

Annex-“A”

TERMS OF REFERENCE (TOR)

for

Baseline survey of Existing Flora and Fauna

under

“চট্টগ্রাম জেলার মীরসরাই উপজেলার উন্নয়ন পরিকল্পনা প্রণয়ন ঃ সার্বিক দুর্যোগ ব্যবস্থাপনাকে
ভূমি ব্যবহারের মাধ্যমে সম্পৃক্তকরণ”

**(Preparation of Development Plan for Mirsharai Upazila, Chattogram District:
Risk Sensitive Landuse Plan)**

URBAN DEVELOPMENT DIRECTORATE
Ministry of Housing and Public Works
Government of the People's Republic of Bangladesh
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APPENDIX 01

BCKGROUND INFORMATION OF THE PROJECT

1.1. Project Background

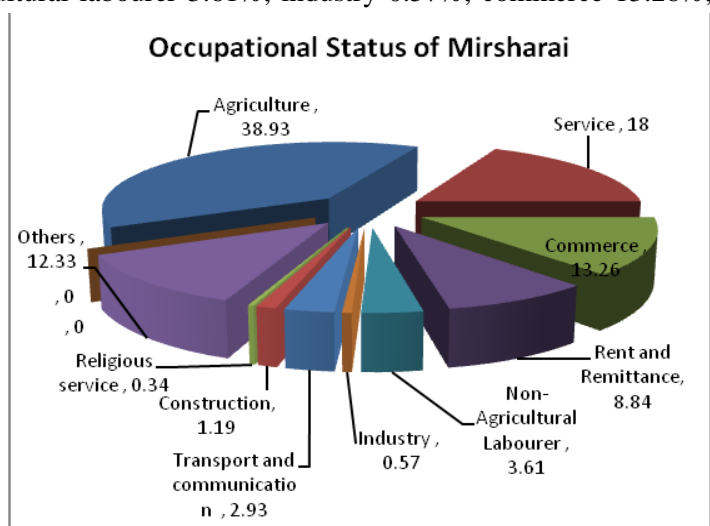
Mirsharai Upazila (CHATTOGRAM DISTRICT) area 482.88 sqkm(BBS)/509.80sqkm(GIS Data), located in between 22°39' and 22°59' north latitudes and in between 91°27' and 91°39' east longitudes. It is bounded by TRIPURA state of India, CHHAGALNAIYA and FENI SADAR upazilas on the north, SITAKUNDA upazila and BAY OF BENGAL on the south, FATIKCHHARI upazila on the east, SONAGAZI and COMPANIGANJ (NOAKHALI) upazilas on the west. Mirsharai Thana was formed in 1901 and it was turned into an upazila in 1983. Mirsharai Upazila consists of 2 Municipality, 16 Union and 113 Mouza.

Mirsharai, the combination of lake and hilly area contains attractive scenic beauty on the southernmost part of Bangladesh. The most important attraction of the upazila is that one can travel Mohamaya Chara Lake by speed boat and explore hilly area and can enjoy Khoiyachora, Baghbiani, Napitachora, Sonaichora, Mithachora and Boyalia waterfalls. This area is located 192.2 km far from DHAKA and 4.5 hour bus journey. Anyone can travel by rail and it is 197 km of rail journey and it takes 4.5 hour from Dhaka to Mirsharai Upazila. 56 km from the CHATTOGRAM Divisional headquarters and takes 1.5 hour travel by bus. The Bangladesh Road Transport Corporation introduced a direct bus service from Dhaka to *Mirsharai* via comilla.(Source: Banglapedia,2012)

At Mirsharai Upazila main river is Feni; Sandwip Channel is notable; canal 30, most noted of which are Feni Nadi, Isakhali, Mahamaya, Domkhali, Hinguli, Moliash, Koila Govania and Mayani Khal. 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

Historical Events: Sultan Fakhruddin Mobarak Shah conquered Chattogram in 1340 AD and established the Muslim rule in this region. During the reign of Gaur Sultans Hussain Shah and Nusrat Shah, Paragal Khan and Chhuti Khan were the rulers of this area. Subsequently Nizam Shah, brother of emperor Sher Shah, was the ruler of this area. Nizampur Pargana is named after Nizam Shah and the whole area of Mirsharai came under the control of Nizampur pargana. From the beginning of the 16th century this region was very rich in Bangla literature. Most of the time between 1580 and 1666 this region was under the control of the Arakanese. The place at which (of the present Mirsharai thana) Bujurg Umed Khan, son of Subadar Sayesta Khan, landed after crossing the Feni River was named as Bujurg Umedpur. With the conquest of Chattogram by Bujurg Umed Khan in 1666, this region came permanently under the Mughal rule. Towards the end of British rule in India, Durgapur and Karerhat areas of Mirsharai upazila were the centres of revolutionary activities of Chattogram. A fierce battle was fought between the freedom fighters (under Capt. Wali Ahmed) and the Pak army at a place adjacent to the Fenafuni Bridge on the south of Mirsharai sadar in which about 100 Pak soldiers were killed. Besides, direct encounters were held between the freedom fighters and the Pak army at many' places including Shuvapur Bridge, Hinguli Bridge, Aochi Mia Bridge and Mostan Nagar.

Main occupations: Agriculture 38.93%, non-agricultural labourer 3.61%, industry 0.57%, commerce 13.26%, transport and communication 2.93%, service 18%, construction 1.19%, religious service 0.34%, rent and remittance 8.84% and others 12.33%. Total cultivable land 22,896.40 hectares, fallow land 147713 hectares; single crop 38.91%, double crop 42.46% and treble crop land 18.63%. At present Cultivable land under irrigation is 6,917.85 hectare. Ownership of agricultural land Landowner 51.30%, landless 48.70%; agricultural landowner: urban 38.82% and rural 52.09%.



Value of land : The market value of the first grade arable land is Tk 30000 per 0.01 hectare. Main crops Paddy, potato, aborigine, bean, tomato, pumpkin and radish. Extinct or nearly extinct crops Sugarcane, jute, arahar, mustard, sesame, linseed, ground nut. Main fruits Mango, blackberry, jackfruit, banana, papaya, litchi, pineapple, water-melon.

Communication facilities Roads: Pucca road 230 km, semi-pucca road 119 km, mud road 1435 km; railway 16 km; waterway 11 nautical miles, Rail junction 4. Extinct or nearly extinct traditional transport Palanquin, bullock cart. Noted manufactories Carpet industry, pipe mill, ice factory, rice mill, bakery, brick-field, steel furniture, fish- poultry' feed' factory, bidi factory. There are also Cottage industries, Goldsmith, blacksmith, potteries, weaving, tailoring, bamboo and wood work. Hats, bazars and fairs Hats and bazars are 52, fairs 5, most noted of which are Abu Torab Bazar, Kamar Ali Bazar, Bara Daroga Hat, Mahajan Hat, Karer Hat, Baraia Hat, Shantir Hat, Zorwarganj Baishakhi Mela, Baruni Snan Mela and Shadhinata Mela. Main exports product is Bamboo, fish, paddy, potato, banana, vegetables.

NGO Activities: Operationally important NGOs are BRAC, Proshika, ASA, Sheba, CARE, and Hunger Project. Upazila health complex 1, family planning centre 16, satellite clinic 11.

Opportunity: Bangladesh can earn money in local and also in foreign exchange by opening a tourist resort at *Mirsharai*. The spot, if properly developed will become an excellent holiday resort and tourist centre. Rowing facility can be arranged easily; fishing and hunting facilities are already there. The success of developing *Mirsharai* as a tourist centre and Special Economic Zone depends much on good communication facilities and availability of modern amenities. Moreover, the proposed *Special Economic Zone* would generate many industry related new activities including huge vehicular traffic such as air, rail, road and water. This phenomenon would have both positive and negative impact on the socio-economic condition and existing land use pattern of the region. The proposed planning package would guide such probable changes in the socio-economic condition and land use pattern of the region, and would also address the adverse impact of such changes.

The proposed project would be prepared on a regional development perspective considering the region as a part of whole of Mirsharai Upazila and its 16 unions. In this development planning package since its location is strategically important from the regional context because this upazila is situated on the way to Dhaka Chattogram highway as the highway runs through this upazila.

Description of the Project Area: A detailed description of the Project Area is given below:

Table: Area, Population and Density of the Project Area:

Municipality	Union	Mouza	Village	Population		Density (per sq km)	Literacy Rate (%)
				Urban and Other Urban	Rural		
2	16	103	208	31206	367510	826	55.1

Source: BBS, 2011

Mirsharai sea beach, hilly area, Mohamaya Chara Lake, Khaiya Chara region has the greater potential for tourism development as there are abundant resources to attract tourists. Mirsharai is developing in an unplanned and haphazard manner very rapidly due to the ample opportunity for tourism development, which is acting as pull factor for private sector developers. Hence, this project has been under taken to protect the region from depletion of its natural resources and character and tourism development as well.

Moreover, honorable MoHPW Minister expressed his heartiest interest to develop char of this Upazila as an exclusive economic zone; as well as to establish a tourist zone and economic zone covering Mirsharai upazila.

1.2 Objectives of the Project

The objective of the project is to optimize coastal resources and activities for sustenance of marginal people. The coastal 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 coastal zone. There is no long term Holistic Development Plan for the coastal zone. Coastal zone needs to be integrated with the mainstream of development process of the country. So, an interdisciplinary development planning approach is urgent to optimize livelihood of coastal zone. The Physical development planning problems, needing attention, are as follows:

- (i) To integrate coastal zone with the mainstream of development process of the country.
- (ii) To frame policies for the best use of land and its control for the Mirsharai Upazila.
- (iii) To optimize coastal environment for sustenance of marginal people.
- (iv) 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.
- (v) Formulation of Policies and plans for gradual nucleation of settlements with policies and plans for development of growth centers of the area.

Formulation of a planning package for development of tourism in Mirsharai Upazila, and also to accommodate future changes in existing land use pattern, socio-economic condition of the area and quality of life of the people due to establishment of the third sea port in the region in an integrated and comprehensive manner

APPENDIX 02

2 Scope of Work

Traditional practice of Development Plan is to expand urban facilities, ignoring or suppressing the priority of agriculture, fisheries, forestry or ecology. The current project would emphasize over the tourism development and around Mirsharai Upazila and also livelihood of the local people, who are very much depended on *local resources*. The current project would also emphasize over the change in land category, land use and livelihood pattern. Spatial development planning is an evolving process.

2.1 Strategic Plan for Mirsharai Upazila at Regional Level: The survey firm would assist in preparing Regional Plan for Mirsharai Upazila would be prepared for 20 years according to the guidelines form: National policies, Formulated and Integrated different sectoral strategies at regional level, spatially interpreted sectoral strategies at sub regional level, formulated Conservation Plan at regional level and formulated Development Plan.

It is also necessary to figure it out the economic disparity by using “shift-share analysis” or “input-out put analysis” technique among the zilas and Upazilas within each district for drawing the future socio-economic development scenario. The Plan would also study on the following component at regional level of Mirsharai Upazilas:

- Lands Study:
 - Review existing Land use and Development Plans, Upazila Plan Books.
 - Change in Land Category and Land Use after FCD
 - Assessment of change in land use after construction of major infrastructure
 - Settlement Pattern
 - Hinterland, Location and level of major facilities at sub regional level
 - Hierarchy of settlements within the sub region
 - Identification of major criteria of the settlements
- Hydrology:
 - Local rivers: Hydrodynamic, Morphological, Geomorphologic development
 - Impact of FCD and FCID at sub regional level
- Environmental studies:
 - Related Environmental Policies, Acts and Laws (in regional planning study)
 - Environmental Procedures and Guidelines (in sub regional planning study)
 - Economic, Social, Biological and Physical Environment at sub regional level
- Hazard management :
 - Review on guidelines on Hazard management at sub regional level
 - Hazard mapping considering natural hazards: Flood, Cyclone, earthquake, coastal erosion, water logging, drainage congestion, salinity intrusion according to guidelines on Hazard and Risk management at sub regional level
- Water Resource Management
 - Agriculture water management at sub regional level
 - Domestic water management at sub regional level
- Transport Studies (Rail, road, and water)
 - Overview of the Existing Transport Situation
 - General Situation of Road Infrastructure
 - Situation of Road Transport (Passengers)
 - Road Transport (Goods)
 - Water Transport
 - Major Traffic Generating Centres and Areas of Congestion
 - Traffic Flow Characteristics
 - Road Transport Services
 - River Traffic Situation
 - Travel Pattern
 - Road Network Development
 - Situation of Rural Transport
 - Location of key point installation at sub regional level
 - Strategic Issues to be addressed in planning the Future Transport System
- Population Study
 - Spatial distribution of population and its changes since 1991
- Study on Basic services (major urban area):
 - Housing,

- Sanitation
- Emergency life support service during disaster
- Communication
- Energy
- Education
- Health
- Economic Activities:
 - Agriculture
 - Industry
 - Fisheries
 - Forestry
 - Disparity analysis
- Anthropological and Ethnographical Study
 - Livelihood Study of local people
 - Ethnographical Study
- Heritage, Archaeology and Tourism management
 - Potentials of Tourism in the in the sub region
 - Planning Tourism in the for the sub region
 - Linkage of Tourism to Recreation and Sports
 - Potential Sites of Heritage
 - Archaeological sites

2.2 Sub- Regional Structure Zoning Category: In order to promote and protect public safety welfare by (i) minimising adverse effect resulting from the inappropriate location or use of sites and structures, (ii) conserving limited land resources and encouraging their efficient use. To carry out the purposes and provisions of the project as they apply within the context of the Sub-regional Structure Plan, the following land zoning category would be followed:

- Main flood flow zone
- Sub flood flow zone
- Wetland
- Forest
- Agricultural land
- Urban area
- Rural settlements
- Forest settlements
- Industrial moderate hazards
- Industrial low hazards
- Water supply protection zone
- Restricted flood protection reserve
- Restricted military / public safety
- Restricted road / rail/ utility reserve
- Restricted special

2.3 Conservation Plan: Major Landuse pressure is heavily depending on the ecosystems and resources of the existing nature. Land-use conflicts and clearly unsustainable uses may be found in planning areas. There is a clear need for broad-based, multi-sectoral and long term development management, including community-based initiatives in sanitation, biomass preservation and collective management of natural resources, including more detailed priorities such as ecosystem preservation of fisheries habitat, maintenance of biological diversity and productivity, forestry management, containment of saltwater intrusion and population risk management. Also needed are institutional and regulatory actions.

Contrary to some current impressions, conservation and economic development are not conflicting ideas. In fact, well-planned conservation-oriented development will add to the general economic and social prosperity of a coastal community, while bad development will sooner or later have a negative effect. With innovative management based upon sustainable use, communities may be able to achieve a desirable balance without serious sacrifice to either short-term development progress or longer-term conservation needs. In broad sense Conservation Plan would cover ecology and environment, land forms: forest, wetland, rivers and agricultural land, Major infrastructures, area of archaeological/ anthropological interest.

2.4 Development Plan for Mirsharai Upazila this would guide need of future Landuse and infrastructure within the next 20 years.

This Development Management Plan would include five components:

- a. **Structure Plan** for Mirsharai Upazilas including paurashava and all unions
- b. **Urban Area Plan** for the declared urban areas of Mirsharai Upazilas
- c. **Development Control Plan** for the whole of upazilas under the project
- d. **Rural Area Plan**
- e. **Action Area Plan**

a. **Structure Plan** for each of Mirsharai Upazilas would provide guideline for landuse and infrastructure within next 20 years. The principal components of such a plan are as following:

- An inventory of existing physical, demographic, economic, social and infrastructure features.
- An analysis of the major existing problems.
- An estimation of trends and changes likely in 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 concentrates on the broad structure for paurashava and unions of Mirsharai Upazilas under the project 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. In those areas and sectors where action is anticipated or proposed within a relatively short time however, more detail may be needed than is provided in the structure plan. Such appropriate level of detail is provided in the action area planning level.

The Structure Plan would cover up to the year 2036 with the content and meaning of the development policy of Planning Commission and guidelines laid in the Sixth Year Plan, Vision 2021, Perspective Plan 2020, Sustainable Development Goals(SDG), National Water Management Plan (NWMP), Coastal Zone Management Project (CZMP), Disaster Management Plan, Comprehensive Disaster Management Programme, Wetland Protection Act, Environmental Laws, Forest Act, Economic Zone Act, The Building Construction Act, 1952 etc.

The Structure Plan would include studies on:

- Hydrological study based on the secondary data-set of the upazilas and connecting rivers (Hydrodynamic characteristics, Morphological characteristics, Geomorphologic development, Dominant Hydrodynamic and Morphologic process, Conceptual Model of Dominant Hydro morphologic process, Impact of FCD in the area)
- Disaster management: Flood, water logging, drainage congestion, salinity intrusion and cyclone, Earthquake, river erosion, drought etc.
- Water Resource Management
- Land Study: Change in Land Category and Land Use after FCD
- Livelihood Study (pattern before and after FCD)
- Settlement Pattern (before and after FCD)
- Population Study
- Housing, Water supply and Sanitation
- Communication, energy, education and health
- Agriculture and fisheries
- Transport system (road and water)
- Ecology and Environment

These sectoral studies would provide planning guidelines for land use and physical infrastructure. Land use, physical feature and spot level survey would be carried over the whole project area. This is in order to promote and protect public safety welfare by (i) minimizing adverse effect resulting from the inappropriate location or use of sites and structures, (ii) conserving limited land resources and encouraging their efficient use.

To carry out the purposes and provisions of the project as they apply within the context of the Structure Plan, the following land zoning category would be followed:

- Main flood flow zone
- Sub flood flow zone
- Water supply protection zone
- Mixed use planned zone

- Mixed use spontaneous zone
- Rural settlements
- Industrial low hazards
- Restricted flood protection reserve
- Restricted military/public safety
- Restricted road/rail/utility reserve
- Restricted special
- Height Restriction Zone for (e.g., Civil Aviation)
- Spring and Neap tide zone
- Exclusive Tourists and Recreation zone
- Trade and Commercial zone
- Fish Processing and Fishing Village zone
- Forest Resources zone

The purpose of a Structure plan is to lessen uncertainty about what presently exists and what is likely to happen in future and to provide a basis for different agencies, public and private, to proceed on the basis of a common goal by providing a framework for overall development. The structure plan examined the existing situation, drew attention to key problems, assessed likely changes and their implications and proposed how some major problems might be tackled.

Very briefly, the structure plan of “Mirsharai Upazilas” notes an anticipated population increase of some certain percentage of population growth in the project area by the end of the plan period and assesses the implications of this growth. Amongst its major proposals are the needs for more modern inputs to sustain agricultural productivity, the need for new non-agricultural jobs, improved infrastructure to promote the tread between two neighboring countries. It concentrates on the framework and not the details of layout or individual development. Where action is anticipated or proposed within a relatively short time however, more detail may be needed than is provided in the structure plan. The structure plan identifies the major actions needed to bring about development in accordance with its recommendations.

b. The Urban Area Plan would emphasis over potential areas (Mirsharai Upazilas) for urban development for next 10 years within the proposed framework of Structure Plan. The function of the Urban Area Plan, in particular, would provide diagnostically analysis of the towns on the basis of which proposed Plans and Programme can be prepared.

Content (with thematic map) of Urban Area Planning Study are the following:

- Existing physical features and Occupancy Type and Use Class
- Proposed or on-going Development Activities
- Population Study: The population statistic shall have to be collected from all possible sources, such as: (a) Census. (b) Municipal Record. Analysis of existing population should bring out the following characteristics: Male/Female ratio, Age-sex pyramid, Reasons for population growth/decline (Birth rates, Death rates, Immigration, emigration)
- Traffic Survey:
 - Trip generation survey
 - Statistical analysis of the past trends in growth.
 - Types and Numbers of different Vehicles
 - The Traffic flow in major arterial roads and maps and charts showing origin and destination
 - Critical traffic Junctions
 - Existing roads type, width, condition of pavement and possibility for future extension
- Industrial Surreys:
 - Location, size and capacity of the existing industries
 - labourer statistics with the housing conditions
 - Future trend.
- Recreational Open Space: Parks, playgrounds should be surveyed to find out its details like location, size and attached facilities.
- Water Supply Data:
 - Source and extend of existing supplies
 - The capacity and system of water supply
 - future programme of expansion
- Power Supply:
 - Existing power supply sources and probable future expansion

- Existing supply lines and the future probable lines
- Growth of the Town:
 - Spatial coverage of the town within broad time-frame
 - Strategic growth option for the town
- Health Facilities:
 - Location of health facilities and their hinterland
- Educational Facilities:
 - Location of health facilities and their hinterland
- Shopping: Shops and Commercial establishments differentiated into wholesale and retail shopping should be recorded. Growth or decline of shopping during the last 10 years
- Municipal Budget: Municipal Budget for last five years should be collected and presented with explanatory notes on the capacity of Municipality with respect to their development activities.
- Municipal Achievements: Maps and publications on the town itself in the form of books and book-lets, etc. should be collected and presented.
- Disposal Services: The methods of collection and disposal of garbage should be surveyed and presented with comments.
- The graveyards, Cremation ground, etc. should, be surveyed and presented. The methods of sewage disposal should be surveyed and presented with comments with probable location of treatment plant.
- Hazard mapping considering natural hazards: Flood, water logging, drainage congestion according to guidelines on Hazard and Risk management in regional plan

c. The Development Control Plan for National and Regional Highway Corridor would cover the areas outside the urban areas under Mirsharai Upazilas along with the national and regional highway of the **Region to prohibit ribbon development**. The planning period for the component is 10 years. The plan would emphasize over retaining efficiency of the national highway. Content (with thematic map) of The Development Control Plan for Highway Corridor will be the similar or revised version (where necessary) of The Urban Area Plan.

d. The Rural Plan is the guideline for the land use control for the rural areas for next 10 years except the urban area and highway corridor area. The plan would emphasize over retaining the characteristic of the rural part of the project. It also provides guide line for necessary physical & social infrastructure which may needed for sustainable rural development particularly for rural growth centres. The main concern of this plan is to preserve the agriculture land as much as possible. Content (with thematic map) of Rural Plan will be the similar or revised version (where necessary) of The Urban Area Plan.

e. The Action Plan is a separate document covering the **first five-year period of the structure plan**. It examines, in the context of the structure plan, those items that might be implemented in this period and thus contains more detail on a more limited range of subjects than the structure plan. It tries to provide the planning area with guidance in deciding between priorities.

Project Selection for action plan: This consists, basically, of the actions listed for the first five-year period in the implementation chapter of the structure plan. While the importance of maintenance has been stressed throughout the structure plan, maintenance activities by themselves, except where they form a part of a development project, are not included in the action plan. Their selection is based on a variety of criteria. These include the maintenance of existing provision levels.

Project Evaluation for action plan: Project evaluation is done for those, which might be locally funded, and for those unlikely to be locally funded but which are the responsibility of a Ministry or another central agency. Ideally, funds would be made available for implementing priority projects following evaluation. This unfortunately is not the case but the evaluations will assist the local agencies in deciding upon priorities for using local development funds and in pressing for action by national agencies. The evaluations vary according to information available but overall are more qualitative than quantitative.

They cover the following aspects:

- Nature of project
- Location
- Justification (why project needed)
- Approximate cost including maintenance element
- Beneficiaries, direct and indirect
- Agency responsible

- Risk/difficulties/problems anticipated

Establishing Priorities for action plan: It is worth repeating that all the actions/projects selected and evaluated are required to bring about development along the lines advocated in the structure plan. Nevertheless, constraints make it difficult to carry out all these activities in even such a small programme. Where possible, therefore, priorities are recommended. It is the funding authority concerned, which should decide upon priorities, but the evaluations can assist in this decision.

2.5 Conducting Survey of Existing Flora and Fauna

The survey firm/NGO shall conduct baseline survey of existing flora and fauna of the project area comprising of Mirsharai Upazilas.

125976.68 acre Baseline survey of existing flora and fauna in the Mirsharai Upazila shall be conducted to attain the following objectives:

- To develop an understanding of the existing flora and fauna based on available information, data gathering, literature searches, site visits and any baseline studies already carried out;
- To make an inventory of the species that are present on the spatial level of the survey and also the species that are frequent and also which are rare
- To identify the autecological characteristics they possess and the communities they form
- To identify the characteristics and physical conditions of the sites that form their habitats
- To determine a threshold for selecting existing flora and fauna, based on their value, using measures;
- To identify those flora and fauna reaching the threshold value which could be affected by the project;
- To identify the spatial arrangements of habitats and the key processes that lead to the decline of endangered species (e.g., Flooding, eutrophication, disturbance, intensification etc.)
- To determine the species including their habitat that might be threatened due to future development
- To identify the factors affecting the integrity of the existing flora and fauna in the ecosystems and the conservation status of relevant habitats and species;
- To set forth recommendations on preserving the species of the project area and ecology sensitive land use planning to keep the ecological system sustainable
- To develop an interactive digital model for the ecological system for the project area

2.6 Methodology for the Assignment

The survey firm/NGO has to follow the following steps to conduct the study:

A. An Inventory of the Flora and Fauna

The survey firm/NGO shall conduct historical study to get information on the spatial distribution of habitats or species and compile habitat or species inventories on various scales, and also recognize the pattern of rarity. The survey firm/NGO needs to know if the habitats actually rare have been in this state for a long time or if they were still frequent some decades ago. Information on the underlying process of decline or increase can be achieved by an historical landscape analysis. Time series of old topographic maps or aerial photos, written historical texts or oral information are all valuable sources to outline a picture of the landscape at times when land use was less intensive than today. Maps with the historical distribution of habitats from these sources should be drawn in the same resolution as the actual distribution. By overlaying both maps the survey firm/NGO shall compute exact balances of losses for all habitat types in the project area.

The communities, which have been rare for a longer time (mainly because of special landscape conditions) and which communities have just recently declined in spatial extent shall be identified through the historical analysis. The historical analysis shall depict wet meadows some decades ago and, within land reclamationschemes, the recent drainage of the valley bottom. Subsequently, the drained meadows were turned into crop fields. Drainage is a major factor for the loss of species that are adapted to wet habitat conditions.

B. The Comparative Assessment of the Plant and Animal Communities Present in a Study Area

The survey firm/NGO shall assess the need for Conservation at the scale of the biocoenosis. The firm/NGO shall draw inference from their shape and physiognomy a potential significance for species when mapping selected habitats. But unless we record the species, we will not know if they really occur in the habitats mapped. The firm/NGO shall then develop criteria for rarity or restitution capacity. As communities change readily in species composition if soil conditions, climatic conditions or land use intensity vary at the sites where they live. This is the scale to identify some of the abiotic driving forces behind the species decline.

Communities (biocoenoses) are spatio-temporal assemblages formed of populations from different plant and animal species. To draw the link towards the abiotic factors, the firm/NGO shall also relate them to the space they live in; and also gather additional data on soil conditions, climatic conditions and land use intensity to draw biotope in the geographical sense.

In their majority, land use changes or conservation measures will not directly affect the communities themselves but these abiotic factors, in their quality and their spatio-temporal extent. Consider a community that needs to be conserved because some species decline in population numbers.

If those species are not world-wide endangered to a very high degree, we will not try to rise the population numbers by off-site breeding programs in zoological or botanical gardens. Instead, our conservation measures will aim to improve the abiotic conditions in the biotopes in a way that endangered species will rise in population numbers.

C. Sampling Technique for Inventory

The survey firm/NGO shall take sample of at least 10 (ten) critical locations of the project area for inventory of existing flora and fauna in consultation with PD. For this reason the firm/NGO has to classify the species distribution to communities for mapping the flora and fauna and identify abiotic factors that may be driving forces behind the species decline. To do so, the firm/NGO shall stratify the landscape into different physiognomic units. By comparing all relives over all representative sites of all landscape units, the firm/NGO shall group relives with similar species distribution together to communities.

From the comparison of the different communities with their aggregated species distribution, the firm/NGO shall deduce which species are restricted to one community type and which species are frequent over a broad range of communities. The frequency and spatial extent of the communities and their sites, respectively shall considered from a map. Therefore, the firm/NGO also needs to produce a map of the vegetation cover.

Aggregation of individual samples of species to communities and community mapping has a long tradition with respect to the vegetation as plants are sessile and are therefore easily to be recognized. Community identification and mapping is much more difficult or even impossible with respect to the fauna. Animals are capable of moving through patches or landscapes. Their current distribution may be highly influenced by their ethology, e.g. territoriality, rivalry or occurrence of potential predators. They may belong to different trophic levels and their spatial home range may vary over several orders of magnitude. Keeping these difficulties in mind, the firm/NGO shall advocate for a pragmatic concept to relate animal occurrences to biotopes. Samples of animal populations are mostly point samples. As long as the biotope physiognomy and the physical factors remain the same in the neighborhood of the point sample, the firm/NGO shall infer that the point data are representative for this neighborhood. Its extent can then be delineated on a map.

D. Evaluation and Goal Development Based on "Target Species"

It is obvious that remaining populations of a threatened species have to be considered with the highest priority. The management of lost habitats and home-ranges should be adjusted to the needs of these populations. The target species approach is usually more general. It is based upon the principle that it is never possible to focus on all species in any given planning area.

The various classes of species that shall be used to gather evidence on the habitat characteristics of a planning area are defined below:

Indicator species: species which indicate special factors such as pH, humidity, temperature, trophic level, nutrient conditions.

Umbrella species: species which prove that the habitat requirements for a broad range of other species are "covered".

Flagship species: Particularly attractive or appealing species which leads public opinion towards nature conservation regardless of cost or restrictions.

Target species (Goal species): species (groups) upon which politicians, nature conservation authorities, or other bodies have agreed to focus in any given area.

E. Integrated Evaluation of Species and Habitats

Particular habitats with a high species diversity, and remnants of representative ecosystems (climax ecosystem') which exist on sites which are now normally in economic use, represent the basic skeleton network of a species conservation concept. In this context, the firm/NGO shall identify and assign the rank to the very important habitats and the most heavily impacted sites; and then shall classify the areas according to their species and habitat diversity.

F. SURVEYS TO BE UNDERTAKEN THROUGH WALKOVER

Detailed step by step methodology for the baseline survey of existing flora and fauna is described below:

Habitat Survey

The initial habitat assessment shall be undertaken through walkover survey and the habitats present within the project area shall be classified and mapped. The firm shall use satellite image provided by UDD to map the extent of habitats.

Species Composition Assessment

In parallel with the habitat mapping and classification exercise, plant species lists and estimates of percentage species composition of the canopy layers of each of the relevant habitat features shall be recorded to underpin future landscape treatments to make a qualitative comparison of the nature of hedgerows on a project.

Hedgerow survey

The firm shall conduct Hedgerow Survey to identify the following:

- ‘Location and setting’ of the establishment type, landscape type and altitude in which the hedge is located;
- ‘Situation’ describing the adjacent land use and linkages with adjacent habitats.
- ‘Structure and condition’ describing the quality, condition and future viability of the hedgerow including characteristics such as its continuous nature and density at the base.
- Finally, species composition of the hedge is recorded, including percentage of flora and fauna are present.

Surveys of a Particular Sites or Features to Assess Conservation Importance

Once the walkover survey and/or desk study reveals the presence of habitats or plant/fungal communities that are potentially of nature conservation importance, relevé (quadrat)-based surveys shall be conducted to fully assess the value of these features.

Species-Specific Surveys

Once, the walkover survey and/or desk study has identified the presence or likely presence of a protected species (or a species of nature conservation importance) that would be affected, targeted surveys shall be undertaken. When a survey has confirmed the presence of a protected species or species of nature conservation importance, the location of the individuals/colonies shall be marked on a plan and the locations accurately identified using a GPS. An estimate of population size or equivalent should be provided.

River Habitat Surveys (RHS) and River Corridor Surveys (RCS)

A RHS and/or a RCS shall be conducted at locations a proposed road crosses a water course. The need for further surveys of riverine habitats will depend upon the extent of the potential impacts on bank-side and in-channel features, and the apparent nature conservation value of these features. This shall be reviewed on the basis of the results of the walkover survey.

The RCS method shall provide information on the vegetation and the physical structure of the water course. This method shall be used at the location of, as well as upstream and downstream (for at least 1km) of, any proposed crossing points. It shall provide a record of the channel conditions for impact assessment and mitigation design and generate a baseline data to underpin post-construction monitoring as well.

G. Characterizing Impacts and Mitigation

The firm/NGO has to illustrate how significant impacts (adverse or beneficial) that might occur due to tourism development and establishment of

Mirsharai Economic zone, BISIC industry and salinity of water as well, in the absence of mitigation and compensation measures, shall be quantified and characterized in the following way:

- determine the value of existing flora and fauna affected, through survey and study;
- assess impacts affecting those flora and fauna, which meet or exceed a defined threshold value, with reference to ecological processes and functions as appropriate;
- quantify the extent, magnitude, duration, timing and frequency of the impacts;
- assess impact reversibility;
- explain the level of confidence in these predictions; and
- Identify likely significant impacts in the absence of any mitigation.

H. Determining Value

The value of the existing flora and fauna shall be determined on the basis of the following:

- whether, as part of screening, potentially affected features or resources are considered sufficiently valuable that there could be a significant effect that would trigger an EIA;
- A ‘threshold’ level of value of the species;
- Deciding what mitigation is appropriate.
- Considering legal and policy implications

I. Evolution of Project Design and Mitigation

- Identify measures to avoid or reduce negative impacts;
- Identify opportunities for enhancement;
- Demonstrate likely success of mitigation measures; and
- Provide sufficient information for mitigation measures to be implemented effectively, e.g. through an Environmental Action Plan (EAP).

J. Identify Significant Residual Impacts and Their Legal, Policy and Development Control Consequences

- Produce a clear summary of the significant residual impacts of the project incorporating mitigation and enhancement measures;
- Where significant impacts cannot be avoided/reduced, identify compensation measures to be implemented;
- Consider the consequences of significant residual impacts in the light of planning policies and legislation; and
- Include mitigation, compensatory actions and enhancements in the EAP or similar.

K. Mapping of the Site

The firm/NGO shall then map the site of the flora and fauna in ARC GIS and present at a scale in consultation with PD.

L. Development of an Interactive Digital Model

The survey firm/NGO shall develop an interactive digital model of existing habitat, decline of habitat and possible areas of conservation.

M. Submission of Report

- The fina
- 1 report shall include, set out clearly, information on existing flora and fauna necessary for decision making. Key aspects include:
 - Description of baseline and trends of existing flora and fauna, if the project were not to go ahead;
 - Explanation of the criteria used to evaluate existing flora and fauna; and assess the significance of impacts of the project;
 - Statement of methodology used;
 - Presentation of analytical techniques used and the analysis itself; and interpretation from the analyses
 - Identification of likely impacts on existing flora and fauna; and an explanation of their significance and the level of certainty with which this can be stated; and
 - Description of legal and policy consequences.

2.7 Deliverables and Timeframe

The outlines of the deliverables and the timeframe for their submission are given in the Table-4 below. Any innovative methods, concepts and ideas beyond the outlines of the deliverables can be included with the activities and corresponding reports. The timeframe can be reshuffle as well.

Table 4: List of deliverables with their tentative outlines

Sl No.	Deliverables	Outline of Deliverables
1.	Mobilization Report	<input type="checkbox"/> Description of objectives and scope of sub-activities <input type="checkbox"/> Team formation and structure of survey team <input type="checkbox"/> Actual work schedule for the work <input type="checkbox"/> Immediate action taken after signing agreement
2	Inception Report	<input type="checkbox"/> Introduction <input type="checkbox"/> Description of sub-activities <input type="checkbox"/> Method and materials for each activity <input type="checkbox"/> Required resources allocation

		<input type="checkbox"/> Revised work schedule for completion of the work
3.	Interim Report	<input type="checkbox"/> Identified existing flora and fauna <input type="checkbox"/> Stating which species are rare and which species are endangered <input type="checkbox"/> Identify the habitats of the flora and fauna <input type="checkbox"/> Identify the characteristics of the flora and fauna
4	Final Report	<input type="checkbox"/> Description of baseline and trends of existing flora and fauna, if the project were not to go ahead; <input type="checkbox"/> Explanation of the criteria used to evaluate existing flora and fauna; and assess the significance of impacts of the project <input type="checkbox"/> Explanation of the criteria used to evaluate existing flora and fauna; and assess the significance of impacts of the project <input type="checkbox"/> Statement of methodology used <input type="checkbox"/> Presentation of analytical techniques used and the analysis itself; and interpretation from the analyses <input type="checkbox"/> Identification of likely impacts on existing flora and fauna; and an explanation of their significance and the level of certainty with which this can be stated <input type="checkbox"/> A digital map of the existing flora and fauna <input type="checkbox"/> Description of legal and policy consequences

2.8 Report submission schedule and Mode of Payment

Reports shall be presented and illustrated in a clear and concise professional manner, including maps, plans, diagrams and other graphics. Schedule of submission:

Table 5: List of Report with Language, No. of Copies, Period of Submission, Binding status and Mode of Payment

Report	Language	No. of Copies	Period of Submission	Binding Status	Mode of Payment (% of Contract amount)
Mobilization Report	English	50	Within 15 days of signing contract	Spiral Binding	Not more than 15%
Inception Report	English	50	End 1 st month	Spiral Binding	Not more than 20%
Interim Report	English	50	End of 2 nd month	Spiral Binding	Not more than 35%
Draft Report	English & Bangla	100	After submission of Interim report next 15 days	Spiral Binding	Not more than 10%
Final Report	English & Bangla	100	End of 3 rd month	Spiral Binding	Not more than 20%

2.9. Some important notes:

- Any report should properly describe the definition, methodology, procedures/steps, reason for accepting/avoiding relevant equation, detail sources of any references, in-depth description of the result, proper way of writing bibliography etc. Report should be provided in doc. format, rather than pdf of other format. Before submitting the report English (spelling, sentence making etc.) should be varied and edited properly. All references (article, chapter of the book, report etc.) used in the report should be provided to UDD with the submission of each deliverable.
- All data (in excel, access, GIS etc.) used in the text or as reference should be provided with the each deliverable
- The awarded department shall record progress of activities through video, still photographs and stories (as appropriate) and must submit the same to UDD as on when required.
- The awarded department shall follow all the conditions and provisions stated in this document and in case of any confusion regarding any of those, explanation provided by UDD shall be deemed as final.

2.10. QUALIFICATION, EXPERIENCE AND RESPONSIBILITY OF BASELINE SURVEY OF EXISTING FLORA AND FAUNA FIRM

2.10.1 Qualifications, Experience and Responsibility of Key Personnel of Survey Firm:

A. Baseline Survey of Existing Flora and Fauna Expert– 1 Person (1x3 = 3 mm.)

Qualification: Minimum Masters Degree in Environmental Science, Ecology, Forestry and Wood Technology, Marine Biology, Zoology, Botany or Related discipline

Experience: At least ten years experience in the study and management of flora and fauna in the coastal region of Bangladesh.

Responsibility: (i) To make an inventory of all types existing flora and fauna in the project area including endanger species. (ii) to identify the potentiality of the natural resources (flora and fauna) for tourism development in the region.(iii) To identify environmental hazards that might be imparted on the flora and fauna due to tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water; (iv) To prepare a map of habitat for existing flora and fauna of the project area indicating communities of various species of plants including the areas that would be disturbed by tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water as well; (v) To earmark the areas, which would not be disturbed by any kind of development; (vi) To make recommendations to protect the forest resources from environmental hazards and also to preserve the endangered species from depletion to attain sustainable development; (vii) To develop an interactive digital model for the whole ecological system with special reference to flora and fauna in the project area.(viii) To prepare report on assigned task under the scope of work of the ToR; (ix) Any other related task as assigned by PD.

B. Environmental Impact Assessment Expert-1 Persons (1x2 = 2 mm.)

Qualification: Master's Degree Environmental Engineering or related discipline.

Experience: At least ten years experience in the study of environment related issues.

Responsibility: (i) Prepare guidelines for environment impact assessment (EIA) for tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water in the region with special reference to existing flora and fauna; (ii) Conduct EIA for various proposed projects under the planning; (iii) To identify the establishments to be established in environmentally critical areas in the region and provide with required remedial measures, and also develop control and regulatory mechanisms for sustainability of the flora and fauna in the region; (iv) To identify the location of habitats that shall be preserved to keep the biodiversity of the region sustainable; (v) To identify the endangered species of the region and earmark the site for their conservation and selecting site for safari park and sanctuary; (v) determination of criteria for selecting site for tourism development; (vi) To examine the environmental condition of the proposed tourism sites and recommend remedial measures with special reference to existing flora and fauna of the region; (vii) To develop an Environmental Action Plan (EAP) for mitigation measures to be implemented effectively.

(viii) To work closely with the GIS/RS specialist to integrate the environmental considerations into spatial database; (ix) Any other related jobs assigned by PD.

C. Associate Baseline Survey of Existing Flora and Fauna Expert–1Persons (1x3= 3 mm.)

Qualification: At least Bachelor Degree in Environmental Science, Ecology, Forestry and Wood Technology, Marine Biology, Zoology, Botany or Related discipline

Experience: At least five years experience in the study and management of flora and fauna in the coastal region of Bangladesh.

Responsibility: To assist the Baseline Survey of Existing Flora and Fauna Expert

(i) To make an inventory of all types marine resources in the project area including endanger species. (ii) to identify the potentiality of the marine resources (flora and fauna) for tourism development in the region.(iii) To identify environmental hazards that might be imparted on the marine resources due to tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water in the region; (iv) To prepare a map for marine resources of the project area indicating communities of various species of plants including the areas that would be disturbed by tourism development and establishment of Mirsharai Economic zone, BISIC industry and salinity of water in the region as well; (v) To earmark the areas, which would not be disturbed by any kind of development; (vi) To make recommendations to protect the marine resources from environmental hazards and also to preserve the endangered species from depletion to attain sustainable development; (vii) To develop an interactive digital model for the whole ecological system with special reference to marine resources in the project area; (ix) Any other related task as assigned by PD.

**APPENDIX-03
BIDDING FOR TENDER**

3.1 Contents of the Technical Proposal

According to the provisions laid in the Public Procurement Regulations 2008.

3.2 Financial Proposal

Financial proposal should be prepared as per following format in the firm's own letter head.

Format of Financial Offer

Sl No	Description of Survey and Studies	Area/no.	Rate (TK.)	Total Amount(TK.)
01	Establishment of Monitoring Well			
02	Aquifer Pump Test			
03	Lab Test for Examining the Water Quality			
04	Data Analysis and Interpretation			
05	Development of Digital Hydro-Geological Model			
09	Project Team of Consultant			
	TOTAL			

N.B. – Above Quoted rates should be inclusive of the cost Salaries, Management, Transportation, Contingency, Incidental, Income Tax & VAT and other related cost including printing and binding of maps and reports etc.

APPENDIX-04

FORMAT OF CURRICULUM VITAE AND PROJECT TEAM

4.1 Format of Curriculum Vitae of Professionals

According to the provisions laid in the Public Procurement Regulations 2008.

4.1.1 Format of the Proposed Project Team

Sl. No.	Position	Name	Age (in Years)	Length of Experience (Year)	Qualification	Man month
1.						
2.						
3.						

4.3 Format of the Major Experience in Similar Project Completed During Last 05 Years

Sl. No.	Name of the project	Name of the Client	Cost of the Project	Project Duration
1.				
2.				
3.				
4.				
5.				