acre
- **Number of household:** 3927

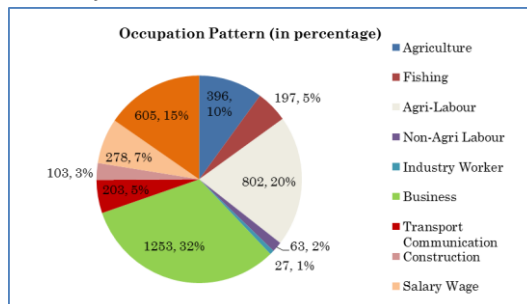
### 3.3 Housing Characteristics

Structure type symbolizes physical and socio-economic scenario of an area. According to structure materials, generally three categories of structure have been found. Most of them are kutcha and few are semi pucca and pucca.

### 3.4 Economic Characteristics

#### 3.4.1 Occupation Pattern

Baidyerbazar union is an agriculture based area. Most of its people are associated with agricultural sector. The occupation pattern of the study area is as follows:



**Figure No. 3.2: Occupation pattern of Baidyerbazar Union**

The chart shows that, 32% people are engaged in agriculture based business, 20% people are engaged in agro labor and 5% are involved in fishing sector.

**3.4.2 Fisheries Sector:** Water body of Baidyerbazar union is 11.03% of total land. Fisheries sector is one of the earning sources here. Very few people are engaged with fisheries sectors for their livelihood.

### **3.4.3 Rural Industry Sector**

Being located along the Narayanganj port, Baidyerbazar union contains some rural industries. These industries are mainly agro-based. Raw materials of these industries are collected from mainly agricultural production. Rice Mill, Textile & Garments industry, Dying Industry, Knitting Industry, Packaging Industry, Poultry Farm, Saw Mill, Re-Rolling Mills, Cosmetics & Toiletries Industry and other Food Manufacturing Industry are the main industries here.

## **3.5 Social Characteristics**

### **3.5.1 Literacy Rate**

Average literacy Rate of Baidyerbazar union is 43.95 % (7+ years). The next table shows the statistics of literacy rate of Baidyerbazar union.

**Table No.3.3: Literacy of Baidyerbazar Union**

<b>Category</b>	<b>Number of population</b>	<b>Percentage</b>
<b>Male</b>	5127	58.93%
<b>Female</b>	3572	41.07%
<b>Total</b>	8699	100.00%

Source: BBS 2001

The above chart shows that, among 19797 populations 8699 persons are literate. Among them 58% are male and rest are female.

### **3.5.2 Health Care Facilities**

Health facility is not satisfactory in this area. Residents of Baidyerbazar union do not get proper medical facilities. There are only one hospital and two community health clinics.

### **3.6 Infrastructure facilities**

#### **3.6.1 Roads and Transportation Services**

Existing road network and transport system is not appropriate for modern transport facilities. There is no footpath for pedestrians. There are three types of roads found here. A Major thoroughfare road is of 60 feet width. Major distributor roads and village roads are of 12 feet 8 feet respectively.

#### **3.6.2 Market and Growth Centre**

Market and growth centre are the influencing factors of development in an area. There are 15 markets and one growth centre in the study area.

#### **3.6.3 Religious Centre**

There are mainly two types of people found in this area such as Muslim and Hindu. There are 15 mosques and 4 temples for their religious purposes.

#### **3.6.4 Training Institution**

There is only one training institute to train up the industrial labors. The training institute is run by Ministry of Industry of Bangladesh.

#### **3.6.5 Bank and Office**

There are two banks which are used for financial purposes. There are eight offices to execute the official works throughout the union such as Union parishad office, Agricultural office, Security office and Medical office etc.

### **3.7 Utility facilities**

#### **Water supply**

Water supply of Baidyerbazar union is satisfactory. There are three types of source of drinking water. Main source of drinking water is Tube well.



### **Electricity supply**

The condition of electricity is satisfactory in the Baidyerbazar union. The GIS map shows that electricity is available throughout the union.

### **Gas supply**

Residents have said that condition of Gas supply is not satisfactory. They have also said that, at present there is no more Gas supply in the union.

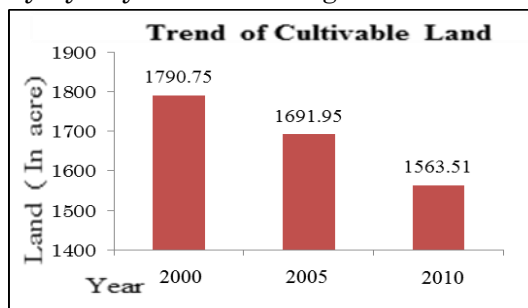
### **Sanitation situation**

The sanitation system is satisfactory and hygienic.

## **3.8 Agricultural Development**

### **3.8.1 Trend of Cultivable Land**

Since the last 15 years the cultivable land of Baidyerbazar union is decreasing. So the production of crops is also decreasing day by day. The following chart shows the trend:



**Figure No. 3.3:** Trend of Cultivable land

Source: Field Survey

It can be found that, from 2000 to 2010 the amount of agricultural land has decreased from 1790.75 acre to 1563.51 acre.

### 3.8.2 Cropping Pattern

Rice is the main crop of Baidyerbazar union. Vegetables also grow in huge amount here. The cropping pattern of Baidyerbazar union is shown by the following table:

**Table No. 3.4: Cropping Pattern of Baidyerbazar Union**

Type of crop	Area of land(in hector)	Percentages
Boro	246	24.6
Wheat	5	0.5
Potato	15	1.5
Aman	250	25
Lentil	56	5.6
Sugarcane	6	0.6
Mustard	93	9.3
Sesame	54	5.4
Vegetables	275	27.5
Total	1000	100

Source: Field Survey

The table indicates that, vegetables grow in most of the land. Rice is produced in total 496 (49.6%) hector land every year. Wheat grows in only 5 acre land.

### 3.8.3 Agricultural Production

The agricultural production in the area is satisfactory and the average production in a year is as follows:

**Table No. 3.5: Agricultural Production of Baidyerbazar Union**

Type of Crop	Production Per Hector(in ton)
Boro	6.5
Wheat	3.5
Potato	25
Amon	1.5
Lentil	1.1
Sugarcane	10
Mustard	1
Sesame	0.6

Source: Field Survey

From the table it is visible that, Potato has the maximum production per hectore followed by Sugarcane.

### 3.8.4 Comparison between Last Three Years Production

From field survey, last three years crop production has been found which are shown in the next table:

**Table No. 3.6: Crop Production (in hector): 2008-2011**

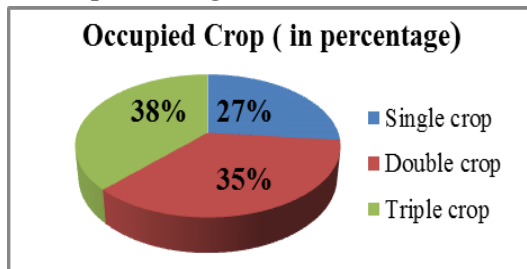
Year	Boro	Wheat	Potato	Aman	Lentil	Sugarcane	Mustard	Sesame	Vegetables
2008-2009	255	33	28	230	66	7	100	54	280
2009-2010	245	27	20	250	63	7	98	52	275
2010-2011	246	5	15	250	56	6	93	54	275
Percentage	24.6	0.5	1.5	25	5.6	0.6	9.3	5.4	27.5

Source: Field Survey

It is noticeable from the table that, wheat production is decreasing at an alarming rate whereas Boro and Aman production has decreased very little.

### 3.8.5 Occupied Crop

The chart below shows the distribution of single, double and triple crop land in percentage:



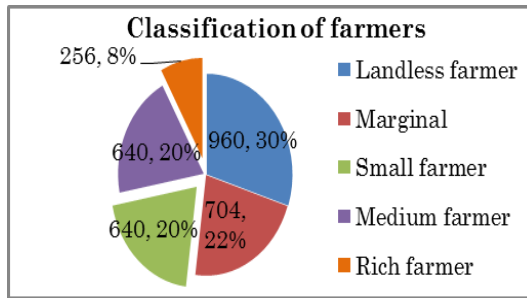
**Figure No. 3.4: Occupied Crop of Baidyerbazar Union**

Source: Field Survey

The chart shows that 38% land are triple crop land and 27% land are single crop land.

### 3.8.6 Farmers' Classification

There are five types of farmers in Baidyerbazar union. The landless farmers rent land from rich farmers for a definite time. Marginal farmers are also very poor and helpless. The farmers' classification of this area is shown by the following chart:



**Figure No. 3.5: Classifications of Farmers of Baidyer Bazar Union**

Source: Field Survey

It is clearly visible that, 30% of farmers are landless and 22% are marginal farmers. Only 8% farmers are rich.

## 4. Planning Policies and Proposals

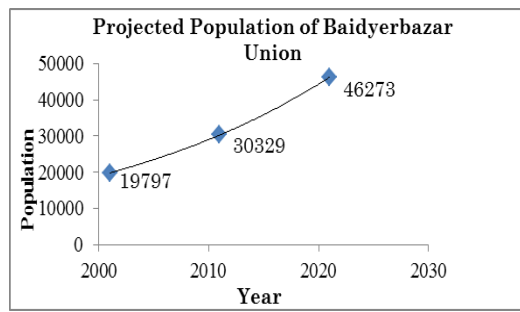
One of the crucial parts in planning is to formulate ideal proposals for designing the selected area in a best possible way. Integration of local people's concern and economic and financial feasibility analysis can lead to the final result. This chapter includes population projection; design proposals and DAP policies regarding Baidyerbazar union.

### 4.1 Population projection

The time scale for any proposed land use plan is the period within which the plan is to be executed. The time scale for the study has been selected to be 20 years. To provide adequate community facilities for the future it is necessary to project the upcoming population. The population forecast for Baidyerbazar union for has been made on the basis of the following assumption:

1. The fertility rate is taken as 2.74 children/ woman/10 year.
2. Infant mortality rate is taken as 59.02/1000 population.
3. Death rate is taken to be 8/1000 population.
4. There will be no migration inside or outside the study area.
5. The year 2001 is taken as the base year and the time interval is taken to be 10 years.

The following figure shows population projection of Baidyerbazar Union:



**Figure No. 4.1: Population projection of Baidyerbazar Union**

The chart shows that, the population of the union may reach 46273 by the year 2021. This calculation is done following the age cohort method.

#### **4.2 Detailed Area Plan (DAP) Policy (RAJUK, 2010)**

To implement the provisions of the DMDP, DAP is the third and last tier of Development plan for Dhaka city. Various land uses are proposed here. Detailed Area Plan provides guidelines to use land for any kind of development. The area under DMDP is divided into five parts. Baidyerbazar union is included in part-B. There are six types of land uses in the Baidyerbazar union. Its physical plan has been proposed by considering the DAP policy. The flood flow zone should be preserved and excluded from any kind of development. There is no overlay zone and non conforming zone within this area.

### **4.3 Planning Proposal**

Proposals for each and every sector such as homestead, Community facilities, Utility facilities, Road network, Irrigation canal and Rural industries has been provided individually.

#### **4.3.1 Proposal for Rural Homestead:**

- Each Homestead will acquire 0.1 acre land.
- The homesteads will be clustered under a block.
- Each block will acquire 6 acre land approximately.
- Open space and vegetation will surround the clusters of homesteads.

**Justification:** It becomes economically feasible to provide electricity, water and gas supply to all the housing units if these are clustered into groups. It ensures proper utilization of land and convenient rural life. Thus ample space for vegetation is also easy to acquire.

#### **4.3.2 Proposal for Community Facilities:**

- Basic requirements like Mosque and community centers will be established in every zone.
- Community activity center, Police outpost, Bank, Hospital, Bus stand, Grave yard will be found only in CBD.

**Justification:** Mosque, community centers, health complex are common in every zone. But Police outpost, Bank, Hospital, college are located at the central zone to serve the total union because it is more convenient for all residents.

#### **4.3.3 Proposal for Utility Facilities:**

- Facilities found in CBD will be utility stations for Gas and Electricity, Service Station, Union Parishad Office, Agricultural office and Training center for farmers.
- One central food godown of 25000 ton capacity will be established in CBD near the major thoroughfare road.

**Justification:** Main stations for each service are located at CBD because this location facilitates transport. It is also effortless to get administrative support.

#### **4.3.4 Proposal for Road network:**

- Existing roads will be kept.
- Roads proposed in DAP will be established.
- Roads will be classified into-
  - Major Thoroughfare : 60feet
  - Major Distributor : 12 feet
  - Village road(Access road): 8 feet

**Justification:** Major thoroughfare will connect the union with the upazilla. Major distributor will connect the union with village or wards. Only village roads will be kutchra and will give access to every rural homestead.

#### **4.3.5 Proposal for Irrigation Canal:**

- Irrigation Canal will be designed based on topography and contour of the area.
- Canal will run from higher to lower level of lands.
- Canal width varies from 4 feet to 1 foot as per requirement.

**Justification:** It is provided to facilitate irrigation to all agricultural lands at maximum period of the year.

#### **4.3.6 Proposal for Rural Industries:**

- Industries of this study area will be kept in their former location.
- These industries will be adjacent to the major thoroughfare road to facilitate easy transportation.

**Justification:** As Baidyerbazar union is an agriculture based area, most of its industries are agro based. The raw materials come from the union itself. Its location will make transportation of goods or raw materials easy as it is beside the major

thoroughfare and well connected to the rest of the union. In the off seasons the labors can work in these industries.

## 5. Design procedure and Space Calculation

This chapter includes proposed land use for Baidyerbazar union, procedure and space calculation of the design and projection of Agricultural production.

### 5.1 Proposed Land Use

Bangladesh has an agriculture based economy. It has been found from the field visit that agriculture has always been the main land use of Baidyerbazar union. But since the last 10 years the amount of agricultural land of this union has been decreasing at a rate of 1.3% per year. This is because of the increasing population and unplanned land absorption.

Land Use	Area(acre)	Area (percentage)
Manufacturing and Industrial Activity	20	0.3%
Community Facility	40	0.6%
Irrigation channel	10	0.15%
Commercial Activity	32	0.47%
Road	50	0.74%
Rural Settlement Zone	900	13.3%
Agricultural Zone	4543	67.1%
Open Space	418	6.17%
Service Activity	10	0.15%
Water body	747	11.02%
Total	6770	100%

**Table 5.1: Proposed Land Use (in acre and percentage)**

From the chart above, it can be found that maximum of land is proposed for agricultural purpose and that is 67.1 % of the total area. After that, priority has been given to rural settlement zones allocating an area of 900 acre which is 13.3% of the total union. Existing 747 acre area has been kept as water body. 40 acre land has been assigned for provision of community facilities.



## 5.2 Design Procedure

The philosophy of the design is to cluster the rural settlements, community and utility facilities into different zones to acquire maximum land for agricultural use. Considering the existing rural settlements and roads, 5 clustered zones have been proposed for Baidyerbazar union. These 5 zones fall under 3 proto types such as:

- ❖ **Proto Type 1: Residential & Industrial Zone-Zone A**
- ❖ **Proto Type 2: Residential Zone-Zone B , Zone D, Zone E**
- ❖ **Proto Type 3: CBD-Zone C**

### 5.2.1 Proto Type 1: Residential & Industrial Zone

#### 5.2.1.1 Zone A

**Location:** This zone is situated at the northwest side of the union beside the Brahmaputra River. The major thoroughfare passes through this zone and connects the rural industrial area with it. This zone mainly accommodates the labors working in these industries.

**Area:** 118.9 acre

**Population:** 8000

**Density:** 67 persons per acre

**Amenity Facilities:** The amenity facilities serving the whole zone are clustered in its central location so that these are easily accessible by everyone. The list of amenities for this zone is given below:

**Table 5.2: Amenity Facilities of Zone A**

Facilities	Number
Primary School	1
Secondary School	1
Play Field	2
Health Complex	1
Community Centre	1
Mosque	1
Kutch Bazar	1

## 5.2.2 Proto Type 2: Residential Zone

### 5.2.2.1 Zone B

**Location:** This zone is located at the northwest side of Baidyerbazar union. This zone is purely a residential zone.

**Area:** 185.7 acre

**Population:** 8000

**Density:** 43 persons per acre

**Amenity Facilities:** The proposed amenity facility for this zone is listed below:

**Table 5.3: Amenity Facilities of Zone B**

Facilities	Number
Primary School	1
Secondary School	1
Play Field	2
Health Complex	1
Community Centre	1
Mosque	1
Kutchra Bazar	1

### 5.2.2.2 Zone D

**Location:** This purely residential zone is placed between Zone C and Zone E.

**Area:** 241 acre

**Population:** 8000

**Density:** 33 persons per acre

**Amenity Facilities:** Zone D consists of the following amenities:

**Table 5.4: Amenity Facilities of Zone D**

Facilities	Number
Primary School	1
Secondary School	1
Play Field	2
Health Complex	1
Community Centre	1
Mosque	2
Kutchra Bazar	1

### 5.2.2.3 Zone E

**Location:** Zone E is located at the south western part of the study area. It gives shelter to the local people of the lower part of this union.

**Area:** 172.21 acre

**Population:** 8000

**Density:** 47 persons per acre

**Amenity Facilities:** Zone E facilitates its local people with the following amenity facilities:

**Table 5.5: Amenity Facilities of Zone E**

Facilities	Number
Primary School	1
Secondary School	1
Play Field	2
Health Complex	1
Community Centre	1
Mosque	2
Kutchra Bazar	1

## 5.2.3 Proto Type 3: CBD

### 5.2.3.1 Zone C

**Location:** This zone is located approximately at the middle of the entire Baidyerbazar union and is the center of all commercial activities of the study area. The major thoroughfare passes through the center of this zone. Other major distributor roads also connect this zone with other zones. The Meghna passes this zone from the right side. The presence of an existing growth center is the reason behind locating this CBD zone in this area.

**Area:** 433.22 acre

**Population:** 14000

**Density:** 32 persons per acre

**Amenity Facilities:** As zone C is the main commercial and business zone of this area, that is why it is facilitated with more amenities than the other zones comparatively. Majority of these civic amenities are placed at the central locations beside the

major thoroughfare road. As a result they are easily accessible from each part of the zone as well as from the whole Baidyerbazar union.

The amenity facilities of Zone C are given below:

**Table 5.6: Amenity Facilities of Zone E**

Facilities	Number	Facilities	Number
Primary School	1	Union Parishad Office	1
Secondary School	1	Agricultural Office	1
Play Field	2	Training Center	1
Health Complex	1	Hospital	1
Community Centre	1	Bus Stand	1
Mosque	2	Post Office	1
Temple	1	Bank	1
Kutchra Bazar	1	Police Station	1
College	1	Utility Station	1
Shop	1	Food Godown	1
Community Activity Centre			1

### 5.3 Management:

The functions of management and control are linked together. Control is concerned with maintaining physical planning operations to meet changing circumstances, particularly those exogenous to the physical plan such as markets, community facilities, CBD, government policy changes and so on. Management will cover four factors of our area-technological, business, administrative and human relations.

- LGED will implement the physical plan of Baidyerbazar union.
- Upazilla authority of BRDB will monitor the physical plan of Baidyerbazar union.
- There will be active and wide spread participation of local people.
- The multidisciplinary nature of rural development and the multitude of governmental and non governmental agencies will be engaged to implement the physical plan of Baidyerbazar union.

- Integration and coordination among various development agencies will be properly maintained to make successful physical plan of Baidyerbazar union.

## 5.4 Projected Agricultural Production

### 5.4.1 Total Projected Agricultural Land = 1839.27 Ha.

### 5.4.2 Rice Production

Different types of crops are grown in different types of lands at different seasons. Amon and Boro are the main crops of Baidyerbazar union. Vegetables also grow in a large amount in this area. The following table shows Boro and Amon rice production in ton/Ha.

**Table No. 5.7: Crop Production**

Crop	Amount
Boro	6.5 ton/Ha
Amon	1.5 ton/Ha

Source: Field Survey

Regarding this annual production of Amon and Boro are given below:

**Table No. 5.8: Annual Rice Production**

Occupied Crop	Area (in Ha)	Amon Production (in ton)	Boro production (in ton)	Total Rice Production (in ton)
Single crop	735.71	1103.56	-	9932.1
Double crop	919.64	1379.46	5977.66	
Triple crop	183.927	275.89	1195.53	

- **Total Rice production** = 9932.1 ton
- **Annual Rice consumption** = 0 .1646 ton/person (451 g/person/day)
- **Required production** = 0.1646 ton/person \* 46273 person  
= 7616.5 ton

- **Surplus production** = 2315.6 ton
- **People served by surplus production** = 2315.6 ton / 0.1646 ton/person  
  
= 14068 person

## 6. Conclusion

The population is increasing in respect of time but land is still the same. Under this consideration, at present, the burning issue of the Dhaka city is to provide adequate housing and food for this ever increasing population. On the other hand, the main objective of planning is to ensure optimum utilization of limited land. It is the proper land use planning that can balance the ratio of environment and community facilities within an area. Baidyerbazar, being one of the examples of those rural areas where agricultural land is decreasing, is in grave need for the aid of planning. Therefore, if proper planning procedures are adopted according to the proposed plan, then Baidyerbazar union would be a better place for housing and employment for the people living within this area for a long time in the future.

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