



Development Plan for Mirsharai Upazila, Chattogram District: Risk Sensitive Land Use Plan (2017-2037)

VOLUME-I: STRUCTURE PLAN

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Preface

Urban Development Directorate (UDD) under the Ministry of Housing and Public Works, Government of the People’s Republic of Bangladesh prepares Development Plan at the Upazila level. This is a great pleasure for all concerned that the **“Preparation of Development Plan for Mirsharai Upazila, Chattogram District: Risk Sensitive Land Use Plan”** project has been completed by June 2020 under the supervision of Urban Development Directorate (UDD).

This Development Plan for 20 years (2017-2037) will serve as a guideline for the future Infrastructure Development together with risk sensitive land use control, effective development, and management of Mirsharai Upazila. Development plan for the entire Upazila contains Structure Plan, Urban Area Plans and Rural Area Plan. Structure Plan zones guide development covering the whole project area for 20 years. Urban land zones in two Paurashavas and Rural Plan zones in sixteen unions for duration of 10 years indicating spatial distribution of functions.

The objective of this Development Plan is integrating the rural area with the urban area in both physical and socio-economic terms to implement rural-urban development. Therefore, the main purpose of preparing this Development Plan for Mirsharai Upazila is to ensure the rational use of scarce land resources for concentrated development at the rural and urban scale considering disaster risk.

Several essential tasks such as Physical Feature Survey; Socio-economic Survey; Transportation Survey; Hydro-Geological Survey; Geological Survey and baseline survey of Flora and Fauna has been conducted for the preparation of Development Plan. Along these tasks Participatory Rural Appraisal (PRA) and a series of consultation meetings with stakeholders also been conducted. Finally, a formal public hearing has been made to register public complaints and awareness through a participatory planning approach with the Upazila and related stake-holders. During the implementation period if needed any change of the development plan may be allowed with the approval of the appropriate authority.

Urban Development Directorate (UDD) acknowledges the full support and cooperation of Mirsharai Upazila Authority, Member of Parliament, Mayors of both Baroiarhat and Mirsharai Paurashava, Chairman of the all Union Parishad, Stakeholders and Member of Civil Societies, member of University Student Association of Mirsharai (USAM) and the common people of locality with the deepest gratitude.

Dr. K. Z. Hossain Taufique

Director

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Executive Summary

The “Development Plan for Mirsharai Upazila, Chattogram District: Risk Sensitive Land Use Plan” project envisages a new development plan for Mirsharai Upazila. Since the plan as envisaged through the current project of Urban Development Directorate (UDD) is first of its kind in Bangladesh, the local authorities at Upazila level have no previous experience of implementing such plans which integrate both urban and rural areas. Both Baroiarhat and Mirsharai Paurashava have previous experience in plan preparation and implementation. However, the Upazila and Union Parishad have no experience of the implementation of physical plans. The plan prepared through this project will be their first experience of implementing the physical plans in their areas.

The objective of this Development Plan is integrating the rural area with the urban area in both physical and socio-economic terms to implement rural-urban development. Therefore, the main purpose of preparing this Development Plan for Mirsharai Upazila is to ensure the rational use of scarce land resources for concentrated development at rural and urban scale as envisaged in the Terms of Reference (ToR).

The report presents summary information and discussion on the survey results of various aspects of the Upazila. The survey on Land Use, Physical Features, Socio-economic conditions, Topography, Hydrology, Hazards, Environment, Agriculture, Drainage and Flood Control and Transportation have provided useful data and information and are used in the Development Plan. This comprehensive Development Plan contains the Structure Plan, Urban and Rural Area Plan, and Action Area Plan. Structure Plan is prepared to provide flexibility through laying down the development strategies. This stratum of the plan is developed for the whole project area. It has duration of 20 years. The urban area plan is developed for 10 years. Covering the two Paurashavas (Baroiarhat and Mirsharai), the urban area plan lays down the detailed land use proposals. Rural Area Plan is developed for 10 years. Finally, Action Area Plan has duration of 5 years. This plan identified both regionally and locally important projects.

Mirsharai Upazila is situated in the Chattogram District under the Division of Chattogram with an area of 482.88 sq. km including 133.14 sq. km forest area. It is located between 22°39' and 22°59' north latitudes, and 91°27' and 91°39' east longitudes. This Upazila consists of two Paurashava, sixteen Unions, 109 populated Mauzas, and 208 Villages. Mirsharai Upazila is located 192.2 km far from the Capital city Dhaka and 60 km far from the port city Chattogram.

About 66.33% of the land of the project area is covered by non-urban land uses (agricultural and forest area). This depicts the rural characteristics of the project area. Around 15.17% of lands are allocated for the residential purpose (Physical Feature Survey, 2017-2019). It is also to be mentioned here that residential density in these areas is very low.

In 2011, the population of the project area was 398716 (BBS, 2011). The Structure Plan Report used population data for a twenty-year plan period in the future from the estimates of cohort method for Upazila, Union, and Paurashava. The projected figure of the population is 488754 for the year 2037.

As per BBS, 2011, considering the average family size 5, the total number of required housing units will be 97751. By the year 2037, the total deficit of housing units will be 18206.

Summary of Policies

Mirsharai Upazila should be developed as an area of the tourist zone and industrial hub of international standards. Existing development of any nature that creates a hindrance to the proposed policy should be discouraged. The following sectoral policies will guide the planned development of Mirsharai Upazila.

Housing		
Policy 01	:	Provision of adequate and affordable basic infrastructure and services
Policy 02	:	Promote housing schemes for the low-income group and the industrial workers
Policy 03	:	Discourage housing development by destroying natural resources
Economy		
Policy 01	:	Enhancing the agro-processing industry
Policy 02	:	Ensure compact development of industrial and commercial growth
Policy 03	:	Development of the tourism sector
Policy 04	:	Promote informal sector economic activities
Policy 05	:	Facilitate the development of the ICT sector
Transportation and Communication		
Policy 01	:	Improvement of regional connectivity
Policy 02	:	Provide a circular road to establishing smooth vehicular traffic circulation
Policy 03	:	Provide connectivity between Bangabandhu Sheikh Mujib Shilpanagar to Dhaka-Chattogram national highways
Policy 04	:	Construction of flyover at the busiest intersection to avoid traffic congestion
Policy 05	:	Improving internal transport network within the Upazila linking the Upazila Headquarters with the Union Headquarter and Growth Center
Policy 06	:	Establishment of safe walkways and bicycle path alongside the major roads
Policy 07	:	Developing a multi-modal local, regional and national transportation network
Water Resource Management		
Policy 01	:	Protection and preservation of wetland and natural water resources
Policy 02	:	Provide a buffer zone along the river, khal, and other water bodies
Policy 03	:	Surface water bodies should be used as major sources of drinkable water supply to residents to reduce dependence on groundwater
Policy 04	:	Heavy withdrawal of groundwater should not implement in the Bangabandhu Sheikh Mujib Shilpanagar area

Policy 05	:	Proposed artificial reservoirs should be investigated in detail for the implementation of the newly proposed reservoir
Disaster Management		
Policy 01	:	Preparation of comprehensive risk sensitive land use plan
Policy 02	:	Protecting and maintaining the natural drainage system based on existing rivers and khals
Policy 03	:	Regular cleaning of the drainage system and excavation of khals
Social and Community Facilities		
Policy 01	:	Ensure educational infrastructure to cover all over the Upazila
Policy 02	:	Provision of the playground at every educational institution
Policy 03	:	Provision of an educational institute for ethnic groups
Policy 04	:	Ensure technical and vocational training institutions at the Upazila level
Policy 05	:	Provision of a community clinic in each union
Policy 06	:	Use playgrounds as eidgah
Policy 07	:	Ensure community-based graveyard/cremation ground
Urban Utility Services		
Policy 01	:	Promote the development of water supply based on surface water
Policy 02	:	Encourage the harvesting of rainwater
Policy 03	:	Promote adequate hygienic public toilet facilities throughout the busy areas of the urban center
Policy 04	:	Provide affordable and hygienic sanitation for the lower-income people
Policy 05	:	Introduction of the community-based waste collection system
Policy 06	:	Generate innovative ideas to convert waste into a resource
Policy 07	:	Provision of solid waste collection point and waste disposal ground in a suitable location
Policy 08	:	Ensure effective management and disposal of medical waste
Policy 09	:	Promote alternative source of energy like a solar panel, biogas
Tourism and Recreation Facilities		
Policy 01	:	Development of tourism support services and infrastructure facilities
Policy 02	:	Promotion of local heritage-based tourism
Policy 03	:	Encouraging eco-tourism development
Policy 04	:	Creation of waterfront facilities and green areas

There are different types of thematic maps that were prepared based on 6 types of surveys during the survey stage. Each survey has a distinct output. The outputs of survey works were presented in the form of thematic maps. The thematic maps are Digital Elevation Model (DEM), existing Land Use, Road type, cropping pattern, Salinity level in deep water, groundwater recharge area, foundation depth, etc.

Suitability analysis is a prime requirement for the preparation of the development plan of any urban and rural areas. There are two types of suitability maps that were prepared after analyzing the suitability of the existing features. Through this analysis, suitable areas for infrastructure and infrastructure development were identified.

The Structure Plan provides the policies that will guide the future development of Mirsharai Upazila. In the Structure Plan, 33641.87 acres (28.14%) land is kept as a rural settlement area and 18316.56 acres (15.32%) land is kept as a forest area. Besides, economic zone (10.54%), private housing area (5.80%), mixed-use (7.51%), circulation network (1.84%), urban area (1.28%), urban extension area (4.18%), rural settlement area (6.44%), water-body (8.19%), and water supply protection zone (8.04%) areas are earmarked on the Structure Plan to support the future need for food and other development purposes of the Upazila.

It should be kept in mind that this development plan is a guideline for the development and control of growth in a systematic manner. The existing Local Government Acts for Upazila Parishad, Paurashava, and Union Parishad have provided authorities, responsibilities, and scope of planned development in their respective areas. The Upazila Parishad has legal responsibilities and opportunities for coordinating development within the Upazila. Without proper regulations or rules, it would not be possible to implement this development plan. However, the Urban Development Directorate (UDD) needs to play its role as a supervising authority for the execution of the suggested plans and policies as per law.

STRUCTURE PLAN REPORT

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Acronyms

BBS	Bangladesh Bureau of Statistics
BEZA	Bangladesh Economic Zone Authority
BIWTA	Bangladesh Inland Water Transport Authority
BM	BenchMark
BRTC	Bangladesh Road Transport Corporation
BSCIC	Bangladesh Small and Cottage Industries Corporation
BTCL	Bangladesh Telecommunications Company Limited
BWDB	Bangladesh Water Development Board
CBOs	Community-Based Organizations
CFS	Country Freight Service
DFI	Direct Foreign Investment
DoE	Department of Environment
DoF	Department of Forest
DPHE	Department of Public Health Engineering
EPZ	Export Processing Zone
EZ	Economic Zone
FWC	Family Welfare Center
GED	General Economics Division
GDP	Gross Domestic Product
GIS	Geographic Information System
HSC	Higher Secondary Certificate
HQ	Head Quarter
ICD	Inland Container Depot
ICT	Information and Communication Technology
IMTP	Integrated Multimodal Transport Policy
LGED	Local Government and Engineering Department
MoA	Ministry of Agriculture
MoDMR	Ministry of Disaster Management and Relief
Mol	Ministry of Industry

MoHFW	Ministry of Health and Family Welfare
MoHPW	Ministry of Housing and Public Works
MoL	Ministry of Law
MoWR	Ministry of Water Resources
NGO	Non-Government Organization
NHA	National Housing Authority
O-D	Origin - Destination
PDB	Power Development Board
PPP	Public Private Partnership
PRA	Participatory Rural Appraisal
REB	Rural Electrification Board
RHD	Roads and Highways Department
SLR	Sea Level Rise
SSC	Secondary School Certificate
STS	Secondary Transfer Station
TMC	Technical Management Committee
ToR	Terms of Reference
UDD	Urban Development Directorate
UHC	Upazila Health Complex

Glossary of Terms

Bazaar	: The bazaar is a Market Place almost synonym of the hat with some advanced facilities in comparison to the hat. Generally, in a hat, there may not be any permanent business/trading house, shops. However, in a bazaar, there are some permanent trading houses, shops, these shops are open every day, and buyers and sellers attend the bazaar from morning till late evening.
Hat	: The term 'hat' is very much known to all from time immemorial throughout the country which is a temporary rural market place. In the rural area, farmers and other producers used to sit with their surplus products in a suitable place having a comparatively better communication system with adjacent villages to exchange these goods. This suitable place is called hat where generally on fixed days sellers and buyers get together and exchange goods and services. This gathering place is developed gradually by the local people at the beginning. The Hat is a rural trading center.
Katcha	: Temporary in nature
Khal	: Any passage of inflow and outflow of water.
Mauza	: Mauza is the smallest unit of the Land Survey system with a unique number called Jurisdiction List Number (J.L. No.).
Paurashava	: Paurashava is the local name of Municipality. The incorporated area administered by the government as an urban area under the Paurashava Ordinance 2008 is considered as the Paurashava.
Pucca	: Permanent in nature
Semi-pucca	: Semi-Permanent in nature
Tempo	: Human Hauler
Union	: The smallest local administrative unit of the rural area which is composed of Mauzas and Villages.
Upazila	: Sub-District administrative area.
Village	: The smallest geographic area of rural areas. A village may be the same as mauza or there may be more than one village in a mauza.
Ward	: The smallest local administrative unit of the urban area. For operational convenience, Municipalities are divided into nine or more wards. The Ward boundaries are specified by gazette notifications.
Zila	: District administrative area

CHAPTER 01: INTRODUCTION

1.1 Introduction

As a local government unit, most of the Upazila Parishad has not yet capable of integrating the rural areas with the urban area in both physical and socio-economic terms to implement planned rural-urban development. Due to lack of practicing effective development planning, these Upazila Parishad have been measurably failed to put in order spatially the most valuable resource i.e., the land of the towns because of the citizens' socio-economic and cultural needs of the citizens. The land is used most haphazardly. As such, the developments are taking place in an unplanned and unregulated manner resulting in a low living standard of the people living in the urban and rural areas. The ties between urban and rural economies have been acting crucial in promoting widespread development in the developed world. Thus, the overall situation of these Upazilas depicts an underdeveloped scenario that needs to be developed based on their potentialities.

In the government's recent policy of overall administrative re-organization, the Upazila has been recognized as the most significant tier of the administration. By considering the above circumstance, a comprehensive development plan is required to address the required land use transformation which will not allow any unauthorized and unplanned development, either in an urban area or in a rural area. In a view of this circumstance, it appears that the comprehensive development plan of the Upazila Parishad is very much important.

1.2 Background of the Project

Mirsharai Upazila located only 60 km away from the port city Chattogram, is a land of various possibilities. With smooth communication by all means of road, rail, and waterways, it is a potential location for economic cum industrial development. Besides, Mirsharai is blessed with excellent geographical advantage making it a suitable location to establish a bay terminal for the Chattogram Port Authority. The work of establishing one of the largest economic zone Bangabandhu Sheikh Mujib Shilpanagar has also started in Mirsharai. Again, the proposed Special Economic Zone would generate many industry-related new activities including huge vehicular traffic on air, rail, road, and water. This phenomenon would have both positive and negative impacts on the socio-economic condition and existing land use pattern of the region.

At the same time, Mirsharai is blessed with an abundance of natural resources and scenic beauties having hilly forest areas, hill streams and waterfalls of Chattogram Hill Tracts on one side and the Bay of Bengal on the other. Mirsharai sea beach, hilly area, Mohamaya Chhara Lake, Khaiyachhara region has the greater potential for tourism development as there are abundant resources to attract the tourists. In the tourism sector with holistic planning and establishment of easy accessibility, Mirsharai can be a great tourist attraction. These are the key drivers of change for the Upazila under study.

Mirsharai Upazila is developing in an unplanned and haphazard manner very rapidly due to the ample opportunity for tourism development, which is acting as a pull factor for private sector

developers. Hence, this project has been undertaken to protect the region from the depletion of its natural resources and character and tourism development as well.

The Government of the People's Republic of Bangladesh funded the current project with the Urban Development Directorate (UDD), under the Ministry of Housing and Public Works (MoHPW) as the executing agency. The project is managed, monitored, and evaluated by UDD at the field level. The Technical Management Committee (TMC) at the organization level is responsible for looking into the technical and coordination aspects, where the Inter-Ministerial Steering Committee is responsible for guiding the project towards its goal.

1.3 Description of the Project Area

Mirsharai came into existence as a Thana in 1901 and was upgraded to an Upazila in 1983. Mirsharai Upazila is situated in the Chattogram District under the Division of Chattogram with an area of 482.88 sq. km including 133.14 sq. km forest area. It is located between 22°39' and 22°59' north latitudes, and 91°27' and 91°39' east longitudes. The Upazila is bounded on the north by Tripura state of India and Chhagalnaiya and Feni Sadar Upazilas of Feni Zila, east by Fatikchhari Upazila, south by Sandwip channel, Sitakundu, and Sandwip Upazilas and west by Feni River, Companiganj, and Sonagazi Upazilas of Noakhali Zila (BBS, 2011).

Mirsharai Upazila is located 192.2 km far from the Capital city Dhaka and 60 km far from the port city Chattogram. At Mirsharai Upazila, Feni River; Sandwip Channel; Ichhakhali, Mahamaya, Domkhali, Hinguli, and Mayani Khal are notable water bodies (Banglapedia). The hills range on the northern and eastern side of this Upazila along the bank of the Feni River extended up to Chattogram and the Chattogram hill tracts. A detailed description of the project area is given in Table 1.1. The location of the project area in respect of Bangladesh is presented in Map 1.1.

Table 1.1: Detail Description of the Project Area

Municipality	Union	Mauza	Village	Population	Urbanization	Density per sq.km
2	16	109	208	3,98,716	7.83%	826

Source: BBS, 2011

1.4 Objective of the Project

The objective of the project is to optimize resources and activities for the sustenance of marginal people. The activities and resources are very important to the economy and life of the people of Bangladesh whose living conditions are inextricably linked to the productivity and sustainability of the region. There is no long-term holistic development plan for the project area. Coastal zone needs to be integrated with the mainstream of the development process of the country. Therefore, an interdisciplinary development planning approach is urgent to optimize the livelihood of the region. Physical development planning problems, needing attention, are as follows:

- To integrate ecology, economy, and social resources with the mainstream of the development process of the country.
- To frame policies for the best use of land and its control for the Mirsharai Upazila.
- To optimize the environment for the sustenance of people.
- Formulation of policies and plans for mitigation of different types of hazards, minimizing the adverse impacts of climate change and recommend possible adaptation strategies for the region.
- Formulation of policies and plans for gradual nucleation of settlements with policies and plans for the development of growth centers of the area.
- Formulation of a guideline for the development of tourism in Mirsharai Upazila and also accommodation of future changes in existing land use patterns, socio-economic conditions of the area, and quality of life of the people.

1.5 Methodological Approach to Plan Preparation

Different approaches and methodologies were followed for the preparation of the Development Plan of Mirsharai Upazila. The Development Plan package was followed in different stages - from the mobilization of the project to the finalization of the plan. Collection of mauza maps and secondary documents, conduction of different surveys, application of 3D Photogrammetric technology for preparation of base-map and GIS database, consultation with stakeholders, fixation of planning standards, review of secondary information, review of national policies and laws and preparation of planning documents were the key approaches and methodologies. Structure Plan was prepared based on the agreed planning standards and land use categories. Development proposals of Mirsharai Upazila were made considering different propositions on future growth and development. The overall planning methodology has been presented in Figure 1.1.

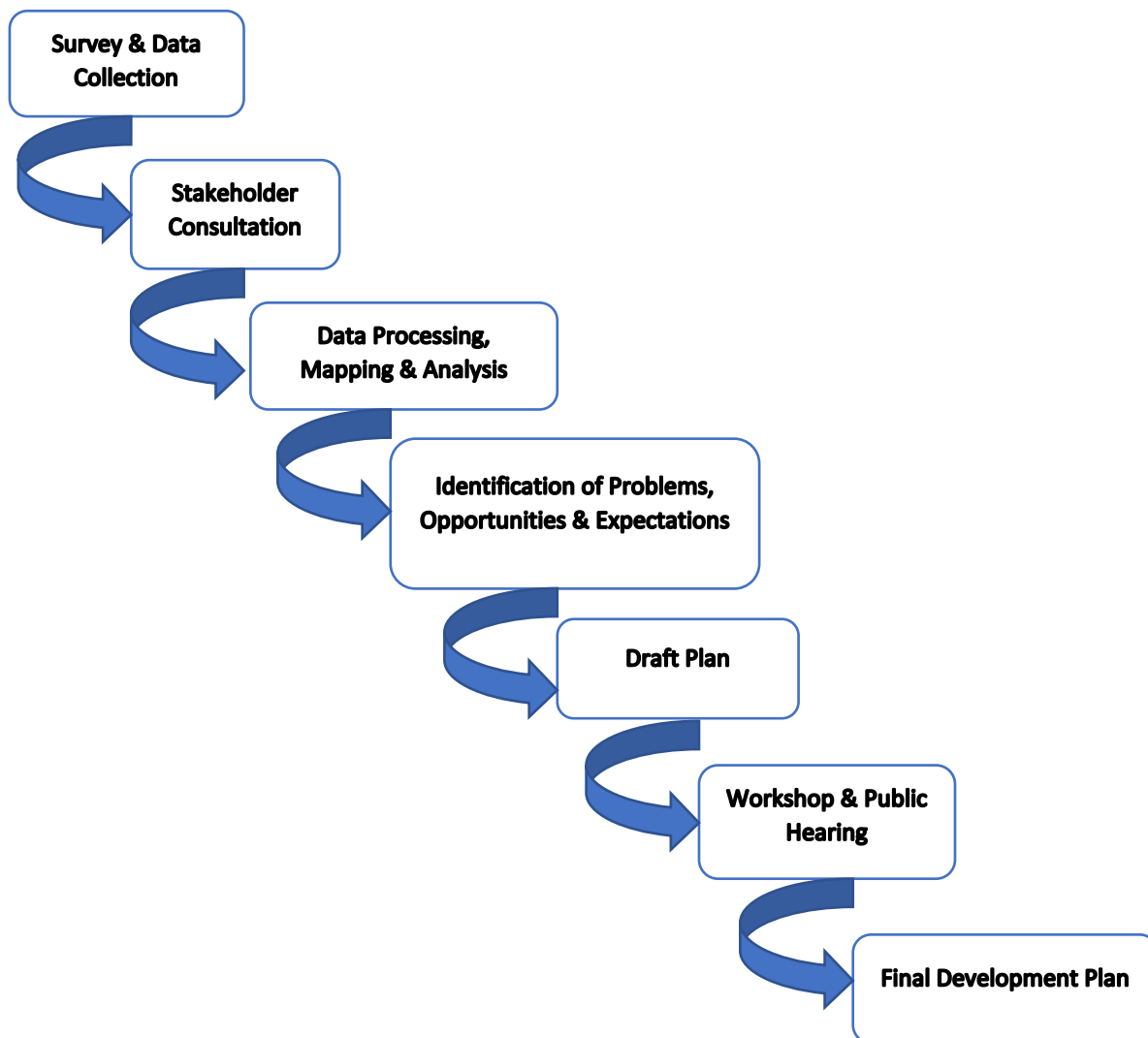


Figure 1.1: Overall Planning Methodology

The detailed discussions of approaches and methodologies are made in the following paragraphs. The flow diagram of the detailed planning process is illustrated in Figure 1.2.

In the first step the conceptualization, mobilization, and operationalize the activities were carried out and the output was the preparation of Mobilization Report. Collection of maps, basic statistics, and information, preparation of the base map, demarcation of project boundary, mauza map procurement, the establishment of GCP and BM, digitization and Geo-referencing of mauza map, 3-D satellite image processing was carried out and the second stage was the preparation of an Inception Report.

In the third stage, a detailed survey has been carried out to know the existing condition of the surveyed area. Different types of surveys and studies were conducted and prepare a database and get an insight into the existing conditions. PRA demand analysis has been done then and after that, consultation meeting has been carried out about the findings and for proposing development plans. Based on the findings of the studies, the survey report was prepared.

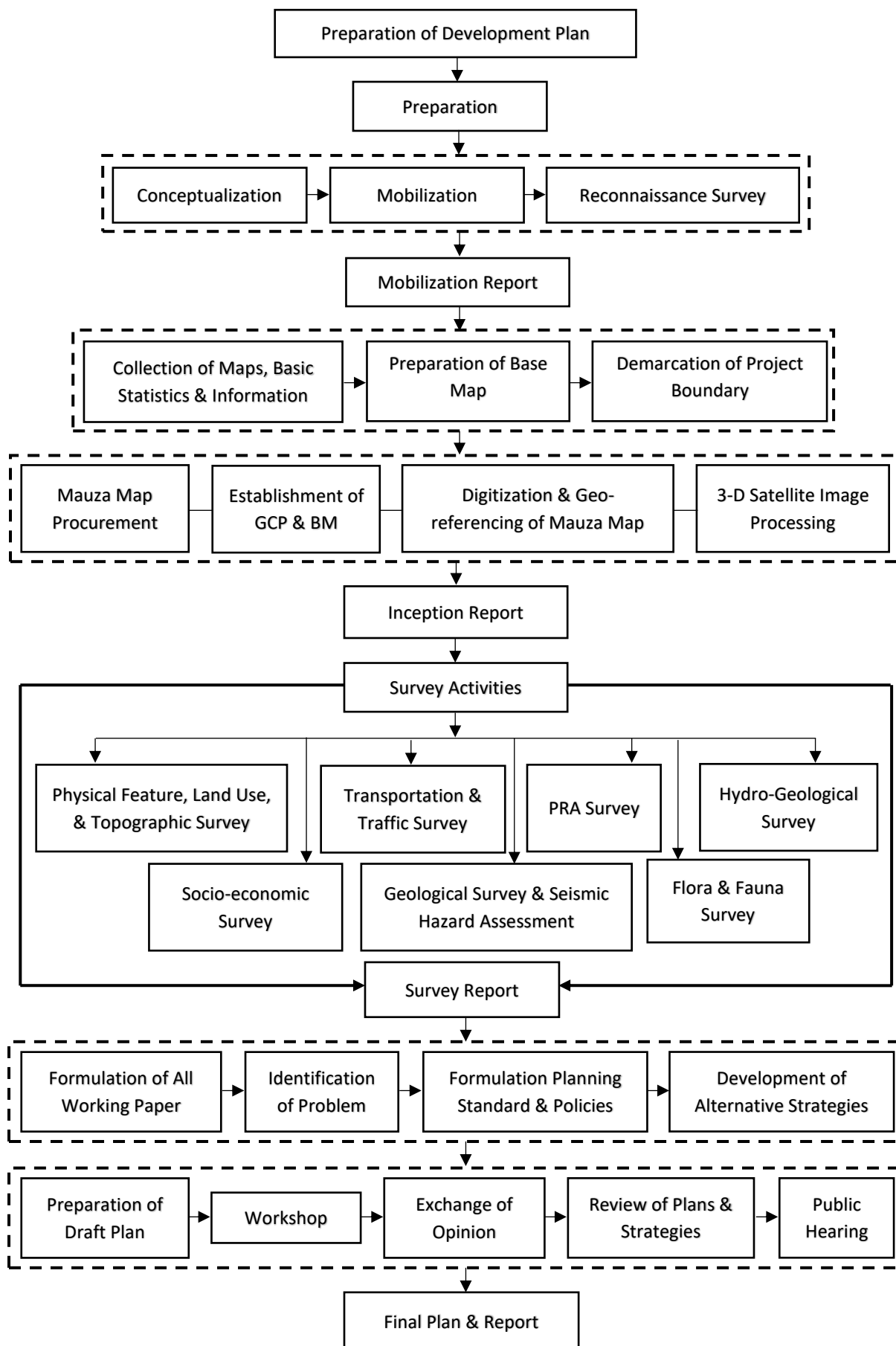


Figure 1.2: Flow Diagram of the Planning Process

The fourth stage was a review of Survey and PRA findings for making a draft plan. Reviews were made by an exchange of opinion with the cross-section, people, and stakeholders either groups or individual basis. Important task or activities in this step was to formulate strategies, policies, and preparing plans for all stages like Structure Plan, Urban Area Plan, Rural Area Plan, and Action Area Plans for selected areas. After that, a draft plan has been prepared and workshops were arranged. The public hearing was included to know the plan's usefulness at the local level and then the Final plan has been prepared.

Fifth and Final step was review and evaluation of the Strategies, Plans, feedback, and opinion of experts and public hearing. After the compilation of all the opinions, the Final Plan has been prepared.

1.6 Content of the Development Plan Report

The Development Plan Report of Mirsharai Upazila is organized into four major parts with an Introduction chapter at the beginning. The four major parts contain various components of work. The four major parts of the Development Plan of Mirsharai Upazila are as follows:

Chapter One: This chapter describes the background information on selecting a project along with justification, description of the project area, planning methodology, and content of the Development Plan report.

Chapter Two: This chapter describes the objectives of the Structure Plan, a methodology for the preparation of Structure Plan, duration, and amendment of the Structure Plan.

Chapter Three: This chapter describes existing conditions of the project area including socio-economic profile, existing land use pattern, physical feature, physical infrastructure, and key observations from Participatory Rural Appraisal (PRA).

Chapter Four: This chapter presents the review of the different type of national policies, laws, act, and regulations which are relevant to this physical development planning process of Mirsharai Upazila.

Chapter Five: This chapter describes the basis of population projection, projection method, the rationale for selecting the population projection method, estimation of population density of Mirsharai Upazila.

Chapter Six to Thirteen: These chapters describe sectoral polices of Structure Plan including economy, housing, transportation and communication, water resource and management, disaster management, social and community services, urban utility services, and tourism and recreation facilities of Mirsharai Upazila.

Chapter Fourteen: This chapter describes public participation including methodology of the PRA, problem scenario of the project area, and participation through social media.

Chapter Fifteen: This chapter describes the formulation of the thematic maps, suitability analysis, and Structure Plan zoning of Mirsharai Upazila.

Chapter Sixteen: This chapter describes the concluding remarks of the Structure Plan report.

CHAPTER 02: CONCEPT OF STRUCTURE PLAN

2.1 Introduction

The Structure Plan delivers long term strategy for the 20 years to 2037 for the development of Mirsharai Upazila. It sets a long-term indicative and flexible strategy that will show the future direction of coordinated development and will serve as the framework for local-level plans. The Structure Plan contains a report which is a policy document with various supporting maps and an appropriate scale composite map depicting the key elements of the major strategic decisions.

2.2 Objective of the Structure Plan

The purpose of the Structure Plan is to outline a preferred pattern of development from the perspective of the Upazila authority as a service provider and planning authority. The main objective of the Structure Plan is to provide sector-wise policy guidelines for two Paurashavas and all the sixteen unions of Mirsharai Upazila. The objectives of the Structure Plan are as follows:

- ✓ An inventory of existing physical, demographic, economic, and social and infrastructure features;
- ✓ An analysis of the major existing problems;
- ✓ Estimation of trends and changes likely in the future (for the next 20 years);
- ✓ The identification of the major constraints on and opportunities for development;
- ✓ Consideration of the major development options and policies;
- ✓ An indication of the most suitable areas for such development;
- ✓ The identification of the priorities in each sector and the major activities needed to implement the development strategy.

The Structure Plan consists of a package of policies dealing with the main aspects of development over the next 20 years and defines a complete set of policies and strategies intending to achieve the overall objectives of the Structure Plan. The structure plan concentrates on the broad structure of the Upazila and is not concerned with the details of physical layout or individual development details which cannot be implemented until the later stages of the planning period.

2.3 Methodology for the Preparation of Structure Plan

The whole preparation process of Structure Plan for Mirsharai Upazila has been illustrated and described as follows:

Planning Area Demarcation

The planning area has been demarcated for the Structure Plan as the existing Upazila area. The total Structure Plan area is covered by two Paurashavas named as Baroiarhat Paurashava, Mirsharai Paurashava and all the sixteen unions named as Dhum Union, Durgapur Union, Haitkandi Union, Hinguli Union, Ichhakhali Union, Karerhat Union, Katachhara Union, Khaiyachhara Union, Mayani

Union, Mirsharai Union, Mithanala Union, Maghadia Union, Osmanpur Union, Saherkhali Union, Wahedpur Union, and Zorwarganj Union.

Projection of Population

After demarcating the planning area, the population of the Structure Plan area has been projected from 2017 to 2037 based on census data of 2011.

Review of Existing Development Growth and Pattern

To understand the existing development pattern and growth, the existing conditions of Mirsharai Upazila have been reviewed in respect of different sectors. To reveal the existing situation several surveys have been done.

Review of National Policies

Development Plan related to all the relevant and recently updated national policies acts, and laws have been reviewed in respect of different sectors. Relevant strategies and targets of national policies have been incorporated into the national policy review chapter.

Adapted Sectoral Policies and Strategies

After reviewing the relevant national policies, major policies and strategies have been proposed sector-wise.

Public Consultation

Public Consultation is an essential element of the participatory planning approach. To understand the problem and prepare the plan, several formal and informal meetings were arranged with the Upazila as well as stakeholders.

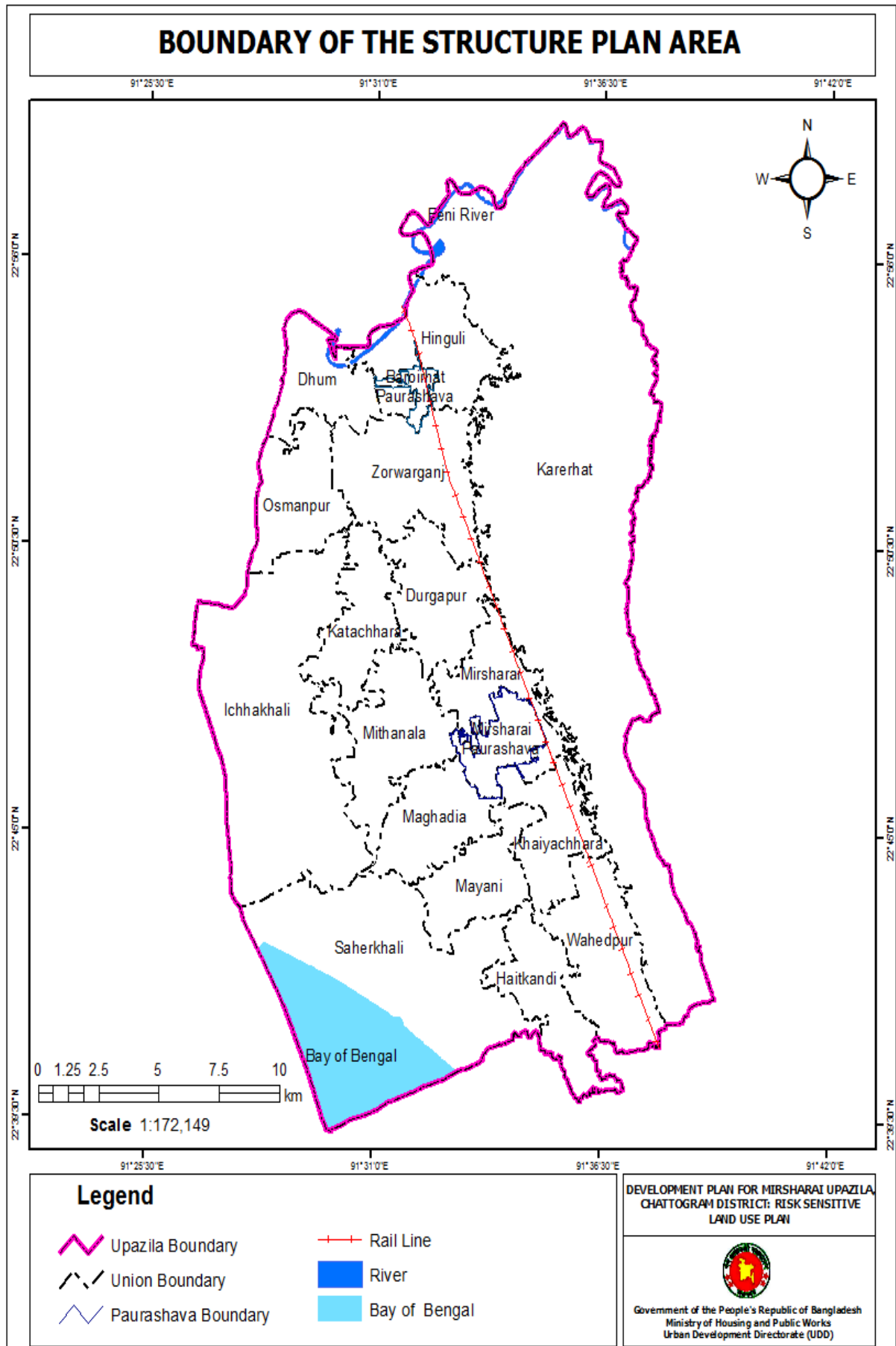
2.4 Area Coverage of the Structure Plan

The total Structure Plan area of Mirsharai Upazila is 493.60 sq. km. (as per GIS database). The jurisdiction area for the Structure Plan is covered by all the sixteen unions and two Paurashavas of Mirsharai Upazila (vide Map 2. 1).

2.5 Duration and Amendment of the Structure Plan

The Structure Plan of Mirsharai Upazila under Development Plan will be valid for 20 years from the time of its approval by the government. Thereby, it will be valid up to the year 2037. Structure Plan can be amended every fifth year. However, after each of the amendments, the Structure Plan must be approved by the Authority.

Map 2. 1: Boundary of the Structure Plan Area



CHAPTER 03: EXISTING CONDITIONS

3.1 Introduction

The key purpose of the structure plan is to provide policy guidelines to resolve the existing problems of Mirsharai Upazila. This chapter presents the summary information on the existing conditions of development and critical planning issues to be considered in the planning and development processes of the project area. The major issues are the demography and population growth, land use pattern, physical infrastructures, transportation, environment, drainage, and disaster management.

3.2 Demography and Population Growth

The total population of Mirsharai Upazila was 368950 in 2001 (BBS, 2001), with 183358 as male and 185592 as female. In 2011, this population figure rose to 398716 (BBS, 2011). Using the census data of 2001 and 2011, the growth rate of the population for this Upazila has been calculated. Based on the population growth rate, the population of Mirsharai Upazila has been projected for the year 2037. According to the population projection, the project area has a total population of 488754 for the year 2037 (Please see detail in Table 5.3 in Chapter-5).

According to the census data (2011), it is noticeable that the household size of Mirsharai Upazila is 4.99 which was 5.34 in 2001. According to the census data (2011), Mirsharai Paurashava has the lowest average household size (4.5) and Saherkhali Union has the highest average household size (5.4). Among the project area, household size is usually smaller in more urbanized areas.

3.3 Socio-economic Profile

3.3.1 Family Size

The predominant family size in the project area is 6-9. The next important group is family with 1-5 members. These two groups together constitute about 91.60 percent of families. Table 3. 1 represents the details of family size in the project area as has been found from the socio-economic survey.

Table 3. 1: Family Size of the Project Area

Family Size	Number of Households	Percentage (%)
1-5	519	38.40
6-9	718	53.20
10-14	93	6.90
15-19	17	1.30
20 and above	3	0.20
Total	1350	100.00

Source: Socio-economic Survey, 2018

3.3.2 Educational Status

Among the surveyed households in the project area, 23.31% are illiterate, around 33.08% have only primary level education. The most observable fact is that only 2.00% of the project area's populations have honors, master, or higher level of education. The educational status of the project area is presented in Table 3. 2.

Table 3. 2: Educational Profile of the Project Area

Educational Status	Number of Persons	Percentage (%)
Illiterate	303	23.31
Primary	430	33.08
Junior Secondary	133	10.23
SSC/Dakhil	268	20.62
HSC/Alim	79	6.08
Degree/Honors/Fazil	61	4.69
Masters or Higher	17	1.31
Technical	9	0.69
Total	1300	100.00

Source: Socio-economic Survey, 2018

3.3.3 Religious Group

Distribution of population by religion in the project area is shown in Table 3. 3. Persons of all three religions Islam, Hindu, and Buddhist are available in the project area; although Muslims overwhelmingly dominate and account for more than 85%. Hindus are around 13.80% and Buddhists around 1.20%.

Table 3. 3: Status of the Religious Group

Religion	Number of Households	Percentage (%)
Muslim	1148	85.00
Hindu	186	13.80
Buddhist	16	1.20
Total	1350	100.00

Source: Socio-economic Survey, 2018

3.3.4 Employment Pattern

The occupation pattern of the project area's population is very diversified. From the occupational pattern, it is found that the percentage of people engaged in the traditional agricultural sector is comparatively low (12.15%). Business is one of the main occupations of the people of the area and 8.46% of people are engaged in it. Household work indicating housewives is the single most common field of employment in the project area with the figure of 39.46%. The occupational pattern of the project is presented in Table 3. 4.

Table 3. 4: Employment Profile

Categories	Number of Persons	Percentage (%)
Agriculture	158	12.15
Business (Small/Medium)	110	8.46
Construction Work	36	2.77
Day Labor	96	7.38
Government Job	36	2.77
Housewife	513	39.46
Skilled labor	24	1.85
Private Job	43	3.31
Self-independent	215	16.54
Student	51	3.92
Transport Work	18	1.38
Total	1300	100.00

Source: Socio-economic Survey, 2018

3.3.5 Income and Savings Pattern

Income and expenditure pattern of the population reflect their socio-economic status and the status of the area as well. The income-expenditure pattern also refers to the savings status of the selected population. It is observed that about 3.63% of respondent's monthly income is below Taka 5000, about 19.33% respondent's monthly income is Taka 5001-10000, about 22.07% respondent's monthly income is below Taka 10001-15000. About 2.81% of respondent's monthly income is more than Taka 50000. The per capita income profile of the household head in the project area is shown in Table 3. 5.

Table 3. 5: Distribution of Per Capita Income

Range of per capita income (in Taka)	Number of Persons	Percentage (%)
<5000	49	3.63
5001-10000	261	19.33
10001-15000	298	22.07
15001-20000	228	16.89
20001-25000	188	13.93
25001-30000	112	8.30
30001-35000	70	5.19
35001-40000	50	3.70
40001-45000	28	2.07
45001-50000	28	2.07
50000>	38	2.81
Total	1350	100.00

Source: Socio-economic Survey, 2018

The pattern of household monthly savings of the project area is presented in Table 3. 6. What we see from the table is that around 75.11% of residents have no savings. On the other hand, only 9.04% of residents have less than Tk. 1000 monthly savings. Another significant phenomenon is that about

2.74% of residents have more than Tk. 7000 monthly savings. This indicates the high inequality in the distribution of monthly income in the project area and that refers to diversified socio-economic classes as well.

Table 3. 6: Distribution of Monthly Savings

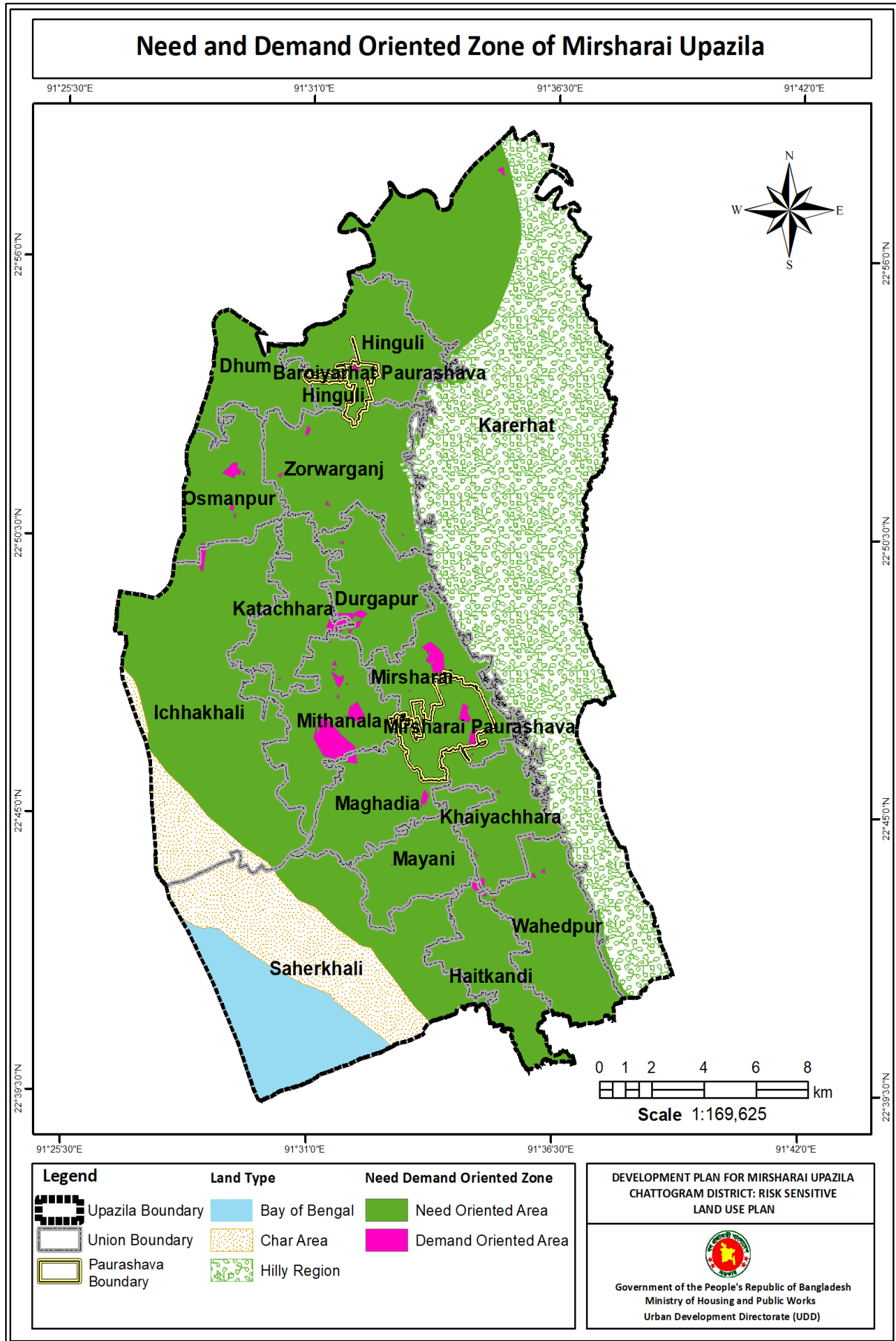
Range of per capita Savings (in Taka)	Frequency	Percentage (%)
<1000	1014	75.11
1001-2000	122	9.04
2001-3000	69	5.11
3001-4000	39	2.89
4001-5000	10	0.74
5001-6000	53	3.93
6001-7000	6	0.44
7000>	37	2.74
Total	1350	100.00

Source: Socio-economic Survey, 2018

3.3.6 Need and Demand Oriented Area

In a general sense, need usually refers to the fundamental necessities essential for our survival or at least to maintain a minimum standard of living. However, if our affordability goes high, we can dream for more, and that creates demand. In developing countries like Bangladesh, it is very unlikely to find a lot of people having the fancy opportunity of demand, rather than struggling just to fulfill the marginal daily survival amenities they need. To map the Need and Demand oriented areas in Mirsharai Upazila we formed a GIS-based model. As an extreme high-income group with a huge level of affordability is pretty rare and even a certain level of rich people having the ability to afford demand are not too available, we can categorize 6, 7, 8 scored areas as demand-oriented areas and 1 to 5 as need-oriented areas. In Mirsharai Upazila, only small portions of the areas were found as a demand-oriented area. The need and demand-oriented area of Mirsharai Upazila are presented in Map 3. 1.

Map 3. 1: Need and Demand Oriented Area of Mirsharai Upazila



3.4 Existing Land Use Pattern

The Land use survey was carried out by recording the current use of the land in the project area. The current use of land was classified according to provision given in the Terms of Reference (ToR). Land use survey records the use of land by its functional activity such as agricultural, administrative area, commercial, circulation network, educational, forest, industrial, residential, waterbody, etc. The generalized land use pattern in the study area has been subdivided into 17 major categories. The land use composition of the project area is shown in Table 3. 7.

Table 3. 7: Existing Land Use Pattern of Mirsharai Upazila

Land Use Type	Area (Acre)	Percentage (%)
Administrative	16.32	0.01
Agricultural	46479.87	39.92
Commercial	332.06	0.29
Community Services	125.85	0.11
Economic Zone	8914.27	7.66
Education & Research	136.95	0.12
Forest	30752.39	26.41
Healthcare Facility	6.50	0.01
Industrial Area	233.22	0.20
Miscellaneous	10.47	0.01
Mixed Use	14.40	0.01
Recreational Area	7.54	0.01
Residential	17665.80	15.17
Circulation Network	1292.78	1.11
Service Activity	21.50	0.02
Vacant Land	290.51	0.25
Waterbody	10140.63	8.71
Total	116441.08	100.00

Source: Land Use Survey, 2017-2019

From land use analysis, it is found that the project area is rural. Out of the total area, around 39.92% of land in the Upazila is under agricultural use. Agricultural category ranks highest in terms of land use area of the project area. Forest area ranks second highest in terms of area and occupies 26.41% of the land. Residential category ranks third highest in terms of area and occupies 15.17% of the land. It is also to be mentioned here that residential density in these areas is very low. Besides water bodies occupies 10140.63 acres of land that constitute only 8.71% of total land use. The circulation network within the project area is 1292.78 acres, which constitute 1.11% of the project area. Only 0.12% of the land of the project area is used for education and research purpose. There are few processing and manufacturing industries which occupy only 0.20% of total land use. Besides, 8914.27 acres of land is dedicated to a special economic zone named Bangabandhu Sheik Mujib Shilpanagar. Map 3. 2 present the existing land use scenario of the project area.

3.5 Physical Feature

To know the existing situations of physical features of Mirsharai Upazila a detailed physical feature survey was carried out and provisions of Terms of Reference (TOR) were followed. Physical features were surveyed using a Photogrammetric survey technique from 3D Stereo Satellite Images.

The Physical Feature survey reveals that there are in total of 161968 nos. structures exist in Mirsharai Upazila. Residential structures are found to be the highest in number and account for about 90.98% of total structures. Table 3. 8 show the existing structure use of the project area.

Table 3. 8: Structure Use Scenario of Mirsharai Upazila

Structure Use	No of Structures	Percentage (%)
Administrative	345	0.21
Commercial	6643	4.10
Community Service	1725	1.07
Education & Research	1226	0.76
Health Facility	115	0.07
Industrial	1610	0.99
Mixed Use	292	0.18
Residential	147352	90.98
Service Activity	432	0.27
Under Construction	2228	1.38
Total	161968	100.00

Source: Physical Feature Survey, 2017-2019

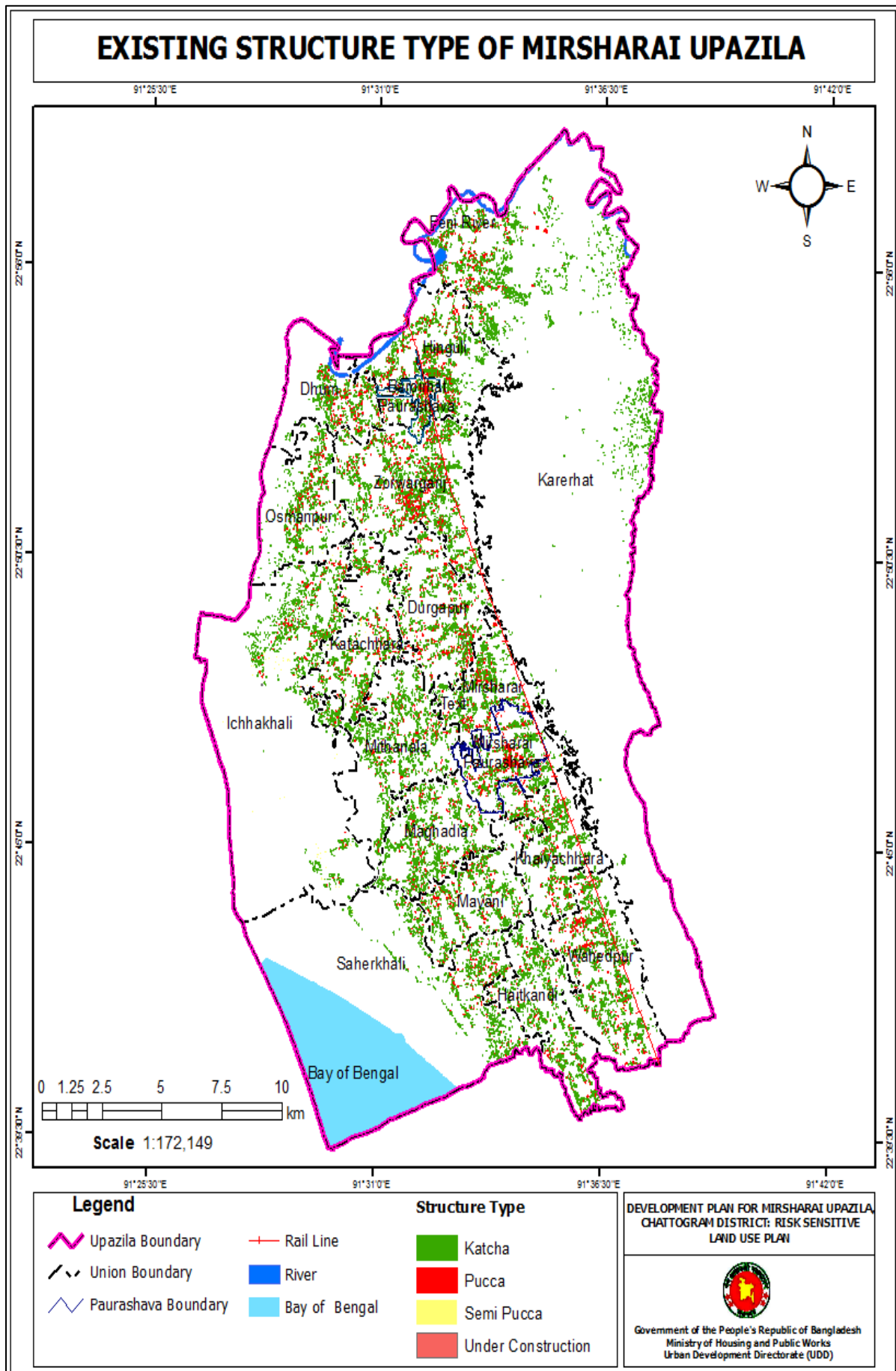
From the Physical feature survey, it is revealed that the majority of the structures in the Upazila are katcha (77.81%). Table 3. 9 shows the structure type of the project area. Existing Structure Type scenario of Mirsharai Upazila is presented in Map 3. 3.

Table 3. 9: Scenario of Structure Type in Mirsharai Upazila

Structure Type	No of Structures	Percentage (%)
Katcha	126035	77.81
Semi-Pucca	17251	10.65
Pucca	18553	11.45
Under Construction	129	0.08
Total	161968	100.00

Source: Physical Feature Survey, 2017-2019

Map 3. 3: Structure Type of Mirsharai Upazila



3.6 Physical Infrastructure

3.6.1 Road Network

The physical feature survey shows that Mirsharai Upazila is served by a road network of 1763.42 km. From the construction point of view, these roads are divided into katcha, semi-pucca, and pucca road. The highest 97.41% of roads are pucca roads. The existing road type in the project area is presented in Table 3. 10.

Table 3. 10: Existing Road Type by Construction in Mirsharai Upazila

Road Type	Length (KM)	Percentage (%)
Katcha Road	18.53	1.05
Semi-Pucca Road	27.17	1.54
Pucca Road	1717.73	97.41
Total	1763.42	100.00

Source: Physical Feature Survey, 2018

3.6.2 Major Intersections

The Traffic and Transportation survey identified major intersections, in particular those intersections that are important from the viewpoint of the entire road network or that are heavily congested. A list of major existing intersections in Mirsharai Upazila is presented in Table 3. 11.

Table 3. 11: Major Intersections in Mirsharai Upazila

Intersection	Intersection Type	Vehicle
Baroiarhat (Baroiarhat Paurashava)	4-way intersection	Auto-rickshaw, leguna, tempo, mini-bus, non-motorized vehicles
Zorwarganj (Zorwarganj Union)	3-way intersection	Auto-rickshaw, non-motorized vehicles
Chaitanner Hat (Durgapur Union)	3-way intersection	Auto-rickshaw, non-motorized vehicles
Mithachhara (Mirsharai Union)	3-way intersection	Auto-rickshaw, non-motorized vehicles
Mirsharai (Mirsharai Paurashava)	4-way intersection	Auto-rickshaw, non-motorized vehicles
Bara Takiya Bazar (Khaiyachhara Union)	3-way intersection	Auto-rickshaw, leguna, tempo, mini-bus, non-motorized vehicles
Sarkar Hat (Wahedpur Union)	3-way intersection	Auto-rickshaw, leguna, tempo, mini-bus, non-motorized vehicles

Source: Traffic and Transportation Survey, 2018

Baroiarhat Intersection

Baroiarhat intersection is a 3-way intersection (T-type). Santir Hat road (Upazila road) is connected with Dhaka-Chattogram Highway and creates a T-type intersection. Besides, the old Dhaka-Chattogram road and regional highway toward Ramgarh (R151) are connected with Dhaka-Chattogram Highway and create four-leg intersections.



Photograph 3. 1: Baroiarhat Intersection

Chaitanner Hat Intersection

Chaitanner Hat intersection is a 3-way intersection (T-type). Ahmed Kabir Chowdhury road (Chaitanner Hat - Abur Hat) is connected with national Dhaka Chattogram Highway.



Photograph 3. 2: Chaitanner Hat Intersection

Zorwarganj Intersection

Zorwarganj Intersection is a 3-way intersection. Muhuri Project road (Union Road) and Zorwarganj-Bangla Bazar-Santir Hat road growth center road (Upazila Road) are connected with old Dhaka-Chattogram road.

Mithachhara Intersections

Mithachhara intersection is a 4-way intersection. Mithachhara intersection is located at Mirsharai Union which is a 3-way intersection. Mithachhara to Baman Sundar Upazila road is connected with Dhaka-Chattogram national highway.



Photograph 3.3: Mithachhara Intersection

Mirsharai Intersection

Upazila road (Court road) and Zila Road (Z1021) towards Fatikchhari Upazila are connected with Dhaka-Chattogram national highway.



Photograph 3.4: Mirsharai Intersection and Zila Road towards Fatikchhari from the Mirsharai Intersection

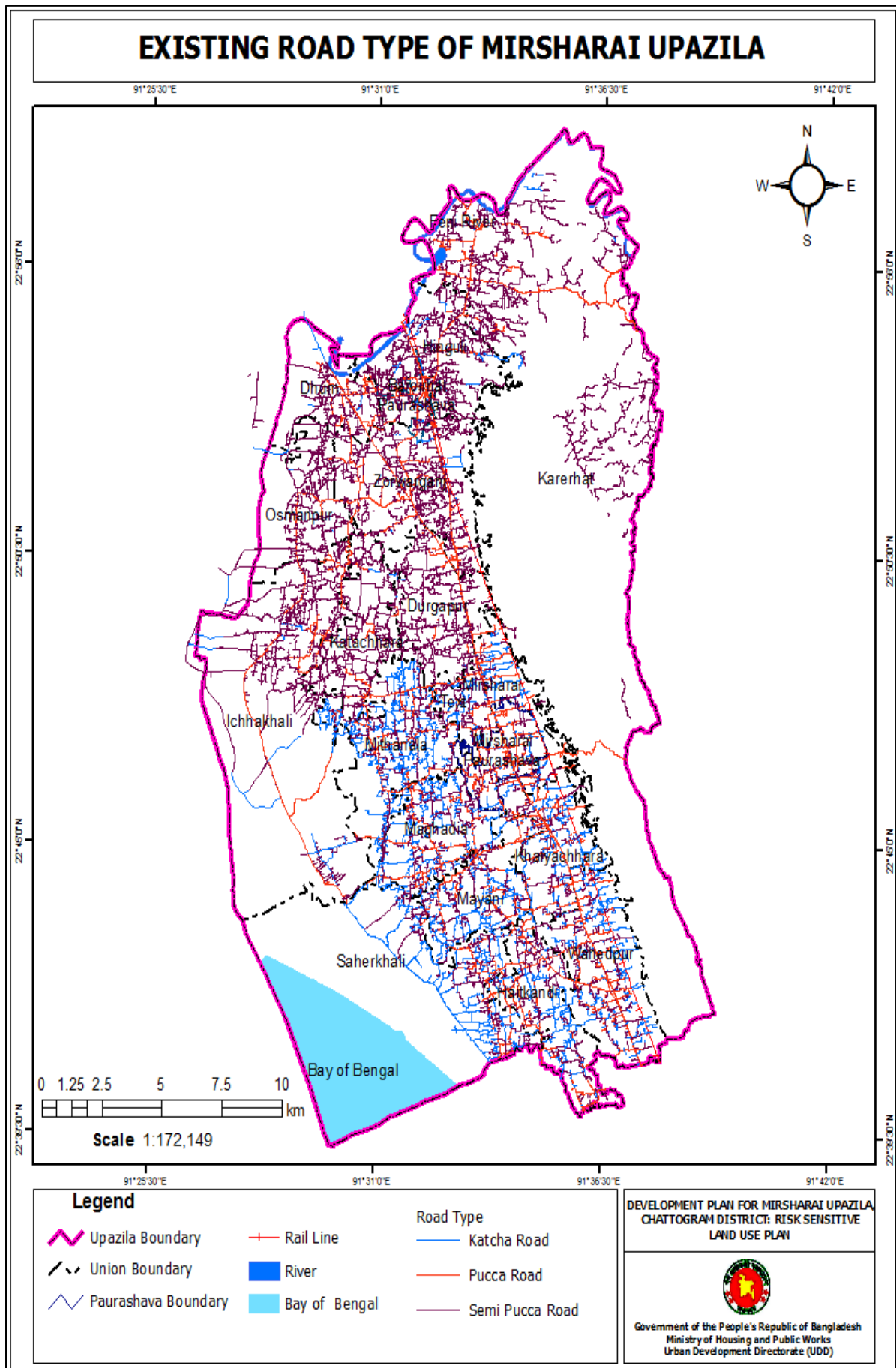
Bara Takiya Bazar Intersection

Bara Takiya Bazar intersection is a 3-way intersection which is located at Khaiyachhara Union. Abu Torab road (Upazila Road) is connected with the service road located beside the Dhaka-Chattogram national highway.

Sarkar Hat Intersection

Sarkar Hat intersection is a 3-way intersection which is located at Wahedpur Union. Oli Ahammed Abdur Rahman Saherkhali Road is connected with the Dhaka-Chattogram national highway.

Map 3. 4: Road Network Type of Mirsharai Upazila



3.7 Participatory Rural Appraisal (PRA)

The foremost objective of the Participatory Rural Appraisal (PRA) workshops is to get local people's experiences, views, and insights into the local development planning process with the use of three popular tools namely Social Mapping, Venn diagram, and Technology of Participation Consensus workshop method. Participatory Rural Appraisal (PRA) sessions enabled the planning team to get people's in-depth knowledge and views about their assets, problems, potentials, development needs, and planning aspirations.



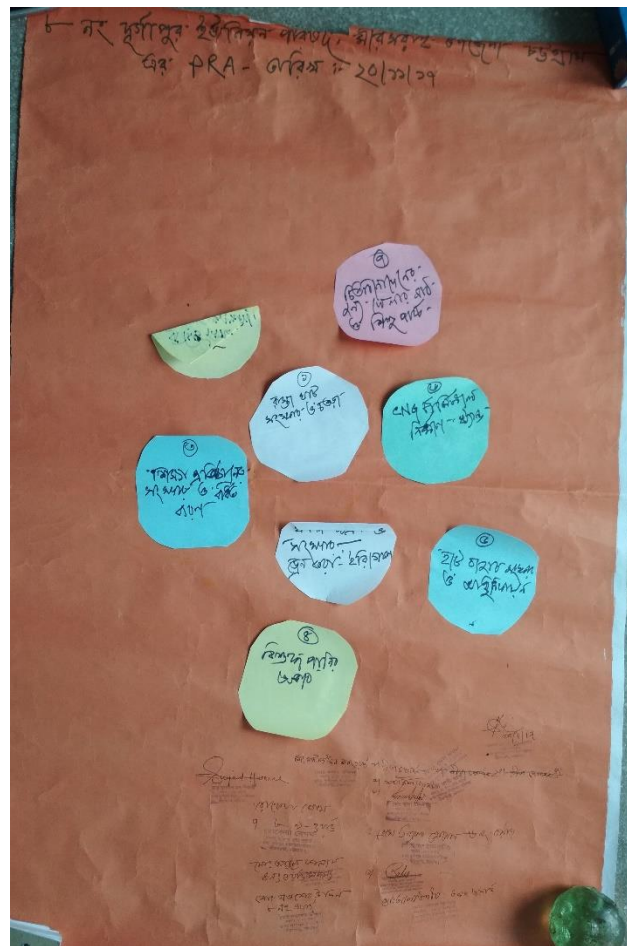
Photograph 3. 5: Conducting PRA at Khaiyachhara Union



Photograph 3. 6: Conducting PRA at Ward No. 04 of Mirsharai Paurashava



Photograph 3. 7: Conducting PRA at Ward No. 05 of Baroiarhat Paurashava



Photograph 3. 10: Major Problems Identified from Hinguli Union PRA

Table 3. 12: List of Sorted Problems of Urban and Rural Area

Serial No.	Problems Obtained from PRA
1	Handicraft and cottage industry needed for women
2	Unemployment problem
3	Dairy firm by government initiative
4	Students work as a tourist guide at Khaiyachhara Waterfall
5	Bank and insurance organization needed
6	Farmers need agricultural loans and agricultural inputs for fair prices
7	The government should encourage the fishermen and give them the Trade License
8	Re-excavation need for Khal and Chhara
9	Waterlogging
10	Agricultural fields are damaged due to waterlogging by the flash flood
11	Siltation of sand by a flash flood caused damage to agricultural field
12	Due to unplanned housing water logging has been occurred during the flash flood
13	Irrigation will be improved by the distribution of Mohamaya Lake's water
14	Khal need to be re-excavated linked with Mohamaya Rubber Dam
15	Sluice gate need for distribution of water of Mohamaya lake
16	Riverbank erosion
17	Drug addiction

Serial No.	Problems Obtained from PRA
18	Community police
19	Remove the illegal position
20	Administrative decentralization
21	Need law assistant
22	Need for legislation to prevent unplanned house construction
23	Social bonds have been reduced
24	CC TV camera for monitoring
25	Absence of proper monitoring house construction plan is not working properly
26	It is necessary to monitor governmental initiatives for adulterated food
27	Need Land Use law
28	Dustbin
29	Drainage problem
30	Different Housing needed for Tribal
31	Housing need for poor people
32	Fire service
33	Lamppost
34	Preservation need for the pond
35	Retaining well
36	Electricity connection and load shading problem
37	Need gas line connection
38	Need ward councilor's office
39	Unplanned construction of houses
40	Slaughterhouse
41	Bridge and culvert
42	Post office
43	Central Bazar
44	Central cold storage and agro-market
45	Need planned housing and car parking
46	Sewerage line
47	Sports complex
48	Underpass need at highway
49	Need rubber dam on Gobania Khal
50	Cyclone center
51	Increase the height of the embankment
52	Public toilet
53	Sluice gate
54	Adequate water needs in the dry season for agriculture
55	Arrange accommodation for the tourists coming to Khaiyachhara Waterfall
56	Facilities should be increased at Khaiyachhara Waterfall for tourist attraction
57	Need own land and building for Union Parishad
58	Reconstruction needs for Abu Torab Bazar and needs new fish market
59	Shopping mall
60	3 bridge needs over Mohamaya Chhara

Serial No.	Problems Obtained from PRA
61	Foot-over bridge
62	Hill slide
63	Need irrigation pump for agriculture purpose
64	The solar panel needs an important road and morh/intersection
65	Reconstruction and extension need for hat-bazar
66	Need liberation monument
67	Embankment should be reconstruction from Zorwarganj to Bangabandhu Sheikh Mujib Shilpanagar
68	ICT center
69	Police fari
70	Sculpture and museum for the liberation war
71	Central kitchen market
72	Feni Riverbank erosion
73	Stadium
74	Police fari and RAB camp needed
75	Community center
76	Government primary school
77	Health care center
78	Reconstruction need for Imampur Eidgah and Madrasah
79	The recreation center and park
80	Community clinic
81	Govt. High school
82	Madrasah
83	Social education problem
84	Reconstruction need for the graveyard, cremation ground, and temple
85	Vocational institution
86	Mosquito problem
87	Reconstruction need for the existing graveyard
88	Central Eidgah
89	Central graveyard
90	Children's park
91	Coconut and other crops are hampered by the squirrel
92	Dog problem
93	Existing health clinic needs to turn a 50-bed hospital
94	Fitness club
95	Development of mosques
96	Reform need for the mass graveyard
97	Health care facilities
98	Nationalization of Shafiuddin Primary School
99	Playfield and park
100	Higher secondary school
101	Central Shaheed Minar
102	Satellite clinic

Serial No.	Problems Obtained from PRA
103	Reconstruction of the health center and need continuous doctor and medicine
104	The central education center and library
105	Maternity clinic
106	Need social forestation
107	Social organizations can be used for developmental work
108	Sanitation problem
109	Scarcity of pure drinking water
110	Waste management and public awareness
111	Waste dumping station
112	Eucalyptus trees cause harm to crops
113	Deep tube well need for pure drinking water
114	CNG terminal needed
115	Road re-construction, extension, and the connecting road needed
116	Need Chinki Rail station up gradation
117	Traffic jam problem at rail gate
118	Bus terminal
119	Passenger shed needed
120	Ward 5 of Baroiarhat Paurashava needs to declare the residential zone
121	Unplanned construction of houses
122	Extension need for Paurashava area

Source: PRA Survey, 2018-2019

CHAPTER 04: REVIEW OF NATIONAL POLICIES, LAWS, AND REGULATIONS

4.1 Introduction

Being considered a guiding tool for all the development works within the Upazila area, the present Development Plan demands reviewing different national policies and acts which are relevant to the physical development process taking place at local level towns.

4.2 Review of Relevant National Polices

This section reviewed relevant national policies, laws, and regulations related to the Development Plan of Mirsharai Upazila.

1. National Land Transport Policy, 2004

The people of Bangladesh spend a significant part of their time and money on transport, in search of a livelihood. People's welfare depends on sustainable national economic growth. Adequate transport infrastructure and services are the preconditions for sustainable economic and social development. A Land Transport Policy is essential to ensure the proper physical and institutional infrastructure transport to achieve national development. The Land Transport Policy, 2004 has been formulated for a long-term vision to make the role of the transport sector more significant for social and economic development.

The major objectives of National Land Transport Policy, 2004 for Bangladesh will aim to:

- To provide a safe and dependable transport service;
- Removal of unnecessary control and formulation of laws and regulations conducive to providing service;
- Fare control;
- Determining the roles of the Government sector and the private sector;
- To maintain an economic and environmental balance;
- To ensure maximum good utilization of Government funds;
- Expansion of the role of transport in the ever-increasing economic activities;
- Reduction of transport cost of goods for export;
- Growth of traffic commensurate with economic development;
- Introduction of an integrated transport system;
- Provision of alternate transport systems;
- Creating awareness regarding a better standard of life and safety;
- Poverty alleviation.

The individual policy components result from detailed consideration of a large number of policy issues such as road, road transport and traffic, non-motorized transport, railway, and integrated issues. Following are the key strategic policies of the National Land Transport Policy:

Greater private sector participation: Private sector participation in the transport sector will be encouraged with the Government ownership of road and rail infrastructure. The provision of long-term lease provisions in the infrastructure sector will allow the private sector to recover its investment. Participation of the private sector will be positively encouraged in infrastructure development.

Effective co-ordination in the transport sector: Better co-ordination has to be established between the relevant Ministries and Departments under its control. Policy/rules and regulations will be formulated to achieve the goal of creating better-working links between the Government and the public and private sectors.

Better integration with inland water transport policy: Physical integration between water, road, and rail modes will be encouraged. Services and infrastructure in the water sector will be studied so that an analysis can be made of potential opportunities for integration, and competition where appropriate.

Increased access to transport and services in rural areas: Paved connections between all the economic growth centers and the country's road network will be provided. Concurrent with the development of the road network, it will be necessary to foster a higher level of rural mobility and access to basic transport facilities.

To introduce long-term network planning: Better use of existing infrastructure will be made by completing the missing links in the main road network, along with a continuation of the new bridge program across major rivers. A program of measures for improving local highway capacity along with bypasses will be developed. A road network development program will be developed on a road corridor basis.

To develop an integrated planning approach in road construction: An integrated plan for the design of (main) roads through Hats and Bazaars will be prepared. In the future, direct access onto main roads from Hats and markets will not be allowed, and alternative access or service roads will be provided. New design standards will incorporate arrangements for junctions/intersections on the strategic road network. On the main roads where there is a significant activity, footways and crossing facilities will be provided on new roads. Priorities for new pedestrian facilities on existing roads will also be drawn up. The government will give priority to parking facilities for buses and cars at existing hats and interchange points.

Fostering inter-national links: Inter-National Links will be encouraged in the greater national interest.

To encourage better interchange facilities: Construction of terminals for an interchange of transport modes for passengers and greater participation of the private sector in this regard will be encouraged.

Fostering safer non-motorized vehicle operations: Where national roads pass through the urban area, measures will be taken to segregate motorized and non-motorized vehicles.

To create a better environment for pedestrians: More footways will be built in urban areas, and a greater emphasis placed on pedestrian crossing facilities.

2. National Integrated Multimodal Transport Policy, 2013

Globalization now calls for a more efficient transportation system to reduce travel time and costs. Countries having efficient transport and communication systems are well placed to attract investment compared to those with weak infrastructure and services. However, an unplanned transport system is damaging towns and cities and harming the countryside. However, from the beginning of 1990, development started taking place in a sectorally biased manner, with an overemphasis on the road subsector over other competing modes. The development of rail and inland Water transport sub-sectors gradually became marginalized. The National Integrated Multimodal Transport Policy, 2013 has been prepared following extensive consultations with concerned government agencies and stakeholders to redress this imbalance.

Objectives of the Policy

The primary objective of the Multimodal Integrated Transport Policy is to emphasize the roles of rail, inland water transport, aviation alongside road transport to ensure the development of the overall transport network. The objectives of the Integrated Multimodal Transport Policy are to:

- Reduce the cost of transport goods, to make goods and services within Bangladesh less costly;
- Aid export competitiveness, through lower transport costs;
- Improve safety;
- Reduce accident rate;
- Take advantages of Bangladesh's geographical position to trade in transport services and induce efficiency in the transport sector;
- Reduce the worst environmental effects of transport;
- Ensure that transport meets social needs in terms of cost accessibility to all sectors of society;
- Improve integration of the overall transport network and foster measures to make interchange between modes easier;
- Reduce the need for travel by better land use planning;
- Use transport as a means to assist poverty reduction;
- Improve fuel and energy security; and
- Increase alternative options for passenger and freight transport.

Policies for Sub-sectors

Within the framework of the IMTP, policies are set out for each sub-sector. The main sub-sectoral policies by modes are set out as below:

Railways

- Upgrading infrastructure of Bangladesh Railway;
- Establishing more inland container depots in harmony with railway network;
- Establishing regional links, including those of Trans Asian Railway, to facilitate trade in goods and services;
- Extending rail service to the doorsteps of people through the expansion of the rail network in all regions of the country.

Inland Water Transport

- Increasing government allocation for dredging;
- Investing in a new port to better serve increasing passenger and bulk cargo needs;
- Investing in existing river ports to improve interchange between water transport and other modes;
- Constructing inland container depots to facilitate freight movement through waterway from seaports;

Road Transport

- Attaching highest priority on improved road maintenance;
- Making the best use of existing roads by improving traffic management measures;
- Applying modern technology in the transport system.

Policy Initiative within the NIMTP Framework

Following steps will be taken to achieve the goals of the integrated multimodal transport policy:

Pedestrians

- Construction of pedestrian-friendly footpath including widening of the footpath;
- Improving footway, maintenance, and cleanliness;
- Provision of ramps to facilitate access for the physically challenged.

Non-motorized Transport

- Provision of separate lanes for non-motorized traffic;
- Gradual restriction on movement of non-motorized traffic including rickshaws to feeder roads connecting main roads;
- Provision of separate bicycle lanes on urban roads;

Urban Transport

- Strategic Transport Plans will be drawn up for all major cities, in which the role of public transport will be emphasized;

Rural Transport

- To provide paved connections between all the economic growth centers and the country's road network. Important destinations in rural areas such as Union Parishad offices, markets,

railway, and water landing stations, schools, health centers, and social facilities will be connected in phases with the existing road network.

- River ports will be gradually connected by road and rail.

3. Coastal Zone Policy, 2005

The Coastal Zone Policy, 2005 formulated by the Ministry of Water Resources (MoWR), intends to provide general guidance to all agencies and institutions concerned for the management and development of the coastal zone in a manner that provides a secure and conducive environment for coastal communities to pursue their life and livelihoods. The goal of integrated coastal zone management is: to create conditions, in which the reduction of poverty, development of sustainable livelihoods, and the integration of the coastal zone into national processes can take place. These policies provide general guidance so that the coastal people can pursue their livelihoods under secured conditions in a sustainable manner without impairing the integrity of the natural environment.

The following are the broad components of the Coastal Zone Policy:

Economic Growth

Effective measures will be taken to understand the objectives of poverty reduction through enhancing economic growth in the coastal zone. Policies in this context are:

- Efforts shall be made to enhance the annual growth rate to a level required to achieve the national goal for poverty reduction and economic growth;
- Emphasis will be given on building efficient power, transportation, and telecommunication links, particularly with islands;
- Settled isolated chars and islands will be brought under 'special rural development programs';
- Necessary measures will be taken to increase the flow of investments in the coastal zone including direct foreign investment (DFI), especially by setting up more export processing zones (EPZ);
- Steps will be taken for medium and small private investments for coastal development.

Basic Needs and Opportunities for Livelihoods

To meet the basic needs of the coastal people and enhance livelihood opportunities, Government policy will be as follows:

- The intensity of coverage of primary education, health care, sanitation, and safe drinking water facilities will be increased;
- Food production will be continued at the self-sufficiency level and of higher production of diversified high-value export goods;
- Khas land will be distributed among the landless and a more transparent process of the land settlement will be ensured;
- An integrated network of communication including highways, major roads, rural roads, railways, and waterways will be developed;

- To facilitate coastal navigation, the following steps will be taken: development and maintenance of main channels of seaports and main important channels of inland navigation; development of communication network with islands for passengers and freight traffic; maintaining riverways; increasing excavation capacity to maintain the navigability of the waterways;
- The law and order situation will be improved by setting up police outposts in remote and far-flung areas.

Reduction of Vulnerabilities

Majority households in the coastal area are vulnerable to climate change. In this regard, Government policies are as follows:

- The integration will be made with the 'Comprehensive Disaster Management Plan' on aspects concerning the coastal zone;
- Effective measures will be taken for protection against erosion and the rehabilitation of the victims of erosion;
- Safety measures will be enhanced by combining cyclone shelters, multi-purpose embankments, killas, road system, and disaster warning system;
- Programs shall be taken to encourage all for tree plantation in a planned manner in the coastal zone.

Sustainable Management of Natural Resources

Medium and long-term Government policy to ensure sustainable management of both biotic and abiotic coastal resources will be as follows:

- Sustainable use of coastal resources shall be ensured. A combination of resource use, e.g. agriculture, forestry, and fishing including aquaculture is often the major economic activity. Efforts will be given to make this sustainable;
- Planning will be done under land use policy to control unplanned and indiscriminate use of land resources. Strategies for new char will be developed. Zoning regulations would be formulated and enforced in due course;
- Adequate upland flow shall be ensured in water channels to preserve the coastal estuary ecosystem threatened by the intrusion of soil salinity from the sea;
- Ponds and tanks will be excavated for the conservation of water and local technology for water treatment (such as pond sand filtering - P.S.F.) will be used for the supply of safe water;
- All opportunities and potentials of aquaculture will be utilized in the coastal zone. Crab culture, pearl culture, seagrass will be encouraged;
- Measures will be taken for afforestation in the coastal areas including newly accreted chars;
- Effective measures will be taken for the conservation of forests. Social forestry will be encouraged and extended.

Equitable Distribution

- Actions will be designed to reach the poorest and the remote rural areas (including the cyclone-prone coastal regions, chars, and river erosion-affected areas), which are vulnerable to adverse ecological processes and those with high concentrations of socially disadvantaged;
- To ensure equitable distribution of national economic benefits, priority will be given to exposed Upazilas and coastal islands.

Empowerment of Communities

- Equal participation of all stakeholders shall be ensured and establishing effective co-operation between the government agencies, local government institutions, and non-governmental organizations.

Conservation and Enhancement of Critical Ecosystems

- Meaningful conservation shall be enforced of critical ecosystems including ECAs, heritage sites, and marine reserves;
- Special measures will be taken for biodiversity conservation;
- Measures will be taken for hill management including the prohibition of hill cutting.

4. Bangladesh Population Policy, 2012

Population Policy, 2012 was prepared to develop a healthier, happier, and wealthier Bangladesh through planned development and control of the nation's population. The major strategies for implementation of the population policy are:

- Ensure services through existing Health and Family Welfare Centers in districts, Upazilas, and unions, including Satellite and Community Clinics in the community;
- Ensure 24-hour services at Union Health and Family Welfare centers;
- Undertake action plans through effective coordination between the Ministry of Local Government and the Ministry of Health and Family Welfare to ensure urban health care services, especially family planning and maternal and child health care services for the slum-dwellers and the floating and destitute people in the Municipal areas;
- Formulate gender-sensitive strategies for both men and women in all government and non-government activities;
- Establish necessary child care facilities including daycare centers in both urban and rural work areas.

5. National Land Use Policy, 2001

The National Land Use Policy, 2001 prepared by the Ministry of Land (MoL) by providing guidelines on different uses of land for agriculture, housing, forest, wetland, transport network, commercial and industrial, horticulture, coastal area, and other uses of land. This policy emphasized the need for

formulating a village improvement act like the “The Town Improvement Act, 1952” to prevent unplanned development in rural areas. It also expresses the necessity of the formulation of national zoning law and preparation of land use zoning map under different local government authorities. The National Land Use Policy provides different strategies which are stated below:

- The agricultural land will be used as much as possible in agricultural purpose and no alteration of land nature will not be made without permission of relevant authority;
- All-City Corporation, Paurashava, and related Upazila will be identified as land use zoning for their area;
- A map will be prepared for identified land use zoning;
- Construction of model housing and the planned residential area will be encouraged for the rural area;
- To ensure the best use of land for housing, multi-story buildings will be encouraged instead of a one-story building in both urban and rural areas;
- Forest declared by the Forest and Environment Ministry will be identified as forest land;
- The initiative will be taken for conservation, maintenance, and extension of existing usable forest land;
- In coastal are forest green belt will be created effectively;
- Social forestation will be encouraged;
- Existing waterbody will be opened and it will not be covered;
- Flood controlling Embankment will be used as road as much as possible;
- Proper tree plantations will be done in the planned way on the embankment;
- Construction of Intra-village/Inter-village roads in rural areas will be planned way;
- To set up industries, new industries will be built in a specific zone;
- To ensure safe vehicle movements in countries' national highway, the service lane will be facilitated both sides of the national highway for the use of local people. And both side of national highway minimum 10 to 20 fit area will be fixed for plantations as the environmental development and beautification;
- The land used as a tea garden and rubber gardens etc. will be identified through the land survey and also ensure its proper uses.

6. National Agriculture Policy, 2018

National Agriculture Policy, 2018 has been formulated to achieve safe, profitable agriculture and sustainable food and nutritional security. The main objectives of this policy are the productivity of crops, production, and income growth of farmers, crop diversification, development of marketing system, ensuring food security through the use of profitable agriculture and efficient natural resources, and development of the socio-economic condition. Most of the issues are not relevant to this Development Plan. The policy guidelines related to planning and development of this Upazila are stated below:

- Acquisition of land more than the requirement for non-agricultural purposes will be discouraged;

- Establishment of cold storage and food processing infrastructure;
- Take the initiative to popularize the social forestation by cultivating appropriate vegetables/fruits/spices along the road and embankment.

7. National Tourism Policy, 2010

Tourism in Bangladesh is still in the initial stage. Despite the huge potential, tourism, and service industries in the country could not achieve the desired progress. In the coming days, the growth and competition of the tourism industry will be grown multiplied worldwide. The National Tourism Policy, 2010, was formulated by updating the national tourism policy prepared in 1992 for well-planned and balanced development of the Bangladesh tourism industry.

Goals and Objectives of the National Tourism Policy

- Incorporation tourism development in national development strategies, policies, and programs;
- Well planned development and maintenance of Bangladesh tourism industry;
- Formulating a comprehensive vision to the development of the tourism industry;
- Formulation of national, regional and area-based Master Plan for the development of the tourism industry;
- Identification, development, and marketing of tourist attraction;
- Ensuring tourist attraction and the quality of service and for this purpose preparing and updating simultaneous laws;
- Involving local government organization in enhancement and management of tourism development;
- Protecting native culture, culture, and heritage, making tourism attracting and promoting and marketing;
- Diversification of tourist attractions including the development of rural tourism, naval tourism, agriculture tourism, health tourism, sports tourism, alternative tourism, community tourism, etc.;
- Development and maintenance of tourism resources through the development of eco-tourism by maintaining the balance of environment and surroundings;
- Creating foreign tourists' attraction by declaring the tourism reserve area and creating an exclusive tourist zone.

Steps are taken for the implementation of the National Tourism Policy

Following initiatives will be taken for the implementation of national tourism policy:

- Identifying tourist spots in countries different location, classification according to the demand of tourists and identification process remain continued;
- Relating to local government institutions with the hilly area of Chattogram in the applicable field for meaningful development, implementation, and preservation of tourism industries;
- Identifying the places of tourist attraction of the country, gradually creating infrastructural facilities;

- Development of road, railway, waterway, and air communication facilities in tourist spots and takes integrated initiatives about the implementation of the Master Plan.

8. National Industrial Policy, 2016

Environment-friendly industrialization is an essential prerequisite for sustainable economic development. To achieve the planned industrial development in the country and continuous technology-based sustainable growth in the industrial sector, the following issues have been included in the industrial policy. For example, the creation of high-priority industrial sectors, definitions of various industrial sectors (hand and crafts, creative industries, high priority industries), intellectual property protection, industrial pollution management, effective methods for improving industrial efficiency, technical policy and strategic facilities to build integrated individual sector. For the first time in implementing this policy, the National Industrial Policy, 2016 has been formulated.

Strategy

The following strategies will be followed by the participation of government and private sector in the proper implementation of the National Industrial Policy, 2016:

- Establishment of suitable industries with the priority of production-oriented and backward areas;
- Development of industrial cluster for the right use of domestic resources and possibilities and planning for the need to set up the region-based industries;
- For the preservation and development of local skills by holding local heritage, provide financial assistance and incentives for the widespread expansion of hand, cottage, small and medium industries;
- Establishment of industrial clusters and industrial park infrastructure, development of labor-intensive industry in the underdeveloped areas and establishment of environmentally friendly industries;
- Through the Bangladesh Economic Zones Authority (BEZA), the Bangladesh Economic Zone will be formed in different districts of the country;
- The development of internal and interconnected communication systems to increase transport facilities of the export-oriented industry.

9. National Housing Policy, 2016

Considering population growth, decrease in per capita land, environmental degradation, and international perspective, "National Housing Policy, 2016" has been formulated to make it more effective and timelier to modify, amend, revise, amend and coordinate the revised "National Housing Policy, 1993".

Principle Elements of Housing Policy

- Under the Integrated Regional Development Plan, a connection between the rural and the hat-bazar with small and medium cities will be developed in such a manner that it will be

developed socially and culturally attractive, with the increase in economic activities and employment opportunities;

- To maintain environment and ecological balance, and prevent environmental degradation, special attention will be given at government/private level in case of taking housing project that existing river or part of the river, existing khal or part of khal, existing beel or part of beel will not be filled;
- The tendency of building houses on agricultural land will be discouraged. Regarding the availability of land for rural housing, similar activities like "Guchchha Gram" and "Ashrayan" will be expanded;
- Basic services infrastructure of existing and new settlements such as water supply, hygienic drainage systems, electricity, roads, etc. and basic social facilities such as schools, playgrounds, health centers, etc. will be built in a planned and integrated manner.

Proposed Strategies

- Considering the preservation of cultural heritage and the development of local and folk architecture;
- To coordinate urban and rural planning and management with the need for housing, communication, environment, and social facilities;
- In the urban and rural areas, the "land bank" created by the unused land and the fallen land and the awakened chars
- Creating a separate, "Land Bank" with unused khas and fallow land and awaken char areas in the urban and rural areas and use them for housing.

10. National Environment Policy, 2018

Environment Policy, 2018 has been adopted to ensure sustainable development in terms of environmental disasters, various disasters, the impact of climate change, and the limitation of natural resources.

Environment Policy for Sectors/Areas

The efficient use of environmental management and environmental factors is spread across all the regions and development sectors of the country. Therefore, the objective of achieving overall goals in environmental management is to explain the sector/field-based environmental policy as follows:

Land Resource Management

- Formulation and implementation of balanced environmental Land Use Policy and Development Plan;
- Implementation of land use system corresponding with the different ecosystem of the country;
- Land zoning will be based on the surroundings and surroundings area;
- To prevent river erosion and landslides, rivers and other water bodies should be brought under tree plantation;

- The government land/resources such as river channel, khal-bills, haor-baor, water bodies, wetlands, ponds, etc. should be identified and conserved;
- Outside the protected areas, forests-wilderness, religious and cultural places, sports and recreation places should be preserved;
- The reserved forest cannot be used for other purposes except forest management.

Water Resource Management

- An integrated water resource management policy will be adopted. To preserve the wetlands and ensure reasonable use, through the stakeholders, especially the participation of the local population, must ensure the use of environmentally friendly water resources and the conservation of biodiversity;
- To create a database for all the wetlands of the country and prevent and preserve the wetland depletion;
- The catchment area map for all rivers and wetlands will be prepared. All the rivers, wetlands and floodplain areas will be preserved by identifying and specifying the boundary;
- Haor and Baor surroundings should be protected and river, khal-beel, pond, lake, etc. waterbody and water resource should be kept free possession and pollution;
- Planning and implementation of the scheme for the preservation and development of reed and swamp forest;
- Arrangements should be made to free water movement in all roadways and railways plan;
- To preserve the city environment, conserving the wetlands, do not fill the lower land, and adequate space for the storage of groundwater should be kept free of concrete;

Safe Food and Water

- Setting up of industrial areas and any type of waste extraction or dumping ground cannot be established near the source for water conservation;

Agriculture

- Fertile agricultural land should be discouraged from non-agricultural use;
- Unplanned roads and dams cannot be built on agricultural land;
- Establishment of unplanned industrial factories, commercial establishments, and residential structures should be discouraged at the agricultural land;
- To recover the wasteland and the degraded forestland and ensure their proper use;
- The brick kiln cannot be built on agricultural land.

Accommodation, Housing, and Urbanization

- Continuous expansion of environment-friendly facilities in the existing residential areas of rural and urban areas;
- Ensure adequate urban forestry and green city will be developed;
- To take any government/private housing project, it will be ensured to determine the necessary place for environment-friendly Secondary Transfer Station (STS) for the household waste management;

- Construction of unplanned housing projects should be controlled and construction of housing will be stopped by filling the agricultural and wetlands;
- To ensure environmental conservation and waterlogging, appropriate sewerage and drainage system will be developed;
- In case of urbanization, all resources (pond, waterbody, river, khal-beel, jhil, lake, hill, flood vulnerable area, coastal wetland, floodplain, forest, and biodiversity) will be preserved, restored and environment friendly;

Forest and Wildlife

- To preserve, expand and develop the necessary forests and trees in terms of the natural ecological balance, and socio-economic needs and realities of the country;
- Preservation and development of the wetlands and habitats of migratory birds of the country;
- Conservation and management of ecological management-based mangrove forests.

Biodiversity, Ecosystem Conservation, and Biosafety

- To preserve and develop the wetlands of the country;
- To preserve the natural and cultural world heritage of the country;
- To introduce biological zoning.

Coastal and Marine Ecosystem

- Environmental protection and development of the coastal and marine ecosystems and resources of the country must be ensured;
- Mangrove forest, coastal forests must be preserved and restored;
- To protect the natural disaster, the coastal green belt has to be created.

Communication and Transportation

- Avoiding the risk of road safety, greening should be done on both sides of the road and railway;
- The major roads of the country should be converted into regional highways and national highways based on the criteria specified;
- to prevent traffic and environmental pollution, adequate communication will be provided to the urban areas through the use of naval-railway-roads;
- The master plan of the roadways in urban areas should be done in such a way so that pedestrian walking, bicycles and all other types of non-motorized transport are preferred.

11. Seventh (7th) Five Year Plan: FY 2016 – FY 2021

The Seventh Five Year Plan was prepared by the General Economics Division (GED) under the Planning Commission of Bangladesh. The Plan was published in December of 2015. The Seventh Five Year Plan (7th FYP) articulates new strategies, institutions, and policies while strengthening the existing ones, to complete the remaining agenda of achieving the social and economic outcomes of the Vision 2021 and the Perspective Plan. In line with the 7th Five Year Plan, the Government

intends to prepare Sector Strategy/Plan for each of these thirteen sectors. The sector plans will provide a comprehensive outlook of sectoral goals, performances, opportunities, and challenges, and above all identify policies and strategies that support the Five-Year Plans.

Strategy for Agriculture Sector

- Crop zoning and Land use planning;
- Plantation activities in the coastal zone will be intensified to strengthen adaptation and mitigation initiatives against climate change impacts;
- To prevent the extent of damage by cyclones and tidal surges, creation of 500-meter wide permanent Coastal Green Belt along the coast will be continued and remaining vacant spaces will be brought under tree cover;
- Programs will be taken to protect the threatened and endangered species of flora and fauna and the fragile ecosystems;
- The Coastal Zone will be treated as a special zone.

Transport and Communication Development Strategy

- The development of a balanced 3R (Rail, River & Road) based multimodal transport infrastructure system;
- Timely completion of critical transport links (roads, bridges, railways, and river waterways) related to regional and multi-regional connectivity;
- Combining inland water transport with the existing road transport system as well as ensuring a healthy road alignment;
- Give priority to regional transport connectivity;
- Instead of raising the height of road network in coastal districts against sea-level rise (SLR), a better strategy would be developing coastal embankment/polder infrastructures as “Climate-resilient” to save all sorts of assets within the protected area;
- Develop rural launch landing stations by providing pontoon facilities for smooth embarkation/disembarkation of passenger and loading/ unloading of cargo.

Strategy for Local Government and Rural Development

Strategic Priorities of LGED for Rural Transport Development and Management

The priority will be to Double lane/Upgrade and maintain selected busier Upazila Roads, Union Roads that are being used by a large number of commercial vehicles including maintenance/ rehabilitation of bridges/culverts in these roads. At the same time, connection with rural roads with railway and waterways will be given priority to promote and integrate multimodal transport system. Proper maintenance of the existing paved rural network will also be included in the priority.

The second priority will be to improve Upazila Roads, Union Roads, and prioritized Village Roads including culverts/bridges which have strategic importance to connect road network, railway, and waterway. Preparation of a Land Use Map to initiate planned development will also be included in the second priority.

The third priority will be to improve Growth Centers and construction of 'ghat' facilities at Growth Centers located on the bank of inland waterways to ensure better integration of road and waterways and thereby stimulating the rural transport and trading system. Besides, the development of rural waterways will be included in the third priority.

The major strategies are as follows:

- The rural infrastructure development/improvement will be planned and implemented based on the findings of Effect/Benefit/Impact/feasibility studies carried out in respect of rural infrastructure development projects of LGED;
- Rural Road Master Plan of LGED will be updated. The updated Master Plan will be followed for infrastructure development projects covering Upazila and Union roads including bridges/culverts, bridges/culverts on village roads and development of growth centers/markets, ghats, and Union Parishad HQ, etc.;
- For the sustainability of rural infrastructure, adequate maintenance system, and a viable funding mechanism based on local resources and emphasizing local participation and ownership will be arranged.

The main targeted priorities for rural road development and maintenance during the 7th Plan will include the following:

- Improvement of the Upazila Road (5000 Km)
- Double lane/Widening/Up-gradation/Rehabilitation of selected Upazila/Union Roads that needs
- up-gradation being used by a large number of commercial vehicles (10000 Km)
- Improvement of road safety engineering at junctions of LGED roads with National Highways
- Improvement of the selected Union Road. (8000 Km)
- Improvement of prioritized Village Road (12000 Km)
- Re-construction/Double lane of Bridges and Culverts on Upazila Road, Union Roads (12000 Meter) being used by a large number of commercial vehicles
- Construction of Bridges and Culverts on Upazila Road, Union Roads (140000 Meter)
- Construction of Bridges and Culverts on prioritized Village Road (50000 M)
- Development of Growth Centers and Rural Markets -1200 Nos.
- Extension of Upazila Complexes (400 Nos.)
- Construction and rehabilitation of Cyclone Shelters and killas (1238 Nos.)
- Land Use Planning and Management Project in the Upazilas of Bangladesh
- Development of Growth Centre centric urban centers in selected Upazilas of Bangladesh-300 Nos.

Strategies for Improvement in Rural Transport

- The development strategy for the rural transport will be reoriented for efficient external access through optimal integration of road and inland water transport and off-road internal accesses;

- Improvement in resource mobilization will be made through the introduction of user fees by the agencies in all areas of transport and for all use of the transport network;
- Provision of required incentive packages for the private sector for greater participation will be ensured, not only in transport services but also for infrastructure building;
- The national standard for road design, geometry, and loading capacity will be set, especially for the rural roads connecting the Upazilas with Zila.

Strategy for Environment and Climate Change Sector

- Ensure restoration of natural water bodies and other environmental resources;
- Preserve, protect, and develop the natural resource base and biodiversity;
- Ensure the conservation of biodiversity and its sustainable utilization;
- Preserve, protect, and develop the natural resource base;
- Develop coastal green belt with mangrove species;
- Preserve, protect, and develop the natural wetlands and water bodies;
- Conserve and protect the eco-system for bio-diversity of wetlands;
- Ensure no forest land shall be converted for non-forest use;
- Conserve and protect the eco-system for bio-diversity and overall environmental stability.

Strategy for Housing and Community Amenities Sector

- Ensuring regionally balanced urbanization through polycentric decentralized development and hierarchically structured urban system;
- Ensuring better utilization of land resources and mitigating increased demand for housing and urban services;
- Protecting, preserving, and improving the urban environment, particularly those of the water bodies;
- Provision of adequate and affordable basic infrastructure and services such as safe water, sanitation, waste management, transport, and communications facilities, health and emergency services, municipality services, schools, etc.;
- Coordinated Development of Land Use and Transportation.

12. National Forest Policy, 2016

The National Forest Policy, 2016 has been formulated to ensure the management of all existing forests, wildlife, and other forest resources for climate resilience, forest enrichment policies in degraded forests.

Objectives of the National Forest Policy

- Ensure strict conservation of public forests, growth of forests, enhancement of forest material services and sustainable management;
- To develop wildlife management and conservation practices in protected areas and other habitats;
- Identify catchment areas of rivers, lakes and other wetlands and declare them as strictly protected areas;

- Expand 30% of the declared forest area to "protected area" to ensure groundwater flow and river flow throughout the year;
- Ensure effective implementation of the relevant recommendations identified in the Bangladesh Climate Change Strategy and Action Plan, 2009.

National Forest Policy Statements

- The habitat of wild animals will be preserved and enriched;
- Forest recreation areas will be established for all possible areas of the country;
- Agricultural forestry should be encouraged in all appropriate areas;
- Along the roads and rail lines, the dam's slope forestation program will be further strengthened.

13. National Water Policy, 1999

National Water Policy, 1999 was prepared by the Ministry of Water Resources (MoWR). The report was published in January 1999. It will guide the management of the country's water resources by all the concerned ministries, agencies, departments, and local bodies that are assigned responsibilities for the development, maintenance, and delivery of water and water-related services as well as the private users and developers of water resources.

Strategies of National Water Policy

Planning and Management of Water Resources

The Government recognizes that the process of planning and managing water resources requires a comprehensive and integrated analysis of relevant hydrological, topographical, social, political, economic, environmental, and institutional factors across all related water-using sectors.

- Develop water resources of the major rivers for multipurpose use, including irrigation, fisheries, navigation, forestry, and aquatic wildlife.
- Designate flood risk zones and take appropriate measures to provide desired levels of protection for life, property, vital infrastructure, agriculture, and wetlands.
- In the future, all national and regional highways, railway tracks, and public buildings and facilities will be constructed above the highest ever-recorded level of flood in the country.

Public Water Investment

The policy of the Government in this regard is:

- Public water projects are designed with specific provisions for future disinvestment, if and when feasible.
- There is continuously updating and archiving of water resource data and basic information by relevant public sector agencies.

Water Supply and Sanitation

The rural areas of Bangladesh suffer from a lack of quality drinking water. Surface water supplies are generally polluted and groundwater, which till now had been the best source of safe drinking water,

is contaminated with arsenic in many parts of the country. The policy of the Government in this regard is:

- Facilitate the availability of safe and affordable drinking water supplies through various means, including rainwater harvesting and conservation.
- Preserve natural depressions and water bodies in major urban areas for recharge of underground aquifers and rainwater management.
- Mandate relevant public water and sewerage institutions to provide necessary drainage and sanitation, including treatment of domestic wastewater and sewage and replacement of open drains and construction of sewers, in the interest of public health.

Water and Agriculture

- Encourage and promote the continued development of minor irrigation, where feasible, without affecting drinking water supplies.
- Strengthen appropriate monitoring organizations for tracking groundwater recharge, surface and groundwater use, and changes in surface and groundwater quality

Water and Industry

The policy of the Government in this regard is:

- Zoning regulations will be established for the location of new industries in consideration of fresh and safe water availability and effluent discharge possibilities.

Water, Fisheries, and Wildlife

Fisheries and wildlife are integral aspects of economic development in Bangladesh and strongly linked to the advancement of target groups, poverty alleviation, nutrition, and employment generation. The policies of the Government in this regard are:

- Fisheries and wildlife will receive due to emphasis on water resource planning in areas where their social impact is high.
- Measures will be taken to minimize disruption to the natural aquatic environment in streams and water channels.
- Drainage schemes, to the extent possible, will avoid state-owned swamps and marshes that have primary value for waterfowl or other wildlife.
- Water bodies like baors, haors, beels, roadside borrow pits, etc. will, as far as possible, be reserved for fish production and development.
- Water development plans will not interrupt fish movement and will make adequate provisions in control structures for allowing fish migration and breeding.

Water for Hydropower and Recreation

Bangladesh has limited potential for hydropower due to its flat terrain and the absence of a suitable reservoir area. The use of water for recreational purposes is useful for developing tourism facilities. The policies of the Government in this regard are:

- Mini-hydropower development schemes may be undertaken provided they are economically viable and environmentally safe.
- Recreational activities at or around water bodies will be allowed provided it is not damaging to the environment.

Water for the Environment

The policies of the Government in this regard are:

- Ensure adequate upland flow in water channels to preserve the coastal estuary eco-system threatened by the intrusion of salinity from the sea.
- Protect against degradation and resuscitate natural water-bodies such as lakes, ponds, beels, khals, tanks, etc. affected by man-made interventions or other causes.
- Stop unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.
- Encourage massive afforestation and tree coverage specifically in areas with the declining water table.

Water for Preservation of Haors, Baors, and Beels

The Government believes that to assist the natural processes of groundwater recharge, maintenance of aquatic life and ecological balance, disposal of wastes through the dynamic river system, and for turning the huge water bodies into recreational areas, their planned development is essential. The policies of the Government in this regard are:

- a) Natural water bodies such as beels, haors, and baors will be preserved for maintaining the aquatic environment and facilitating drainage.
- b) Only those water-related projects will be taken up for execution that will not interfere with the aquatic characteristics of those water bodies.
- c) Haors that naturally dry up during the winter will be developed for dry season agriculture.
- d) Take up integrated projects in those water bodies for increasing fish production.
- e) Natural water bodies will be developed, where possible, for recreational use in support of tourism.

14. Perspective Plan of Bangladesh (2010-2021): Making Vision 2021 A Reality

The Perspective Plan of Bangladesh (2010-2021) was prepared by the General Economics Division (GED) under the Planning Commission. The report was published in April 2012. The Perspective Plan provides the road map for accelerated growth and lays down broad approaches for the eradication of poverty, inequality, and human deprivation. Specific strategies and the task of implementation will be articulated through the two five-year plans: Sixth Five Year Plan (2011-2015) and the Seventh Five Year Plan (2016-2020). A brief review of "The Perspective Plan of Bangladesh (2010-2021)" has been discussed which is as follows:

Food Security: Agriculture and Rural Development

Ensuring food security for the poor is a fundamental objective of the Government. Intending to enhance agriculture production and ensuring food security, the target is that, by 2021, food deficiency will be eliminated and the country will attain self-sufficiency in food production enabling to meet the nutritional requirement of the population.

Strategies for Agriculture

- Priority attention is planned crop intensification in the coastal zone;
- Sustaining ecological balance.

Strategies for Rural Development

- To establish a powerful autonomous local government body. This is imperative to initiate and provide coordination among private and public rural development institutes.
- Utilize huge water bodies for fish production and link them to urban markets;
- To establish cold storage facilities at wholesale markets and in rural collection centers.

Strategies for Water Resource Management

- Focus on surface water irrigation and stabilize a reduced use of groundwater;
- Rehabilitate coastal embankments to help adapt to climate change;
- Protect rivers from erosion of watercourses and enhancement of land reclamation;
- Examine the government's water sector agencies and institutions and, if necessary, redesign, reorient, and further equip them for more effective implementation of policies and strategies.

Manufacturing Sector

Manufacturing is the predominant and leading sector within a broad industry which also includes such activities as power generation, water and sewage, and mining and quarrying.

Strategic Policies for Manufacturing Sector

- Developing Bangladesh as an exotic tourist destination in Asia;
- Institutions related to industrial development (such as BOI and BEPZA) will be provided with adequate resources to enable them to function efficiently.

Transport for the Future

The vision of the perspective plan is to establish a safe, low cost, modern, and technologically dependable, environmentally friendly inter-modal transport system to reduce the financial cost and time for both commercial traffic, cargo, and for public transportation.

Policy Objectives

The main objective of the perspective plan concerning transportation is to develop an efficient, sustainable, safe, and regionally balanced transportation system in which various modes

complement each other, interface appropriately and, where possible, provide healthy competition to each other. The broad policy objectives can be summarized as follows:

- Meeting the transport demand generated by a higher rate of growth of GDP;
- Establishment of effective railway linkages between the east and west zones of the country;
- Re-orientation of the development strategy for rural transport for efficient external access through optimal integration of road and inland water transport and off-road internal accesses;
- Adequate care will be taken while developing the transport network and service so that these do not cause environmental pollution and affect the ecological balance

Sub-Sectoral Goals, Objectives, and Strategies

Strategies for Roads

- Attention will be given to up-gradation and maintenance of the existing roads relative to new road construction.
- Routine and periodic maintenance programs will be drawn up by concerned authorities.
- National Highways should receive priority attention to ensure a high level of service, safety, and quality. The Dhaka-Chattogram Highway (NH1) is to become a six-lane road while the other highways should gradually become four-lane by 2021. These roads can form part of the regional road network, as well as the Trans-Asian Road network facilitating trade between Bangladesh and neighboring countries.
- To ensure balanced development across the country, there should be an adequate number of east-west connections.

Strategies for Railways

- Rehabilitate, upgrade/improve, and replace old-aged infrastructures and rolling stocks to reduce journey time, improve the service quality and to build the image of the railway as a safe and reliable means of transport.
- Connect the Capital City with Cox's Bazar, Mongla Port, Tungipara, Barisal, Chattogram Hill Tracts, and other areas where rail network does not exist.

Strategies for Inland Waterways

- Establishment of inland container river port on a priority basis.
- Implementation of projects for improving the traditional country boat sector.
- Implementation of the development projects of rural launch landing stations by providing pontoon facilities for smooth embarkation/disembarkation of passengers and loading/unloading of cargo.

Strategies for Ports and Shipping

- Maintain and improve the navigational channel through capital dredging and regular maintenance dredging.
- Expansion of terminal/yard facilities and improvement of operations through the acquisition of modern container handling equipment and procurement of harbor crafts and vessels.

- Urgent establishment of ICDS/CFS at all potential cargo distribution centers across the country.

Policies and Strategies for Urban Transport

The pressure on urban transport systems in the country has been increasing as a consequence of rapid urban growth. Urban transport aims to improve transport and traffic infrastructure to meet existing and potential demands, and developing an integrated and balanced system in which all modes (motorized and non-motorized) can perform efficiently and each mode can fulfill its appropriate role in the system. The main objective of urban transport policies should be to support sustainable urban development.

Policies and Strategies for Rural Transport

Roads, waterways, or both serve most of the rural markets and growth centers. It is important to give attention to ways that the rural transport infrastructure, particularly the physical infrastructure, can support rural economies. The long-term goals of the perspective plan concerning rural roads are (i) to provide all-weather access to all growth centers, all union Parishad complexes, most rural markets, and other rural service delivery centers, and (ii) to improve rural access to facilitate agricultural production and marketing. The strategies may be the adoption of a Rural Road Master Plan and Maintenance Plan with priority accorded on maintenance over new construction, and more involvement of LGIs in ensuring utilization and maintenance of constructed facilities

Policies and Strategies for the Urban Sector

- To achieve a more balanced distribution of urban centers in terms of population size, employment opportunities, housing, and essential infrastructure and services.
- To bring about improvement in the housing situation in terms of quality and quantity of housing units, housing tenure, and housing accessibility.
- To promote sustainable land-use planning and innovative land management practices.
- Steps will be taken to provide adequate and affordable basic infrastructure and services to help safeguard the health, safety, welfare, and improved living environment of urban dwellers.
- Developing an integrated and balanced transportation system taking into consideration the needs of the road system, non-motorized transport, public passenger transport, and mass transit.

Policies and Strategies for Public Health Facilities

- The number and size of UHCs and FWCs should be streamlined with FWCs away from the UHCs, especially in large Upazilas.
- Community clinics in all unions can be established.

Environmental, Climate Change and Disaster Management Strategies

- Best utilization of the available land, arresting, and reversing the land degradation process, is a major policy thrust. Further unplanned growth needs to be stopped and an urban renewal strategy will be formulated and implemented.

- Efforts to protect and enhance biodiversity will be strengthened.
- In rural areas, the arsenic contamination of groundwater will continue to be addressed with determination. Mitigation options include the treatment of arsenic-contaminated water.
- Increase the use of surface water sources. Deep aquifers appear to offer a long-term source of arsenic-free and safe drinking water.
- To improve navigability and water discharge, and to reduce flood risks, a strategy of dredging and training of rivers in a planned and phased manner will be pursued.
- Afforestation, particularly in coastal areas, is already a major thrust and will be strengthened in terms of the strategic location and overall area covered.

15. Sustainable Development Goals (SDGs)

Goals and Targets of the Sustainable Development Goals (SDG)

Goal 1: End poverty in all its forms everywhere

Goal 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Goal 5: Achieve gender equality and empower all women and girls

Goal 6: Ensure availability and sustainable management of water and sanitation for all

Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all

Target 6.6: By 2020 protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes

Goal 7: Ensure access to affordable, reliable, sustainable, and modern energy for all

Goal 8: Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation

Target 9.1: Develop quality, reliable, sustainable, and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being with a focus on affordable and equitable access for all

Goal 10: Reduce inequality within and among countries

Goal 11: Make cities and human settlements inclusive, safe, resilient, and sustainable

Goal 12: Ensure sustainable consumption and production patterns

Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources

Goal 13: Take urgent action to combat climate change and its impacts

Goal 14: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development

Goal 15: Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Target 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains, and drylands, in line with obligations under international agreements

Target 15.2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests, and substantially increase afforestation and reforestation globally

Target 15.4: By 2030 ensure the conservation of mountain ecosystems, including their biodiversity, to enhance their capacity to provide benefits which are essential for sustainable development

Target 15.7: Take urgent action to end poaching and trafficking of protected species of flora and fauna, and address both demand and supply of illegal wildlife products

Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels

Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

4.3 Review of Relevant Laws and Regulations

a) Playfield, Open Space, Park and Natural Water Reservoir Conservation Act, 2000

The Act (36 of 2000) is necessary and expedient to provide for the conservation of Megacity, Divisional Town and District Town's municipal areas including country's all the municipal areas' playground, open space, park, and natural water reservoir conservation

Following is a review and observation of the relevant parts of the above-mentioned Act.

- According to the Section-3 of the Act, this act calls for wide circulation of a Master Plan for any City/District Town/Upazila/Paurashava. It also calls for making available a copy of the plan on payment of fees. The provisions of the plan should also be known to the people so that they can carry out their development according to the plan.
- According to the Section-5 of the Act, any land having such use as a playfield, park, and natural water reservoir cannot be changed or used for any other purpose(s).

b) The Building Construction Act, 1952

The Building Construction Act, 1952 was prepared to prevent haphazard construction of buildings and excavation of tanks that are likely to interfere with the planning of certain areas in Bangladesh. This act provided regulations regarding setbacks, building heights, etc. in urban areas. The act is usually exercised in areas under the urban local governments. The act sets some conditions regarding the construction of buildings in urban areas where the Act will be in execution.

The major specifications in the Act are:

- The act calls for the preparation of a master plan of the area concerned before approval of the building plan.
- According to the Section-3B of the Act, this act gives special power to plan approval authority to remove any building that did not follow the specified rules of the act or take action against any building owner who constructs building violating the rules after approval of the building plan.
- According to the Section-3C of the Act, this act forbids the cutting of any hill without prior permission of the appropriate authority.
- The act in its Section 18 keeps provision for preparation of Building Construction (BC) rules to ensure healthy and environment-friendly building development.

c) Water Act, 2013

The Water Act, 2013 was prepared to make provisions for integrated development, management, abstraction, distribution, use, protection, and conservation of water resources.

The major specifications of this act are:

Section-17: Declaration of Water Stress Area and management

- To protect any water source or an aquifer, the Government may declare any area or any part thereof or any land connected thereto with such water resources as Water Stress Area for a period specified therein. The boundary of the Water Stress Area shall be specified by referring to the mouza map and plot numbers.

Section-18: Preferential use of water in the Water Stress Area and exemption

- Notwithstanding anything contained contrary in any other law for the time being in force, abstraction and use of water from any Water Stress Area shall, subject to the availability of water therein, be made under the following order for the national interest and the interest of the local communities, namely:- use of water as potable; use of water in the household; use of water in agriculture; use of water in aquaculture; use of water for balancing eco-system; use of water for wildlife; use of water national river flows; use of water in the industry; use of water salinity control; use of water for power generation; use of water for amusement; and use of water for other purposes.

Section-19: Fixing the lowest safe yield level of aquifer and restriction on abstracting groundwater

- The Executive Committee may fix the lowest safe yield level of an aquifer of any area. The boundary of the area, to which lowest safe yield level applies, shall be specified by referring the mouza map and plot numbers.

Section-20: Ensuring the normal flow of water source

- No person or organization shall, without the permission of appropriate authority, stop the natural flow of any watercourse, create obstacles to such flow, divert, or attempt to divert the direction of any watercourse. With the permission of appropriate authority, the development of a water source, or the prevention of erosion of the bank, any kind of structure on such a water source may be constructed.

Section-21: Protection of flood control embankment

- To ensure the sustainability of the flood control embankment, without the permission of the appropriate authority, no person shall be allowed to construct any house or establishment or any other structure on or on the slope of the embankment. To make the flood control embankment strong, suitable trees may be planted alongside the embankment in a well-organized and planned manner. A flood control embankment may be used as a street or road for the best use of land.

Section-22: Conservation of water source and management

- By demarcating the boundary of the water source, the Executive Committee may issue a protection order to the owner or appropriate authority for the conservation of the water source such as dighi, pond, haor, baor, or any other source as a source of potable water.

Section-25: Declaration of flood control zone and management

- The Executive Committee may declare any wetland as a flood control zone to ensure easy passage of the flow of floodwater. The boundary of the flood control zone shall be specified by referring to the mouza map and plot numbers.

CHAPTER 05: PROJECTION OF POPULATION

5.1 Introduction

The future population growth is useful to draw mechanisms for improving and guiding long-term development strategies. For the better implication of Government policies, it is compulsory to identify the current population as well as the future growth of the population of the country or an area with sufficient aspects. The growth of the population and the physical developments of the Upazila are interconnected. To accommodate the growing population, new areas are required for residence, commerce, industrial, road network, and other service facilities. For that reason, the role of population projection is inevitable for utilizing scarce resources. Projection of future population for a specific period for a particular area is one of the most essential tasks in the planning process. This chapter presents the future population growth and future population density of Mirsharai Upazila.

5.2 Projection of Population

Population projections can be used for several purposes. The most important use of population projections is providing information on possible future scenarios. To make a 20-year population projection of sixteen unions of Madaripur Upazila including two Paurashava areas, two alternative methods have been selected and used. The selected methods are the 'Cohort Survival Method' and 'Linear Method'.

In conducting two projection methods, the population from the national census of 2011 has been considered as a base year. The population data has been collected from BBS, 2011. Of the two projection methods, the Cohort survival method is considered more reasonable for the project area due to the presence of notable of rural-urban and urban-urban migration

5.2.1 Cohort Survival Method of Population Projection

As mentioned above, for population projection, the "Linear Method" and "Cohort Survival Method" were applied. Of the two estimations, the estimation of the Cohort Survival Method was considered for applying in the preparation of the Structure Plan for Mirsharai Upazila. The cohort component technique uses the components of demographic change to project population growth. The technique projects the population by age groups, in addition to other demographic attributes such as sex and ethnicity. This projection method is based on the components of demographic change including births, deaths, and migration.

Cohort Survival Method Equation

$$P_{t+n} = \text{Survived population} + \text{Births} + \text{Net Migrants}$$

Here,

Survived population = The number of persons alive at the beginning of the age interval

Birth = Number of births taking place during the projection interval.

Net migrants = Movement of people across political boundaries that are semi-permanent or permanent.

$$\text{Net migrants} = (\text{Population}_{t+n} - \text{Population}_t) - (\text{Births} - \text{Deaths})$$

Population $_{t+n}$ = Current population

Population $_t$ = Last census

When the cohort component method is used as a projection tool, it assumes the components of demographic change such as mortality, fertility, and migration, will remain constant throughout the projection period.

5.2.2 Calculation of Population Projection

Over the decade 2001-2011, the population growth rate for the Upazila was 8.07% and the annual compound growth rate was 0.77%. The decadal growth rates for the last six decades are shown in Table 5. 1.

Table 5. 1: Decadal Growth Rate of Population (1951-2001)

Decade	Growth Rate (%)
1951-1961	11.8
1961-1971	36.0
1971-1981	20.4
1981-1991	6.1
1991-2001	13.3
2001-2011	8.1

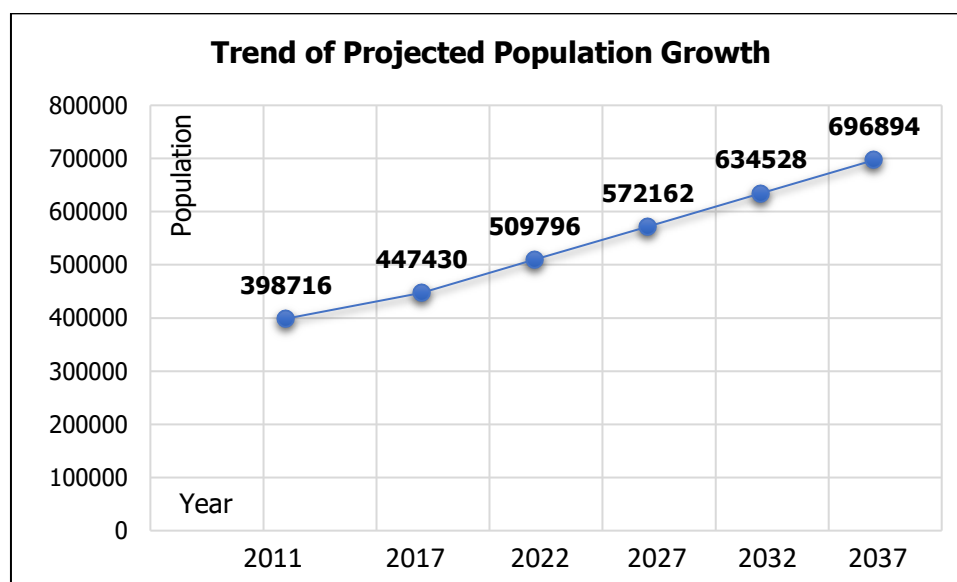
Source: BBS, 2011; Community Report: Chattogram Zila

Calculation of Population Projection

Therefore, the projected population of Mirsharai Upazila for 2037 is:

$$\begin{aligned}
 P_{2037} &= \text{Survived population} + \text{Births} + \text{Net Migrants} \\
 &= 634528 + 13830 + 48536 \\
 &= 696894
 \end{aligned}$$

Figure 5.1 shows the trend of projected population growth from the period of 2011 to 2037 in Mirsharai Upazila. The trend of the projected population growth of Mirsharai Upazila is increasing.



Source: BBS, 2011

Figure 5. 1: Projected Population Growth Trend in Mirsharai Upazila

5.2.3 Projected Population Distribution

The population projections are made for 20 years for two Paurashavas and sixteen unions of Mirsharai Upazila. Table 5. 2 shows the union-wise projected population distribution of Mirsharai Upazila over several periods within the 20-year plan period.

Table 5. 2: Union-wise Population Projection of Mirsharai Upazila (2017-2037)

Union	Base Year Population (2011)	Year Wise Projected Population				
		Year- 2017	Year-2022	Year-2027	Year- 2032	Year-2037
Baroiarhat Paurashava	11602	12148	12623	13117	13630	14163
Mirsharai Paurashava	16218	16982	17646	18336	19053	19797
Dhum Union	16770	17560	18246	18960	19701	20471
Durgapur Union	21128	22123	22988	23887	24821	25791
Haitkandi Union	19051	19948	20728	21539	22381	23256
Hinguli Union	29133	30505	31698	32937	34225	35563
Ichhakhali Union	27980	29298	30443	31634	32870	34155
Karerhat Union	35467	37137	38589	40098	41666	43295
Katachhara Union	23596	24707	25673	26677	27720	28804
Khaiyachhara Union	23423	24526	25485	26482	27517	28593
Mayani Union	18285	19146	19895	20673	21481	22321
Mirsharai Union	16828	17621	18309	19025	19769	20542

Union	Base Year Population (2011)	Year Wise Projected Population				
		Year- 2017	Year-2022	Year-2027	Year- 2032	Year-2037
Mithanala Union	23109	24197	25143	26127	27148	28209
Maghadia Union	23406	24508	25467	26462	27497	28572
Osmanpur Union	14645	15335	15934	16557	17205	17877
Saherkhali Union	16912	17709	18401	19120	19868	20645
Wahedpur Union	24981	26158	27180	28243	29347	30495
Zorwarganj Union	36182	37886	39367	40907	42506	44168
Total	398716	447430	509796	572162	634528	6,96,894
Bangabandhu Sheikh Mujib Shilpa Nagar	-					22,20,000*
Total						29,16,894

Source: BBS, 2011

*Note: According to the Bangladesh Economic Zone Authority (BEZA), out of the total Administrative area of Bangabandhu Sheikh Mujib Shilpa Nagar, around 55.14% area is located at Mirsharai Upazila. As per BEZA, the total projected population for the Bangabandhu Sheikh Mujib Shilpa Nagar will be 3.7 million. Considering this fact, out of the total projected population of Bangabandhu Sheikh Mujib Shilpa Nagar 60% projected population has been added with a total projected population of Mirsharai Upazila.

5.3 Estimation of Population Density

Population density of any area over the planning period is important to determine the volume of facilities and services that will be required in various phases of the Development Plan. Table 5. 3 provide the existing and projected population density of two Paurashavas and 16 unions of Mirsharai Upazila.

Table 5. 3: Union-wise Population Density of Mirsharai Upazila

Union/Paurashava	Pop. Density (BBS, 2011)		Projected Pop. Density (2037)	
	Density per Acre	Density per sq.km.	Density per Acre	Density per sq.km.
Baroiarhat Paurashava	22	5527	27	6747
Mirsharai Paurashava	9	2142	11	2615
Dhum Union	6	1378	7	1682
Durgapur Union	6	1372	7	1674
Haitkandi Union	5	1335	7	1629
Hinguli Union	7	1642	8	2004
Ichhakhali Union	2	463	2	565
Karerhat Union	1	231	1	282

Union/Paurashava	Pop. Density (BBS, 2011)		Projected Pop. Density (2037)	
	Density per Acre	Density per sq.km.	Density per Acre	Density per sq.km.
Katachhara Union	7	1691	8	2065
Khaiyachhara Union	7	1781	9	2174
Mayani Union	6	1394	7	1702
Mirsharai Union	5	1331	7	1625
Mithanala Union	5	1162	6	1418
Maghadia Union	7	1651	8	2015
Osmanpur Union	4	968	5	1182
Saherkhali Union	1	259	1	316
Wahedpur Union	5	1266	6	1545
Zorwarganj Union	6	1540	8	1880
Mirsharai Upazila	3	808	4	990

Source: Prepared by Consultants based on BBS, 2011

5.4 Limitation of Cohort Survival Method

First, it is highly dependent on reliable birth, death, and migration data. Thus, it may be difficult to collect the information to apply this tool. Second, it assumes that survival and birth rate and estimates of net migration will remain the same throughout the projection period. Third, it does not consider the non-demographic factors that influence population growth or decline.

5.5 Conclusion

The population of Mirsharai Upazila has been projected from 2017 to 2037 based on census data of 2011. Using the method described above, the projected population will be 696894 in 2037, and the projected population of Bangabandhu Sheikh Mujib Shilpanagar will be 37,00,000. The projected population will be helpful for the future development of Mirsharai Upazila in different ways. The projected population and density will be useful for the planning of new schools or expansion of existing schools, provision of transport facilities, provision of health services, and other development plans.

CHAPTER 06: ECONOMY

6.1 Introduction

The economic development of any place is associated with the generation of employment. Economy and employment are the most vital issue for the growth and development of any place. One of the main objectives of this sector is to create sufficient employment for the present and future population. This chapter thus focuses on developing strategies for achieving the goal of making Mirsharai economically more functional and productive.

6.2 Existing Scenario

Like elsewhere in the country, the Mirsharai Upazila area economy consists of both the formal and informal sectors. In the formal sector economic activities, including industrial and manufacturing activities carried out on both sides of Dhaka-Chattogram Highway. These formal sector establishments play an important role in the local economy as well as the regional economy. A major portion economy of the project area is agriculture in nature, which includes agriculture, livestock, fishing, and forestry.

From the socio-economic survey, it is found that Mirsharai Upazila is largely agriculture-based and partially fisheries-based. Main occupations of the upazila are Agriculture 12.15%, Business (small and medium) 8.46%, Government Job 2.77%, private job 3.31%, unskilled labor 11.54%, skilled labor 1.85%, wage labor 7.78%, transport 1.38%, housewife 39.46%, and others 17.92%. The employment status clearly shows that women are predominantly engaged in household work. It appears that mainly male populations are involved in the employment sector rather than females. The very low number of people employed in the industry is due to a lack of opportunity. Besides, Bangladesh Economic Zone Authority (BEZA) estimated that around 1.44 million jobs will be created in Bangabandhu Sheikh Mujib Shilpanagar.

6.3 Future Plan and Direction

The following policy guidelines are formulated for making Mirsharai Upazila increasingly functional and productive.

Policy ECO/1: Enhancing the agro-processing industry

The development of agro-processing facilities can prevent post-harvest losses and enhance farmers' income. Agriculture has huge implications including agro-processing and food industries which will be labor-intensive, supporting the boosting of employment. The development of agro-processing facilities can prevent postharvest losses and enhance farmers' income.

Strategic Actions

The agro-processing research facility of BARI will be strengthened. The private sector should be encouraged to export processed fruits and vegetables to domestic as well as overseas markets. Most of the technologies and facilities for handling, storage, processing, and packaging of farm products and by-products should be of international standard for domestic and external consumption. Agro-based industries can be promoted in the designated industrial areas within the Upazila. Both public & private agencies can be encouraged for investment in agro-based industries.

Implementation Agency

- Mirsharai Upazila Parishad, Ministry of Industry, Ministry of Agriculture, BSCIC

Policy ECO/2: Ensure compact development of industrial and commercial growth

Some locations within the project area have spontaneously developed as industrial and commercial clusters. These locations need special treatment in terms of infrastructure and services to promote compact industrialization.

Strategic Actions

Mark strategic industrial and commercial zones in the Structure Plan map. Promote infrastructure and services development in the compact industrial and commercial zones.

Implementation Agency

- Mirsharai Upazila Parishad, Private Sector, Local Government Agencies

Policy ECO/3: Development of tourism sector

Tourism has not only emerged as a leading economic sector worldwide but also has boosted trade of countries that lagged in economic development. It is an important vehicle for economic progress that generates employment, foreign exchange, revenue, and contributes to poverty alleviation. The project area has great potential to develop as tourists spot.

Strategic Actions

Mohamaya Lake, Khaiyachhara Jharna, Napittachhara Jharna, etc. should be preserved and developed as a tourist spot. Create awareness and enforcement of the law to ensure safety and security for tourists and hygienic food and water. Providing funds for small and medium entrepreneurs to establish business related to tourism.

Implementation Agency

- Mirsharai Upazila Parishad, Bangladesh Parjatan Corporation, Private Sector Agencies

Policy ECO/4: Promote informal sector economic activities

Socio-economic survey reveals that around 16.54% of surveyed peoples are self-independent. The informal sector should be facilitated to grow and get improved and gradually merged with the formal economy within higher production.

Strategic Actions

Demarcate a suitable location to promote informal business activities. Provide an appropriate tenure arrangement for the business operators. Provide collateral-free soft credit to upgrade business. Provide skill development training to promote higher production and quality products.

Implementation Agency

- Mirsharai Upazila Parishad, Paurashava, Department of Social Welfare, NGOs

Policy ECO/5: Facilitate the development of the ICT sector

The vision for Digital Bangladesh is to establish an equitable, inclusive society and economy. In recent years, the ICT sector of Bangladesh has made eye-catching progress. If this sector can be supported by location, infrastructure, and services, it can become one of the robust sectors of the Mirsharai Upazila as well as the national economy.

Strategic Actions

Steps will be taken to gradually convert the potential Union Digital Centers into Business Process Outsourcing (BPO) centers by providing high-speed connectivity and other necessary infrastructure. Support ICT initiatives to expand services in rural areas (cloud-based service, National helpline, BPO, Incubation Centre, ICT Research & Development center, Broadband connectivity, etc.). Select Bangabandhu Sheikh Mujib Shilpanagar economic zone for ICT based further activities.

Implementation Agency

- Ministry of Information and Communication Technology, Ministry of Planning, BTRC, BTCL, Telecom Companies, Private Sector

CHAPTER 07: HOUSING

7.1 Introduction

Housing is the most vital part of human settlement. Housing is a key factor in making Mirsharai Upazila a sustainable, affordable, livable, and equitable city. To confirm a better living environment for the maximum productivity of the residents, the applicable policy should be taken for the housing sector of the Upazila. This segment delivers the development policies for the housing and residential sector of Mirsharai Upazila. The key objective of this segment and recommended policies is to provide housing for all with keeping the cultural heritage of the area.

7.2 Existing Scenario

According to Land Use Survey 2018, residential and homestead land use occupying 15.17% land of the project area. With the establishment of an economic zone in this region, the volume of traffic will increase, more employment will be created, more opportunities for industrialization will emerge, most importantly more population will gather in this Upazila to enjoy the economic benefit and better living standard. It is seen from the projection of the population that by the year 2037, the population of the project area will be 696,894. Besides, according to the Bangladesh Economic Zone Authority (BEZA) total projected population for the Bangabandhu Sheikh Mujib Shilpanagar will be 3.70 million.

7.3 Housing Requirements

Housing need reflects the actual requirement of housing for a particular size of the population. Housing is one of the most vital components of our life. It is a source of security, safety, and everyday comfort. So, housing should be considered as a priority area for development. An attempt has been made to draw a picture of the housing situation of Mirsharai Upazila. For the assessment of the demand for various types of housing, the socio-economic status of the population is important. The formula used for calculating demand of the dwelling units is given below:

$$H=P/S$$

Where, H= Number of dwelling units

P= the projected population

S= the average household size

Considering the average household size 5 (BBS, 2011), the total number of required housing units will be 139379. By the year 2037, the total deficit of housing units will be 59834 having the highest number of dwelling units in the Ichhakhali Union (1626) and lowest number of dwelling units in Baroiarhat Paurashava (434). The projected demand for dwelling units for the year 2037 has been shown in Table 7. 1.

Table 7. 1: Projected Housing Requirements (Dwelling Units) in Mirsharai Upazila

Union/Ward	No. of Households (BBS, 2011)	Projected Population (2037)	Projected Household	Deficiency
Baroiarhat Paurashava	2399	14163	2833	434
Mirsharai Paurashava	3507	19797	3959	452
Dhum Union	3419	20471	4094	675
Durgapur Union	4351	25791	5158	807
Haitkandi Union	3700	23256	4651	951
Hinguli Union	5889	35563	7113	1224
Ichhakhali Union	5205	34155	6831	1626
Karerhat Union	7362	43295	8659	1297
Katachhara Union	4366	28804	5761	1395
Khaiyachhara Union	4879	28593	5719	840
Mayani Union	3549	22321	4464	915
Mirsharai Union	3164	20542	4108	944
Mithanala Union	4445	28209	5642	1197
Maghadia Union	4832	28572	5714	882
Osmanpur Union	3046	17877	3575	529
Saherkhali Union	3049	20645	4129	1080
Wahedpur Union	4752	30495	6099	1347
Zorwarganj Union	7631	44168	8834	1203
Total	79545	696894	139379	59834

Source: BBS, 2011

7.4 Future Plan and Direction

Considering the present situation of the Mirsharai Upazilas housing sector, the critical issues, and future needs, the Structure Plan has set the following policies to achieve the goal of housing development.

Policy HOU/1: Provision of adequate and affordable basic infrastructure and services

Basic infrastructure and services at the community level consist of the supply of safe drinking water, sanitation, solid waste management, educational facilities, social welfare, health and emergency services, transportation and communications facilities, energy, municipality services, public safety, etc. The provision of adequate and affordable basic infrastructure and services is needed for safeguarding the health, safety, welfare, and improved living environment of the people.

Strategic Actions

Adopt programs and projects for the establishment of effective community-level connectivity. Take up programs and projects to provide utility services to potential residential areas through the local government agencies. Provide good access to public transport and a wide variety of services and

amenities through the private sector, community-based organizations, and non-governmental organizations under the coordination of local authorities.

Implementation Agency

- Mirsharai Upazila Parishad, Paurashava, LGED, DPHE, NHA, Private Sectors, CBOs

Policy HOU/2: Promote housing schemes for the low-income group and the industrial workers

Since the private sector housing development will be operated for profit, the low-income group households will hardly get access to these schemes. Due to the high cost of land and housing infrastructure, the vulnerable low-income groups are often underprivileged of minimum housing facilities. As a public development authority, Upazila Parishad's authority and the National Housing Authority have to think about the housing facilities for the poor of the project area.

Strategic Actions

Housing schemes for a low-income group of people will be taken considering the economic group of people such as industrial workers' Housing besides special economic zone named "Bangabandhu Sheikh Mujib Shilpanagar". Housing schemes will be proposed through different land development instruments such as rehabilitation schemes, redevelopment schemes, etc. Low-income housing schemes should be designed in such a way that no one other than the targeted people can get it (See **Error! Reference source not found.**).

Implementation Agency

- NHA, Donors, Private sector.

Policy HOU/3: Discourage housing development by destroying natural resources

The rural areas have sizeable agriculture land with scattered settlements. For ensuring future food security and preserving the natural environment, it is required to preserve the agriculture, water bodies, and forest area from any type of residential expansion for food production.

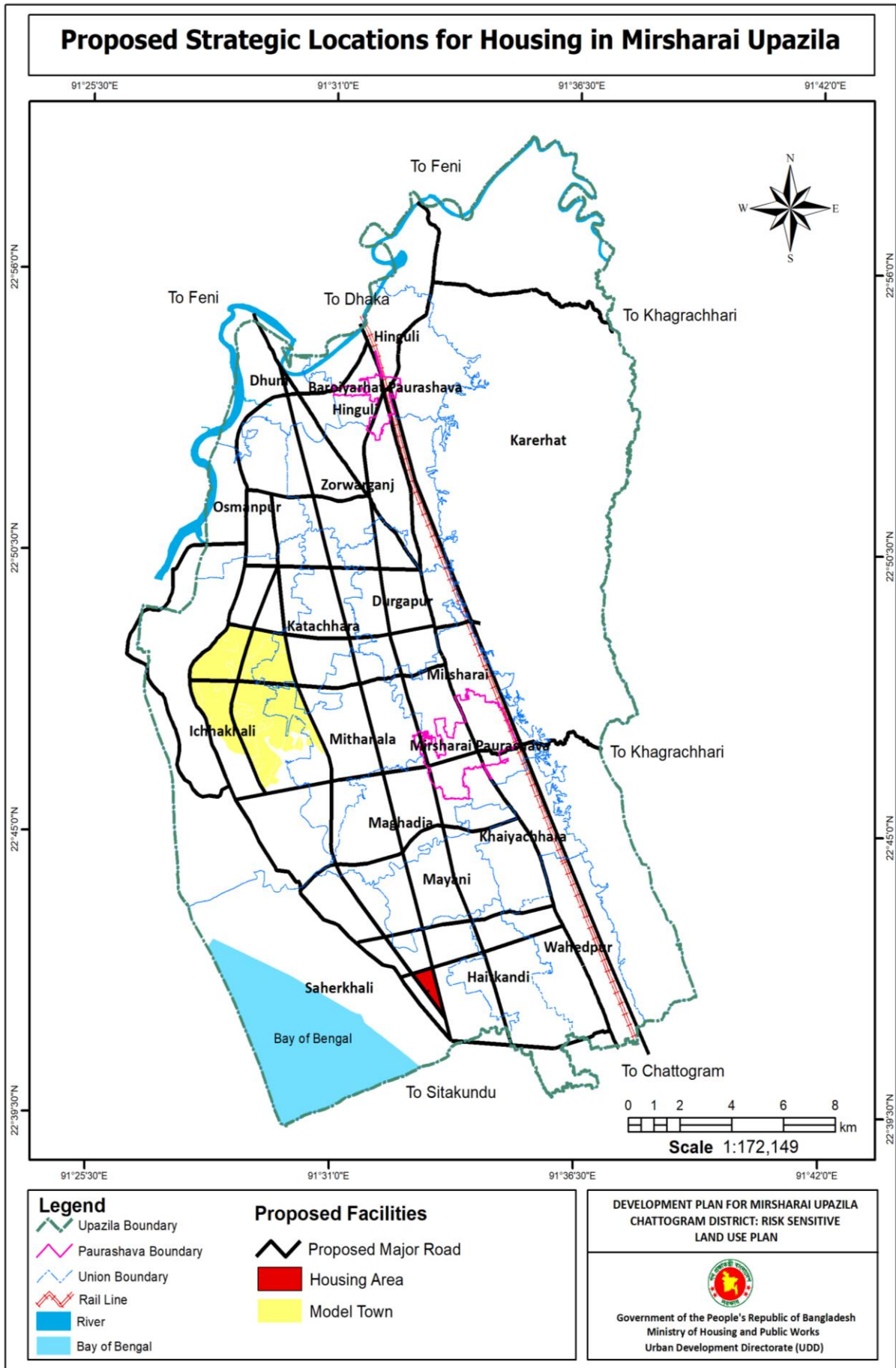
Strategic Actions

The high-value agricultural lands, water bodies, and forests will be identified and no housing development permission will be given for building construction and/or site and service projects in those areas. Construction of unplanned housing projects should be controlled and construction of housing will be stopped by filling the agricultural and wetlands.

Implementation Agency

- Mirsharai Upazila Parishad, Ministry of Agriculture, NHA.

Map 7. 1: Proposed Strategic Locations for Housing in Mirsharai Upazila



CHAPTER 08: TRANSPORTATION AND COMMUNICATION

8.1 Introduction

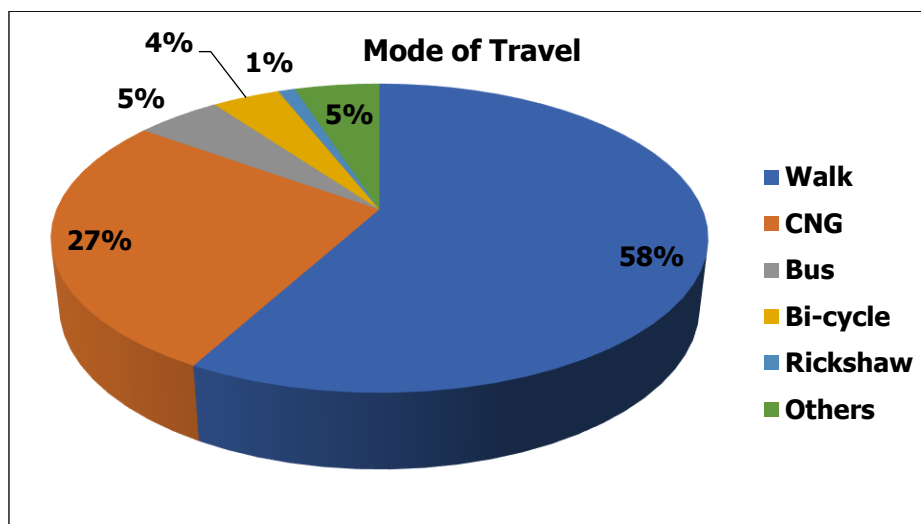
In planning transportation and traffic management is considered to be one of the most important components. The performance of the transportation system largely affects the economy and social improvement of an area. An improved road communication system reduces road user costs and costs of production and thus facilitates the socio-economic development of the country. At present, the transportation system of Mirsharai Upazila relies mainly on road transport. The main purpose of our transportation and traffic management plan is to coordinate between roads, railways, and waterways so that people of all levels can enjoy a comfortable transport system shortly. Policies recommended for the sector have been assembled under some broader strategies. The strategies have been formulated in a way that they would form the key mechanisms to drive the plan to its goals. The current chapter of the report provides some guidance for developing an integrated transport system.

8.2 Existing Condition of Transport Network

Transport is vital in fostering economic growth and development. Mirsharai is connected both by rail and road network system. The present transport system of Mirsharai Upazila consists of roads, railways, and inland waterways. Among the different transportation systems of the project area, road transportation has become the dominant modal. According to the Traffic and Transport Survey 2018, the existing road network system is composed of 193 Km pucca road, 119 Km semi-pucca road, and 1500 Km katcha road; 16 Km railways.

8.2.1 Existing Public Transport Scenario

The reconnaissance survey revealed that conventional public transport services are available in Mirsharai along the Dhaka-Chattogram highway. Within the Upazila, unconventional modes of transport – mainly auto-rickshaws, easy bikes, and leguna serve as para-transit. Rickshaws are also predominant just like throughout Bangladesh. Even along with the Dhaka - Chattogram highways, alongside conventional buses and mini-buses, a substantial number of leguna are seen in operation. People in this Upazila mainly rely on unconventional modes of transport for Intra and inter-zonal trips. According to the Traffic and Transport Survey 2018, people make most of the trips by walking which is 58% of total trips. Besides, out of the total 27% of trips are made by CNG.



Source: Traffic and Transportation Survey, 2018

Figure 8. 1: Mode of Travel in the Project Area

8.2.2 Existing Transport Network Scenario

Existing Traffic and travel situations are not at a satisfactory level in the Upazila. The maximum roads of the Upazila are narrow. Transport facilities are not good in Mirsharai Upazila, no designated parking for unconventional motorized vehicles. For haphazard and unplanned parking, congestion is high in Mirsharai. The project area is connected by Dhaka-Chattogram national highway. The regional highway passes through the eastern and northern side of the project area and connects surrounding Upazilas. The road condition is very poor in Mirsharai, except the national highway between Dhaka and Chattogram. The east and west connections from this national highway ensure access to scattered settlements across the whole landscape. Several local markets along the national highway route have become a hub for business.

8.2.3 Existing Deficiencies

To estimate the future traffic demand on the future road network of Mirsharai Upazila following seven surveys have been conducted. First, by reconnaissance survey of the Upazila, field observation; second, through household sample survey; third, through attraction survey; fourth, by executing of traffic count survey, fifth, by executing Origin-Destination (OD) Survey; sixth, by executing travel time survey and lastly, through stakeholder interviews.

The Traffic and Transportation survey reveals that average, 3.52 trips per household generate within the project area per day. From the household survey, it also exposes that home-based trips are prominent among the share of trips by a different purpose. It is seen that 21% of the trips are made for educational purposes; where 7% of trips are made for shopping purposes. In the overall scenario for the whole Mirsharai, people make most of the trips by walking which is 58% of total trips. These trips are mainly short-distance trips. On the other hand, 27% are made by CNG and 5% of trips are made by bus.

From the attraction survey it has been revealed that in 2 Paurashavas, vehicle attraction is higher than in other locations. Most of the schools, colleges, bazaars, hospitals, and government and private offices are located in these two Paurashavas. Therefore, the traffic demand is high in these two areas. Household O-D Survey reveals that the intra-zonal trips are higher in most of the zones except for Khaiyachhara and Mayani where the number of inter-zonal trips is higher than the local trips.

From the Household Survey, it has been revealed that the intra-zonal trip is higher in most of the zones except for Khaiyachhara and Mayani where the number of inter-zonal trips is higher than the local trips. Dhum, Durgapur, and Saherkhali Union also produce a considerable amount of inter-zonal trips. The higher number of intra-zonal trips in most cases maybe because most of the facilities such as rural markets, educational institutions, health facilities, administrative and other offices, etc. are available within most zones and the local inhabitants do not usually have to move to other zones or distant places for their day-to-day activities. However, the zones with a higher amount of inter-zonal traffic are more dependent on other zones for their day to day activities.

Table 8. 1: Distribution of Intra-zonal and Inter-zonal Trips

Zone Name	Intra-zonal Trips (%)	Inter-zonal Trips (%)
Karerhat Union	84	16
Hinguli Union	98	2
Dhum Union	51	49
Zorwarganj Union	70	30
Osmanpur Union	58	42
Durgapur Union	53	47
Katachhara Union	80	20
Ichhakhali Union	88	12
Mirsharai Union	89	11
Mithanala Union	78	22
Saherkhali Union	52	48
Maghadia Union	79	21
Khaiyachhara Union	17	83
Mayani Union	39	61
Wahedpur Union	95	5
Haitkandi Union	59	41

Source: Traffic and Transportation Survey, 2018

8.3 Transportation and Communication-related Policies

Policy TRA/1: Improvement of regional connectivity

Justification

Ramgarh port will be connected with Mirsharai Upazila at Baroiarhat section by the Ramgarh-Karerhat-Baroiarhat regional highway. Traffic count survey shows that peak hour vehicle volume is

high in this route (600-700 vehicle/ hour at Chinkir Hat intersection). This route will provide a significant road link to India's north-eastern states, and facilitate greater trade and exchanges between India and Bangladesh. Mirsharai–Narayanhat–Fatikchhari Zila Road can be an alternative to the existing Baroiarhat–Karerhat–Ramgarh route. It can be a major and shorter link to Khagrachhari (Fatikchhari and Manikchhari) and Chattogram via Najirhat and Bibirhat. Traffic count survey shows that the peak hour vehicle volume of this route is 184 vehicles/ hour. The proposed Mirsharai-Teknaf Marine Drive is a route alongside the seashore which will connect the Asian Highway network as well as India, Myanmar, and China especially Kunming.

Implementation Strategy

Give priority to regional road network connectivity.

Implementing Agency

- Roads and Highways Department (RHD)

Policy TRA/2: Provide a circular road to establish smooth vehicular traffic circulation

Justification

The main purpose of a circular road is to relieve the town centers from cross traffic. The proposed circular road will create smooth vehicular traffic circulation through and around the Mirsharai Upazila. Besides, to bypass the Bangabandhu Sheikh Mujib Shilpanagar traffic via possible Baroiarhat Bypass towards Feni and via Marine Drive road to Chattogram. The proposed circular road will encircle entire Mirsharai Upazila through the Bangabandhu Sheikh Mujib Shilpanagar embankment road and along the existing Dhaka-Chattogram railway.

Implementation Strategy

Maintain adequate Right of Way (RoW) for proposed circular roads.

Implementing Agency

- Mirsharai Upazila Parishad, LGED

Policy TRA/3: Provide connectivity between Bangabandhu Sheikh Mujib Shilpanagar to Dhaka-Chattogram national highways

Justification

According to the Bangladesh Economic Zone Authority (BEZA), Bangabandhu Sheikh Mujib Shilpanagar will generate 1.44 million job opportunities which will change the overall economic scenario of the Mirsharai Upazila. From the Traffic count survey, the pedestrian volume in Dhaka EPZ at the peak hour is 25,602 in total. There is no traffic forecast available at this moment but it can be

predicted that the EZ will produce 10 times the traffic of Dhaka EPZ in the next 20 years. This locality is expected to become a new hub for business in the service sector with all urban facilities.

Implementation Strategy

As the economy grows and the traffic intensifies on the streets, an efficient network of roads has to be built based on access control connecting the Dhaka-Chattogram highway. At east-west direction six major roads Alignment 1: Zorwarganj-Bishu Miar Hat-Osmanpur-Azampur Hat-Murhrihat Bazar-Embankment; Alignment 2: Chowdury Hat-Katachara-Julanpur Bazar-Embankment; Alignment 3: Mirsharai-Mithanala Bhorer Bazar-Embankment; Alignment 4: Boro Takiya Bazar-Abu Torab Bazar-Kazir Taluk-Embankment which is now under construction; Alignment 5: Sarkar Hat-Domdoma Bazar-Shaherkhali Bhorer Bazar-Embankment; Alignment 6: Boro Darogar Bazar-Kamar Ali Bazar-Samaitir Hat-Embankment has been proposed for widening. These roads will mainly connect the Bangabandhu Sheikh Mujib Shilpanagar with the Highway and also serve the internal traffic of Mirsharai Upazila.

Implementing Agency

- Mirsharai Upazila Parishad, LGED, RHD

Policy TRA/4: Construction of interchange/flyover at the busiest intersection to avoid traffic congestion

Justification

The survey revealed that among the surveyed traffic intersections maximum traffic intersections are most congested places during pick hours. Centralization of business activities in the main bazaar area and poor traffic management caused congestion in this area. It is necessary to improve these intersections based on the construction of flyover at the intersection point. Interchange at Hinguli intersection will connect the two ends of the proposed circular road intersected by the highway and overpass the regional traffic from Ramgarh and Feni. Flyover at Mirsharai intersection will establish a direct connection between the two parts of the Mirsharai Paurashava divided by the national highway and direct communication from Bangabandhu Sheikh Mujib Shilpanagar to Fatikchhari and Chattogram later on.

Implementing Agency

- Roads and Highways Department, Mirsharai Upazila Parishad

Policy TRA/5: Improving internal transport network within the Upazila linking the Upazila Headquarters with the Union Headquarter and Growth Center

Justification

To exploit the full potentials of both urban and rural areas of the Upazila for economic growth, better-quality transportation connectivity between the urban and rural areas is of paramount importance. Now, all the Union Headquarters and growth centers are not directly connected and some of them are also not directly connected to the Upazila Headquarters. The development of an improved transportation network can be carried out phase-wise during the plan period. The better road network will be planned considering the acceleration of rural economy and movement of people and goods and services in the Upazila.

Implementing Agency

- Mirsharai Upazila Parishad, LGED

Policy TRA/6: Provision of service roads on both sides of the National Highway and Regional Highway to accommodate local and slow-moving vehicles

Justification

The major arterial roads have to be kept free as far as possible from local use. The provision of service lane will enable movement of local traffic in a separate lane and free the fast-moving main road thorough traffic. This will give efficiency of movement for both the categories of traffic.

Implementation Strategy

Service roads can be introduced at an important intersection where local roads will directly connect to service roads instead of the highway.

Implementing Agency

- Mirsharai Upazila Parishad, RHD, LGED

Policy TRA/7: Development of railway communication

Justification

Railway Passes through Mirsharai Upazila which provides safe and comfortable transport and used to be a major source of linkage between Dhaka and other cities up to Chattogram. Movement of people and goods to and from Mirsharai and other areas will increase manifold with the improvement of the railway.

Implementation Strategy

Railway has its national plan with special emphasis on major national connections. Establishments of new rail line connectivity to Bangabandhu Sheikh Mujib Shilpanagar.

Implementing Agency

- Ministry of Railway

Policy TRA/8: Developing a multi-modal local, regional and national transportation network

Justification

Improvement of the local transportation network will help developed internal road and waterway transport systems within the Upazila. An appropriate local transportation system and the network are necessary for improving greater communication with regional and national transportation system. This will connect all parts of the Upazila with the regional and national transportation system and help transportation of goods and services between the Upazila and many other potential regional and national centers.

Implementation Strategy

The local level transportation network of roads, waterways, and railways will be designed and developed in a way so that the network and system can be integrated with the regional and national network and system of transportation. The Upazila level network will connect all the Union headquarters and growth centers. Proposals will be made for widening the existing narrow roads and the development of new roads where accessibility is poor.

Implementing Agency

- Mirsharai Upazila Parishad, LGED, BIWTA

Policy TRA/9: Establishment of safe walkways and bicycle path alongside with the major roads

Justification

A proper walking environment is an essential part of any area's transportation system. Besides, bicycles are one of the most efficient and environmentally friendly means of transportation. It occupies less space than other vehicles on the road. For achieving a better quality of life, safe sidewalks and bicycle paths are required along with the road system. The traffic and transportation survey showed that people make most of the trips by walking which is 58% of total trips. These trips are mainly for short-distance trips.

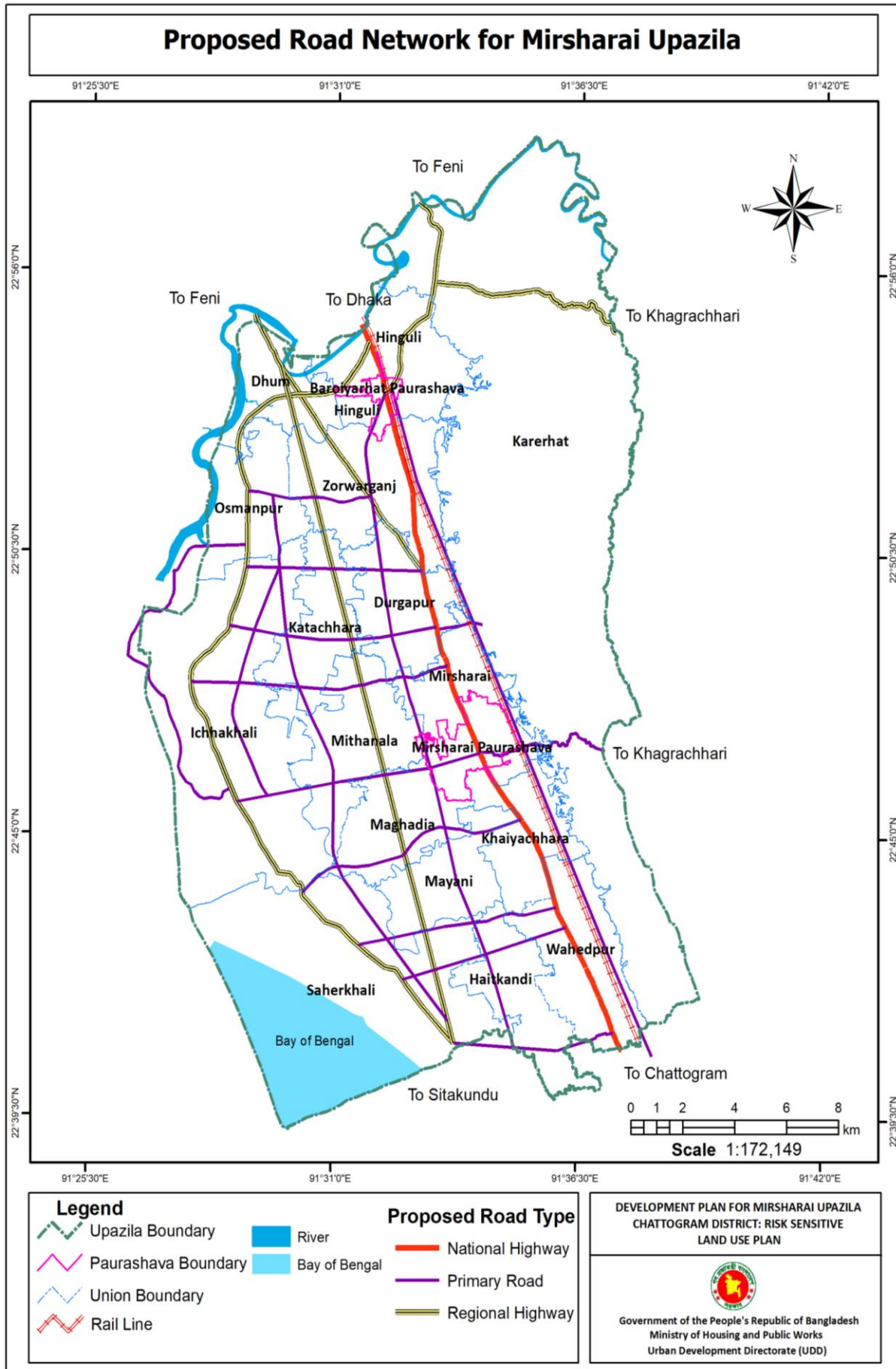
Implementation Strategy

The width of the roads/right of ways for roads should be designed with required planning standards to accommodate the sidewalks and bicycle paths. Wider space around the intersection would be an advantage.

Implementing Agency

- Mirsharai Upazila Parishad, Paurashava, LGED

Map 8. 1: Proposed Road Network for Mirsharai Upazila



CHAPTER 09: WATER RESOURCE MANAGEMENT

9.1 Existing Conditions

Water resources play a vital role in the livelihood pattern of the local inhabitants with a complex set of relationships. The efficient management of this resource can promote the quality of life of the local people to a great extent. From an environmental point of view, it is necessary to preserve natural resources to ensure the better living condition of the Upazila.

People in Bangladesh have traditionally been dependent on surface water for their daily needs. Groundwater is also used as feasible for various purposes. The rural areas of Mirsharai Upazila suffer from a lack of quality drinking water. Surface water supplies are generally polluted and groundwater, which till now had been the best source of safe drinking water, is contaminated with arsenic, salinity in many parts of the Upazila. Heavy withdrawals of groundwater have also lowered the water table in many areas below the effective reach of hand tube-wells.

9.2 Policy Recommendations

The following policies are suggested for natural water resource and environmental issues:

Policy WRM/1: Protection and preservation of wetland and natural water resources

Justification

Loss of wetland and natural course may cause a loss of biodiversity and natural environment. Filling up and encroachment of natural watercourses would result in drainage congestion and waterlogging. To ensure natural water bodies and fish resources which are crucial to sustain the livelihood and to retain the eco-system

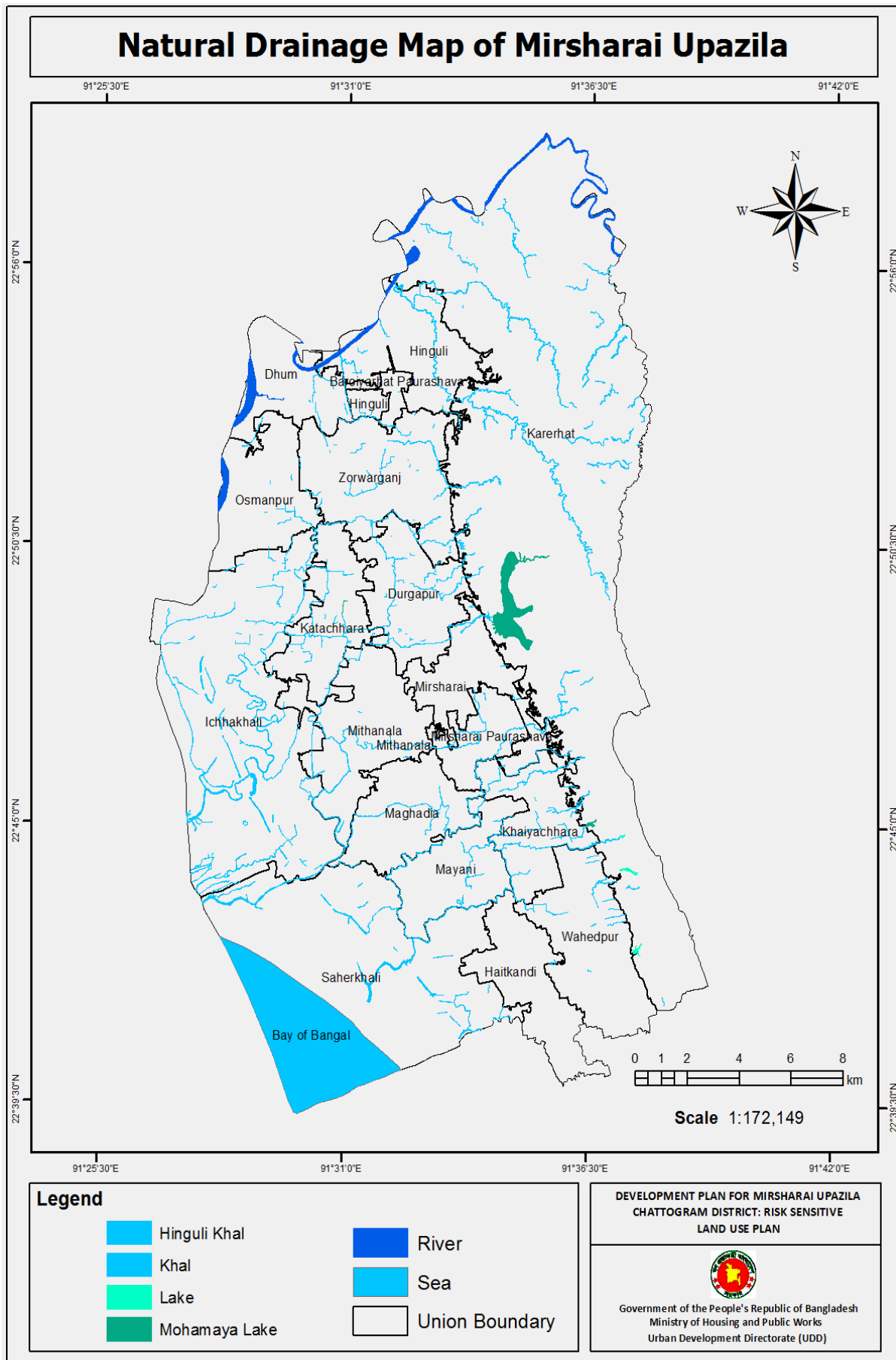
Strategies

Making the wetlands and natural watercourses as areas of conservation; taking up of projects for development and maintenance of wetland and natural watercourses, compulsory acquisition of land if necessary. To preserve the wetlands and ensure reasonable use, the stakeholders, especially the participation of the local population, must ensure the use of environmentally friendly water resources and the conservation of biodiversity.

Implementing Agencies

- Mirsharai Upazila Parishad, Paurashava, BWDB, Local Beneficiaries

Map 9. 1: Existing Natural Drainage Map of Mirsharai Upazila



Policy WRM/2: Necessary planning and management measures to be adopted for the preservation and enhancement of surface and groundwater quality

Justification

The source of groundwater and surface water has to be kept free from all sorts of pollution so that they can be used in the future.

Strategies

Proper implementation of policy related to sanitation and drainage will eventually resist the scope for polluting water from domestic waste and sewerage. The policy related to industrialization will resist the scope of pollution through industrial waste. Restrictions should be imposed on the discharge of untreated domestic and industrial sewage (liquid waste) into surface water sources.

Implementing Agency

- Mirsharai Upazila Parishad, Paurashava Authority, DoE

Policy WRM/3: Provide bank protection width along the river, khal and other natural streams

Justification

All existing watercourses, rivers, lakes, tanks should be protected. The boundary of water bodies and inundation might be determined as per the high tide level or high flood level. No construction should be permitted in water bodies' premises and the water spreads.

Strategies

The required bank protection width for individual lakes or natural streams should be determined based on the outcomes of a detailed river hydrodynamic and flooding analysis. However, in the absence of engineering analysis, the implementing agencies may preserve the following width or buffer distance measured from the bank position on each side of the natural stream.

- 50 m for the rivers.
- 10 m for other types of natural channels such as lakes, canals, creeks, etc.

Implementing Agencies

- The local government department and relevant national agencies should be involved in the implementation process of the policy.

Policy WRM/4: Surface water bodies (primarily rivers) should be used as major sources of drinkable water supply to residents to reduce dependence on groundwater

Justification

The major source of water supply in Mirsharai Upazila is groundwater extracted through tube-wells/deep tube-wells. Groundwater alone is not adequate to meet the increasing demand for

drinkable water. The rate of groundwater recharge is much lower than the rate of its extraction, which results in the lowering of the groundwater table.

Strategies

Rivers will be protected for the conservation of water and local technology for water treatment will be used for the supply of safe drinkable water. Proposal for surface water treatment plants can be considered and executed.

Implementing Agencies

- Mirsharai Upazila Parishad, Paurashava Authority, DPHE, NGOs

Policy WRM/5: Proper investigations on arsenic, salinity and iron contents of the groundwater are necessary, before installation water from any sources

Justification

Field kit data from the field survey suggest that the shallow aquifer is heavily contaminated with elevated arsenic concentration throughout the Upazila except in the extreme northern corner. However, the deep aquifer is largely low in arsenic concentration except for one or two locations.

Strategies

While searching new sources of water for supply to the citizens, it is necessary to have a proper investigation of these sources and also on the water quality. These investigations will help ensure the environmental consequences of new extractions and the quality of water.

Implementing Agencies

- Mirsharai Upazila Parishad, DPHE, NGOs, Local Beneficiaries

Policy WRM/6: Heavy withdrawal of groundwater should not implement in the Bangabandhu Sheikh Mujib Shilpanagar area

Justification

The aquifer condition in the Bangabandhu Sheikh Mujib Shilpanagar area is not suitable for heavy groundwater withdrawal required for the project. The shallow groundwater in this part of the Upazila is brackish while the deep groundwater is fresh and occurs in a thin confined aquifer below a thick and soft clay layer. Heavy pumping from that aquifer would cause the compression of the aquitard and result in land subsidence. Besides, there is a high risk of later intrusion of seawater from the adjacent sea.

Strategies

For the industrial use of water for the Bangabandhu Sheikh Mujib Shilpanagar authority should not depend on groundwater alone. Surface water as well as treated seawater use is to be executed for an alternative water source.

Implementing Agencies

- Bangabandhu Sheikh Mujib Shilpa Nagar (BSMSN) authority should be involved in implementing the policy.

Policy WRM/7: Detail investigation on the extent and yielding capacity of this artesian aquifer in the Mirsharai Upazila is recommended

Justification

The artesian condition exists in the Northeastern corner of Mirsharai Upazila. It could meet a part of the water demand in the project area with natural freshwater.

Strategies

To meet the excessive demand for drinking water for Bangabandhu Sheikh Mujib Shilpanagar employees it should be investigated details of the artesian aquifer that exists in the Mirsharai Upazila. Once investigated, a properly controlled way should be implemented for the use of this natural fresh and contaminant-free water for drinking purposes.

Implementing Agencies

- Local government department and Bangabandhu Sheikh Mujib Shilpanagar authority should be involved in implementing the policy.

Policy WRM/8: Proposed artificial reservoirs should be investigated in detail for the implementation of the newly proposed reservoir

Justification

These surface water sources should be able to meet a significant part of the total water demand in the Bangabandhu Sheikh Mujib Shilpanagar project as well as local irrigation demand.

Strategies

The potential storage sites can mitigate the impact of flash flooding, and reserve water for use to a certain extent. The proposed artificial reservoirs area should be investigated in detail for the implementation of reservoirs like Mohamaya.

Implementing Agencies

- DPHE, BWDB, and Bangabandhu Sheikh Mujib Shilpa Nagar (BSMSN) authority should be involved in implementing the policy.

Policy WRM/9: A feasibility study of Feni River for a water treatment plant should be assessed for the additional source of water

Justification

Feni River is the only big river in the Mirsharai Upazila which carries huge water round the year. The use of river water can meet a significant demand for water for industrial as well as drinking purposes.

Strategies

The detailed feasibility study should be done for the installation of a River water treatment plant for the use of the Bangabandhu Sheikh Mujib Shilpanagar area.

Implementing Agencies

- Local Government Department, BWDB, and Bangabandhu Sheikh Mujib Shilpanagar authority should be involved in implementing the policy.

Policy WRM/10: Feasibility of importing groundwater from adjacent Upazilas might be assessed for an additional option

Justification

Natural water whether it is groundwater or surface water cannot follow the administrative boundary of an area. That why adjacent areas like Feni Upazila, as well as Sitakundu Upazila, can be the alternative source of groundwater for the use in Bangabandhu Sheikh Mujib Shilpa Nagar (BSMSN).

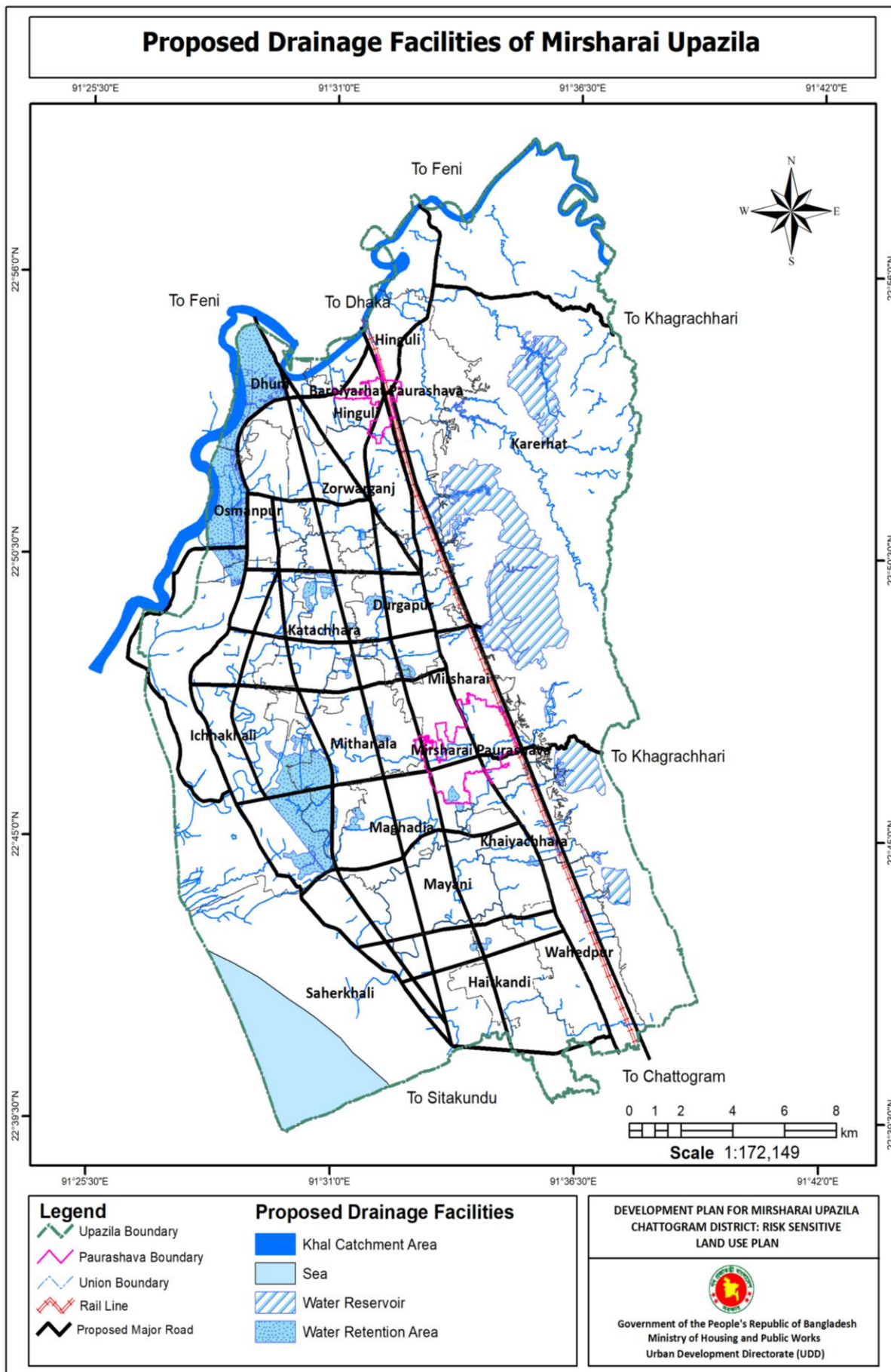
Strategies

A detailed feasibility study should be done for groundwater resources of adjacent Feni and Sitakundu Upazila which will be brought by pipeline to the Bangabandhu Sheikh Mujib Shilpanagar area.

Implementing Agencies

- Local Government Department, BWDB, and Bangabandhu Sheikh Mujib Shilpa Nagar (BSMSN) authority should be involved in implementing the policy.

Map 9. 2: Proposed Drainage Facilities of Mirsharai Upazila



CHAPTER 10: DISASTER MANAGEMENT

10.1 Existing Conditions

A natural disaster like floods caused extensive damage to lives and properties in both urban and rural areas of Mirsharai Upazila. Flood is the most common natural disaster at Upazila. It is observed that this Upazila has been suffering from the flash flood. An important feature of this Upazila is the hills and their valleys. Mirsharai Upazila is inundated by a flash flood of short duration and causes severe damages to crops and other assets.

The existing natural drainage system of Mirsharai Upazila is comprised of several khals and rivers. Among them, some of khals and rivers are also connected with the sea. The whole Upazila is being surrounded by rivers, khals, and sea. Merging all these rivers, khals, and natural channels generate a natural drainage network. This natural drainage network provides a unique landscape of water bodies, hilly area, paddy field, and rural setting. Nowadays, rivers and khals are being misused through encroachment and pollution. Besides, there are large numbers of missing links at the natural drainage network. On the other hand, secondary and tertiary drains are not sufficient in this Upazila; and those do exist not properly maintained.



Photograph 10. 1: Scenario of Flash Flood, 2018 in Mirsharai

10.2 Policy Recommendations

The following policies are suggested for flood control and drainage development measure:

Policy DM/1: Preparation of comprehensive risk sensitive land use plan

Justification

Risks can be mapped throughout a city to show the zones with different levels of risk. If risk maps are overlaid on land-use maps, patterns of land use can be correlated with susceptibility to disasters.

Strategies

To identify surface geology, foundation depth, building height recommendation area to make the Mirsharai Upazila resilient to some catastrophic events.

Implementing Agencies

- Local Government Agencies, Directorate of Disaster Management, Mirsharai Upazila Parishad

Policy DM/2: Protecting and maintaining the natural drainage system based on existing rivers and khals

Justification

Khals and rivers serve as the arteries of drainage in the Upazila. All the natural canals of the Mirsharai Upazila should be preserved for the natural flow of water, especially the rain and floodwater. The natural canals generally have anticipated slopes for the flow of water. This unique flow system cannot be established easily by a man-made drainage system. Besides, such human interference is expensive.

Strategies

All-natural canal within the Upazila area must be vested for maintenance and proper use as a drainage canal. Development of any kind will not be allowed to block the drainage paths for water.

Implementing Agencies

- The Water Development Board, Mirsharai Upazila Parishad, Paurashava authority

Policy DM/3: Developing hierarchical drainage system within the Upazila especially the urban area

Justification

The internal drainage system is important to save the future Mirsharai Upazila from possible waterlogging and flooding through the preservation of natural drainage and the creation of a new drainage network. Drainage hierarchy is required for smooth drainage of waste and stormwater into the final outfall. At present, drains are highly inadequate even in the urban area.

Strategies

Develop a drainage system following the natural slope of the ground as much as possible. A comprehensive network of the drainage system for the Upazila especially the urban area will be designed and implemented in the future.

Implementing Agencies

The Upazila Parishad with the cooperation of the respective Union Parishads and Paurashava authority will be responsible for drainage improvement in the Upazila. The Local Government Division of the Ministry of Local Government, Rural Development and Cooperatives will be supporting and monitoring the drainage development activities in the Paurashava and the Upazila Parishad.

Policy DM/4: Regular cleaning of the drainage system and excavation of khals

Justification

Regular cleaning of secondary and tertiary drains should be ensured so that they can collect sufficient volume of water and feed the primary drainage network otherwise they may create water logging during heavy rainfall. A huge amount of silt is carried by the stormwater during the flush flood which makes it a necessity for periodic excavation of natural khals.

Strategies

The local community can play a major role in cleaning up the drains next to their door and local government authority can initially periodical excavation of khals.

Implementing Agencies

- Mirsharai Upazila Parishad, Paurashava, Community Based Organizations (CBOs)

CHAPTER 11: SOCIAL AND COMMUNITY FACILITIES

11.1 Introduction

The quality of life in any area depends upon the availability of and accessibility to quality social infrastructure. Social amenities and community facilities include education facilities, health facilities, playgrounds, eidgah, graveyards, and community centers. For comfortable and healthy living, these facilities are the fundamentals.

11.2 Existing Scenario

Many existing educational institutions are quite old which require repair and/or need to be replaced including associated amenities. Socio-economic survey reveals that mainly primary and secondary education rate is high than university level. After the higher secondary level, the number of students has become lower. It indicates that the tendency to obtain higher education among people of the Upazila is low.

Socio-economic survey reveals that the maximum numbers of health care centers have no bed facilities and no permanent nurse. Besides, 45% of health care centers have only one permanent doctor and 20% health care centers have no permanent doctor. Besides, there are 14 family welfare centers, 7 union health centers, 3 private clinics, and one mother and child welfare center. Poor communities' especially ethnic groups are usually ignorant and less attentive towards general health. This affects their income and disrupts their family lives.

11.3 Future Plan and Direction

11.3.1 Educational Facilities

To revitalize local education facilities to reduce travel distance, the following are the policies to improve the education system in the project area.

Policy EDU/1: Ensure educational infrastructure to cover all over the Upazila

Educational institutions have been established in the project area either side by side or haphazardly. This is necessary to avoid long-distance travel to schools, which is cumbersome, costly, and sometimes risky for children.

Strategic Actions

The gaps in education facilities will be minimized through creating new schools equitably in all Unions within the Upazila. A sufficient number of educational institutions at various levels should be ensured based on the projected population and appropriate standards. A location suitability study

for the educational institution can be taken for new areas. Ministry of Education and Mirsharai Upazila authority will work jointly for managing and distributing the education facilities within the Upazila area.

Implementation Agency

- Ministry of Education, Mirsharai Upazila Parishad.

Policy EDU/2: Provision of the playground at every educational institution

Provisions of the playground and open space are very vital for proper educational environment and recreation as well. For ensuring proper physical and mental growths of the children, it is a must to ensure the provision of sufficient open space as a playground.

Strategic Actions

The concerned department should ensure the minimum amount of open space as a playground through official recognition to the educational institutions.

Implementation Agency

- Ministry of Education

Policy EDU/3: Provision of an educational institute for ethnic groups

In some areas of Mirsharai Upazila, there is a thin ethnic population. There are areas where no primary school exists.

Strategic Actions

Primary schools will be set up in these areas inhabited by ethnic people, both in hilly or plain lands. Special assistance will be provided to the marginalized indigenous children.

Implementation Agency

- Ministry of Education, Mirsharai Upazila Parishad, Paurashava, NGOs.

Policy EDU/4: Ensure technical and vocational training institutions at the Upazila level

A strategy to achieve nearly full employment must ensure that all new entrants to the workforce are trained to develop their knowledge, skill, and creativity. When the economic zone will be fully operational more employment opportunities will be created which will require more manpower that is skilled.

Strategic Actions

Different types of vocational training could be planned, including those in emerging trades such as accounting and financial services, graphics and textile design, computer animation, etc. The private sector will be encouraged to establish quality vocational and technical institutions.

Implementation Agency

- Technical Education Directorate, Mirsharai Upazila Parishad, Paurashava

11.3.2 Health Care Facilities

Alongside education, health is now universally regarded as an important index of human development. Better health is essential not only for physical well-being but also for economic livelihood. The government's vision for the health sector is as follows: "The Government seeks to create conditions whereby the people of Bangladesh have the opportunity to reach and maintain the highest attainable level of health". The main objective is to provide health care facilities in all parts of Mirsharai Upazila. The following are the policies to improve health care facilities in the project area.

Policy HCF/1: Provision of a community clinic in each union

Health services are equally important and are required by the rich and poor. There are gaps in the provision of health facilities in urban and rural areas. Such a universal need requires special attention to formulate an appropriate health policy that can satisfy the needs of all strata of the population in the society. Among the critical issues that inhibit progress in maternal and child health, delivery at home, often with unqualified birth attendants, is a major concern.

Strategic Actions

Select potential locations through extensive consultation with local government agencies. Ministry of Health and Family Welfare (MoHFW) should take up the project to provide at least one community clinic including maternity and child care facilities in each union within the project area.

Implementation Agency

- Ministry of Health and Family Welfare, Local Government Agencies

11.3.3 Community Facilities

For comfortable and healthy living, the following are the policies to improve community facilities in the project area.

Policy CF/1: Use playgrounds as eidgah

Most educational institutes have their playgrounds. If these playgrounds are used as Eidgah, no new Eidgah grounds will be required separately.

Strategic Actions

Playgrounds can be used as Eidgah.

Implementation Agency

Ministry of Religious Affairs, Mirsharai Upazila Parishad, Local Beneficiaries

Policy CF/2: Ensure community-based graveyard/cremation ground

Community-based graveyards and cremation grounds are inadequate. There is no arrangement of community-based graveyards. As a result, people buried dead bodies beside the homestead which reduces the usefulness of the habitat.

Strategic Actions

Mirsharai Upazila Parishad with the help of local beneficiaries can ensure community-based graveyards. Graveyards should be provided neighborhood wise.

Implementation Agency

- Mirsharai Upazila Parishad, Paurashava, Local Beneficiaries.

CHAPTER 12: URBAN UTILITY SERVICES

12.1 Introduction

Utility services are the most essential part of sustainable urban development. To make a livable urban center, there must be a provision of sufficient utility services. Provision of sufficient utility services, such as water supply, sewerage, and sanitation, drainage, electricity supply, gas supply, solid waste management in urban centers, and their proper maintenance have major contributions in sustainable and environmentally sound development. Except for the electricity supply, the rest are the responsibilities of the Paurashava.

12.2 Existing Scenario

According to the Socio-economic survey, most of the families have their tube well or common tube well for drinking water purposes. There is few piped waters for domestic purposes that are not served for the community level. The majority percentage of water sources (85.9%) belong to the Tube well and 5.2% belong to the common tube well. Only 2.8% of water sources belong to the pipeline. Field survey reveals that among all the water sources 88.8% of water is drinkable, 9% of sources are Arsenic Contaminated, and the rest of the sources (2.1%) is not drinkable.

Solid waste generation due to different activities is a common phenomenon in any urban area. Solid wastes generated from urban dwellers can be a cause of degradation of the environment if not properly managed. Collection and management of solid waste is a great challenge for the Paurashava authority. This is a common practice to dump household waste in adjacent low-lying vacant lands alongside almost all the households. From the socio-economic survey, it has been observed that both Mirsharai and Baroiarhat Paurashava maintain a solid waste management system. In Baroiarhat Paurashava, there are two waste dumping stations and 131 dustbins. Baroiarhat Paurashava authority provides one garbage truck, three trucks, and six vans to collect waste from the household and the Bazar area. On the other hand, there are 150 dustbins and one solid waste dumping station in Mirsharai Paurashava. Mirsharai Paurashava authority provides two garbage trucks and four vans to collect waste from the household and the Bazar area.

Electricity is an important issue for urban growth and development. Commercial and Industrial activities are consuming the lion share of electricity which is likely to increase considerably. Electricity in Mirsharai is provided by the Power Development Board (PDB) and Rural Electrification Board (REB). The socio-economic survey reveals that the project area is almost covered by the electricity network. However, electricity supply in the Upazila is characterized by load shedding and voltage instabilities. Around 91.2% of families are under electricity coverage. Only 5.5% of families use a solar panel for their energy source and 3.3% family use Kupi/Bati/Harican for their source of light.

From the socio-economic survey, it has been observed that the majority percentage (82.5%) of the family is used wood for their cooking purpose. Only 13.1% family are used cylinder gas as their fuel source and 3.1% family are used pipeline gas supply. A recent policy of the government prohibits the supply of gas for domestic purposes due to a shortage of gas availability.

12.3 Future Plan and Direction

12.3.1 Water Supply

Water supply is the responsibility of the urban local government. Considering the need for healthy urban living following policies are set to ensure sustainable and safe potable water supply for all.

Policy WAT/1: Promote the development of water supply based on surface water

The existing water supply system has got a very poor scenario in terms of demand and supply. Currently, groundwater is the main source of water supply in all over the urban area.

Strategic Actions

Possibilities may be discovered for the collection of surface water from rivers or other water bodies during monsoon season. The surface water treatment plant may be conceived and executed.

Implementation Agency

- Baroiarhat Paurashava, Mirsharai Paurashava, DPHE, Donor, NGOs.

Policy WAT/2: Encourage the harvesting of rainwater

Harvesting of rainwater may be applied to maximize rainwater use to meet the increasing household demand for water. However, this has to be popularized by drawing up motivation programs.

Strategic Actions

Local government authorities can start a campaign to popularize the use of rainwater for drinking purposes. A mandatory rainwater harvesting system may be included as a condition for approval of a high-rise building plan.

Implementation Agency

- Baroiarhat Paurashava, Mirsharai Paurashava, NGOs.

12.3.2 Sanitation

To make sure better health of the future city dwellers there is a need to provide affordable hygienic sanitation for the future city population. The following are the policy proposals to improve future sanitation.

Policy SAN/1: Promote adequate hygienic public toilet facilities throughout the busy areas of the urban center

The deficiency of a well-distributed and adequate number of public toilet facilities is a major reason for the public nuisance created by people in public places. Adequate public toilet facilities are necessary at places where people gather such as bus terminal, railway stations, launch/boat ghat, parks, local Bazar area, and other public places.

Strategic Actions

Paurashava authority should provide more public toilet service in different public areas on a priority basis. The Public-Private-NGO partnership approach may be explored for the development and maintenance of public toilet facilities.

Implementation Agency

- Baroiarhat Paurashava, Mirsharai Paurashava, DPHE, PPP, CBOs, NGOs.

Policy SAN/2: Provide affordable and hygienic sanitation for the lower-income people

The lower-income people are the most vulnerable to diseases caused by unhygienic sanitation. Construction and installation of an adequate number of low-cost pit latrines will provide access to lower-income people to hygienic sanitation. According to the Socio-economic survey, among the surveyed respondents 17% said that latrines are not hygienic.

Strategic Actions

Local government agencies incorporation with donor agencies can initiate affordable and hygienic low-cost sanitation projects for low-income people. The Department of Public Health and Engineering (DPHE) have long been working for this service. The DPHE experience can be utilized for hygiene and sanitation.

Implementation Agency

- Baroiarhat Paurashava, Mirsharai Paurashava, DPHE, NGOs.

12.3.3 Solid Waste Management

Considering the rapid growth of urbanization and insufficient waste services, the need for improved solid waste management following policies are set to develop a solid waste management system.

Policy SWM/1: Introduction of the community-based waste collection system

Many urban areas in Bangladesh have experiences of collective solid waste collection. The involvement of local people and private sector bodies in waste management can ensure more effective waste management as they are the beneficiaries and reduce the responsibility of the Paurashava authority.

Strategic Actions

The total local waste collection system from households can be done by CBOs and the private sector. The local authorities in collaboration with local people can take initiatives to arrange CBOs. The private sector may come up with recycling of waste locally to make the waste collection a profitable business. The local authorities should act as the facilitator or promoter of the community-based waste management system.

Implementation Agency

- Baroiarhat Paurashava, Mirsharai Paurashava, CBOs, NGOs.

Policy SWM/2: Generate innovative ideas to convert waste into a resource

Proper management of disposal solid waste can be turned into resources. By recycling, waste can be extended the life of a disposal site. If waste can be reduced at the source, the task of management and disposal will be little.

Strategic Actions

Adopt the most usable waste minimization 3R approach (Reduce, Reuse, and Recycle). Popularize the 3R approach among the local people. A controlled dumping or sanitary landfill system should be introduced for handling a large volume of solid waste to be generated in the future. Recycling plants may be set up in dumping sites or collection centers if space is available. Introduce more recycling programs, more publicity for recycling, and recognition for recycling efforts. The private sector may be involved by offering financial and technological support for recycling waste to recover resources.

Implementation Agency

- Baroiarhat Paurashava, Mirsharai Paurashava, Private Sector, Donors, NGOs.

Policy SWM/3: Provision of solid waste collection point and waste disposal ground in a suitable location

Improper management of solid waste might turn into a major problem to manage the final disposal of waste—collection, transportation, and disposal sites apart from a health problem. Due to a lack of space for their placement, the collection point bins are usually placed right on the road.

Strategic Actions

Select the strategic location of solid waste collection point with a measure to prevent public nuisance. Action Area Plan should point out appropriate locations for waste collection points and waste dumping ground. A controlled dumping or sanitary landfill should be introduced for handling a large volume of solid waste to be generated in the future.

Implementation Agency

- Baroiarhat Paurashava, Mirsharai Paurashava, DoE, Donor, NGOs.

Policy SWM/4: Ensure effective management and disposal of medical waste

Medical waste is one of the most harmful wastes. Medical wastes carry germs of a multiplicity of diseases. Therefore, they should be treated very carefully to avoid any contamination and threat to public health.

Strategic Actions

Local government agencies' conservancy departments should have separate sections to handle medical waste. Measures should be taken to establish a sufficient number of incinerators at suitable locations. Provide necessary logistics and vehicles to manage medical waste.

Implementation Agency

- Baroiarhat Paurashava, Mirsharai Paurashava, DoE, Private Sector, Donor, NGOs.

12.3.4 Electric Supply

Electricity supply is a national issue, so it will be solved on a national basis. In the Chattogram region, Bangladesh's government has planned to build the Mirsharai area as the largest Economic Zone of Bangladesh. The development of this economic zone is expected to cause very high electricity demand. The entire distribution system in Mirsharai area has been planned at 33kV. As these are Industrial loads, i.e. concentrated high load in small places, 230/33kV substation shall be established at Mirsharai in a separate project for power supply. This 230/33kV substation at Mirsharai economic

zone will initially be connected to Bangladesh Steel Re-rolling Mills (BSRM) 230kV system in the separate project through a 400kV D/c line which will be initially charged at 230kV¹.

To enhance the power supply capability of the Mirsharai Economic Zone, the Mirsharai 230kV substation will be upgraded to higher capacity viz. 400kV level and will directly be connected to Karerhat substation through the extension of Mirsharai – BSRM 400kV line up to Karerhat substation, for secure and reliable power transfer to industrial loads. In the future, few more 230kV substations within and around this economic zone are also expected to be fed directly from 230kV bus of Mirsharai 400/230kV substation¹.

Policy ES/1: Promote alternative source of energy like a solar panel, biogas

Because of new renewable energy or energy efficiency, alternative sources of energy must be searched.

Strategic Actions

Take up programs and projects for research and innovation on alternative energy. Alternative sources of power like solar energy, biogas plants, etc. should be patronized and encouraged. Promote energy conservation through the efficient use of energy in the industrial, building, transport, and consumer sectors. Compulsory solar panels for public advertising, lighting in open areas, public utilities, streets, etc.

Implementation Agency

- Baroiarhat Paurashava, Mirsharai Paurashava, PDB, REB, Private Sector.

12.3.5 Gas Supply

Gas supply will proceed as per the national gas distributor's plans and programs. It is suggested to ensure priority supply in industrial and residential areas. Moreover, extensive use of biogas plant can supply a significant amount of gas supply needed for cooking.

¹ Feasibility Report: Enhancement and Strengthening of Power Network in Eastern Region of Power Grid Company of Bangladesh, 2017

CHAPTER 13: TOURISM AND RECREATION FACILITIES

13.1 Introduction

Tourism has considered the world's largest and rapidly growing industry in the modern business world. It has a vital influence on the economic development of a country. Many countries are now dependent on the tourism sector for foreign currency earnings. However, Bangladesh is still lagging. In the tourism sector with complete planning and establishment of easy accessibility, Mirsharai Upazila can be a great tourist attraction. Mirsharai is blessed with an abundance of natural resources and scenic beauties having hilly forest areas, hill streams, and waterfalls of Chattogram Hill Tracts on one side and the Bay of Bengal on the other. However, lack of infrastructure, security, and quality food creates a barrier to flourishing the sector.

Open space and recreational facilities are very important breathing places for residents and deserve special attention to allocate land use accordingly. Recreational facilities like Playground, Community Parks, Sports facilities, Cinema Hall, Theater, Shishu Park, and Picnic spot, etc. are included in this category. The recreation facility is important for health and environment friendly living in both urban and rural areas.

13.2 Existing Condition

Tourism in Mirsharai does not play an important role in the economy of the country yet. Mirsharai Upazila has enough facilities for tourist attraction. Among the tourist destinations of Bangladesh, Mirsharai is considered to be the frequently visited destination by mainly the domestic tourists. Climatically Mirsharai Upazila is very pleasant with a unique tropical character. However, in recent years, Mirsharai experiences massive growth in tourism. Mirsharai is developing in an unplanned and haphazard manner very quickly due to the ample opportunity for tourism development, which is acting as a pull factor for private sector developers.

There are some recognized sites where the tourists are usually attracted in and around Mirsharai. In this Upazila, there are a huge number of other potential places that can be developed as sites for visitors. Mirsharai sea beach, hilly area, Mohamaya Chora Lake, Khoiya Chora, Baghbiani, Napitta Chora, Sonaichora, Mithachora, and Boyalia waterfalls have the greater potential for tourism development as there are plenty resources to attract tourists. Tourists started flocking these areas after the beauty of the waterfalls and the scenic trail that leads to the waterfalls inside the hills spread through social media in the last two years.

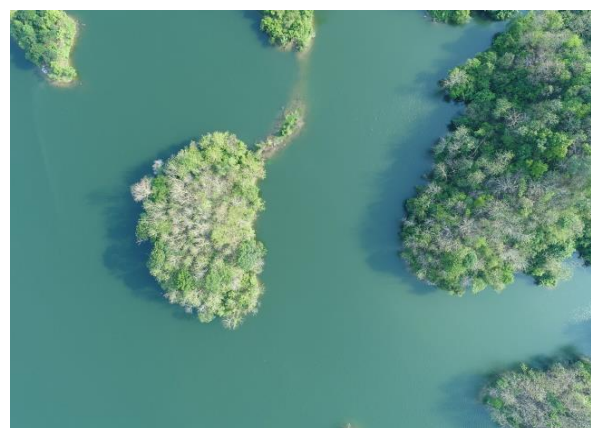
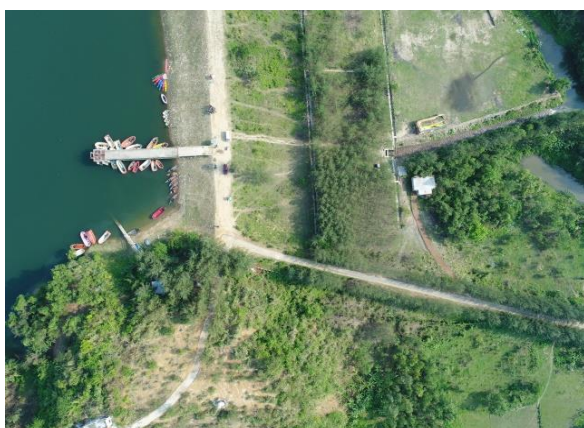
Khaiyachhara Waterfall: Khaiyachhara Waterfall is located 4.2 km east of the Dhaka-Chattogram highway on the north side of Barotakia Bazar of Khaiyachhara Union of Mirsharai Upazila. After going one-kilometer into the car/CNG, the rest will go on foot.



Photograph 13. 1: Khaiyachhara Waterfall

Napitta Chora Trail: Napitta Chora Trail is a three-story fountain. The names of three waterfalls are Kupukatakum, Mithachari, and Bandarakum, or Bandrichara. The corridor to the fountains is called the Napitta Chora Trail.

Mohamaya Lake: Mohamaya Lake, with an artificial lake of 11 sq. km. built-in the foothills of the hill, two kilometers east of Thakurdighi Bazar of Durgapur union of Mirsharai Upazila. There are tremendous mountain caves, rubber dams, and springs. The project is under the control of the Bangladesh Water Development Board (BWDB), to ensure the availability of irrigation water from the lake water and to undertake future hydroelectric projects.



Photograph 13. 2: Drone Survey Image of Mohamaya Lake

The Socio-economic Survey shows the most favorite destination for recreation is the local town/playing field/backyard, which is represented, 56.5% of respondents. Besides, 18.1% of residents chosen Mohamaya Lake, and 8.8% of residents chose Khaiyachhara/Napittachhara as their recreation site. Khaiyachhara waterfall and Mohamaya Lake are the very popular travel destination in Mirsharai.

13.3 Tourism and Recreation Facilities Related Policies

The following policy guidelines are formulated for the development of Tourism and Recreational Facilities in the Mirsharai Upazila.

Policy TRF/1: Development of tourism support services and infrastructure facilities

Justification

A large number of tourists come to Mirsharai every day, where hardly any facility to stay at night. Tourism infrastructure means the physical facilities such as transport and communication, infrastructure for sports tourism like the stadium, golf course, water parks, for accommodation good hotels and guest houses; for entertainment theatre, cultural center, and so on.

Implementation Strategy

Good hotel, Parjatan motel, frequent services, and tourism-related infrastructure is essential to be established. The tourist information center can be introduced for the tourist they can get information about their expected destination, transportation, and residing place, and other necessary information. Tourism-related support infrastructure such as taxi services, updated information on various aspects, souvenir production and marketing, public toilets, good restaurant and entertainment supports, friendly tourist guide, etc. are to be created for facilitating tourism.

Implementing Agency

- Mirsharai Upazila Parishad, Private Sector, Bangladesh Parjatan Corporation, Public Private Partnership (PPP)

Policy TRF/2: Establishment of ropeway transport from Mohamaya lake to Khaiyachhara waterfall alongside with railway track

Justification

To attract more tourists, a Cable railway can be set up between tourism spots Mohamaya Lake and Khaiyachhara Waterfall. A cable car is a mass transit system using rail cars that are hauled by a continuously moving cable running at a constant speed. There are at least 4-5 spots in the region where cable cars could open new doors in communication and tourism.

Implementing Agency

- Mirsharai Upazila Parishad, Public Private Partnership (PPP), Bangladesh Parjatan Corporation

Policy TRF/3: Promotion of local heritage-based tourism

Justification

Preservation of local heritage and culture in and around Mirsharai Upazila can help to promote tourism. They may include handicraft, culture, archaeological/historical site, places of religious importance, hilly area, etc.

Implementation Strategy

The places of historical/archaeological interest should be made reachable and welcoming to the tourists. Local heritage sites, archeological/historical sites, cultural and religious sites should be preserved and developed. Besides, the government should come forward to develop the infrastructure and transport sector.

Implementing Agency

- Mirsharai Upazila Parishad, Department of Archaeology, Department of Culture and Religious Affairs, NGOs

Policy TRF/4: Encouraging eco-tourism development

Justification

Conservation of eco-system in a hilly area and coastal zone and build up eco-tourism in the area based on the natural bio-diversity for tourism is required. Investments in the eco-tourism sector can be positive for environmental conservation. The natural sites at the Upazila level have the potential for such investments and development.

Implementation Strategy

Eco-tourism development prospects in the Upazila should be explored for investment in eco-tourism. Attractive natural sites will be identified and offered for eco-tourism development. Bangladesh Parjatan Corporation should take initiatives for eco-tourism development in Mirsharai, especially in the naturally and culturally rich area.

Implementation Agency

- Mirsharai Upazila Parishad, Bangladesh Parjatan Corporation, National Tourism Board, Public Private Partnership (PPP)

Policy TRF/5: Creation of waterfront facilities and green areas

Justification

To protect the river, khal and water body fronts from possible encroachment, and as well as to provide waterfront recreation facilities, areas on selected river/khal/water front's areas will be delineated for preservation as green space. Besides, these areas will be providing ecological balance.

Implementation Strategy

Feni Riverfront area developed should encourage khal protection and its ecology. These areas will be conserved as non – built-up areas where green spaces can be developed in different forms provided with attractive recreation facilities for site seers. Concerned agencies and local bodies are to cooperate and support the attainment of the policy objectives. Strict control should be exercised by the Upazila and Paurashava authority for not to use any such designated land for any other use.

Implementing Agency

- Mirsharai Upazila Parishad, Bangladesh Water Development Board (BWDB), Public Private Partnership (PPP)

CHAPTER 14: PUBLIC PARTICIPATIONS

14.1 Introduction

Peoples' participation is considered as the precondition of a sustainable development plan for any place. There are several purposes for people's participation in development planning and decision-making (Ahmed and Swapan, 2009). Decision-makers can learn about different problems or issues of a particular community through the involvement of the people of these local communities. This major objective of this participatory approach is to involve residents in finding their problems, needs, selecting priorities, and identifying strategies that are sustainable, feasible, and local people are willing to implement.

14.2 Public Participation in Planning

Local people are more aware of local problems than any outsider. Their participation is very much effective in decision making for the preparation of Development Plan at the local level. However local people do not have formal education on planning, but they have inherent knowledge about the local environmental system, which should be explored through the assessment of people's opinions.

14.3 Participatory Rapid Appraisal (PRA)

Participatory Rapid Appraisal (PRA) is an approach used to incorporate the knowledge and opinions of people in the planning and management of development projects and programs. In recent years, there has been a rapid expansion of new participatory reflection and action methods (PRA) and related approaches in the context of development and research. PRA methods are now increasingly used in both rural and urban situations. The main objective of the Participatory Rural Appraisal (PRA) workshops is to get local people's experiences, views, and insights into the local development planning process.

In many government and non-government institutions, extractive research is being superseded by investigation and analysis by local people themselves. Methods are being used not just for local people to inform outsiders, but also for people's analysis of their conditions. This is particularly important in community approaches to livelihood improvement and natural resource management.

14.3.1 PRA Methodology

Participatory Rural Appraisal (PRA) is an approach that incorporates methods to gather ideas about any place through the local people. It can enable local folks to share, enhance, and analyze their knowledge for incorporating in designing, planning, and formulating effective implementation strategies for the development of the locality. To conduct PRA four technics are followed and these are Social Mapping, Preparing Venn Diagram, Listing of Problems, and Participatory Modeling Method.

The following steps are undertaken in preparing the final output. The steps are:

- ✓ Step-1: Division of Union/Paurashava

- ✓ Step-2: Listing of Problems
- ✓ Step-3: Category of problems according to Terms of Reference (TOR)
- ✓ Step-4: Distribution of Weight to Problems
- ✓ Step-5: Scenario Drawn
- ✓ Step-6: Composite Scenario
- ✓ Step-7: Super Imposing the PRA output in Mauza Map

The final output and analysis would represent in the mauza map. This would help us to grasp the scenario in the real ground which would help the planning team of MUDP Project while planning. The Mirsharai Upazila Development Plan (MUDP) Project is covers of 16 Unions and 2 Paurashava (Mirsharai Paurashava and Baroiarhat Paurashava) of Mirsharai Upazila, Chattogram District. Total of 720 nos. participants participated in 48 PRA sessions, these participants were allowed to brainstorm the problems, and they prepared a list of problems. Table 14. 1 presents an overview of participatory methods that have been applied in different urban and rural settlements of Mirsharai Upazila Development project.

Table 14. 1: PRA Sessions in Different Sectors

Serial No.	Type of PRA	No. of PRA Sessions
1	Baroiarhat Paurashava (Urban PRA)	10
2	Mirsharai Paurashava (Urban PRA)	10
3	16 Union Parishads (Rural PRA)	16
4	Spontaneous PRA	04
5	Senior Citizen	01
6	Youth Society	01
7	Tribal	01
8	Agriculture PRA	03
9	Others Stakeholders	02
Total		48

Source: PRA Survey, 2018



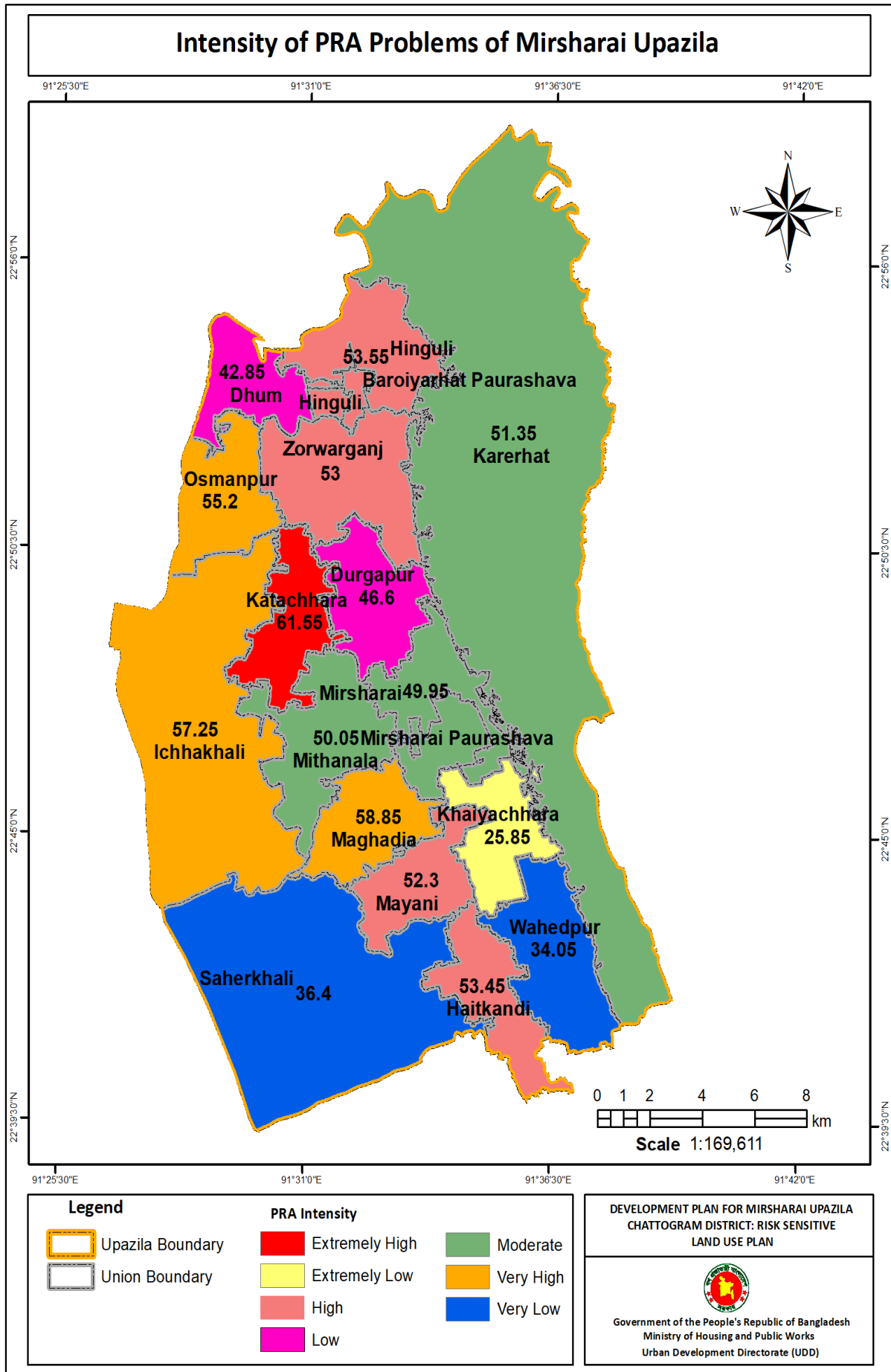
Photograph 14. 1: PRA Session with Women Participant

14.3.2 Scenario of the Project Area

It is evident from the PRA output that all the unions and Paurashava have individual problems. Prioritization of these problems also varies from union to union. Problems priority, frequency, and prospects after the solution of the problem were considered while giving weight. However, this was not so easy because the rate of priority and the type of problem was unique for each union. That is why the opinion of the different professional bodies of UDD such as Planner, Geographer, Sociologist, and Researcher was considered while giving weight. From all these sitting it was decided that severe problems will get more weight. That means the height weight is given to that problem which needs more attention. Finally, it stands that the high value is the mark of a worse condition.

The analysis identifies that from all the unions Katachhara Union is the most deprived union and is in worse condition followed by Ichhakhali and Maghadia Union. Khaiyachhara Union has the best condition among these unions so we should take necessary steps according to these data and immediate necessary steps are recommended for Katachhara Union. The scenario of the whole project area is presented in Map 14. 1.

Map 14. 1: Intensity of PRA Problems in Mirsharai Upazila



14.4 Participation of Young Generation

To achieve SDG-11 emphasizes the participation and management of all in human settlement planning. The main purpose of the PRA system is to ensure good governance through the participation of the people at all levels in the land use planning.

At present, out of the total labor force of Mirsharai Upazila, the youth percentage is 28.6%. If the opinion of this large youth group is not included in the plan, they will not be interested in implementing the plan. The main objective of the National Youth Development Program is to adopt effective programs to ensure the participation of the youth in national development. Therefore, the participation of youth society (University Students of Association of Mirsharai- USAM) of Mirsharai Upazila has been ensured in the preparation of the Development Plan for Mirsharai Upazila.

According to government directives, effective use of Facebook has been ensured in public awareness and publicity in the development plan, public participation in the policymaking process, and in formulating new innovative work.



Photograph 14. 2: PRA Session with University Student Association of Mirsharai (USAM)



Photograph 14. 3: Art Competition under this Project at Mirsharai Upazila

14.5 Conclusion

PRA is a flexible tool that was used to ensure the active participation of the stakeholders and also to ensure their involvement in the implementation of the Development Plan. This exercise has given an ample opportunity to the planners of the MUDP project to work directly with the grass root people and prepare a people-oriented demand-driven land use plan as well. The MUDP project personnel are highly optimistic regarding the effectiveness of not only the plan preparation process but also the successful implementation of the plan. The data that were derived from the PRA sessions will be used at different stages of the plan preparation. It helps to reduce the gap between the project management team and the beneficiaries and also to negotiate with the people who might be affected during the implementation of the Development Plan.

CHAPTER 15: STRUCTURE PLAN

15.1 Introduction

The Structure Plan is an indicative plan which can be used as a guiding framework of the whole Development Plan package. It is presented in maps and explanatory text that indicates a broad scale of urban and rural growth of the project area. It is mainly the long-term strategic plan for the Upazila.

15.2 Objectives of the Structure Plan Area

The main objectives of the Structure Plan are to explain the strategy and the development policies to create the framework for the future development of Mirsharai Upazila. It will serve as a framework for the future development of the Structure Plan area. The Structure Plan has the following objectives:

- To demarcate the future growth areas and set a strategy for the future development of Mirsharai Upazila;
- Formulation and integration of different sectoral strategies for the Upazila;
- To provide a basis for coordinating decision, development action within the urban area;
- To identify the suitable land for the future development of the project area;
- Identification of urban growth area based on analysis of patterns and trends of development, and projection of population, land use, and economic activities for the next 20 years.

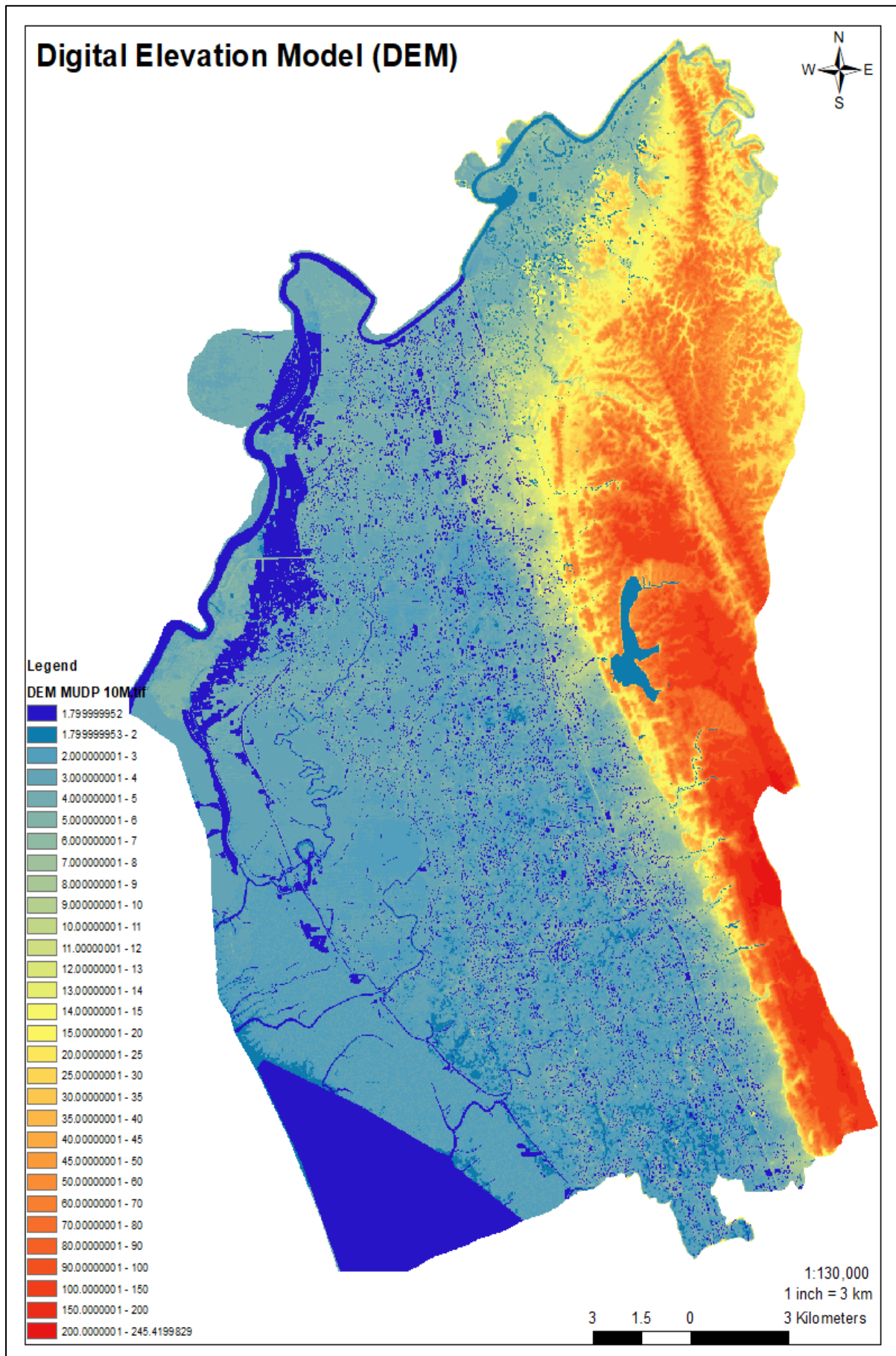
15.3 Formulation of Thematic Maps

During the survey period, different types of surveys had conducted. Each survey has a separate output. These outputs are presented in the form of thematic maps.

15.3.1 Digital Elevation Model (DEM)

DEM refers to the digital representation of topography that creates cell-based with a single elevation representing the entire area of the cell. In a word, a digital elevation model (DEM) is a digital file consisting of terrain elevations for ground positions at regularly spaced horizontal intervals. Digital Elevation Model (DEM) of Mirsharai Upazila is presented in Map 15. 1.

Map 15. 1: Digital Elevation Model (DEM) of Mirsharai Upazila



15.3.2 Cropping Pattern

The existing land use of this Upazila depicted that most of its land is occupied by agricultural use. Through consultation with the Sub-Assistant Agriculture Officer (SAO) of Mirsharai Upazila, the cropping pattern of Mirsharai Upazila has been determined. From the consultation, it has been found that there is single cropping, double cropping, triple cropping land, and other land use which comprises 5.98%, 39.88%, and 54.14% of total agriculture area respectively. Summary of the cropping pattern of Mirsharai Upazila appears in Table 15. 1.

Table 15. 1: Cropping Pattern of Mirsharai Upazila

Cropping Pattern	Area (Acre)	Percentage (%)
Single Crop	320	5.98
Double Crop	2134	39.88
Triple Crop	2897	54.14
Total	5351	100.00

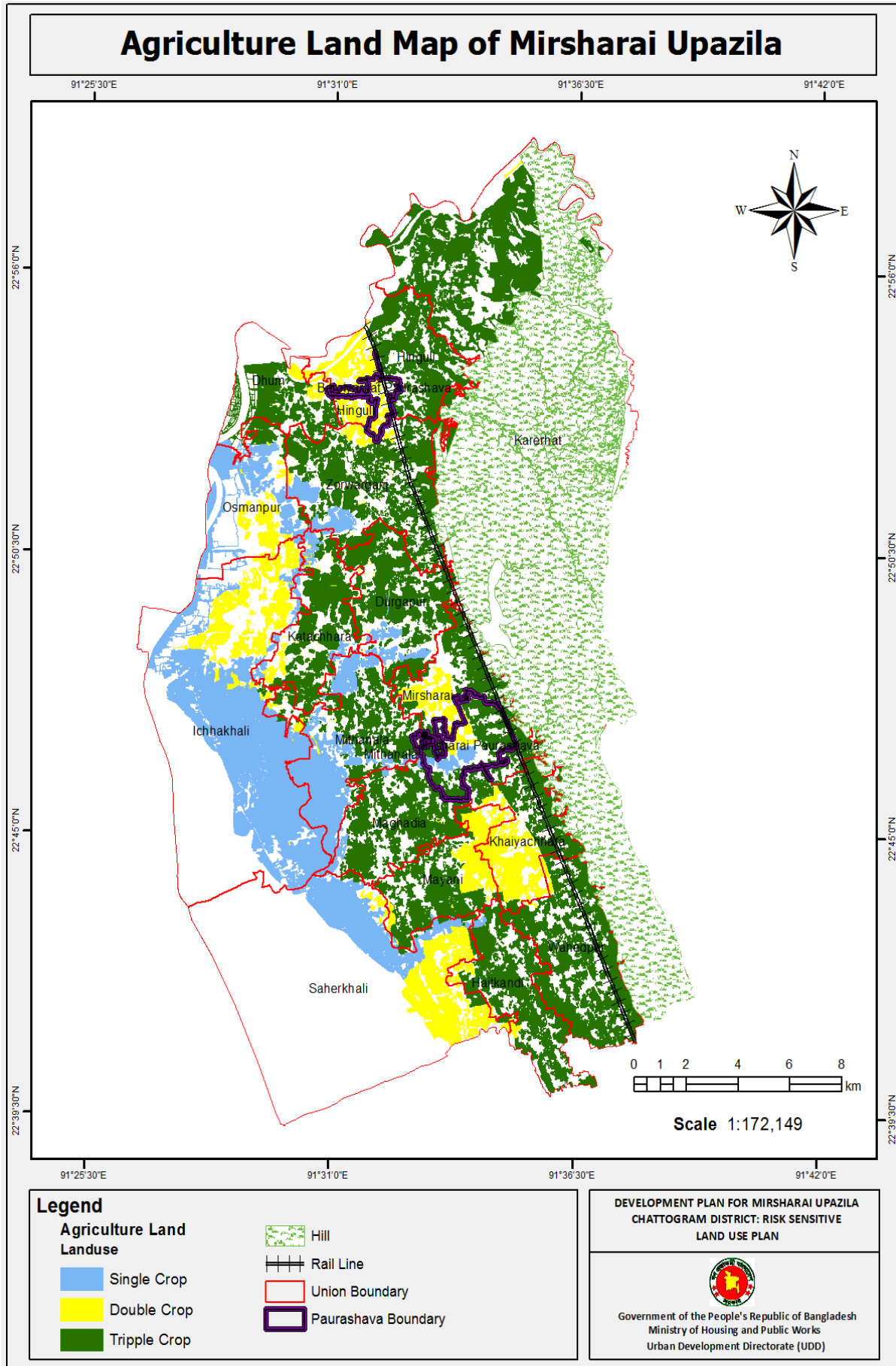
Source: Field Survey, 2019

15.3.3 Groundwater Quality

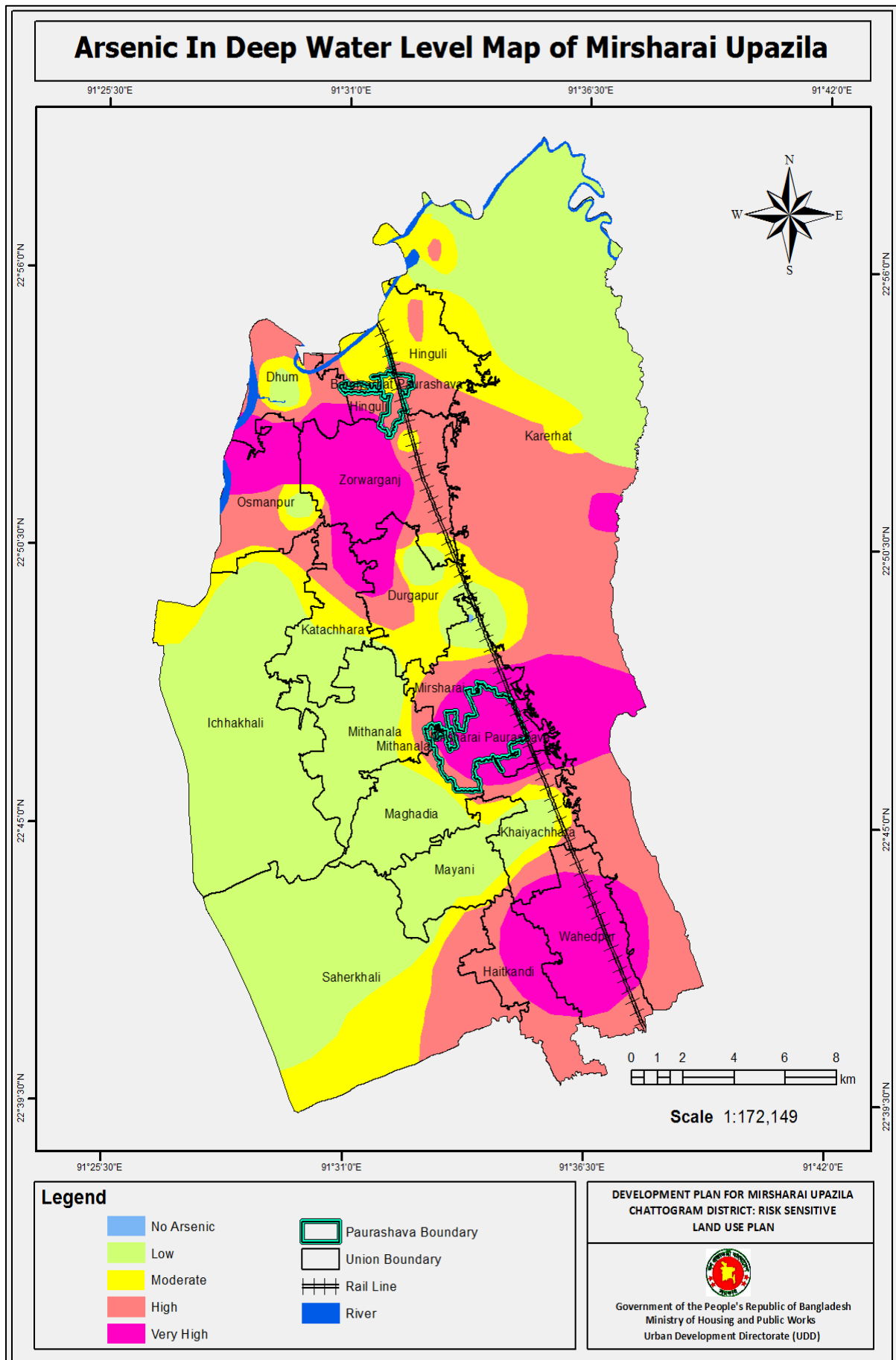
Arsenic

Field kit measured arsenic concentration in several wells distributed within the project area. Field kit data suggest that the shallow aquifer is heavily contaminated with elevated arsenic concentration throughout the Upazila except in the extreme northern corner. However, the deep aquifer is largely low in arsenic concentration except for one or two locations. In these locations, it is highly likely that the sampled wells are shallower than reported; depth verification is required before making any conclusion on the arsenic contamination of the deep aquifer in the study area. Moreover, field kits only indicate the likelihood of contaminated wells. Without laboratory analysis, confirmation about the arsenic status for the deep aquifer where only a few samples show marginally high concentration would not be accurate. Arsenic in Deep Water Level of Mirsharai Upazila is presented in Map 15. 3.

Map 15. 2: Cropping Pattern of Mirsharai Upazila



Map 15. 3: Arsenic in Deep Water Level of Mirsharai Upazila



Salinity

The EC contour at the shallow aquifer aligns perfectly with the orientation of the Sandwip channel, indicating that the channel is well connected with the shallow aquifer in this region resulting in the intrusion of saline water from the channel to the shallow aquifer (Map 15. 4).

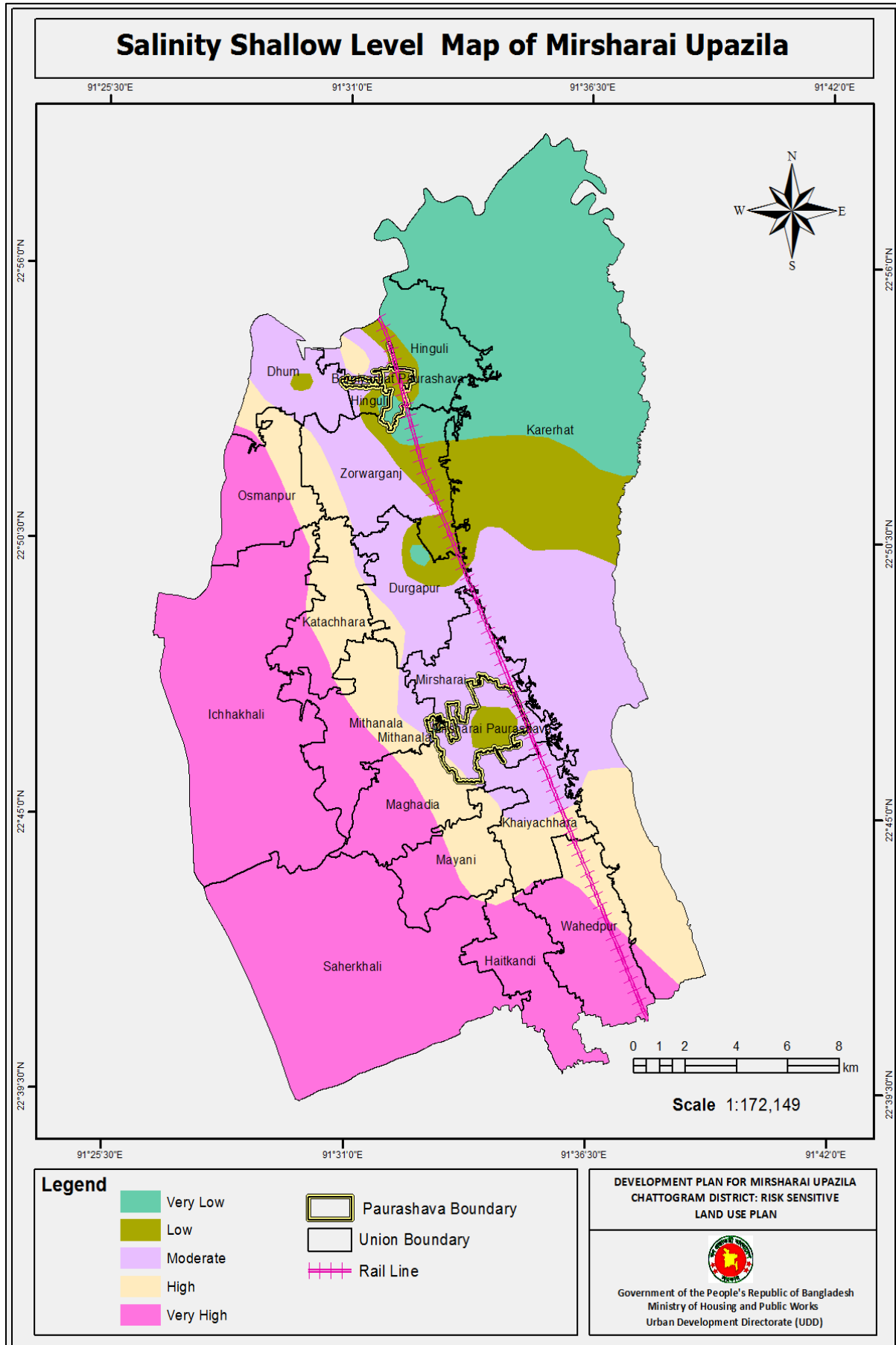
Groundwater Recharge Area

Map 15. 5 shows the distribution of the model-simulated recharge rate in the study area. The high recharge rate in the north is readily evident. However, the figure also indicates a high recharge rate along the western boundary near the rivers and the elevated eastern boundary. The high recharge rates along the western boundary are due to its location near a river, water infiltrates into the shallow subsurface and quickly discharges off into the nearby river. This recharge does not penetrate deeper into the aquifer. Similarly, due to the presence of thick aquitard below the shallow aquifer along the eastern boundary, recharge along with these elevated areas only adds water to the shallow aquifer. In contrast, since all three aquifers are connected in the north and there is now aquitard present in between them, recharge in this region adds water to all three aquifers. The deep aquifer which provides suitable drinking water throughout the upazila is primarily recharged in the north. Additionally, the deep aquifer could also be recharged regionally in areas farther north. Flow into the deep aquifer from the constant head boundary in the northwest would indicate this.

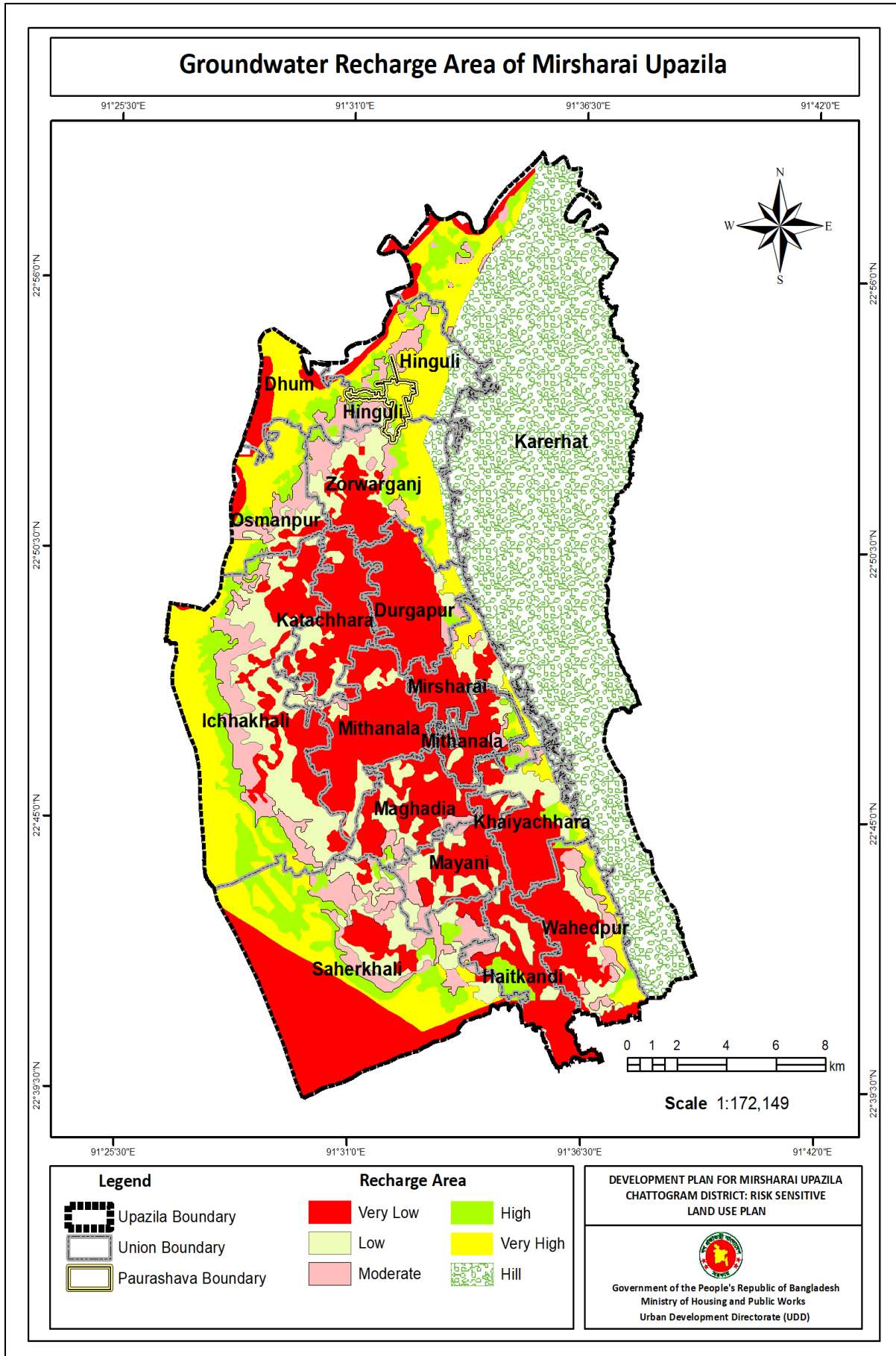
15.3.4 Surface Geology

Geology focuses on the nature and properties of rocks and sediments. Good knowledge of the geology of the rocks and sediments is indispensable to understand the nature and properties of the parent materials. It is essential to understand the processes of the formation of major soils of the country. Geomorphological knowledge is also important to visualize the processes and methods well. Bangladesh lies in an active seismic location. Moreover, being a riverine country, the sediments are much affected by the combination of river process and seismic activity. The rivers are the most significant features of Bangladesh geology. They constantly change course, sometimes so rapidly that it cannot be predicted. As a result, the topological features of Bangladesh are ever-changing and it gives a spectacular feature of Surface geology (Map 15. 6).

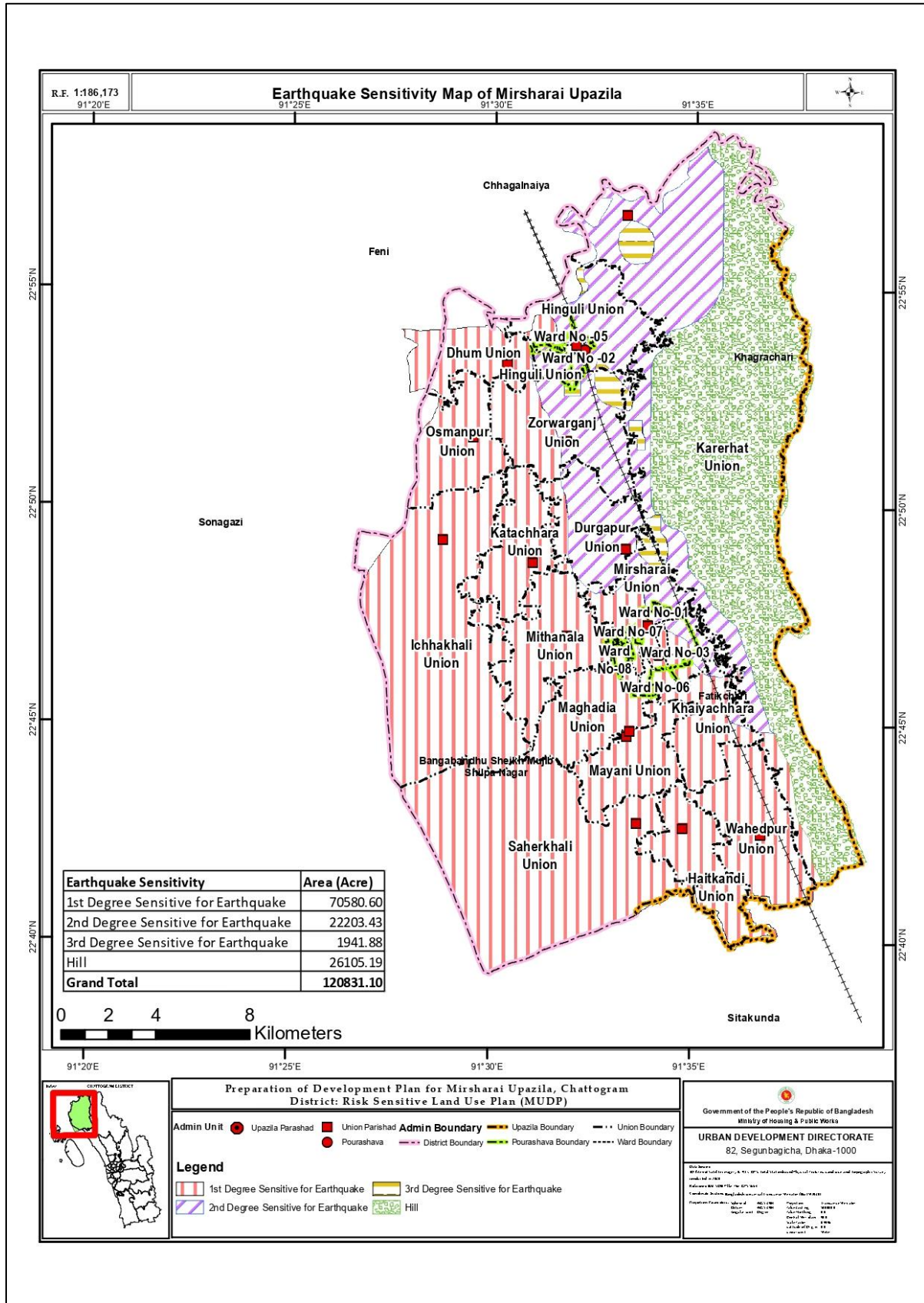
Map 15. 4: Salinity in Shallow Level of Mirsharai Upazila



Map 15. 5: Groundwater Recharge Area of Mirsharai Upazila



Map 15. 6: Earthquake Sensitivity Map of Mirsharai Upazila



15.3.5 Foundation Depth

Lithological succession encountered in the boreholes reveals that geologically the study area is very complex as the eastern part is a high terrace zone on the other hand western part is a flat land area that finally ended up in the bay of bangle. The bore logs encompass eight distinct lithofacies, denoted as layers1 to layer8 and each layer has distinct lithological characteristics and standard penetration test blow counts (SPT-N) as described in Figure 15. 1.

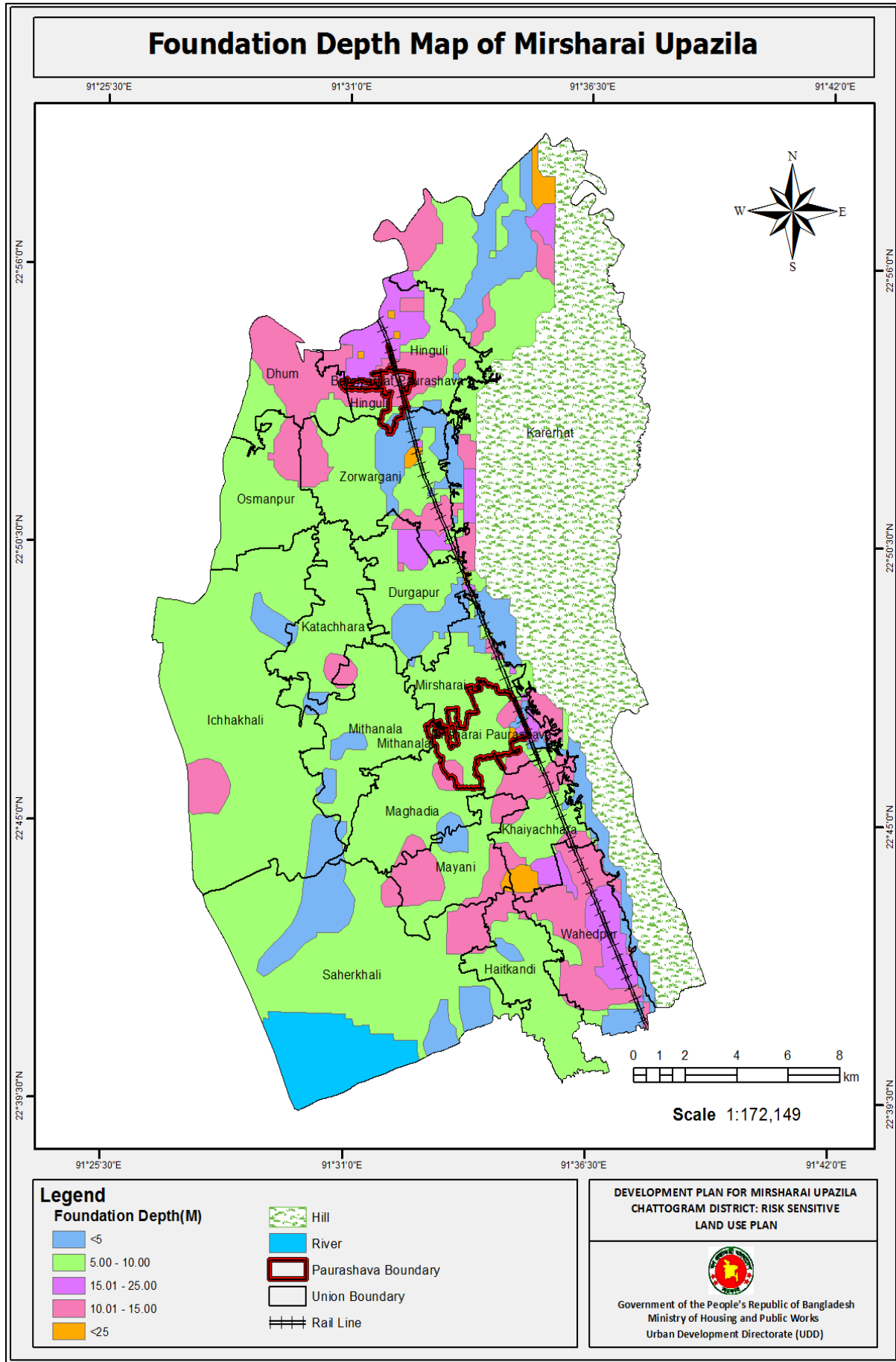


Figure 15. 1: Legend and Lithological Characteristic of Sub-surface of Mirsharai Upazila

All 85 boreholes of 30m depth were carefully examined to delineate the spatial distribution of the subsurface lithological units of the area. Among 8 layers; layer 1 to layer 5 is mostly present at the flat landed areas and layer 6 to layer 8 is mainly present at hilly regions of the study area.

Based on N-value (soil resistance) layer 3 and layer 5 consider as a foundation layer. Among them, layer 3 covers almost all areas of Mirsharai Upazila. The only the northern part of the Karerhat union and surrounding area reflect layer 5 as a foundation layer. The northern part of the Karerhat union, the central part of Zorwarganj, the South-eastern part of Durgapur and Wahedpur, Eastern part of Mirsharai and Khaiyachhara and South-western part of Mithanala union reflect shallow foundation depth (3m), which need to be verified with allowable bearing capacity. The foundation depth of the overall area of Mirsharai Upazila varies from 3m to 10m (Map 15. 7). Very few areas consider their foundation depth more than 10m.

Map 15. 7: Foundation Depth of Mirsharai Upazila



15.3.6 Soil Type

An important part of this study is the soil classification of the project area. The area has been investigated and classified according to a method provided by NEHRP (stands for National Earthquake Hazard Reduction Program, USA) Provisions. NEHRP Provisions describes; at first to define, the site class based on AVs30, and secondly to set the amplification factors by the selected site class, as shown in Table 15. 2.

Table 15. 2: Definition of Site Class Based on Vs30 - According to NEHRP (National Earthquake Hazard Reduction Program, USA) Provisions

Site Class	Site Class Description	Shear Wave Velocity (m/sec)	
		Minimum	Maximum
A	Hard Rock The Eastern United States only	1500	
B	Rock	760	1500
C	Very Dense Soil and Soft Rock Unstrained shear strength $u_s > 2000\text{psf}$ ($u_s \geq 100\text{kPa}$) or $N \geq 50$ blows/ft.	360	760
D	Stiff Soils Stiff soil with undrained shear strength $1000\text{psf} \leq u_s \leq 2000\text{psf}$ ($50\text{KPa} < u_s < 100\text{KPa}$) or $15 \leq N \leq 50$ blows/ft	180	360
E	Soft Soils Profile with more than 10 ft. (3m) of soft clay defined as soil with plasticity index $PI > 20$, moisture content $w > 40\%$ and undrained shear strength $u_s < 1000\text{psf}$ (50kpa) ($N \leq 15$ blows/ft.)		180
F	Soils Requiring Site-Specific Evaluations 1. Soils vulnerable potential failures or collapse under seismic loading: e.g., liquefiable soils, quick and highly sensitive clays, collapse weakly connected soils. 2. Peats and/or highly organic clays: (10ft (3m) or thicker layer) 3. Very high plasticity clays: (25ft (8m) or thicker layer with plasticity index > 75) 4. Very thick soft/medium stiff clays: (120ft (36m) or thicker layer)		

Velocity range of the soils of the project area is 158 to 230 m/s i.e., they belong to the class D and E according to the provision. Further class D has been categorized these soils into D1 to D5 sub-classes based on their Vs30 velocity range, shown in Table 15. 5.

Table 15. 3: Sub-soil, Vs30 based Classification of the Soils

Ground Class	V_{s30}	Soil Type
C	360 - 760 m/sec	Very Dense/ Hard Soil and Soft rock
D1	300 - 360 m/sec	Stiff / Dense to very dense/Hard Soil
D2	250 - 300 m/sec	Stiff / Dense Soil
D3	220 - 250 m/sec	Medium Stiff to Stiff / Medium Dense to Dense Soil
D4	200 - 220 m/sec	Medium Stiff / Medium Dense Soil
D5	180 - 200 m/sec	Soft/Loose to Medium Stiff /Medium Dense Soil
E	- 180 m/sec	Soft / Loose Soil

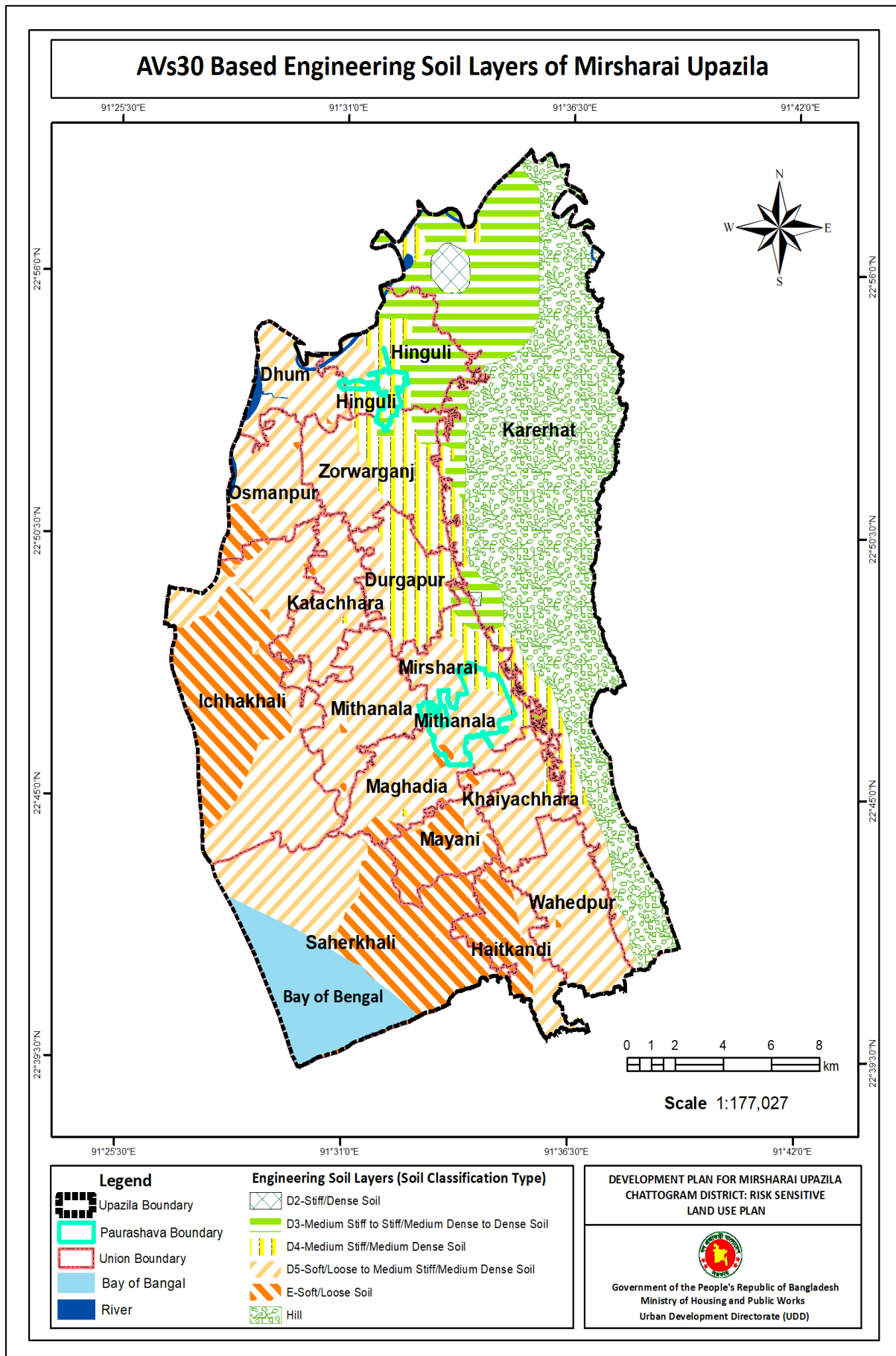
The soils at the project area fall mainly into 5 categories (D2, D3, D4, D5, and E). From Map 15. 8, it can be observed that the dark green colored areas of Karerhat union belong to category D2 which means the soil types of those areas are stiff/dense. The light green shaded areas of Hinguli, Baroiarhat Paurashava, Zorwarganj, and Karerhat union belong to category D3 which means the soils types are medium stiff/medium dense to stiff/dense soil. The yellow-colored areas of Hinguli, Baroiarhat Paurashava, Zorwarganj, Durgapur, Mirsharai Paurashava, and Mirsharai union shows that the soil types of the zones are D4 suggesting the soils are medium stiff/ medium dense. The orange-colored areas suggest the soils are D5 type which means the soils are soft/loose to medium-stiff/medium dense and the rest of the area belongs to category E suggesting soft/loose soils as shown in the Map 15. 8.

15.3.7 Building Height Recommendation

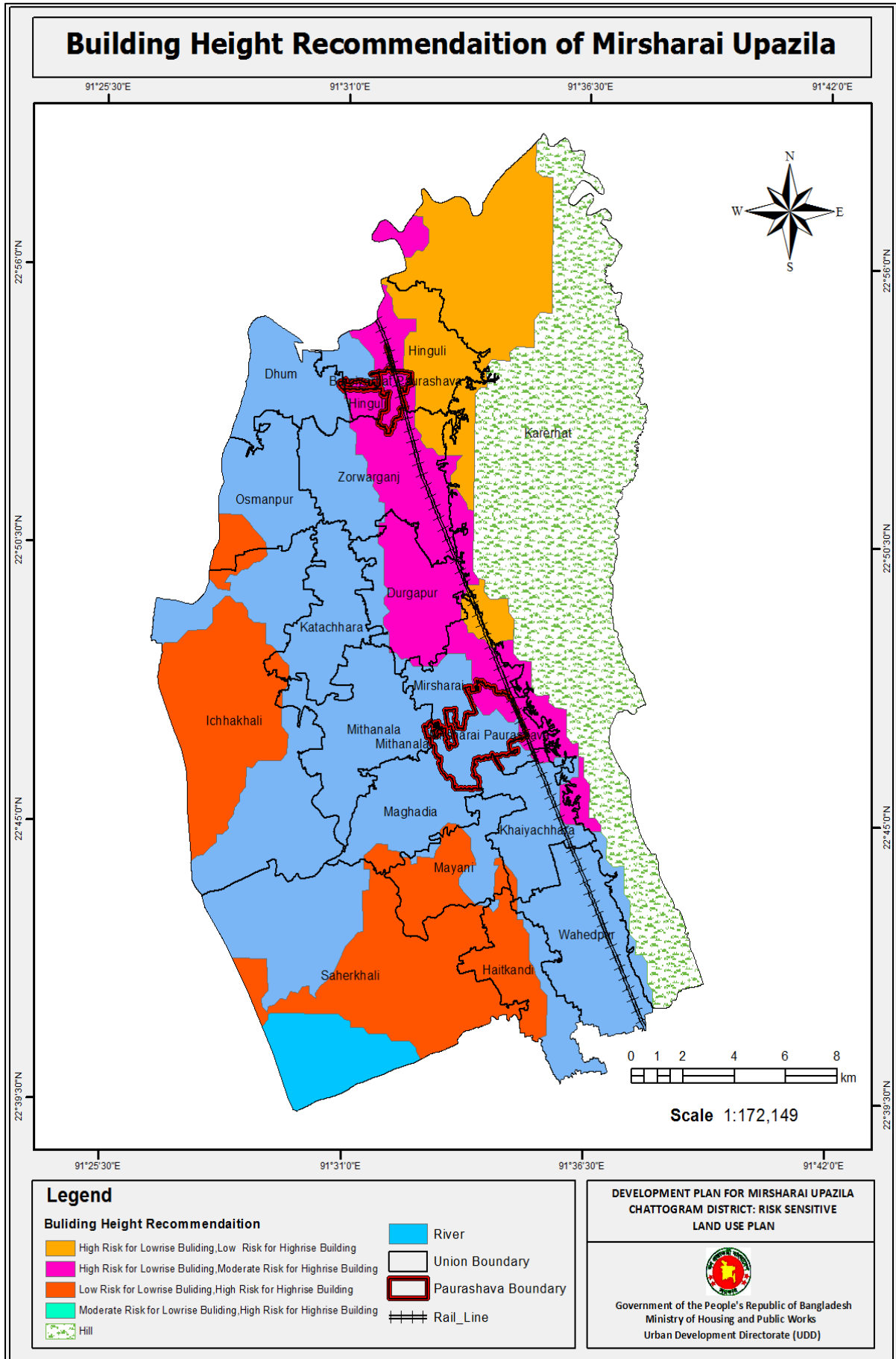
Peak spectral acceleration (PSA) is an important tool for determining the building height of an area. Here PSA for 1.0 0.2 and 0.3 sec is used for identifying the appropriate location for high rise and low rise building respectively. A building height map is produced for the study area using PSA (Map 15. 9), which represent low rise building and high-rise building. The low rise indicates 2-3 stories building and a high rise represents 10 story building.

From Map 15. 9 it can be observed that the light green colored areas of Karerhat, Hinguli, Zorwarganj, and Mirsharai Unions area high-risk sensitive zones for low rise building but low risk-sensitive for high rise buildings. The map also shows that the grey colored areas of Hinguli, Zorwarganj, Durgapur, Mirsharai Paurashava, and Mirsharai unions are High risk-sensitive for low rise buildings but moderately sensitive for high rise buildings. The red-colored zones of Osmanpur, Ichhakhali, Katachhara, Saherkhali, Mayani, Haitkandi, and Khaiyachhara unions are Low risk-sensitive for low rise buildings but High risk for high rise buildings. The rest of the study area with orange color is moderately sensitive for low rise buildings but high-risk sensitive for high rise buildings.

Map 15. 8: Soil Type Map of Mirsharai Upazila



Map 15. 9: Building Height Recommendation Area of Mirsharai Upazila



15.4 Suitability Analysis

For the plan preparation of Mirsharai Upazila, suitability analysis is a vital step. Through this analysis, suitable areas for development have been identified for planning.

15.4.1 Infrastructure Suitability

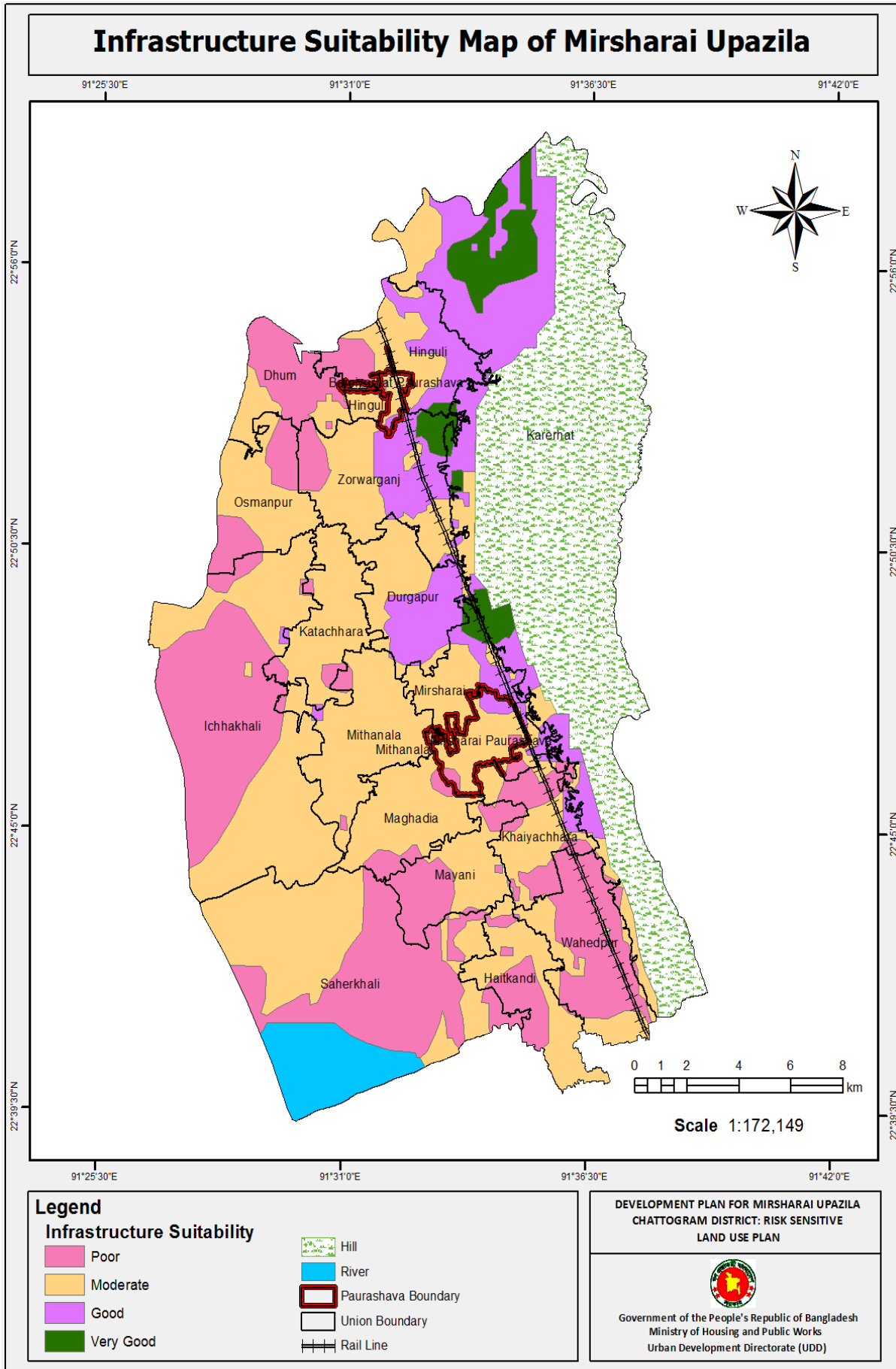
Infrastructure Suitability is the process of identifying the most and least suitable areas of Mirsharai Upazila. To identify the area for zoning an analysis has been carried out. Land use suitability map of the area is produced based on subsurface sediment criteria, foundation layer depth, Shear wave velocity (Vs), S.A, and PGA seismicity of the area.

Map 15. 10 shows that the northwestern part of Karerhat union; Eastern part of Zorwanganj, Hinguli, Mirsharai, and Khaiyachhara union; and Southern half of Baroiarhat Paurashava and Durgapur union of the project area is very good to a good category for infrastructure development which suggest that those areas are suitable for the light infrastructure of commercial, residential or/and industrial purpose is suitable with a foundation depth of up to 5 m (suitable on foundation layer). Large and tall infrastructure requires a pile foundation placed on Soil layer no 3 or 5 in Table 15. 4.

Table 15. 4: Land Use Classification for Infrastructure Development

Serial No.	Infrastructure Suitability	Infrastructure Foundation Suitability	Suggested Land Use Suitability
01	Very Good	4-6 story light infrastructure is suitable with a foundation depth of up to <5 m. Large and tall infrastructure requires a pile foundation placed on Soil layer no 3 or 5.	Commercial area, Residential area, and Industrial zone
02	Good	4-6 story light infrastructure is suitable with a foundation depth of around 5m, for Large and tall infrastructure requires a pile foundation placed on layer no 3 or 5.	Commercial area, Residential area, Industrial zone
03	Moderate	4-6 story light infrastructure requires on-site subsoil investigation and proper foundation design. A deep pile foundation is needed for large infrastructure.	Industrial zone, Residential area, Commercial area, Agricultural Zone, Park, and Recreation
04	Poor	Detail subsoil investigation and proper foundation design are required for all types of infrastructure, due to low suitability with hazard potential.	Agricultural zone Wetland Rural settlement Park and Recreation
05	Very Poor	Detail subsoil investigation for deep pile foundation is essential, due to very low soil resistance and high hazard potential. A shallow foundation is not preferred	Agricultural zone Wetland Rural settlement Park and Recreation

Map 15. 10: Infrastructure Suitability of Mirsharai Upazila



Map 15. 10 also shows that the except some discrete places the orange-colored areas of Katachhara, Mithanala, Mirsharai Paurashava, and Maghadia union; northern half of Baroiarhat Paurashava and Durgapur union; western parts of Mirsharai, Hinguli, Zorwarganj and Dhum Union and the orange-colored areas of Osmanpur, Ichhakhali, Saherkhali, Karerhat, Mayani, Haitkandi, Wahedpur, and Khaiyachhara Union are moderately suitable for infrastructure development and suggesting light infrastructure, which requires on-site sub-soil investigation and proper foundation design and deep pile foundation is needed for the large and tall infrastructure of commercial, residential or/and industrial purpose. And the soil condition of the red-colored areas of Hinguli, Dhum, Osmanpur, Ichhakhali, Saherkhali, Khaiyachhara, Mayani, Zorwarganj, Haitkandi, Wahedpur and Maghadia union is poorly suitable for infrastructure development. Thus, detailed subsoil investigation for deep pile foundation and proper foundation design is essential for all types of infrastructure. These areas are more suitable as agricultural and rural settlement and park and recreational zone.

15.5 Structure Plan Zoning

Structure plan doesn't necessarily describe detailed lot by lot land use and other infrastructure specifically. Rather it indicates the potential growth and changes will take place. It also doesn't require excessive effort in gathering detailed data. The total area of the Upazila is segregated under some broad classes that will guide future growth with wide aspects. Definitions of broad classes of Structure Plan are given below for conceptualizing focus of the future magnitude as well as the illustration of the policies and strategies.

The total coverage area of the Structure Plan of Mirsharai Upazila is 116441.08 acres. The total area is under structure plan coverage. The area has re-structured into some planning zones. The statistics of the formulation of zoning in Mirsharai Upazila has presented in Table 15. 5 and Map 15. 11.

Table 15. 5: Structure Plan Zoning Category

Land Zoning Category	Area (Acre)	Percentage (%)
Agricultural Zone	31748.29	26.027
Circulation Network	2056.33	1.686
Commercial Zone	781.73	0.641
Economic Zone	16912.61	13.865
Faecal Sludge Treatment Plant	34.56	0.028
Hilly Area	23954.93	19.638
Housing Area	160.62	0.132
Khal Catchment Area	4897.50	4.015
Mixed Use	308.78	0.253
Model Town	2045.42	1.677
Railline Buffer Area	307.44	0.252
Recreation	4501.37	3.690
Rural Settlement	18172.63	14.898
Sea	4309.42	3.533
Urban Area	3083.54	2.528
Water Reservoir	4445.33	3.644
Water Retention Area	4259.44	3.492
Total	121979.92	100.000

Source: Field Survey, 2018

a) Agriculture Zone

Agriculture zone is the zone of food production where predominantly agricultural production will be encouraged. All types of agricultural activities such as crop production, aquaculture, vegetable production, etc. will be dominant and will be permitted to ensure food security and also fishing, poultry, etc. will be included in this zone. Total an amount of 31332.28 acres of land covering 25.44% of the Structure Plan area has been declared as an agriculture zone.

The main purposes of agriculture zone are to:

- To protect high-value agriculture land where crop production is most high;
- To promote farming activity and farming operation in the land especially suitable;
- To conserve the agriculture lands within the urban area for the coming years.

b) Commercial Zone

Commercial Zone comprises growth centers, rural hat Bazar. These areas are considered as the market place for the villagers to provide a noticeable number of commercial activities. Total an amount of 202.03 acres of land covering 0.16% of the Structure Plan area has been declared as a commercial zone. The commercial zone will have the sole objectives as follows:

- Promote trade and commerce compactly associated with all other facilities;
- To sustain economic activity and economic development of the rural area.

c) Circulation Network

Circulation network contains a major road network and railways linkage with regional and national settings. These roads have been proposed to save some prime areas of structure plan zoning. A total amount of 1990.18 acres of land has been proposed as a circulation network. The main purposes of the circulation network are:

- Development of regional connectivity.
- Widening of existing narrow roads.

d) Economic Zone

Total an amount of 13997.82 acres of land covering 11.37% of the Structure Plan area has been allocated for the economic zone named "Bangabandhu Sheikh Mujib Shilpanagar". This zone has been earmarked as the primary location to promote industrial development.

e) Forest Area

Forests area adds aesthetics as well as environment aiding components to any areas. Forest in this case means both traditional as well as manmade forests (plantation) created through community and social afforestation drives. Total an amount of 24513.04 acres of land covering 19.90% of the Structure Plan area has been kept for forest area. These areas will be declared as reserved forests.

f) Housing Area

A total amount of 163.65 acres of land has been kept for the housing area. These areas have been allocated for the housing purposes of low-income people.

g) River/Khal Catchment Area

The water supply protection zone comprises river, canal/chhara/khal. 50-meter buffer from the edge of the rivers, 10-meter buffer from the chhara/khal will be preserved for River/Khal catchment area. Total an amount of 5350.89 acres of land covering 4.34% of the Structure Plan area has been reserved for river/khal catchment area.

h) Mixed-Use

Total an amount of 4052.28 acres of land covering 0.03% of the Structure Plan area has been kept for model town purpose.

i) Model Town

Total an amount of 32.57 acres of land covering 3.29% of the Structure Plan area has been allocated for mixed-use purposes.

j) Recreation

Total an amount of 3237.79 acres of land covering 2.63% of the Structure Plan area has been allocated for recreation and green space purpose.

k) Rural Settlement

The areas with a relatively low density of population and located outside the urban area, rural roads, or highway where there are isolated houses or open ground are called Rural Settlement. Rural Settlement haphazardly developed at roadside areas. In Mirsharai Upazila, the rural settlement area is predominantly influenced by agriculture, homestead farming, and vegetation, etc. Total an amount of 18626.70 acres of land covering 15.12% of the Structure Plan area has been kept for rural settlement.

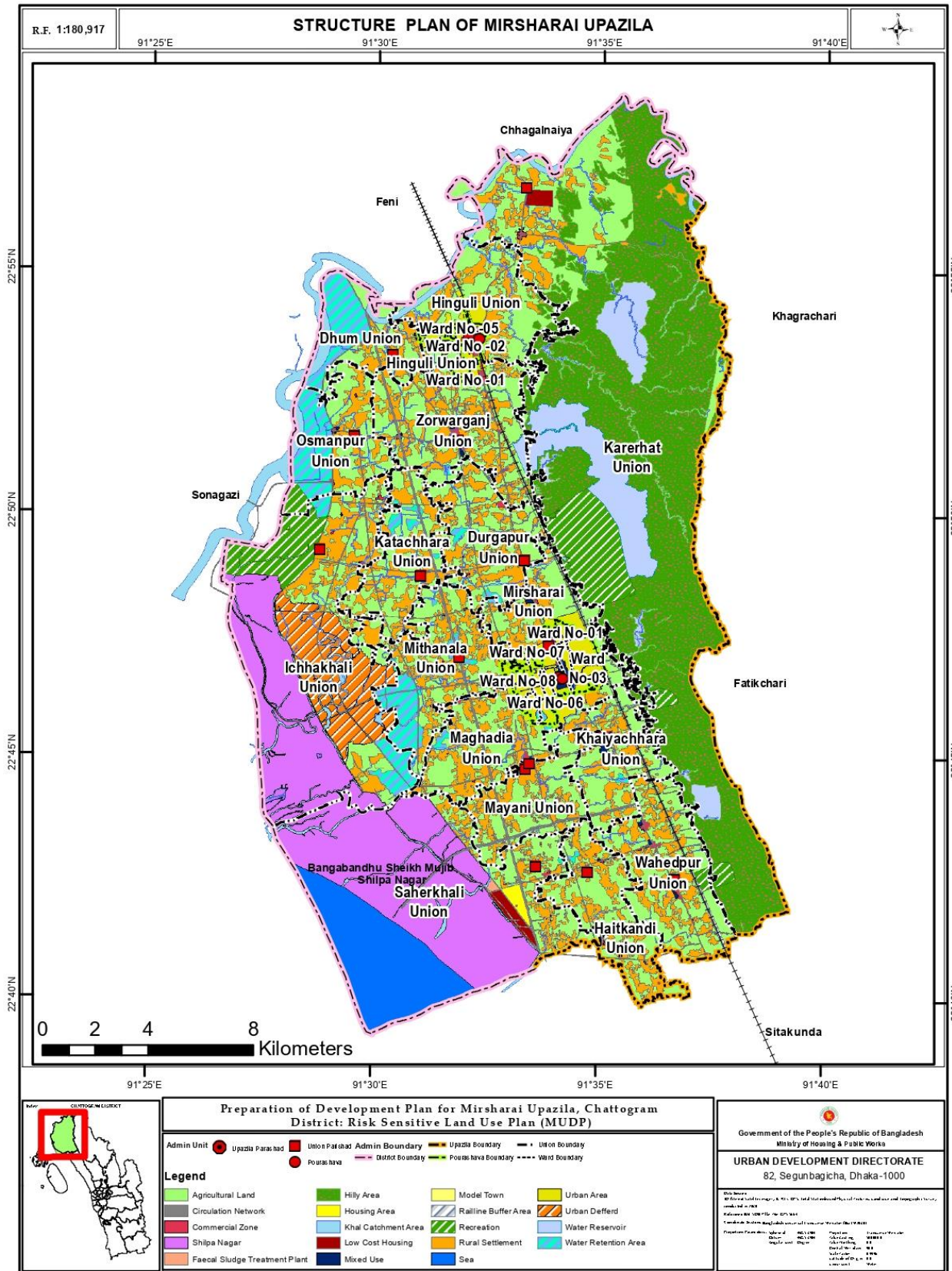
l) Urban Area

This area is also known as a built-up area or core area. This is defined as the area which has the highest concentration of services; it also has the highest population concentration and density at the present day.

m) Waterbody

Waterbody under this category is grouped under three functional subcategories, water reservoir; water retention area, and sea. About 16,011.26 acres of water body has been proposed to preserve.

Map 15. 11: Structure Plan of Mirsharai Upazila



CHAPTER 16: PLAN IMPLEMENTATION

16.1 Introduction

Plan Implementation is the most crucial task for the stakeholders. This chapter highlights the various measures needed to be taken to execute the plan proposals. Effective implementation is most critical of the total planning process.

16.2 Legal Framework for Implementation

The implementation of Structure Plan, Urban Area Plan, Rural Area Plan, and Action Area Plan will be legally guided by the Local Government Acts of all Local Government Units within the Upazila - (i) Local Government (Upazila Parishad) Act, 2009; (ii) Local Government (Paurashava) Act, 2009; and (iii) Local Government (Union Parishad) Act, 2009.

Some other Acts are relevant for taking actions in matters of preserving and conserving the water bodies and environment of the Upazila. The Water Act 2011 and Act 2000 for protecting the water bodies, playfields, and environment are particularly important.

There are national policies for most of the sectors. The relevant sector policies are consulted in this project for the preparation of Structure Plan of the Upazila, Urban Area Plan for the urban areas, and Rural Area Plan for the rural area and Action Area Plan for the selective areas. These sector policies will be important for adopting measures of executing development projects as indicated in the plan documents. For further details of the policies and strategies, the implementing agencies may consult the national policy documents for any sector.

16.3 Custodian of the Plan

The Urban Development Directorate (UDD) under the Ministry of Housing and Public Works is the custodian of the Plan prepared under the current project. The present planning project of the Urban Development Directorate (UDD) addresses all aspects of development within the Upazila. There are multi-sectoral tasks to be carried out by multiple stakeholders at the Upazila including Upazila Parishad, Paurashava, and Union Parishad.

All the stakeholders must be involved in carrying out the implementation of the plan proposals. Planning proposals are essentially much time-bounded, therefore, execution of the proposals should move ahead once the government formally approves the plan. Mirsharai Upazila will be the main custodian of the total plan package. It will also be responsible for executing the monitoring and implementation phase of the development projects by other development as well as Upazila Nirbahi Officer (UNO).

16.4 Capacity Building

The plan package imposes a large number of development projects on Mirsharai Upazila for implementation. Mirsharai Upazila will directly implement much of the development projects.

Besides, it will also be responsible for monitoring and implementing the development projects by other urban development and service giving agencies. To raise working capability, training programs should be arranged and modern office and working equipment should be installed.

16.5 Role of Urban Development Directorate

Urban Development Directorate (UDD) is directly involved with the Upazila development plan and UDD is currently doing the Upazila Development Plan. The role of the Urban Development Directorate (UDD) should expand to monitor and evaluate the development plans of Upazilas directly to make it more practical and fruitful. Urban Development Directorate (UDD) can provide technical services for the effective implementation of the plan.

16.6 Monitoring, Review and Updating of the Plan Components

Planning is always a continuous process. The plan package needs to be updated regularly to make it respond to the spatial changes over time. Urban Development Directorate (UDD) being the custodian of this plan should always monitor the implementation of the plan. The review will aim to analyze the status of implementation of plan provisions, the changing physical growth pattern, infrastructure development, and the trend of public and private physical development including growth direction. It is necessary that the entire plan document should be reviewed every 4th year of the plan period and will come into execution from the 5th year of the plan period. For regular updating and changes and plan implementation monitoring, the Upazila should immediately set up a planning section with planners and staff.

16.7 Circulation of the Plan Documents

The strength of the statutory plan is yet to be established among the stakeholders including common citizens and the public sector development agencies. As the custodian of the plan, Urban Development Directorate (UDD) will be responsible to disseminate and establish the true spirit of the plan. UDD will remain responsible to inform all the government organizations that a statutory plan has been prepared for the corridor, because of its statutory nature; it has to be followed by all. It should be adhered to by them while taking up development programs and projects within the jurisdiction of the plan area.

To achieve the objective of the plan, it has to be disseminated among all the government agencies. Copies of the plans including maps and reports will have to be sent to them with a letter stating under what legal authority the plan has been prepared.

The plan would be uploaded on the UDD website so that people can download, study, and be aware of the plan. Besides, hard copies of the document would be made available for sale at a reasonable price. UDD can also contact the line agencies through the letter to make them aware of the projects proposed under this plan and the role of the respective line agencies to implement the same.

16.8 Implementation Modalities

If there is any land use required on any plot for Government/Non-Government/Private Intervention/Project/Land acquisition for General welfare that is not inconsistent to the proposed land use or it's permitted, conditionally permitted, restricted or special use stated in the gazetted plan, it must be approved by the Ministry of Housing and Public Works through review committee. Ministry of Housing and Public Works will provide administrative orders regarding the specific land use change and it will be included during the review of the plan on a specific interval as stated in the plan. The formation of the review committee and its terms of reference (ToR) are given in Table 16.1.

Table 16. 1: Review Committee Formation

Serial No.	Person	Position
01	Secretary, Ministry of Housing and Public Works	Chairperson
02	Director, Urban Development Directorate (UDD)	Member
03	Joint Chief/Deputy Chief, Planning Cell, Ministry of Housing and Public Works	Member-Secretary
04	Upazila Nirbahi Officer of Concerned Upazila/Mayor of Concerned Paurashava	Member
05	Project Director, MUDP Project, UDD	Member
06	Upazila Engineer of Concerned Upazila/Assistant Engineer of Concerned Paurashava	
07	Concerned Project Manager, MUDP, UDD	

Terms of Reference (ToR) of Review committee:

- ❖ The committee would meet on a need basis.
- ❖ Any decisions taken by the committee will be gazetted by the Ministry of Housing and Public Works.
- ❖ The committee may co-opt new members if necessary.

CHAPTER 17: CONCLUSION

17.1 Concluding Remarks

The Structure Plan report has presented a summary of overall existing conditions, critical planning issues, and population projection of the Upazila in the future. The national policies, strategies, broad development proposals and implementation strategies of the plan have helped the preparation of Urban Area Plan, Rural Area Plan, and Action Area Plan. It is observed that national policies and strategies have important implications if those are applied carefully. The strategic measures suggested are targeted to achieve these policies at the Upazila level. The implementing agencies will have an important role to play once the Development Plan gets approval of the government for execution.

The success of the plans will depend on the capacity of the local governments in implementing the plans. The supports of the national government for the execution of the plans are always necessary. The national government should be increasingly engaged with the local governments at the Upazila level in improving the policy and legal framework for the implementation of local physical plans. This will enhance the institutional strength of the local governments in the execution of the planned development process.

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ANNEXURE-A: PROJECT TEAM

A. Key Professionals

Serial No.	Name	Position Assigned
01	Ahmed Akhtaruzzaman	Project Director
02	Md. Ahshan Habib	Project Manager
03	Yearunnessa Khanam	Assistant Planner
04	Zakia Sultana	Planner
05	Md. Saifur Rahman	Planner

A. Individual Consultants

Serial No.	Name	Position Assigned
01	Sikder Saeeduzzaman	Urban Planner
02	Adil Hasan	Hydrologist

B. Supporting Staff

Serial No.	Name	Position Assigned
01	Md. Monir Hossain	Draftsman (Grade-1)
02	S. M. Saidul Islam	Draftsman (Grade-2)
03	Md. Shahinur Rahman Sarkar	Draftsman (Grade-3)
04	Md. Nazrul Islam	Draftsman (Grade-4)
05	Md. Raju Ahamed	Tracer
06	Renu Mia	Tracer

ANNEXURE-B: PHOTOGRAPHS



Photograph-1 & 2: “Art Competition, 2018- Children Thought About Mirsharai Upazila” at Zila Parishad Auditorium in Mirsharai Upazila under Development Plan for Mirsharai Upazila, Chattogram District: Risk Sensitive Land Use Plan (2017-2037) Project



Photograph-3 & 4: Seminar on MUDP Project at Zila Parishad Auditorium in Mirsharai Upazila



Photograph-5 & 6: PIC Meeting was held in May 2018 under MUDP Project



Photograph-7 & 8: Conducting Urban PRA at Ward No. 07 in Mirsharai Paurashava and Ward No. 05 in Baroarhat Paurashava



Photograph-9 & 10: Conducting Rural PRA at 01 No. Karerhat Union and 12 No. Khaiyachhara Union in Mirsharai Upazila



Photograph-11 & 12: Participation of Young Generation Group named “University Student Association of Mirsharai (USAM)”

ANNEXURE-C: MAP
