

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

Background of the Project

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 has no previous experience of implementing such plans which integrates 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 implementation of physical plans. The plan prepared through this project will be their first experience of implementing the physical plans in their own areas.

Objectives of the Project

The vision 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. The main objective of preparing this Development Plan for Mirsharai Upazila is to ensure rational use of scarce land resources for concentrated development at both rural and urban scale considering the disaster risks. Specific objectives of the project are:

- To integrate the economy, social resources and ecology with the mainstream of development process of the country;
- To conserve the agricultural land of the project area;
- To develop the tourism activities within the project area;
- To reduce the disaster risk in the project area.

Methodological Approach of Plan Preparation

The project planning area will cover entire Mirsharai Upazila area which might have potential for development within the next 20 years up to year, 2037 A.D. The project is planned to be completed in three stages/tiers. In the first stage, there will be preparation of Structure Plan for entire Mirsharai Upazila. The second stage will be preparation of Urban Area Plan incorporating necessary data of urban (two municipalities) area and also preparation of Rural Area Plan for 16

unions for assessing problems or opportunities, which need immediate intervention. The third stage will be preparation of Action Area Plan. The current project would also emphasize over the change in land category, land use and livelihood pattern.

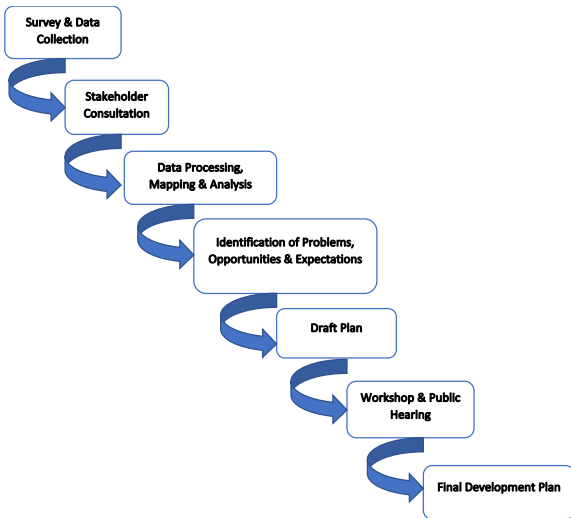


Figure-1: Overall Planning Methodology

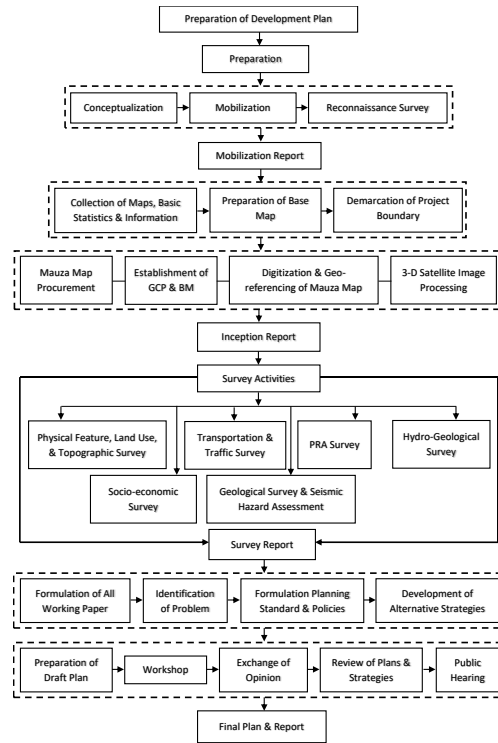


Figure-2: Flow Diagram of Planning Process

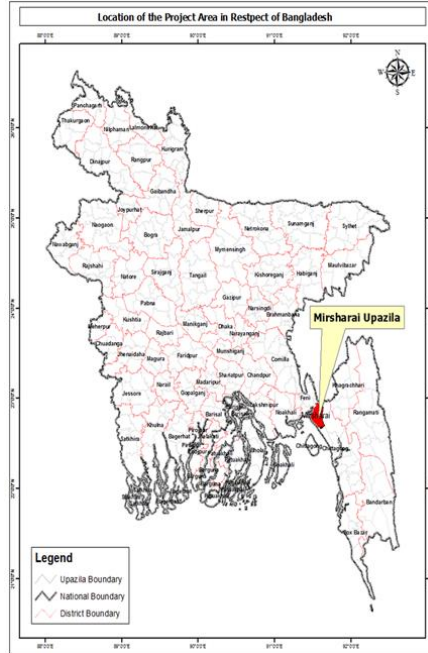
Description of the Project Area

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 consist of two Paurashava (Municipality), 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. Population of the Upazila is 3,98,716 (2011) and the density of population is 826 per sq.km. The rate of urbanization in 2011 was 7.83%.

Table-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



Map-1: Location of the Project Area in Respect of Bangladesh

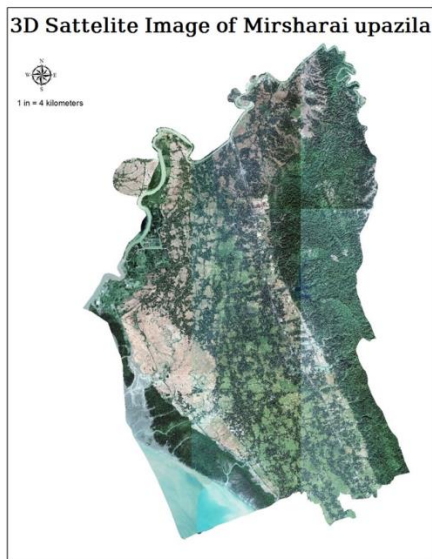
Different approaches and methodologies have been followed for the preparation of Development Plan of Mirsharai Upazila. The Development Plan package has been followed in different stages- from mobilization of the project to finalization of the plan. Collection of mauza maps and secondary documents, conduction 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.

Exponential Growth rate Method/Compound Growth Rate Method is used to calculate the projected population. Growth rate for the population projection of the Upazila was 0.77%. According to Population Census 2011, population of Mirsharai Upazila was 398716. Projection shows, the population of the urban and rural area will be 696894 in 2037.

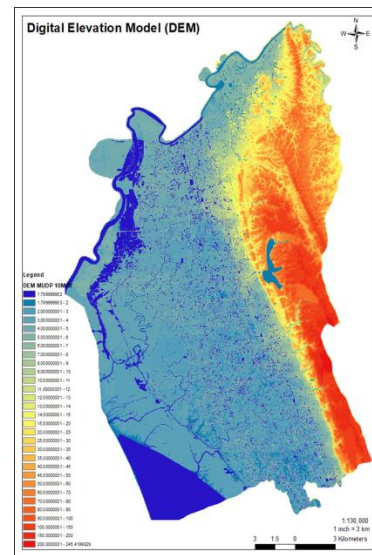
In the survey stage, Physical Feature, Land Use, & Topographic Survey; Transportation & Traffic Survey; Hydro-Geological Survey; Socio-economic Survey; Geological Survey and Seismic Hazard Assessment; and Flora and Fauna Survey have been carried out in order to know the existing condition of the surveyed area. There are different types of thematic maps has been prepared based on 6 types of survey during the survey stage. Each survey has distinct output. The outputs of survey works were presented in the form of thematic maps.

Physical Feature Survey

The Topographic database has been obtained from geo-referenced 3-D (four band) image and further cross-checked and ground truthing by using RTK-GPS and Total Station to obtain and verify 3-D data (X,Y,Z value) on location and alignment of all data obtained from physical feature survey including roads, flood embankments and other drainage divides. DEM of the whole of the project area (both urban and rural) has been generated from 3-D four band satellite image interpretation.



Map-2: 3D Satellite Image of Project Area



Map-3: Digital Elevation Model of Mirsharai

During physical feature survey, Story-wise attribute of structures have been collected, besides collecting building material of the structures. Moreover, existing land use was also been identified during the survey.



Figure-3: Drone Survey

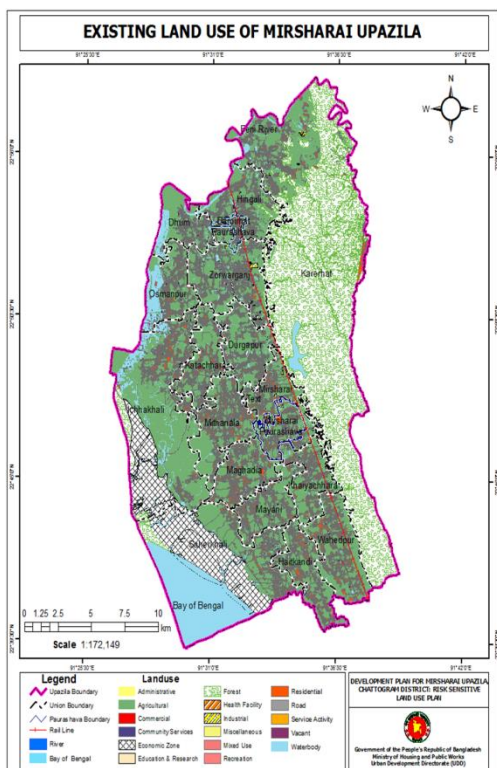


Figure-4: Total Station Survey using RTK-GPS Technique

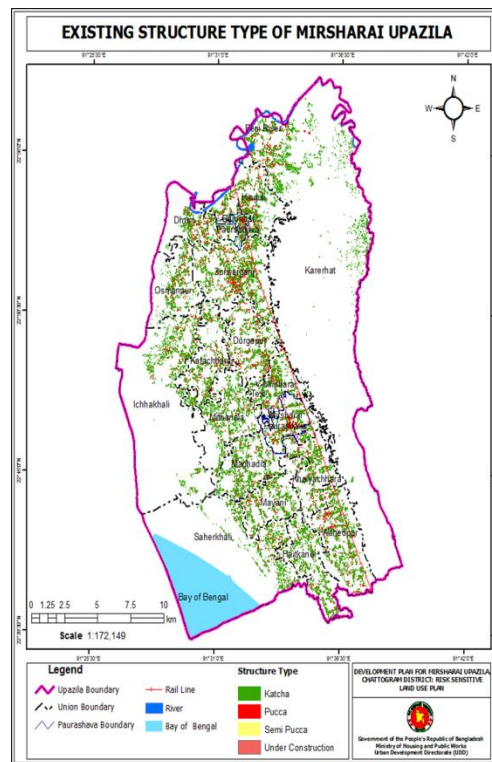


Figure-5: Physical Feature Survey Checking Activities

The project area is predominantly agricultural in character. It is clearly revealed in the Land Use Survey that the most dominant Land Use category of Mirsharai Upazila is agriculture which comprises 39.92% of the total land area of the Upazila. Forest area ranks second highest in terms of area and occupy 26.41% of land. Residential category ranks third highest in terms of area and occupies 15.17% of land.



Map-4: Existing Land Use of Mirsharai Upazila

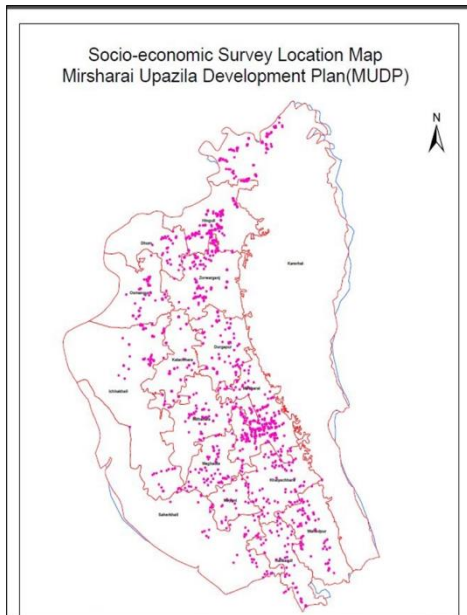


Map-5: Existing Structure of Mirsharai Upazila

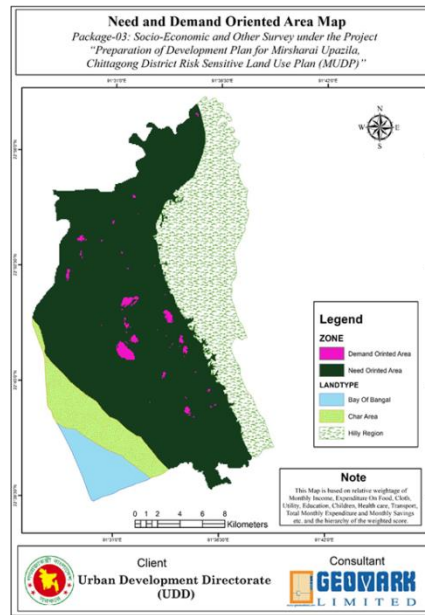
From the Physical feature survey, it is revealed that the majority of the structures in the Upazila are katcha (77.81%). Residential structures are found to be the highest in number and accounts for about 90.98% of total structures. Mirsharai Upazila is served by a road network of 1763.42 km. The highest 97.41% roads are pucca road.

Socio-economic Survey

A total of 1350 questionnaire survey has been conducted within the project area. Socio-economic survey reveals that mainly primary and secondary education rate is high than university level. After higher secondary level, the number of students is become lower. It indicates that the tendency to obtain higher education among people of the Upazila is low. Besides, 45% health care centers have only one permanent doctor and 20% health care centers have no permanent doctor.



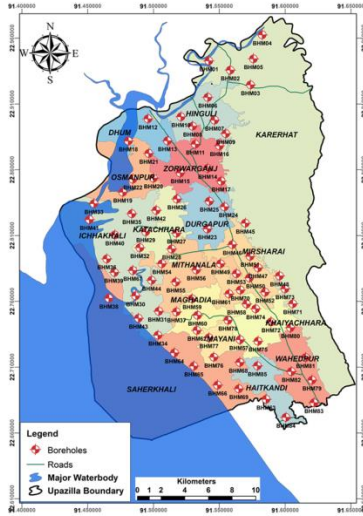
Map-6: Distribution of Socio-economic Survey



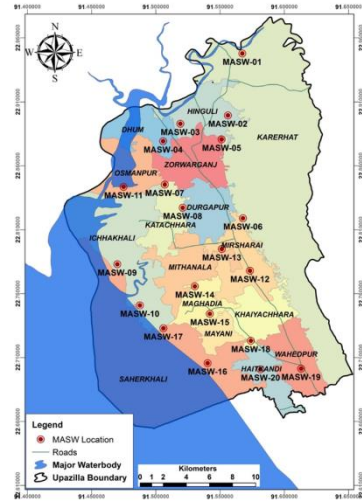
Map-7: Need and Demand Oriented Area

Geological Survey

To conduct this project work, geomorphological, geotechnical and geophysical data of soil has been collected, analyzed and interpreted. Foundation depth of overall area of Mirsharai Upazila varies 3m to 10m. Northern part of the Karerhat union, central part of Zorwarganj, 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. Very few areas consider their foundation depth more than 10m.

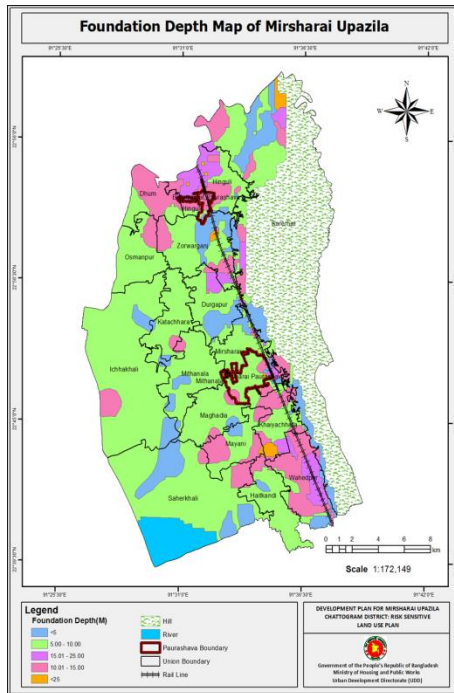


Map-8: Location of Borehole in Mirsharai Upazila

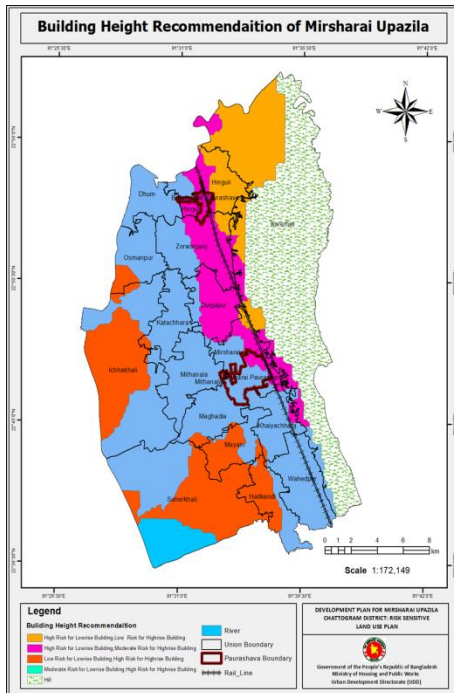


Map-9: Location of MASW

Peak spectral acceleration (PSA) is an important tool for determining the building height of an area. Here PSA for 1.0 and 0.2 sec is used for identifying the appropriate location for high rise and low rise building respectively. Karerhat, Hinguli, Zorwarganj and Mirsharai Union area are high risk sensitive zone for low-rise building but low risk sensitive for high rise buildings. Osmanpur, Ichhakhali, Katchhara, Saherkhali, Mayani, Haitkandi and Khaiyachhara unions are Low risk sensitive for low rise buildings but High risk for high rise buildings.



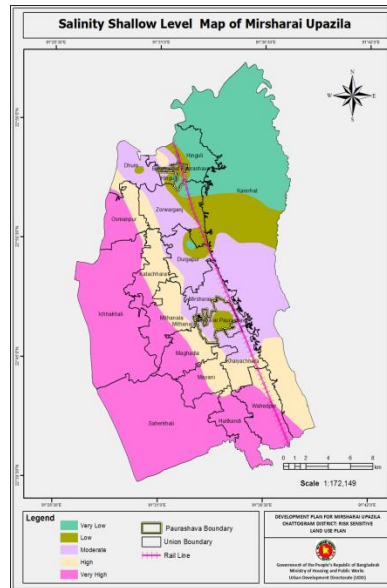
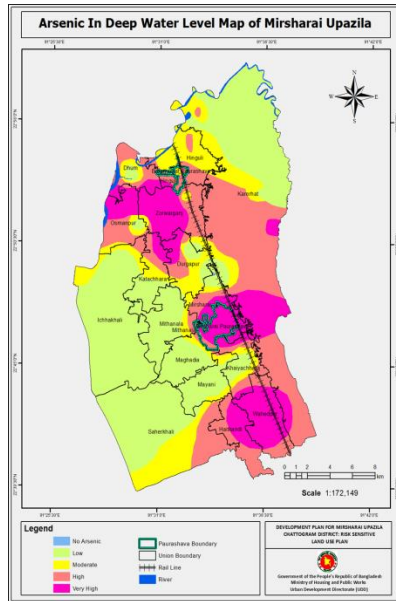
Map-10: Foundation Depth of Mirsharai Upazila



Map-11: Building Height Recommendation of Mirsharai Upazila

Hydrological Survey

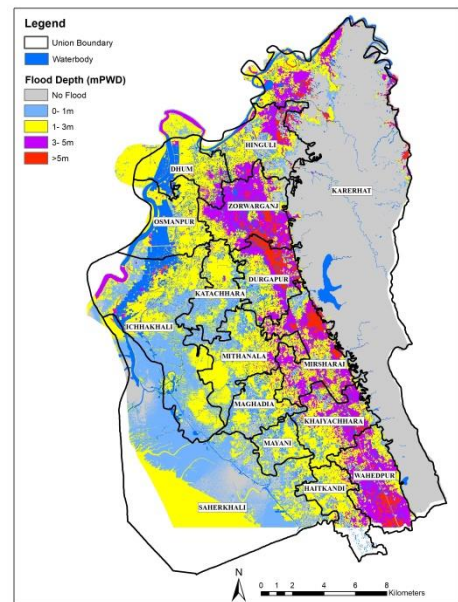
Field kit measured arsenic concentration in a number of wells distributed within the project area. Field kit data suggest that the shallow aquifer is heavily contaminated with elevated arsenic concentration throughout the Upazila except in the extreme northern corner.



Map-12: Level of Arsenic in Deep Water of Mirsharai Upazila

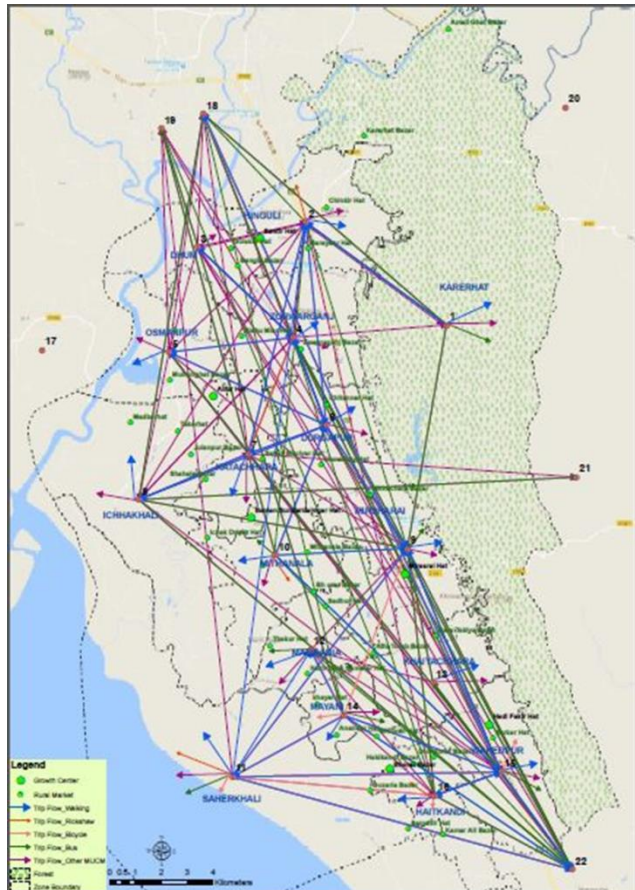
Map-13: Salinity Level of Mirsharai Upazila

Following map show the flooded area for the proposed land use if no storage reservoirs are constructed.



Transportation Survey

From the Transport 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.



Map-14: Trip Distribution in Mirsharai Upazila



Figure-6: Activities of Transportation Survey

Participatory Rural Appraisal (PRA)

Participatory Rural Appraisal (PRA) is an approach which incorporates methods to gather ideas about any place through the local people. The main objective of the Participatory Rural Appraisal (PRA) workshops is to get local people's experiences, views, and insights to the local development planning process. PRA sessions have been conducted with the local authority Mayor, Ward Councilor's of Paurashava and Chairman and local people of sixteen Unions. Total 675 nos. participants participated in 46 PRA sessions, these participants were allowed to brainstorm the problems, and they prepared a list of problems.

Table-2: 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	Others Stakeholders	02
9	Block Supervisor of Agriculture Officer in Upazila	01
Total		46



Figure-7: PRA Session with Women Participant



Figure-8: Rural PRA at Dhum Union



Figure-9: Urban PRA at Mirsharai Paurashava



Figure-10: PRA Session with Tribal People

In brainstorming process, participants prepared a list of 660 nos. problems (2 municipalities - 273 nos. problems and 16 Union – 387 nos. problems). Therefore, after compilation around 123 problems remain unchanged from 660 problems.

Youth Participation in Development 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 has been ensured in the preparation of 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 of Mirsharai Upazila, public participation in the policy making process and in formulating new innovative work.



Figure-11: PRA Session with University Student Association of Mirsharai (USAM)



Figure-12: Youth integration in Development Plan preparation through social media

Art Competition

An art competition was organized for the children of Mirsharai Upazila who are the future generation of this project area, with the objective of creating awareness among the children against disaster and development of their own native town as well.

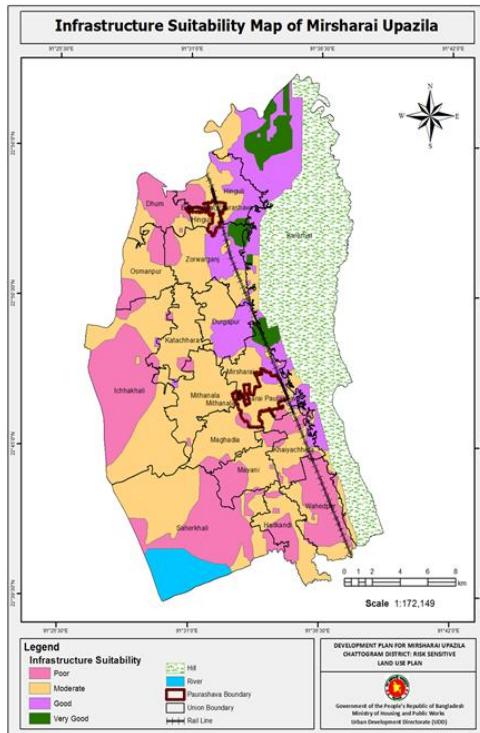


Figure-13: Children Art Competition at Mirsharai Upazila

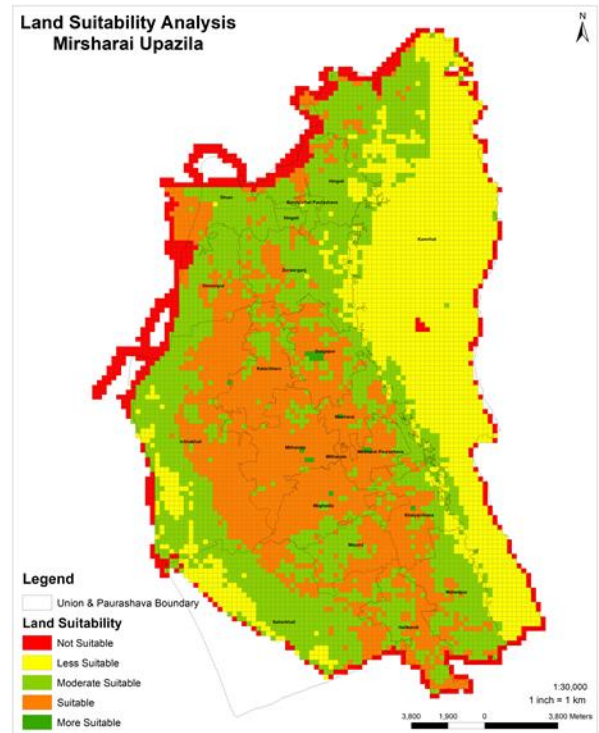


Suitability Analysis

For the plan preparation of urban and rural areas of Mirsharai Upazila, suitability analysis is a prime requirement. Through this analysis, suitable areas for development have been identified for planning. Infrastructure Suitability is the process of identifying the most and least suitable areas of Mirsharai Upazila. In order to identify the area for zoning an analysis has been carried out.



Map-15: Infrastructure Suitability of Mirsharai Upazila

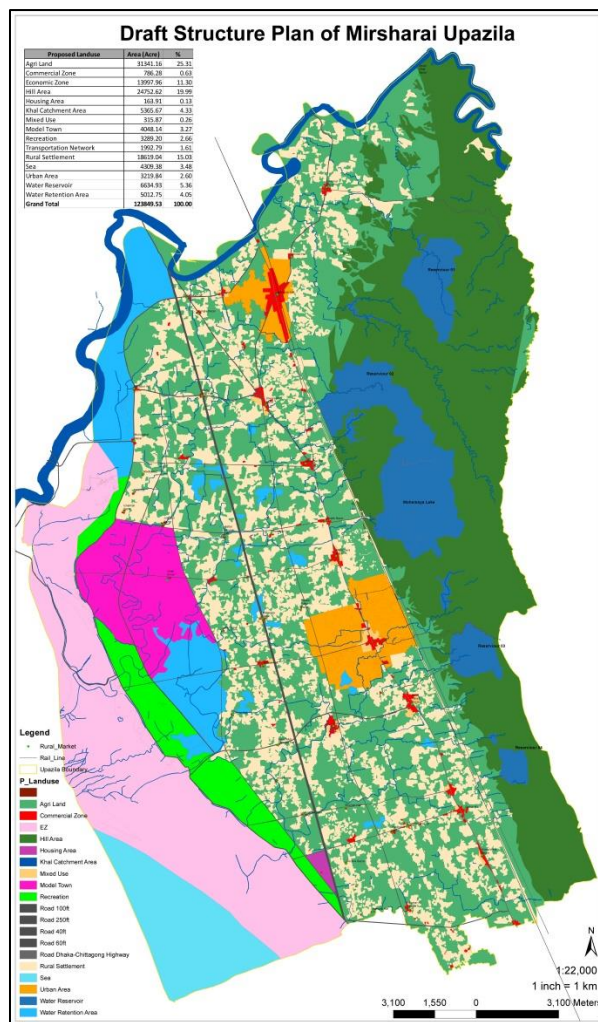


Map-16: Land Suitability of Mirsharai Upazila

Structure Area Plan

The Structure Plan is a 20 years strategic plan covering the entire Mirsharai Upazila. For future planned risk sensitive development of the upazila and as well as to protect natural resources including agriculture and major water body, a strategic land use zoning plan has been prepared for the entire upazila. About 26.90% of land has kept as agriculture area of which most area has been found to be suitable for agriculture. In order to preserve the ecological balance, 21.50% of land of the total area has been kept as a forest area. About 4052.28 acres of land for model town and 163.65 acres of land for planned housing area have been kept for future residential purpose. Besides, 4.37% of land of the total area has been kept as a water retention area. 50-meter buffer has been created from the edge of the rivers (Feni River) to protect the

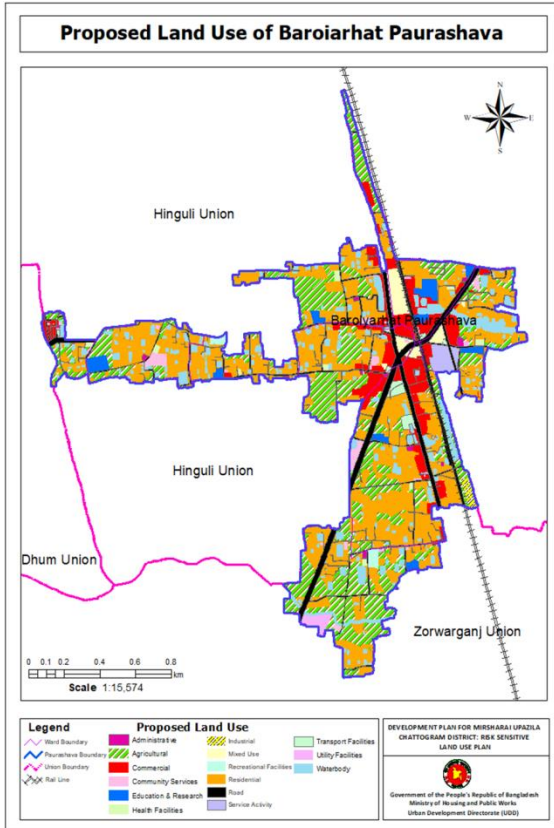
rivers and construct embankment on that buffer zone. Major Khals have been protected through 10-meter buffer zone alongside the edge of the khals.



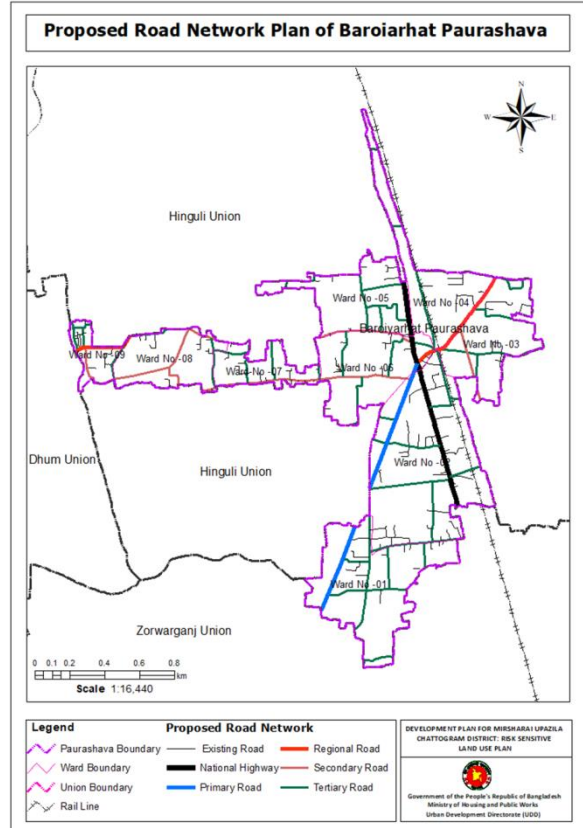
Map-17: Structure Plan of Mirsharai Upazila

Urban Area Plan

The 10 years Urban Area Plan is concerned with urban area development that also cover future land use zoning and development control. Urban Area Plan is constructed to guide the physical development of Baroiarhat and Mirsharai Paurashava including all the economic and social activities. The plan determines the priority development issues based on PRA results conducted in the urban area. The plan makes development proposals covering various sectors including, transport, urban infrastructure and services. It proposes to excavate existing khals for improvement of drainage and reduce the risk of flooding.



Map-18: Proposed Land Use of Baroiarhat Paurashava



Map-19: Proposed Road Network of Baroiarhat Paurashava

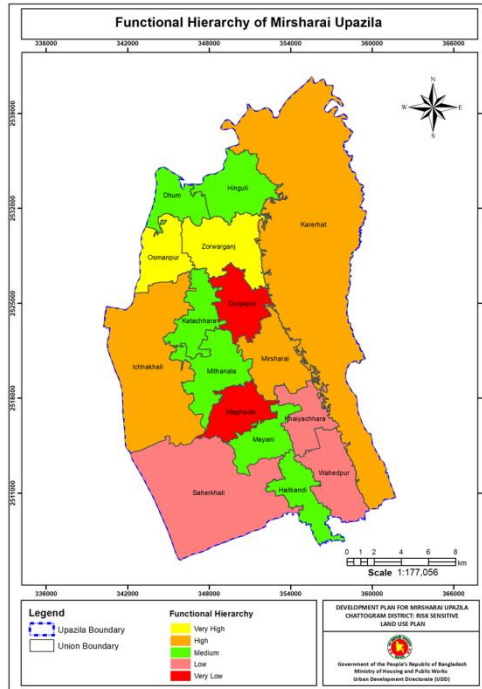
Other infrastructure and urban services proposals are primary school, secondary school, vocational training center, community clinic, fecal sludge and waste treatment plant, waste transfer station, playground, eidgahs, cremation center, community center, planned housing area, wholesale market, CNG station, public toilet.

Rural Area Plan

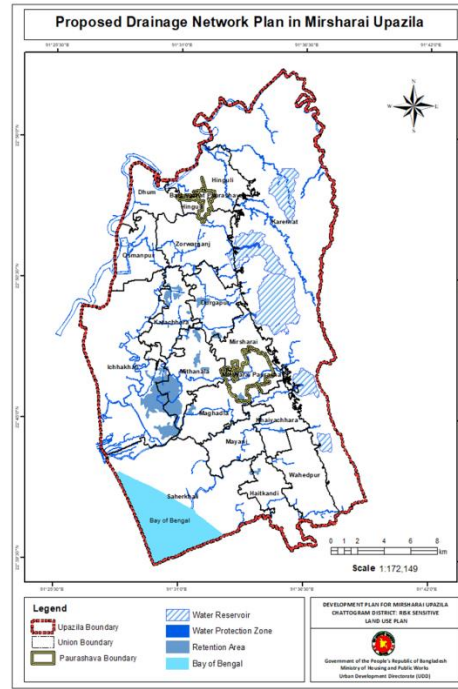
Rural Area Plan aims to guide the physical development of sixteen unions of Mirsharai Upazila (except two Paurashava areas) including all the economic and social activities. This is also a strategic plan proposed for a period of 20 years. It lays down strategies and policies for rural area development followed by some development proposals.

The spatial distribution of rural services at union level in Mirsharai Upazila is quite uneven. On the basis of functional hierarchy, Maghadia and Durgapur Union are very low category than other union. These unions served less rural services and need more rural services.

During preparation of Rural Area Plan special emphasis has been given to retain the existing natural water bodies. It is suggested to open up these filled up khals by excavation. Khal links should be excavated and links reestablished. Major Khals have been protected through 10-meter buffer zone alongside the edge of the khals.



Map-20: Functional Hierarchy at Union Level in Mirsharai Upazila



Map-21: Proposed Drainage Network Plan of Mirsharai Upazila

Major development proposals of the Rural Area Plan comprise three cold storages for storing perishable agro-products, one wholesale market, one cattle market, eight kitchen markets, eleven community clinics, one community center, five eidgahs, thirteen cremation grounds, fourteen graveyards, ten playgrounds, public toilets and waste transfer stations at union level, CNG stations at union wise, one bus stand, nine primary schools, seven secondary schools, four colleges, etc.

Conclusion

It should be kept in mind that this development plan is a guideline for the development and control of growth in a systematic manner. Development Plan of Mirsharai Upazila suggests to follow up the plan proposals and recommendations of different sectors to keep a balance between development demand and supply and citizens' expectations. This development plan is a blueprint for the planning and development of urban or rural areas of Mirsharai Upazila for the next 20-years.