Payra-Kuakata Comprehensive Plan Focusing on Eco-Tourism
Structure Plan: 2021-2041

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EXECUTIVE SUMMARY

The Structure Plan is a policy document that serves as a guide for the comprehensive and long-term development of Barguna Sadar upazila. The plan encompasses ten unions, including Aylapatakata, Badarkhali, Burir Char, Dhalua, Phuljhury, Gaurichana, Keorabunia, M.Baliatali, Naltona, and Barguna Sadar. The ultimate goal of the plan is to enhance the socioeconomic position of the local residents through integrated planning, implementation, and community participation for optimal resource utilization and poverty reduction.

To achieve this goal, the Structure Plan incorporates a wide range of policies and strategies that address different aspects of development. The plan's primary focus is on land use, transportation, infrastructure, environmental protection, and social services.

The land use policy identifies suitable locations for residential, commercial, industrial, and agricultural activities and recommends regulations to guide development in these areas. It aims to promote sustainable land use practices that minimize environmental degradation and support the local economy.

The transportation policy aims to improve connectivity within and outside the upazila by enhancing the road and public transport infrastructure. The plan proposes measures such as the construction of new roads and bridges, the expansion of existing ones, and the introduction of new public transport services to ensure efficient movement of people and goods.

The infrastructure policy focuses on providing basic facilities such as water supply, sanitation, and waste management to the local population. It aims to improve the overall quality of life by ensuring access to essential services.

The environmental protection policy aims to manage natural resources sustainably and mitigate the adverse effects of climate change. The plan proposes measures to conserve forests, rivers, and wetlands and reduce greenhouse gas emissions to minimize the impact of climate change.

Finally, the social services policy aims to provide essential services such as healthcare, education, and social protection to the local population. The plan aims to improve access to quality services and ensure that vulnerable groups receive adequate support.

In summary, the Structure Plan for Barguna Sadar upazila is a comprehensive document that provides a framework for the upazila's development. The plan's implementation will require cooperation and participation from the local community, government agencies, and other stakeholders. If successfully implemented, the plan will improve the socioeconomic position of the residents and enhance the overall development of the upazila.

This report provides detailed findings from the regional plan level and guidelines at the structure plan level. The basic database also different sector experts' inputs are incorporated in the preparation process has been described in this report. Besides this, with the help of secondary databases, many analyses for the decision-making have been conducted in this interim report, Survey report, and working papers. To prepare the base map and very primary reference point of the plan, all the mouzas of the project area have been digitalized, the entire procedure has been described in the report, and databases were prepared.

The overall goal of this structure plan is to lead the development or redevelopment of Barguna Upazila to enhance the residents' socioeconomic position by following the guidelines laid out in the regional plan.

CHAPTER ONE: BACKGROUND OF THE STRUCTURE PLAN

1.1 Introduction:

Barguna Upazila is located inside the district of Barguna and is located on Bangladesh's outer coast. The upazila is renowned for its iconic and diverse coastline. With over 10 kilometers of coastline, the local community values the recreational and lifestyle opportunities that the coast provides. It offers a range of economic benefits and attracts industries and businesses reliant on the coastal Resource. Padma Gora Forest and Sonbunia beach attract domestic visitors keen to experience a slice of paradise. The coastline along the upazila is dynamic and distinctive. These distinct environments bring their unique challenges, and this requires strategics to understand the characteristics, opportunities, and solutions that are best matched to each area. The impacts of climate change and inevitable pressures caused by land use and development need to be carefully considered along with ways in which the community as well as the authority can ensure sustainable management of natural and physical coastal resources, now and for future generations.

The structure plan of Barguna Sadar Upazila will benefit the region in several ways. Firstly, the plan provides a comprehensive overview of the demographics, economy, culture, and infrastructure of the upazila, which can help identify areas for growth and development. This can provide a roadmap for the upazila's development and help prioritize and allocate resources effectively. The plan can also serve as a tool for attracting investment and funding from both public and private sources. By highlighting the potential for growth and development in key areas such as agriculture, tourism, and infrastructure, the plan can attract investors and businesses to the upazila, which can create employment opportunities and drive economic growth.

The structure plan can help improve connectivity and mobility within the upazila by upgrading and expanding the road network and transportation systems. This can improve access to essential services such as healthcare, education, and markets, and also facilitate the movement of people and goods within the upazila and to other parts of the country.

Secondly, the plan can help improve access to basic services such as electricity, water, and sanitation. This can be achieved through the construction of new infrastructure and the upgrading of existing infrastructure, which can improve the quality of life for residents and promote economic growth and development.

Thirdly, the plan can help mitigate the impact of natural disasters such as flooding and cyclones, which are common in the region. This can be achieved through the construction of infrastructure such as flood protection embankments, drainage systems, and shelters, which can help protect residents and their properties during times of crisis.

Fourthly, the infrastructure plan can create employment opportunities in the construction and maintenance of infrastructure, which can provide a boost to the local economy and improve livelihoods.

Finally, the plan can help attract investment and funding from both public and private sources, which can be used to finance the construction and maintenance of infrastructure. This can help reduce the burden on local resources and ensure sustainable development.

In summary, the structure plan of Barguna Sadar Upazila has the potential to improve connectivity and mobility, enhance access to basic services, mitigate the impact of natural disasters, create employment opportunities, and attract investment and funding, which can promote sustainable economic growth and development in the region.

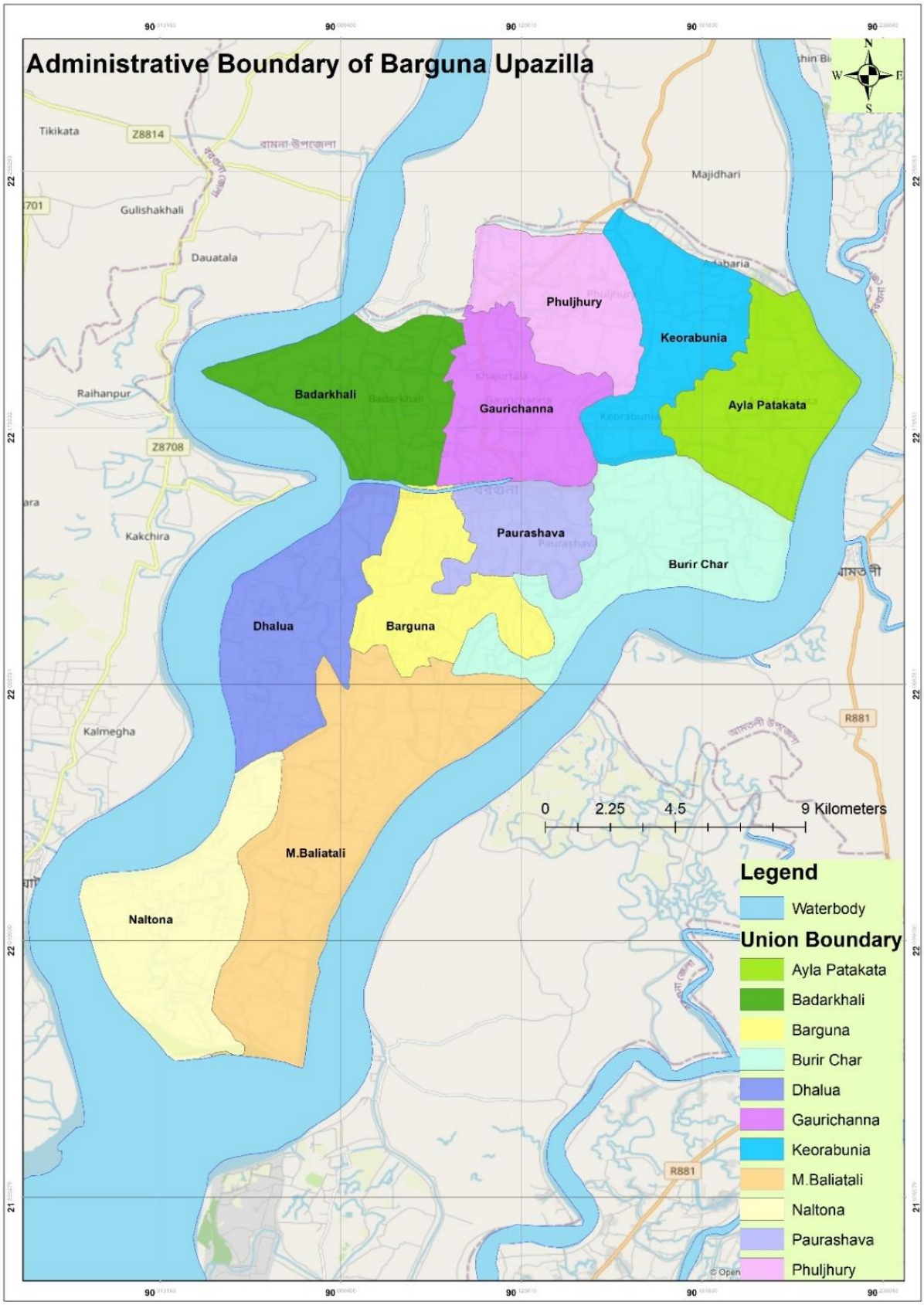
1.2 National and Regional Setting:

The Barguna District has a total area of 1939.39 km2. It was established as a district on 28 February 1984. It is bounded on the north by the districts of Jhalkathi, Barisal, Pirojpur, and Patuakhali. In the east, it borders the Patuakhali district. To the south, Barguna is bounded by the Patuakhali District and the Bay of Bengal. On the western side, it borders Pirojpur and Bagerhat districts. The geographic location of Barguna Sadar Upazila is in between 21°58' and 22°15' north latitudes and in between 89°59' and 90°14' east longitudes. There are six upazilas, six thanas, four municipalities, 42 unions, and 560 villages. Important rivers include the Payra River, Bishkhali River, Khakdon river, Baleshwar River, and Haringhata river. The total area of the river is 160 km2 which is 22% of the total area of the district. Moreover, there are 300 natural canals in the district. The average annual temperature is 33.3° Celsius and the annual lowest temperature is 12.1° Celsius. The annual rainfall of the district is 2506 mm. The total area of reserved forest area is 30533.90 acres. (Bangladesh National Portal, 2022).

The Barguna Sadar Upazila consists of A category Paurashava established in 1994 (Bangladesh National Portal, 2022), Barguna Municipality is subdivided into 9 wards. Barguna Sadar upazila consists of ten unions (Aylapatakata, Badarkhali, Burir Char, Dhalua, Fuljhury, Gaurichana, Keorabunia, M.Baliatali, Naltona, and Barguna Sadar), 53 populated mauzas and 191 villages (BBS, 2011).

Bangladesh enjoys natural beauty and settings for developing ecotourism in many parts and corners of the country like Sylhet, haor areas, the Chittagong hill tracks, the coastal chars, and many newly formed islands. Bangladesh has the potential to become an ecotourism hub for its abundant natural wealth and can ensure the socio-economic development of local communities and conserve biodiversity. Thus, ecotourism can attract economic returns and job creation for local communities through the conservation of local biodiversity and the skill to handle ecotourism. Given the earning potential, the govt. And private entities have started to promote nature-based tourism around potential ecologically rich areas.

The success of developing the Payra-Kuakata region as a tourist center depends much on good communication facilities and the availability of modern amenities. Moreover, it is predicted that the Payra sea port would generate many port-related new activities including huge vehicular traffic such as air, rail, road, and water. This phenomenon would have both positive and negative impacts on the socio-economic condition and existing land use patterns of the region. The proposed would guide such probable changes in the socio-economic condition and land use pattern of the Upazila. This plan will also address the adverse impact of such changes.



Map 1: Administrative Boundary of Barguna Upazila

1.3 Need For A Plan

A structure plan is required in Barguna Sadar Upazila, as in any other area, to guide and manage its growth and development in a coordinated and sustainable manner. Without a structure plan, the development of the upazila could be haphazard, uncoordinated, and unsustainable, leading to various problems such as:

1. Inefficient land use: Without a plan, the upazila may suffer from inefficient land use, resulting in the misuse of valuable land resources and unplanned urban sprawl.
2. Inadequate infrastructure: Development without a plan could lead to inadequate infrastructure, resulting in the lack of basic facilities such as roads, drainage, water supply, and sanitation.
3. Traffic congestion: Inadequate transportation planning could result in traffic congestion and other transportation-related issues.
4. Environmental degradation: Unplanned development could lead to environmental degradation, including the loss of natural resources and the pollution of air, water, and soil.
5. Social and economic issues: Without a plan, the development of the upazila may not prioritize the needs of the community, leading to social and economic issues such as poor access to healthcare, education, and job opportunities.

A structure plan provides a coordinated and integrated approach to guide the development of the upazila, addressing these issues and ensuring that development is sustainable and meets the needs of the community. The plan would set out a clear vision for the future of the upazila, providing a framework for decision-making and investment in the area. Barguna Sadar Upazila Structure Plan would generally include a comprehensive and integrated planning framework for the development and management of the Barguna Sadar Upazila in Bangladesh. The plan would likely encompass various aspects of the upazila, such as land use, infrastructure, transportation, environmental sustainability, social services, and economic development.

Specifically, Barguna Sadar Upazila Structure Plan might involve:

1. Land use planning: This would include zoning regulations, mapping, and identification of suitable locations for various land uses such as residential, commercial, industrial, and public facilities.
2. Infrastructure planning: This would cover the development of infrastructure such as roads, bridges, drainage, and utilities like water supply and sanitation.
3. Transportation planning: This would involve the assessment of transportation needs and the development of a transportation network that would connect the upazila to the surrounding areas.
4. Environmental sustainability: The plan would include measures to promote sustainable development and protect the environment, such as controlling pollution, preserving natural resources, and managing waste.
5. Social services: This would include planning for the provision of social services such as education, healthcare, and public safety.
6. Economic development: The plan would aim to promote economic development in the upazila by identifying opportunities for growth and investment, promoting entrepreneurship, and supporting local industries.

Overall, the Barguna Sadar Upazila Structure Plan would aim to create a comprehensive and cohesive vision for the development of the upazila that would guide decision-making and investment in the area.

1.4 Scope of The Plan

The scope of the Barguna Sadar Upazila Structure Plan is to provide a comprehensive framework for the development of the upazila over the next several years. The plan is intended to guide and coordinate development activities across a range of sectors, including infrastructure, transportation, land use, environment, and socio-economic development.

Scopes of the Barguna Sadar Upazila Structure Plan will include:

1. **Promoting sustainable land use:** The Structure Plan will aim to promote sustainable land use practices that balance the needs of economic development, social well-being, and environmental sustainability. This will include measures to protect agricultural land, preserve natural resources, and prevent unplanned urbanization.
2. **Improving infrastructure:** The Structure Plan will prioritize to improve the quality and accessibility of infrastructure, including roads, water supply, sanitation, electricity, and telecommunications. This will involve prioritizing investments in infrastructure that support economic growth, public health, and social well-being.
3. **Enhancing transportation systems:** The Structure Plan will seek to enhance transportation systems by improving public transportation, developing pedestrian and bicycle infrastructure, and reducing traffic congestion. This will involve developing new transport infrastructure, improving the quality and safety of existing infrastructure, and promoting sustainable and low-carbon transport options between different parts of the upazila.
4. **Providing affordable housing:** The Structure Plan will prioritize to provide affordable and adequate housing options for all segments of the population. This will involve promoting mixed-use development, providing incentives for developers to build affordable housing, and improving the quality of existing housing.
5. **Supporting economic development:** The Structure Plan will aim to support economic development by promoting the growth of key sectors such as agriculture, fisheries, and tourism. This will involve providing infrastructure and support services to local businesses, attracting new investment to the area, and promoting the development of value-added industries.
6. **Enhancing social services:** The Structure Plan will ensure enhanced access to social services such as healthcare, education, and public safety. This will involve improving the quality and accessibility of existing social services, developing new social infrastructure, and providing incentives for private investment in social services.
7. **Preserving cultural heritage:** The Structure Plan will endeavour to conserve and promote the rich cultural heritage of the upazila, including traditional architecture, arts, crafts, and local festivals and traditions. This will entail the development of cultural tourism infrastructure, the organization of cultural events, and the preservation of historical and cultural landmarks.
8. **Enhancing environmental sustainability:** The Structure Plan will emphasize promoting environmental sustainability by encouraging green infrastructure, reducing waste and pollution, and safeguarding natural resources, including forests, wetlands, and water bodies. This will entail encouraging sustainable land use practices, establishing green spaces and parks, and implementing sustainable waste management practices.

9. **Fostering community engagement:** The Structure Plan will prioritize fostering community participation and engagement in the planning and development process. This will involve conducting community consultations, raising public awareness about the plan's objectives and goals, and involving community members in the implementation and monitoring of the plan.

10. **Enhancing public spaces:** The Structure Plan will work towards enhancing public spaces such as parks, plazas, and community centers, and ensuring their accessibility and safety for all residents. This will involve the creation of new public spaces, the improvement of existing public spaces, and the provision of amenities such as seating, lighting, and public art.

11. **Promoting innovation and technology:** The Structure Plan will prioritize promoting innovation and technology in various sectors, including agriculture, healthcare, and education. This will entail promoting the use of digital tools and ICTs, supporting innovation hubs and incubators, and fostering public-private partnerships to promote innovation.

12. **Improving access to basic services:** The Structure Plan will concentrate on improving access to basic services such as education, healthcare, water supply, and sanitation for all residents of the upazila. This will involve improving the quality and coverage of existing services, promoting community-led service provision, and strengthening the capacity of local government institutions to deliver services.

13. **Addressing climate change:** The Structure Plan will target the effects of climate change in the upazila by endorsing measures to adapt to and mitigate these effects, such as improving drainage systems, encouraging sustainable land use practices, and facilitating the use of renewable energy sources. This will involve collaborating with national and international organizations and programs to secure funding and technical assistance.

14. **Enhancing tourism potential:** The Structure Plan will aim to enhance the tourism potential of the upazila, by promoting its natural and cultural attractions, developing tourism infrastructure such as hotels and resorts, and promoting sustainable tourism practices. This will involve partnering with the private sector and local communities to develop and promote tourism products and services.

15. **Strengthening disaster resilience:** The Structure Plan will focus on strengthening the upazila's disaster resilience by identifying and mitigating the community's risks and vulnerabilities to natural hazards like cyclones, floods, and landslides. This will involve establishing early warning systems, promoting community-based disaster preparedness and response, and improving the resilience of critical infrastructure such as hospitals and schools.

16. **Improving health and well-being:** The Structure Plan will prioritize enhancing the health and well-being of the community in the upazila by providing access to quality healthcare services, promoting healthy lifestyles, and addressing social determinants of health such as poverty, education, and housing. This will involve improving the capacity of local healthcare institutions, promoting health education and awareness campaigns, and ensuring access to safe water and sanitation.

17. **Strengthening local economic development:** The Structure Plan will focus on strengthening the local economy in the upazila by fostering the growth of local businesses and industries, facilitating access to financing and credit, and promoting skills development and training. The Plan will also facilitate the establishment of special economic zones, promote agribusiness and tourism, and support the development of local supply chains.

18. **Promoting sustainable energy use:** The Structure Plan will prioritize the promotion of sustainable energy practices in the upazila by encouraging the adoption of renewable energy

sources like wind and solar power, energy efficiency and conservation, and clean cooking fuels. This will involve supporting the development of decentralized energy systems, encouraging the use of energy-efficient technologies, and supporting the growth of green industries.

19. **Promoting sustainable agricultural practices:** The Structure Plan will strive to promote sustainable agricultural practices in the upazila by encouraging the adoption of climate-smart farming techniques, organic farming methods, and modern agricultural technologies. This will involve promoting the use of efficient irrigation systems, soil health management practices, and effective crop rotation practices.

20. **Enhancing the productivity and competitiveness of fisheries:** The Structure Plan will prioritize enhancing the productivity and competitiveness of fisheries in the upazila by promoting sustainable aquaculture practices, the development of value-added fisheries products, and the adoption of modern fishing technology. This will involve promoting efficient fishing techniques, sustainable fishing practices, and effective fisheries management policies and programs.

21. **Promoting climate-resilient agriculture and fisheries:** The Structure Plan will focus on promoting climate-resilient agriculture and fisheries in the upazila by encouraging the adoption of climate-smart farming and fisheries practices, effective early warning systems for climate-related hazards, and the use of climate-resilient crop and fish varieties. This will involve promoting drought-resistant crops, efficient water management practices, and the development of resilient aquaculture systems.

1.5 Multi-Tier Planning Approach:

The Barguna Sadar Upazila may require several types of plans to guide its development, including a Regional Plan, a Structure Plan, an Urban Area Plan, and an Action Plan.

1. **Regional Plan:** A regional plan is a comprehensive planning document that outlines a long-term vision for a particular region or area. It typically includes goals and objectives for economic development, infrastructure, land use, environmental protection, and social issues, and provides a framework for coordinating and prioritizing development activities within the region.

2. **Structure Plan:** A Structure Plan provides an overall vision and framework for the development of the entire upazila, encompassing various aspects such as land use, transportation, infrastructure, social services, and environmental sustainability. The Structure Plan would guide decision-making and investment in the area, ensuring that development is coordinated and sustainable.

3. **Urban Area Plan:** An Urban Area Plan focuses on a specific urban area within the upazila, such as Barguna town, and provides a more detailed and specific plan for its development. The Urban Area Plan would include details on land use, transportation, infrastructure, public spaces, and other aspects of urban development. It would provide a framework for guiding investment and decision-making within the urban area.

4. **Action Plan:** An Action Plan is a more specific and detailed plan that focuses on a particular sub-area within the urban area, such as a neighbourhood or commercial district. The Action Plan would include specific design and development guidelines for the area, including details on building heights, setbacks, streetscapes, landscaping, and other elements. The plan would guide development and investment within the sub-area, ensuring that it is consistent with the overall vision and framework provided by the Structure Plan and Urban Area Plan.

Overall, the combination of a Structure Plan, Urban Area Plan, and Action Plan would provide a comprehensive and coordinated approach to guiding the development of Barguna Sadar Upazila, ensuring that development is sustainable, efficient, and meets the needs of the community.

1.6 Co-Relation Between Different Tire Of Plans

There is a close correlation among a Regional Plan, a Structure Plan, an Urban Area Plan, and an Action Plan. Each plan is developed to achieve specific objectives and is interlinked with the other plans.

A Regional Plan provides an overarching long-term vision for a particular region, outlining goals and objectives for economic development, infrastructure, land use, environmental protection, and social issues. It is developed in consultation with stakeholders and serves as a framework for coordinating and prioritizing development activities within the region.

A Structure Plan is a detailed plan that outlines specific strategies and actions for achieving the objectives of the Regional Plan at a more local level. It provides a comprehensive overview of the demographics, economy, culture, and infrastructure of a particular area and helps to identify areas for growth and development. It may also include specific projects and initiatives that can be implemented to achieve the objectives of the plan.

An Urban Area Plan is a more detailed plan that focuses on a specific urban area within the region. It outlines strategies and actions for improving the quality of life for residents of the area, including the provision of essential services, transportation, and infrastructure.

An Action Plan is a more specific plan that outlines the specific steps and timelines for implementing the strategies and actions outlined in the other plans. It typically includes specific goals, objectives, and targets, as well as the resources required for implementation.

In summary, each of these plans is developed to achieve specific objectives at different levels of geographic and strategic detail, and they are all interlinked with each other to achieve a common vision and objectives for the region. The Action Plan provides a roadmap for implementing the strategies and actions outlined in the other plans, while the Urban Area Plan and Structure Plan provide more detailed strategies and actions for achieving the objectives of the Regional Plan.

1.7 Objective Of The Structure Plan

The Barguna Sadar Upazila Structure Plan is a comprehensive plan that aims to guide and regulate the physical development of the Barguna Sadar Upazila region in Bangladesh. The structure plan mainly comprises two fundamental principles: development promotion and development control. Addressing these two principles, the following objectives have been fixed up.

1.7.1 Development promotion objectives

The development promotion objectives of the Barguna Sadar Upazila Structure Plan include:

1. **Facilitating economic growth & creating Employment opportunities:** The plan aims to create a conducive environment for economic growth in the upazila. This includes identifying areas suitable for commercial and industrial activities and promoting investment in these areas. The plan also facilitates creating employment opportunities in the upazila by promoting economic growth and attracting new businesses and industries.

2. **Endorsing physical & Social infrastructure:** The plan aims to improve the existing infrastructure of the upazila, including roads, transportation, water supply, sanitation, and other public utilities. This will help to improve the quality of life for the residents and attract new businesses and investments. The plan facilitates developing smart city infrastructure, such as

intelligent transportation systems, smart buildings, and digital infrastructure to enhance the quality of life for residents and improve the efficiency of services. The plan promotes social infrastructure, such as schools, healthcare facilities, and community centers, to improve the quality of life for residents and ensure access to essential services.

3. **Promoting sustainable development:** The plan aims to promote sustainable development practices that minimize the impact on the environment and ensure the long-term viability of the upazila.

4. **Supporting local agriculture:** The plan aims to support the agricultural sector in the upazila by identifying suitable areas for farming and promoting agricultural practices that increase productivity and sustainability. The plan aims to support local agriculture by promoting sustainable agricultural practices, providing training and support to farmers, and creating market linkages to help farmers access markets for their products.

5. **Enhancing public spaces & encouraging green development:** The plan aims to enhance public spaces such as parks, playgrounds, and community centers to provide residents with safe and accessible places to relax and socialize. The plan will also encourage green development practices, such as the use of renewable energy sources, green buildings, and sustainable transportation, to reduce the environmental impact of development activities.

6. **Promoting eco-tourism & supporting cultural diversity:** The plan aims to promote eco-tourism in the upazila by developing sustainable tourism activities that preserve the natural environment, support local communities, and provide visitors with unique and authentic cultural experiences. Supporting cultural diversity in the upazila by promoting cultural activities and events, preserving cultural heritage sites, and encouraging the participation of diverse communities in the development process will also be considered.

7. **Encouraging affordable housing:** The plan aims to encourage the development of affordable housing in the upazila by providing incentives for developers to build affordable housing units, and by regulating development activities to ensure that affordable housing is integrated into new developments.

8. **Mitigating disaster risk:** The plan aims to manage disaster risks in the upazila by identifying areas prone to natural disasters and regulating development activities in these areas to reduce the risk of damage and loss of life.

9. **Managing solid waste:** The plan aims to manage solid waste in the upazila by promoting waste reduction and recycling, regulating waste disposal activities, and promoting public awareness of responsible waste management practices.

1.7.2 Development control objectives

The development control objectives of the Barguna Sadar Upazila Structure Plan include:

1. **Imposing Strategic land use zones & Regulating building heights and densities:** The plan aims to regulate land use in the upazila to ensure that development activities are carried out in a planned and orderly manner. The plan will impose regulation on land use in the upazila by defining zones for different types of development, such as residential, commercial, and industrial, and by regulating development activities within these zones to ensure that they conform to the designated land use. Regulation on building heights and densities will be imposed in the upazila to ensure that new developments are in proportion with the surrounding environment and do not cause overcrowding or strain on infrastructure.

2. **Protecting Open Space, natural resources & cultural heritage:** The plan aims to protect natural resources, including forests, water bodies, and wildlife habitats, by ensuring that development activities do not harm these resources. The plan also intends to manage natural resources, such as water and land, by promoting sustainable practices and regulating development activities that may have a negative impact on these resources. The plan also has agenda to protect the cultural heritage of the upazila, including historic buildings, sites, and monuments, by regulating development activities in these areas. The plan aims to preserve open spaces, such as parks and agricultural land, by regulating development activities in these areas and promoting their use for recreational and environmental purposes.
3. **Constraining urban sprawl:** The plan aims to manage urban sprawl by promoting compact, mixed-use development that reduces the need for private vehicle use, and by restricting development in areas outside of the upazila's urban center.

CHAPTER TWO: METHODOLOGICAL APPROACH & CRITICAL PLANNING ISSUES

2.1 Component Of The Structure Plan

To prepare the structural plan, not only the above-ground scenario but also the below-ground scenario was examined. To inspect the comprehensive circumstances, multiple components have been considered. These components are Physical features, Socio-economy, Transportation, Disaster, Hydrogeology, Geology, Hydrology, Forest, Eco-tourism, etc.

2.2 Approaches To Planning

In Bangladesh, approaches to planning can be particularly important given the country's rapid population growth, urbanization, and other economic and social challenges. Here are some issues that can be taken to prepare a structure plan for Barguna Sadar Upazila of Bangladesh.

- Selecting the project area for Sustainable planning and development.
- Georeferencing the entire Upazila mouza map and creating a base map.
- Map preparation to identify essential characteristics such as existing embankments, khals, hills, swamps, regulators, and bridges in the proposed area, satellite imagery, and map preparation depicting all elements.
- Secondary data collecting, such as hydrographic charts, water levels, water flow, and meteorological and disaster-related data.
- Examine accessible data and reports.
- Hydrological, geological, transportation, agricultural, and physical feature surveys in the field.
- Agricultural PRA data on cropping patterns and prioritize crops depending on land fertility.
- Collection of tentative plans of economic zone and other government proposals in the project region.
- Updating and upgrading the available water flow and storm surge
- Review the existing drainage system and prepare an improved plan for the drainage system.
- Statistical analysis of time series simulated storm surge level and significant flood height and assessment of storm surge level for different return periods around the proposed area.
- Assessment of significant flood height of cyclonic wave for different return periods around the proposed area and assessment of embankment crest level for fifty/hundred-year return period considering tide, storm surge level, and cyclonic wave; Fixation of crest level considering simulated results with climate change scenario. A flood wall incorporated with the embankment might be introduced.
- Morphological analysis i.e., bank-line shifting characteristics by time series satellite images, erosion-deposition pattern by the model result, and data analysis.
- Devise the design criteria i.e., height, slope, length, width, number, etc. considering fifty/hundred-year return period for different proposed structures.
- Identify the source of sweet water for industrial, Agricultural, Residential, and other uses.
- Planning of the proposed development work considering the natural beauty of this area for tourism.
- Devise the plan for development work keeping the wetland, khals, and other natural resources uninterrupted to preserve the environmental balance.
- Reserve the rainwater for different uses.
- Rakhine Ethnic community culture conservation and Development.
- Provide service facilities to the char area and include their livelihood opportunities.
- Recommendation for improvement of existing communication facilities in the project area.

- Provision for recreational facilities would be entertained while designing the coastal protection facilities; Prominent coastal protection structures worldwide might be considered to attract picturesque beauty in conformity with the adjacent landscape.

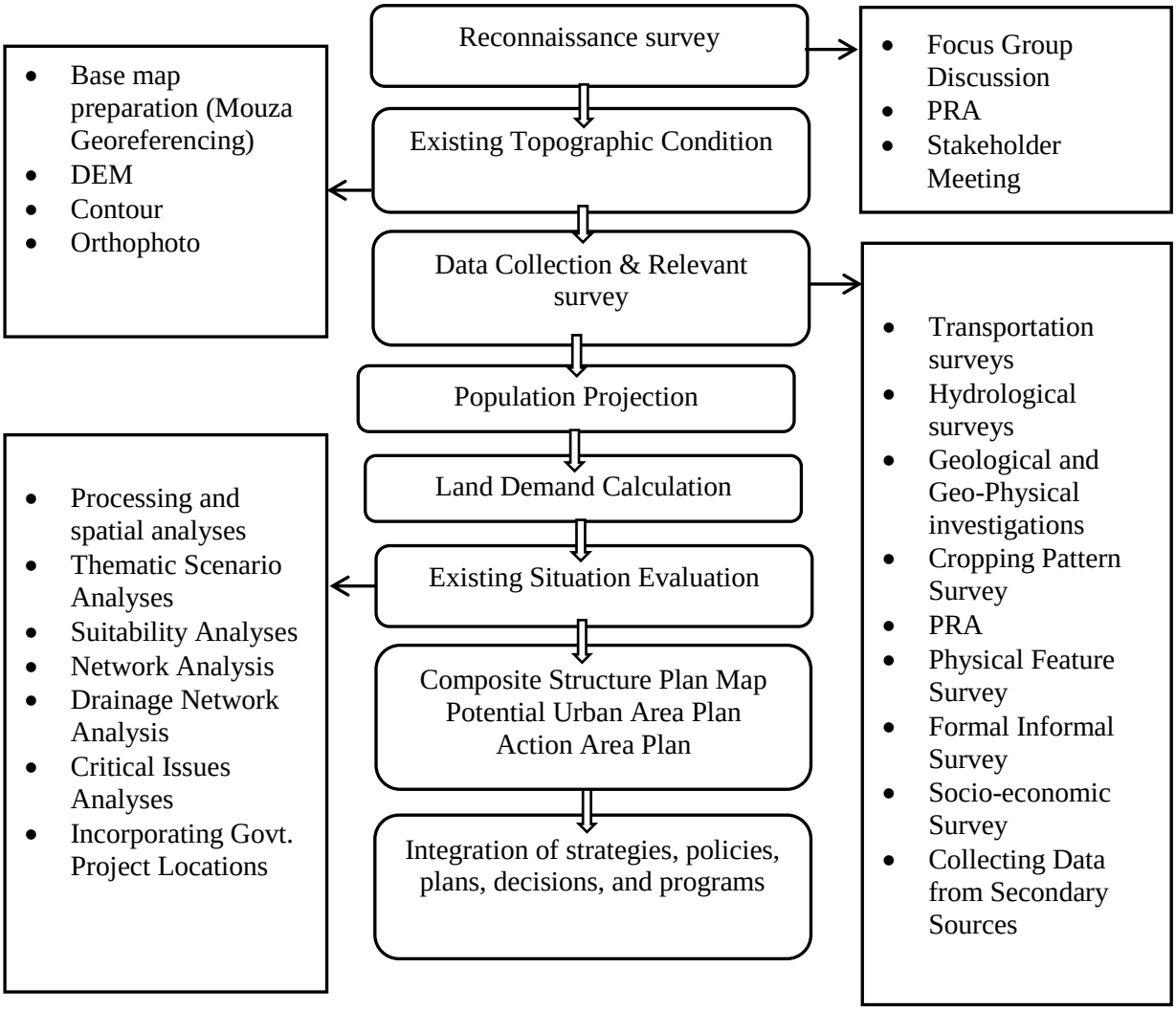


Figure 1: Technical Methodology of Structure Plan Preparation

Identifying the key needs and challenges in terms of social, economic, and infrastructure development in the project area might involve analyzing demographic data, assessing infrastructure gaps, and conducting surveys and stakeholder consultations to gather input from communities, businesses, and other stakeholders. Another critical part is identifying and prioritizing strategies and policies that will aid in achieving the plan's goals and objectives. Engaging stakeholders throughout the planning process may help to ensure that their needs and concerns are addressed in the plan. Overall, the structural plan method to planning can aid in resolving the problems and complicated challenges that Barguna Sadar Upazila faces in achieving sustainable and inclusive development that benefits all of its people.

2.3 Critical Planning Issues:

There are several critical planning issues that need to be addressed in the Barguna Sadar Upazila. These issues are:

1. **Regional connectivity and Transport Mobility:** Barguna Sadar Upazila is surrounded by Payra and Bishkhali River. Barguna Sadar is separated from Patharghata by Bishkhali River and from Amtali by Payra River. The Upazila's economy is highly linked with surrounding region. Therefore, transport connectivity is highly important. Currently, the only way to cross those rivers are through Ferry. Bridge connecting Patharghata and Barguna on Bishkhali River and Amtali and Barguna on Payra River would strengthen the regional connectivity.

2. **Housing:** Affordable and adequate housing is a significant issue in urban areas of the upazila. The plan needs to identify strategies to address the housing shortage, promote affordable housing options, and improve the quality of housing for urban residents.

3. **Environmental Degradation and Canal encroachment:** The Barguna Sadar Upazila is located in a coastal area and is vulnerable to environmental degradation caused by natural disasters such as cyclones, floods, and erosion. The plan needs to address the challenges of environmental protection, sustainable land use, and climate change adaptation. Canasl encroachment is also a serious issue in the upazila.

4. **Infrastructure Deficiencies:** The upazila suffers from deficiencies in basic infrastructure, such as roads, water supply, and drainage systems. These deficiencies hinder economic growth and development, and the plan needs to prioritize the development of infrastructure to support growth and improve the quality of life for residents. The upazila is facing challenges related to the inadequate and insufficient urban infrastructure, including water supply, sanitation, and solid waste management. The plan needs to address these issues by identifying strategies to improve the urban infrastructure and services and promote sustainable and efficient urban development.

5. **Limited Access to Health and Education:** The upazila has limited access to quality healthcare and education, particularly in rural areas. The plan needs to address this issue by identifying strategies to improve access to health and education services and facilities.

6. **Poverty and Inequality:** The upazila suffers from high poverty rates and income inequality. The plan needs to identify strategies to reduce poverty and promote inclusive growth, particularly for marginalized and vulnerable groups.

7. **Absence of Land use Zoning:** The upazila faces challenges related to land use and zoning, particularly in urban areas. The plan needs to develop a comprehensive land use and zoning plan that balances economic development with environmental protection and community needs.

8. **Economic Development:** The upazila needs to diversify its economy and create employment opportunities to support sustainable economic growth. The plan needs to identify sectors with growth potential and promote entrepreneurship and innovation.

9. **Limited Access to Finance:** The upazila faces challenges related to limited access to finance for businesses and individuals. The plan needs to identify strategies to increase access to finance and promote financial inclusion.

10. **Disaster Risk Management:** The Barguna Sadar Upazila is located in a region that is prone to natural disasters, such as cyclones, floods, and earthquakes. The plan needs to identify and address the risks associated with such disasters and develop strategies to manage and mitigate their impact on the local communities.

11. **Urbanization:** The upazila is experiencing rapid urbanization, which is putting pressure on urban infrastructure, such as housing, transportation, and utilities. The plan needs to address this issue by developing a comprehensive urban plan that supports sustainable and equitable urban development.

12. **Governance and Institutional Capacity:** The upazila faces challenges related to governance and institutional capacity, including the lack of effective public service delivery, weak institutional frameworks, and limited public participation in decision-making. The plan needs to address these issues by identifying strategies to strengthen governance and institutional capacity and promote participatory planning and decision-making.

13. **Natural Resource Management:** The upazila has significant natural resources, including forests, wetlands, and fisheries, which provide important ecosystem services and support local livelihoods. The plan needs to identify strategies to manage these resources sustainably and promote their conservation and restoration.

14. **Social and Cultural Heritage along with ethnic community:** The upazila has a rich cultural and social heritage, which is an important asset for sustainable development. The plan needs to identify strategies to promote the preservation and promotion of this heritage and support cultural and social activities that contribute to community development and well-being. The Rakhine community lives in Baliyatli union of Barguna sadar upazila which is in the southern part of the Barguna district. Bengali culture has a mixture of Rakhine culture with the culture of this region. Rakhine have their own production system, including diverse industries, agricultural works, pigs, and animals. At the same time, social programs include Jajal Krira, Fanus Chodra, Pitha festival etc.

15. **Tourism & Eco-tourism:** The Barguna Sadar Upazila has a significant potential for tourism development, particularly due to its coastal location, natural beauty, and cultural heritage. The plan needs to identify strategies to develop the tourism sector sustainably, while preserving natural and cultural resources, and providing economic opportunities for local communities.

16. **Agriculture and Fisheries:** Agriculture and fisheries are important sectors in the upazila, providing employment and income for many households. The plan needs to identify strategies to support these sectors, promote sustainable and efficient practices, and enhance value chains to increase income and productivity.

17. **Informal Settlements:** Informal settlements are prevalent in urban areas of the upazila, leading to overcrowding, poor living conditions, and social exclusion. The plan needs to address informal settlements by identifying strategies to promote formalization, provide adequate housing, basic services and infrastructure, and ensure social inclusion.

18. **Public Space and Recreation:** Access to public space and recreational facilities is essential for the well-being and social cohesion of urban residents. The plan needs to identify strategies to promote the creation of public spaces, recreational facilities, and green areas, and ensure equitable access for all.

19. **Economic Informality:** The urban economy in the upazila is characterized by significant informality, which leads to economic exclusion and insecurity. The plan needs to identify strategies to promote formalization, support micro, small, and medium-sized enterprises (MSMEs), and create employment opportunities.

20. **Technology and Innovation:** Technology and innovation can drive urban development, promote economic growth, and enhance the quality of life for urban residents. The plan needs

to identify strategies to promote technology and innovation, support digital transformation, and ensure equitable access to technology.

21. **Water Supply and Sanitation:** Access to safe drinking water and sanitation facilities is essential for the health and well-being of urban residents. The plan needs to identify strategies to promote adequate water supply and sanitation facilities, including infrastructure development, water resource management, and hygiene promotion.

22. **Waste Management:** Urban areas generate significant amounts of solid waste, which pose environmental and health risks. The plan needs to identify strategies to promote proper waste management, including waste reduction, recycling, and disposal, and ensure the participation of the informal sector in waste management.

23. **Resilience and Adaptation:** Urban areas of the upazila are vulnerable to various shocks and stresses, including natural disasters, climate change, and economic shocks. The plan needs to identify strategies to promote resilience and adaptation, including risk reduction, early warning systems, and social safety nets.

24. **Salinity:** The salinity levels in Barguna Sadar Upazila vary depending on the time of year and the location within the upazila. During the dry season (November to April), when there is less rainfall and freshwater flowing into the area, salinity levels tend to be higher. Conversely, during the monsoon season (June to September), when there is more rainfall and freshwater, salinity levels tend to be lower. Therefore, fresh water source is limited. Surface water treatment and rainwater harvesting can be the best option.

25. **Sea Level rise:** According to various studies and reports, the sea level in Bangladesh has been rising at a rate of around 7 millimetres per year, which is higher than the global average. This rise in sea level has significant impacts on the coastal communities of Barguna Sadar Upazila and the surrounding areas, including increased coastal erosion, inundation of low-lying areas, and saltwater intrusion into freshwater sources. The impacts of sea level rise are particularly severe during cyclones and storm surges, which are becoming more frequent and intense due to climate change.

26. **Flooding and drainage:** As the area lies at the southernmost tip of Barguna facing the Bay of Bengal, the area is highly vulnerable due to hydrological hazards, especially monsoon floods and coastal floods. Coastal floods can arise from tidal floods as well as storm surge-induced floods. The area is also vulnerable due to extreme precipitation, especially during cyclones that occur during the pre-monsoon and post-monsoon periods.

CHAPTER THREE: POPULATION & DEMOGRAPHY

3.1 Demographic Setting of The Upazila

In 2011 the total population of the Barguna Upazila was 261,332, of which 128,580 were male, and 132,752 were females. The sex ratio of Upazila was 97, which remarkably decreased in 2011 compared to 105 in 2001. Analyzing the population growth history, it is explored that in 1991, the total population of the Barguna Upazila was 219,729 of which 111,402 were males, and 108,327 were females. The sex ratio was 103, which also decreased in 1991 compared to 101 in 1981. Annexure iv illustrates in detail the population growth trend of Barguna Upazila from 1981 to 2011 which is the last national census of Bangladesh. Figure 2 clearly describes age-sex-wise population distribution, the percentage of the dependent population was high in 2011. Therefore, insight could be drawn that in the coming year, Barguna needs more employment opportunities to sustain the residents' livelihood and to support the elderly-dependent population.

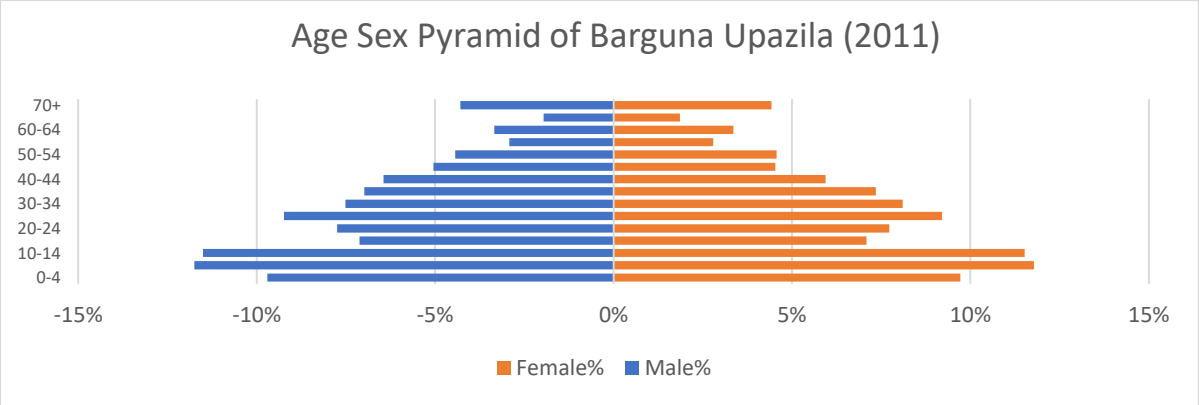


Figure 2 Age-sex pyramid of Barguna Upazila

3.2 Population Projection

The population has been forecasted by applying the cohort method. The cohort-component method segments the population into age-sex groups or birth cohorts and accounts for the fertility, mortality, and migration behavior of each cohort.

3.2.1 Projected Population

According to BBS, the population of Barguna Upazila in 2011 was 261,343, and the annual growth rate was 0.41. *Table 1* shows that the population in 2021, 2031, and 2041 will be 289884, 324824, and 353821 respectively. **Error! Reference source not found.** shows the projected population scenario of Barguna adar Upazila from 2011 to 2041.

Table 1: Projected Population

Union/Paurashava	Population 2011	Population 2022	Population in 2031	Population in 2041
Barguna Paurashava	32235	40019	46388	53464
Ayla Patakata	19782	21332	22600	24009
Badarkhali	26201	29725	32608	35812
Barguna	20599	21876	22921	24082

Burir Char	29542	30848	31917	33104
Dhalua	25700	28631	31029	33694
Gaurichanna	27675	32613	36653	41142
Keorabunia	17755	18402	18931	19520
M.Baliatali	28944	31514	33617	35953
Naltona	19705	22530	24841	27410
Phuljhury	13205	16885	19896	23241
Total	**261343**	**294375**	**321401**	**351430**

Source: PKCP project, UDD, 2018

Age-Sex Ratio

Figure 3 illustrate the age-wise male and female population up to 2041.

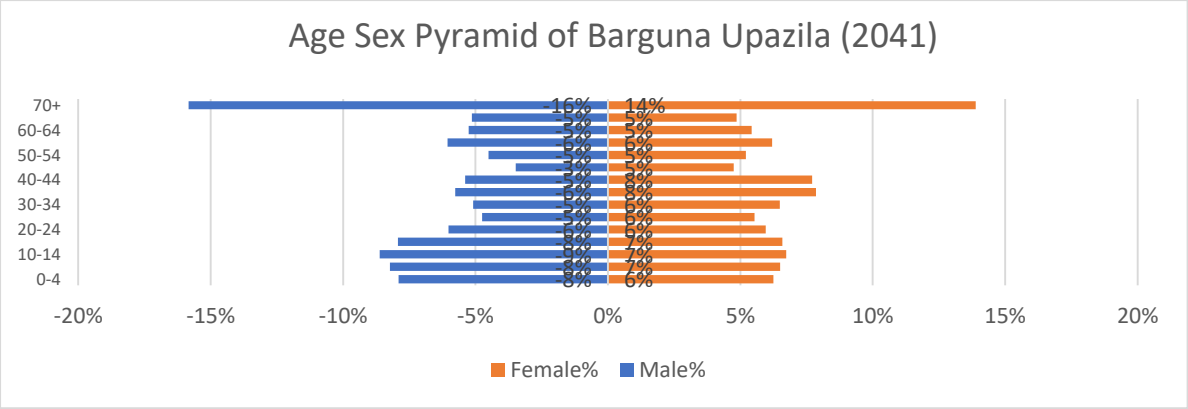


Figure 3: Age-sex pyramid of Barguna Upazila -2041

3.3 Population Policy

The policies in relation to population are set out below.

POP.01 Expected population growth and changes in its socio-economic and age structure should be taken into account for future development initiatives.

The forecast of population growth should be reviewed from time to time, in the light of new evidence, to track the new trends in migration, age and income structure.

POP.02 Initiatives should be taken for rational distribution of population within the Structure Plan area through making land available by ensuring infrastructure facilities, housing and community facilities.

To ensure rational distribution of population within the planned area is one of the main objectives of the development plan. This distribution of population has to be in relation to the availability and suitability of land and other urban activities.

POP.03 Authority should undertake different type of programs to convert the burden of population into the strength of the region matching the objectives of the plan.

To convert the burden population into the strength of the region decentralized employment opportunity can play vital role. The implementing authority must take programs to explore the actual economic potentials of existing growth centers as well as establishment of special economic zones as prescribed in the plan.

POP.04 Initiatives should be taken for discouraging rural to urban migration to explore agriculture based economic potential

Barguna Sadar Upazila has significant potential in the sector of agricultural production. Increasing rate of urban migration can impact negatively on agricultural production due to lack of skilled man-power. Therefore, implementing authority should allocate enough resources on agricultural productivity as well as providing training and logistics for the farmers to ensure proper production and storage & marketing facility to support their income so that they no longer need to migrate in search of livelihood.

CHAPTER FOUR: ECONOMY

4.1 Economic Findings

4.1.1 Findings from Basic and Non-Basic Employment

From the perspective of the percentage increase from 2003 to 2013, in Barguna Upazila, basic employment has increased by 144 percent, and total employment has increased by 36 percent. Basic employment contributes to total employment. Basic employment contributes 33% in Barguna. So, most of the employment is not export-related, although basic employment contributes to non-basic employment, which can be identified by the economic base multiplier (detailed statistics have been presented in Annexure IV, Tables 1,2,3, and 4).

Table 2: Employment of 2003 and 2013 Comparison among the Upazilas

Upazila	Basic Employment 2003	Total Employment 2003	Basic Employment 2013	Total Employment 2013	Increase in Basic Employment	Increase in Total Employment
Barguna	2606	14088	6363	19189	144%	36%
(Source: PKCP project, UDD, 2019)						

4.1.2 Findings from Economic Base Multiplier:

Economic base multiplier is used to evaluate employment as a measure of activities and can be used for projection purposes. The future total employment of a region can be evaluated by estimating the prospects of the basic activities in the regional economy and by using a multiplier.

It can be seen that the economic base multiplier has increased from 0.18 to 0.34 for Barguna Upazila from 2003 to 2013. The economic base multiplier is the ratio of total basic and non-basic employment to basic employment. So, the increase in the multiplier indicates that the percentage of basic employment to total employment has decreased over 10 years. This means that Upazila is declining in some economic activities and are not able to earn as much from export and outside the region.

4.1.3 Findings from Shift-Share Analysis:

The growth of a region can be attributed to a national trend or unique regional factors. The industry combination of the nation or the region itself may play a role in regional growth also. Shift-Share analysis helps answer these questions by splitting the employment growth between the three shift-share components, namely: National Share, Proportionality Shift, and Differential Shift.

The industrial structure analysis provides insight into the growth of Upazila. It has been seen that Barguna Upazila lags behind the national growth rate as the Growth is lower than National Share. Wholesale and Retail Trade was supposed to grow to 3463, whereas it grew to 942 annexes (**38**). This is a result of an unfavorable industry mix and regional disadvantage. The manufacturing sector shows quite a lot of potential as it grew more than the national growth. This sector has both industry and local advantages resulting in a positive Net Shift Component. The transportation, Storage, and Communication sector also have an advantage over the industry mix. The hotel and Restaurant sector benefitted from a local advantage.

Table 3: Industrial Structure Analysis

Upazila	Growth (G_i)	National Share (NS)	Industrial Mix (IM)	Regional Shift (RM)	Net Shift Component
Barguna	5101	16528	-2510	-8917	-11427

(Source: PKCP project, UDD, 2019)

4.1.4 General Findings:

General findings have been drowned by comparing Barguna Upazila with the other six Upazilas within the project region. Error! Reference source not found. depicts the Upazilas as Fast-Growing or Slow-rowing regions based on the Total Growth of Employment (G_j) in each region concerning their National Share (NS). It is done by comparing the G_j of each region with their NS; if it is higher than NS, then the region is considered Fast-Growing, otherwise Slow-Growing. It is found that only Barguna Upazila is lagging behind the national growth. This means that the overall growth rate of employment in the region was lower than the overall growth rate of employment in the nation.

4.2 Sectoral Policies And Strategies

4.2.1 Agricultural Sector

The economy of the Barguna Upazila is dominated by agricultural activities. Most households are engaged in farming activities that produce varieties of crops, namely local and HYV of rice, wheat, vegetables, spices, cash crops, pulses, and others. Various fruits like mango, jackfruit, coconut, betel nut, banana, etc., are grown. Coconut and betel nuts are grown abundantly in Upazila. Fish of different varieties abound in this district which enjoys the advantages of marine fishing.

Table 4: Cropping Pattern of Barguna Upazila

Cropping Pattern	Percentage
Single Cropped	4.75
Double Cropped	29.11
Triple cropped	37.51
Other Land Use	28.63

ADP 01. Promotion of regional agriculture

Barguna Sadar Upazila is well known for Water Mallon Production. Main crops are Paddy, ground-nut, khesari, mug, vegetables. Some extinct or nearly extinct crops such as sweet potato, tobacco, futi, sesame, mustard etc. are also grown in Barguna Sadar Upazila. Promotion of agriculture would help raising income and savings leading to employment through investment in non-agriculture pursuits. The main objective of agriculture sector will be to increased production and simultaneously ensure value addition. Surplus from agricultural will help development of agro-based industries and investment in other productive sectors in Barguna Sadar. Availability of credit for farming and storage facilities are vital issues for bringing a change in agro-sector in the Upazila.

ED. 01 Developing Growth Center Markets (GCMs)

Agricultural products usually get sold in rural Growth Center Markets (GCMs). Therefore, availability and proper connectivity to the Growth Center Market is necessary for sustainable agricultural development. Implementing agencies will take specific projects to develop existing GCMs and establish new ones as prescribed in the plan.

ED. 02 Increasing crop intensity while conserving existing agricultural land

Barguna Upazila Structure Plan designates and protects the current agricultural areas as an agriculture region. Increased agricultural output in the Upazila will result from better drainage and flooding conditions. Protecting valuable agricultural lands will be made possible by clearly delineating the borders of agricultural fields to prevent encroachment. In triple- and double-cropped agricultural lands,

little physical development is envisaged. Brick-burning activities are prohibited near agricultural zoning or land. No development in triple crop land.

Map 2: Cropping pattern map of Barguna Upazila

Source: PKCP Project, UDD, 2019

4.2.2 Industrial Sector

The industrial sector plays pivotal role in employment generation. But industries are prone to generate pollution. Therefore, for sustainable industrial growth without polluting the nature, future large and noxious industries should be restricted in the noxious industrial zone and other industries according to their scale and environmental impact will be allowed to different zones following the development control guidelines.

ED. 03 Developing Barguna Paurashava as regional industrial center

Barguna Paurashava has been serving as an important trading and business center in Barguna Sadar Upazila. Government policy measures can encourage the private investors to set up new industries and thus develop this Paurashava as the center of sub-regional industrial hub by removing all sorts of official bottlenecks in initiating any new investment and also making official procedures easy for getting legal documents by the industrialists; Easy Financial and institutional facilities to encourage the promising entrepreneurs; Special incentive packages for the Small and Medium Enterprises (SMEs); Equipping the Industrial Estates with developed infrastructure facilities.

ED. 04 Promoting decentralization policies at National Level

Formulation and persuasion of a concrete decentralization policy by the Government will effectively help the economic growth of Barguna Sadar Upazila. Following the decentralization initiatives industrialists and other entrepreneurs will be encouraged to set up manufacturing; trading and service-based establishments in such remote area.

ED. 05 Selecting Area for Export Processing Zone

ED. 06 Agricultural Processing zone

The land of Barguna Sadar upazila is very fertile for agricultural production. The upazila is specially known for its watermelon production. Due to lack of supporting infrastructures, a good portion of the agricultural products get rotten or damaged before marketing. It is a timely need to establish Agricultural Processing zone in the Upazila. Because of that, due consideration has been provided. However, Agricultural Processing zone must contain the following.

- Food processing
- Cold storage facility
- Packaging industry
- Seed bank and storage facility
- Small and medium Agricultural tool manufacturing and assemble factory.
- Farmer training facility
- Agro-based market with provision for seasonal agricultural fair

Besides the traditional agro products like rice and vegetables Barisal is rich for local fruits like guava, jackfruits, mango; vegetables like potato, tamarind, pepper, cereals etc. these can be a good source of raw materials for the agro-processing industry.

ED. 07 Identify locations for new industrial and trading areas.

Presently, urban core area is occupied with manufacturing units, commercial and trading activities, and also by residential areas making the life of municipal dwellers unbearable. In the future, all heavy and noxious industrial and trading activities, service providing establishments should be set up in locations selected as par Structure Plan.

4.2.3 Ecotourism Sector

A major portion of tourists come to Bangladesh for other purposes than tourism purposes, so to attract tourists to visit Bangladesh through the marketing of its tourists, "attractions, effective promotion,

recreation, and entertainment should be organized. Though the tourism industry is declared a thrust sector in Bangladesh, there is lacking comprehensive plans in industrial policy. Some statements regarding investment and human resource development are found in industrial policy, especially for tourism but without enough concentration. However, proper consideration was given to developing eco-friendly industries.

ED. 08 Development of tourism focusing regional resources

Tourism can be a lucrative source of income and employment for Bangladesh endowed with huge natural and historical resources. Developing Tourism will simultaneously help create many ancillary professions besides the principal trade -both in private and public sectors. Tourists will have a stopover at Barguna to visit Kuakata Sea beach, river network, different islands and forests, etc. have pleasure trips in sight seeing through boats and other water transport, have river cruise, and thus will create many subsidiary occupational scopes for a good number of poor and informal entrepreneurs.

ED. 09 Providing Tourism Logistics

To promote tourism, international tourist fairs can be arranged in adequate numbers both at home and abroad to inform the latest updates on our tourism products, services, and overall tourism industry to attract tourists. Tourism Call Centres may be introduced like "Medical Call Centers" and "Legal Call Centres" to keep potential tourists informed about the tourism products, facilities, and services available all over Bangladesh. To protect vulnerable areas like the coast, some industries (which create high pollution/ have threats to pollute the environment at a critical level) are required to be marked as read and prohibited.

ED. 010 Promotion of Ecotourism

Haringhata Eco-Tourism & Wildlife Sanctuary can be a good place for ecotourism development due to the visual splendor created by the mangrove plantation. It can provide a sense of seclusion from other regions of the world and has enormous potential for developing eco-tourism destinations. The small single cottage can be developed in association with group tourism by creating a natural barrier.

ED. 011 Forest resource management

To conserve forest and plantation resources with control way following strategies has been proposed.

- Keep the enterprise to a manageable scale.
- Ensure that the construction and maintenance of ecolodges follow environmental protocols to avoid degrading the areas that tourists value for their pristine qualities.
- Demonstrate an upfront commitment to environmental objectives, provide quality leadership, and exploit small market niches where personalized service and unique experiences are favored over large-scale operations.
- Education for host communities and for the tourists who plan to visit them is key to providing both with a good experience.
- Prioritize conservation over short-term profit.
- Gain local enthusiasm by doing as much as possible to ensure that benefits are shared fairly and that no one shoulders a disproportionate share of the cost.
- Gain necessary government support to provide financial backing for rural and indigenous people.
- Strive for local ownership and 80% local staffing.

4.2.4 Services Sector

ED. 012 Limiting trading centers for informal entrepreneurs into one designated area

It is no denying the fact that informal sector of the urban economy not only absorbs major portion unskilled labour but also an important source of service provider for the middle- and lower-income citizens of the municipality. So, considering the importance of this sector in the urban economy, special

areas in the core city area and in the outskirt should be developed with infrastructure facilities. In this way, haphazard and scattered way of conducting the informal activities may be avoided and chaotic situation arisen from these activities in the municipality can be avoided.

ED. 013 Human resource development through training under Ministry of Youth Development in collaboration with child and Women Affairs Ministry

By providing training and logistics, the youth population can be turned into asset. Individual entrepreneurs must be encouraged to setup new business.

ED. 014 Extension of gas network up to Barguna Paurashava and also ensuring sufficient power supply for smooth operation of proposed manufacturing and other commercial and trading activities.

Natural gas is a major source of fuel as well as raw materials for many important industries. Use of natural gas can reduce cost of production and make investment on industries profitable. The Padma Bridge will be a game changer for greater Barisal region. Gas transmission pipeline through Padma Bridge may bring gas supply to greater Barisal region. So, it is possible to expand it up to Barguna Paurashava. Gas supply is likely to attract investors to greater Barisal region. Moreover, sufficient power supply should be ensured for rapid industrialization of the region.

ED. 015 Establishing internet and telecommunication facilities

In complying with government's policy of modernization, improvement and extension of telecommunication system should be established. In this era of information and globalization, our SMEs, our farmers and agriculturists are expected to utilize the modern information technology and exchange information on their products throughout the global market. Establishing high speed data communication and broadband Internet service are to be ensured.

CHAPTER FIVE: SPATIAL DEVELOPMENT STRATEGY

The population density, concentration of built-up areas, preservation of valuable agricultural land, protection of ecologically sensitive areas and digital elevation model are the main parameters used for setting the spatial development strategy for Barguna Sadar Upazila. The following spatial development strategies have been considered.

SDS 01. Priority should be given to the infill development in the subsisting civic areas with a view to saving resources needed for the development of infrastructures and community facilities.

From a development perspective redesigning the infrastructure facilities in built-up areas to cope with growing demand can always be very costly. The existing maximum density in urban areas is only 22 persons per acre which are low in comparison to the of national standard 350 persons per acre. In rural areas, the average density is 4 person per acre. The low density indicates that there is space for development in current urban areas. Calculation shows that the future population can be accommodated in the existing urban area through infill development. The positive side of this development policy is that it can save a large number of resources needed for infrastructure development in new areas.

SDS 01. Spatial development should be directed towards the areas with buildable lands in terms of elevation from the mean Sea level.

Digital elevation models can depict the undulation of surface patterns. The surface pattern demonstrates the areas which are vulnerable to flood hazards as well as finds out areas that needed less investment for making the available land buildable. In Barguna Sadar Upazila, majority of the land situated 1.5 to 3 meter above the mean sea level but North-eastern part of the upazila has the lowest ground elevation from mean sea level ranging from 0.1 to 1.5 therefore landfill will be required in the areas that can be made available for new development.

SDS 02. The taxation policy for vacant land should be acclimated in order to discourage land speculation in the existing civic areas.

Taxation policy can play a key role in order to make an optimum use of free space. Tax to be imposed on real estate property value instead of building property value; this should not be limited to the factor of income from property. There is a necessity of readjustment of taxation policies for urban property tax.

SDS 03. New industries should be located in specific zones outside the existing civic area.

New light and medium manufacturing and processing industries should be located within the proposed economic zone in Barguna Union and heavy industries should be located within the proposed economic zone in Phuljhuri union adjacent to Barisal- Barguna Highway.

SDS 04. The spatial development strategy should focus on conserving precious agrarian lands as part of the natural development strategy. thus, urban sprawling is to be discouraged.

Development will be discouraged in agrarian lands specially in triple cropped and double cropped lands.

SDS 05. Urban development should be confined in and near ecologically sensitive areas to conserve ecology.

No development will be permitted in and near ecologically sensitive areas to conserve ecology.

CHAPTER SIX: TRAFFIC AND TRANSPORTATION

According to the transportation survey and public consultation at the PRA session, on-street parking, a narrow road network, and a lack of parking all contribute to congestion. Locals also emphasized how ferry crossings add significant time to travel. Land use, environmental quality, economic growth and viability, and achieving lifestyle goals are all obvious factors to consider when developing a comprehensive plan. However, there are more subtle factors that will influence the outcome of these extensive transportation studies. The existing internal connecting roads are in disrepair. During the rainy season and floods, roads become underwater and muddy, there are no parking facilities for vehicles, no public transportation, and unplanned ghats and terminals.

6.1 Traffic and Transportation Policies

6.1.1 Travel Demand Management

TRN 1. Create mixed land-use areas that provide both places to live and work

Contemporary sustainable land use planning, also known as "Smart Growth," devotes time, attention, and resources to restoring community and vitality to CBDs and older suburbs. Mixed land use creates vibrant, vibrant neighborhoods/communities while reducing the need for long-distance travel and commuting. Short-distance travel also encourages the use of environmentally friendly alternatives such as walking and bicycling. Mixed land use provides the commercial foundation for viable public transportation. This would also mean limiting the creation of new, strictly single-use zones (like residential, commercial, etc.).

TRN 2. Avoid dispersed and scattered development patterns

Dispersed and scattered development encourages ‘sprawl' and increases travel. It increases the demand for more transportation corridors, resulting in increased traffic. As a result, avoiding and discouraging this type of development through various policy measures would help reduce the number of new trips created.

TRN 3. Restrain from building new facilities that induce more travel, e.g., freeways, flyovers, etc.

Freeways and flyovers are built for highspeed mobility and have almost no access function. As a resul t, they naturally entice some motorized trips. The general rule is that new roads split existing traffic an d provide a useful alternative to travelers. Experience from around the world shows that, in addition to this utility, more roads usually lead to more travel, especially if those roads are designed for exclusiv e mobility. Any network development initiative should prioritize existing connections and how they c an be managed or restructured to meet the needs. A certain level of road construction or reconstructio n is reasonable as long as it does not encourage new trips that were not previously available.

TRN 4. Encourage soft measures or activities that replace the need for traveling

Alternative measures to complete a task can directly affect travel demand because transportation is a derived demand that serves some other purposes. It has a direct impact on travel needs and prevents trips from taking place. Internet use, e-mail, e-governance, telecommuting, and other measures can effectively replace travel and accomplish a task in much less time. Facilitating these methods has the potential to significantly reduce overall travel demand.

TRN 5. Consider the traffic impact of land use and structure occupancy when issuing building construction and land use permits.

Because transportation is primarily a function of land use, any proposed development should be evaluated in terms of the traffic impact it will have on the surrounding area. Any structure's intended use must be clearly defined. 'Transportation clearance'' should be granted based on the size and proposed use of the structure and must be a mandatory criterion for receiving a building permit.

6.1.2 Recommended Action steps:

- Integrated policy: (STM)

Develop a land use and transportation policy that reduces travel needs and trip lengths while encouraging the use of sustainable modes of transportation.

- Travel-cutting tactics (STM)

Developing a comprehensive strategy to promote activities that replace the need for travel, such as internet use, e-governance, telecommuting, and so on.

- Disrupting the rush: (LATM)

Travel during peak hours, including staggered and flexible working hours, flexible work weeks, and so on. Spreading rush-hour traffic out over a longer period of time reduces peak-hour volume and discharge on roads, as well as the likelihood of congestion.

- Traffic Impact Assessment (TIA): (LATM)

Evaluating the effects on traffic should be made a basic criterion for approval of any new building or land development, regardless of occupancy type.

6.2 Pedestrian First

TRN 6. Formulating plans and actions that give highest priority to pedestrians

In terms of the short trips that predominate in the project area, walking is the healthiest and economically viable option for the area. Aside from a few roads designed for speed and mobility, the majority of roads in a Upazila like Barguna Sadar are organic in pattern and best suit pedestrians.

TRN 7. Giving priority to pedestrians when planning infrastructure use and road-space sharing.

In development economics, resource allocation is critical. As a result, implementing new transportation schemes would necessitate careful prioritization. Focusing on pedestrians would pave the way for vibrant, lively local communities in this regard.

TRN 8. Considering walkways to be multi-functional social spaces

The main idea here is to make the street, particularly the local ones, not only a zone for movement but also a place that encourages more social interaction. Provisions for roadside small traders or hawkers that provide safety for pedestrians as well as utility can be made.

TRN 9. Walking trips must be safe and accessible.

When taking actions that have the potential to increase the number of high-speed vehicles on a road section, it is necessary to consider how this may affect the safety and usability of pedestrians who use that section.

6.2.1 Recommended Action steps:

- Create infrastructure to promote walking (LATM).

Proper physical facilities and technical measures, such as road crossings, signs and signals, and walkway maintenance, can shift people away from other modes of transportation and toward walking.

- Maintain a continuous pedestrian network (LATM).

Design the pedestrian network in such a way that it eliminates the need for modal transfer as much as possible for pedestrians, especially for shorter trips.

- Establish a distinct vehicle-free zone for pedestrians only.

Declare a distinct zone as a "precinct" or vehicle-free area, preferably a commercial or shopping area. This will provide a calm and safe environment for pedestrians.

6.3 Connectivity and Accessibility

TRN 10. Creation of major linkages

As the urban area grows and traffic on the streets increases, an efficient road network based on major north-south and east-west links must be built. This would ensure direct connectivity between the network's curial nodes, reducing travel time and length. This is a continuous process that will be tightly integrated with the upazila's spatial development policies.

TRN 11. Public transportation development and availability (PT)

This should account for the vast majority of the motorized vehicle market. PT must be available within easy walking distance of any location in the upazila. The upkeep of an efficient public transportation system provides a low-cost and easily accessible solution for mass movement.

TRN 12. Maintain and use the natural network of Khals as transportation corridors.

Establishing a network of Khals as vital transportation corridors, particularly for goods movement, would create a viable alternative to road transport while also helping to preserve this traditional mode. Water transportation is typically inexpensive. And, because goods delivery generally takes time, waterways can play an important role in this sector. It can also be used for recreational purposes by the residents.

TRN 13. Offer critical network segments a diverse range of modal options.

When moving from one location to another within the upazila, people require a variety of modes of transportation. This would provide easy access to all types of travelers.

TRN 14. Make modal shift facilities that are effective and efficient.

The presence of modal shift facilities boosts the overall efficiency of the transportation infrastructure and system. The establishment of a functional transfer station will be critical in ensuring the modal shift of goods and passengers. As a result, the "transfer stations" must be carefully located and designed.

TRN 15. Wherever possible, end-level local roads should be dead ends.

This would reduce through traffic while also creating a sense of community around the local road, which would be bounded by the adjacent households. It also improves the quality of life by increasing the area's safety and security.

6.3.1 Steps to take:

- Connect critical system nodes with maximum accessibility (LATM).

- Create an extensive bus network.

Create an extensive bus network that can effectively compensate for private transportation while also providing residents with maximum accessibility.

- Create "Interfaces": (LATM)

Developing a proper system of interfaces or transfer points that allows for smooth modal change

6.4 Traffic Control and Management

TRN 16. Formation of a "Road Hierarchy" and "Traffic Blocks"

A road hierarchy based on their predominant use and significance for urban level transportation should be established, resulting in distinct traffic blocks or enclaves. The creation of blocks would result in strong visual and functional identities for local areas. This would also make community management easier and provide a foundation for future research.

TRN 17. Road space allocation

Based on the road's hierarchy and adjacent land uses, road space should be allocated among different modes and uses. This is critical for road safety and effectiveness.

TRN 18. Control the expansion of private motorized transportation

Private motorized vehicles should be discouraged because they take up valuable road space. This is especially important in Bangladeshi cities where road space is limited. Many mechanisms, such as taxation and road rationing, can be used. Three-wheelers should be phased out of roads over the first five years of the project, in conjunction with the growth and expansion of public transportation. Because it transports a large volume of traffic in a small amount of space, public transportation should be encouraged.

TRN 19. Lane-based traffic management

Lane-based traffic management entails determining the number of lanes on each street and their individual capacity, and then basing traffic management and future expansion on that assessment. Different modes can be assigned to different lanes. Every segment of the road's use, such as movement, parking, pedestrian crossing, and so on, must be pre-planned and clearly defined.

TRN 20. Intersection management

Intersections, particularly those where major roads meet or cross, require special attention. They are major sources of contention and contribute to traffic congestion. To keep the flow smooth and frictionless, these areas require strict regulation.

6.4.1 Steps to take:

- Road classification (STM)

Roads are classified into a hierarchy of primary, intermediate, and access roads, as well as distinct traffic blocks, major and minor, bounded by main links.

- New and more effective traffic regulations (LATM)

Taking new and creative steps based on the local level scenario, such as one-way traffic movement during specific hours of the day in specific road sections, restricting certain types of vehicles for specific periods, and so on.

6.5 Environmental Friendliness And Long-Term Viability

TRN 21. Ensure that transportation projects' socioeconomic and environmental impacts are thoroughly examined.

The benefits of increased mobility must be balanced against the environmental, social, and economic costs of transportation systems. Transport is not a standalone structure. Any new initiative, such as a large road construction project, has the potential to improve connectivity and boost economic activity. However, it may evict hundreds of people and cause significant changes to the surrounding ecology. In these cases, a reasonable trade-off must be made, and the net result must be beneficial to people's lives and the environment.

TRN 22. Encourage the use of fuel-free transportation while discouraging the use of fuel-dependent transportation.

The use of fossil fuels and the emission of harmful emissions are major environmental concerns worldwide. This is where FFT can come in handy. Walking and bicycling are examples of "green transport" because of their environmental friendliness. The promotion of these modes of transportation can eliminate the long-term negative impacts of fuel-based vehicles while also improving the health and safety of the residents.

TRN 23. Provide equal access to short- and long-distance travel.

Short trips dominate the transportation landscape in Barguna Sadar. Aside from the few major corridors, access is the primary function served by roads. As a result, road space must be allocated in such a way that the majority of road users are accommodated.

TRN 24. Transportation for all.

Transportation facilities must be designed so that different segments of society, particularly the less advantaged groups such as the poor, the elderly, women, children, the physically handicapped, and so on, have maximum accessibility.

TRN 25. Make "smart choices" easier for travelers.

"Smart Choice" refers to travel decisions that help reduce congestion, pollution, and create better environmental conditions, such as using space-efficient and sustainable modes of transportation, making intelligent route choices, and so on. Such measures are prioritized in modern transportation management. They can make the most of their time, space, money, and other resources.

6.5.1 Steps to take:

- Prohibit the use of vehicles that have negative environmental effects, such as 2-stroke engines (LATM)

- Establish pedestrian-only and FFT-only zones (STM)

This can result in safe, noise-free zones that can be used not only for movement but also for lively, diverse social activities.

- Increasing Public Awareness (LATM)

It can be extremely beneficial to design programs and activities to increase the general public's understanding of traffic laws and regulations. These programs must also educate people on how they make travel decisions and how those decisions affect the upazla's traffic system.

- Ongoing policy and action evaluation (STM)

Transportation is one of the upazila's most dynamic and influential systems. It has an impact on many other relevant systems and processes, as well as actions and decisions made outside of its direct control. As a result, a continuous review of major policies and decisions, as well as the necessary modifications and upgrades, will aid in maintaining their relevance and effectiveness.

LATM: Local Area Traffic Management

Concerned with local level decisions; to be implemented by local body i.e., Local government agencies

STM: Strategic Transport Management

Involves strategic vision and long-term planning; to be implemented by higher level planning authority

Map 3: Proposed Transportation and communication network of Barguna Upazila

Source: PKCP project, UDD, 2018

CHAPTER SEVEN: HOUSING

7.1 Housing Situation in Barguna Sadar Upazila

This section provides the development guidelines for the housing sector of Barguna Sadar Upazila. One of the important issues to determine the future demand for housing is the population growth rate. The population of Barguna Sadar Upazila has not gone beyond its limit. Still there is lots of scope for planning and developing the upazila. The population density of the project area in 2011 was only 17 persons per acre while projected calculation shows that in 2041, the density will be 22 persons per acre. Through population projection 93622 new people has to be accommodated in the next 20 years.

It is seen from the projection of population that by the year 2041, the population of the project area will be 354965 and, therefore, a total of 70993 nos of dwelling units will be required by that time assuming an average household size of 5 persons.

Slum dwellers form a very minor portion of the urban population in Barguna Sadar Upazila. Slums should be relocated and upgraded on a participatory basis to closest locations. Dwellers of these slums should be given the choice for relocation/upgradation, whichever they prefer.

The main objective of the study and recommended policies is to provide housing for all with conserving the cultural heritage of the area. The development plan of the city should and would be carried out in such a way that all structural works will follow the human scale so that all residents will think that they are the focal point of the plan. The following strategies has been taken.

7.2 Housing Strategy

HDS 01. Housing provision should be available for all.

Financial facilities need to be given to the low- and middle-income group to construct proper houses for themselves. It is necessary to undertake policy to construct houses for the low-income people and to deliver it to them with some easy installments which will improve the overall housing situation of the area. Public and private housing sector should work in close co-ordination to meet the future demand for housing. Existing public and private financial institutions need to revise their rules and regulations to provide loan facilities for construction of houses for the low- and middle-income group.

HDS 02. Provision of low-income group has to be made mandatory for any type of real estate development program - both public and private initiatives

Local and national level policy has to be made for the low-income group to get special cooperation from the real estate development sector - both public and private. Any real-estate development program must have proportionate facilities for the low-income group to obtain planning permission. A proportional distribution of the land, houses and financial support will ensure that the low-income group will get their chances to get a house and healthy living environment.

HDS 03. Planning permission in mix land use zones should be given based on compatibility

It should be mandatory for planning permission of mixed use that the subsequent uses in a mixed use are compatible to one another without any conflict.

HDS 04. Critical natural resources need to be identified and conserved and no housing development permission to be given to alter or destroy those resources.

Critical natural resources (water body, forest, wild life habitat, habitat for the migratory birds etc.) need to be identified and no residential development permission will be given for building construction and/or site and service projects in those areas and alter or destroy the current use of those lands.

HDS 05. Monitoring mechanism needs to be developed to ensure proper and maximum utilization of land and houses.

Proper monitoring system needs to be developed to monitor the demand and supply of the housing. Policy needs to be formulated to ensure proper and maximum utilization of the lands and to restrict artificial raise of price of the land.

HDS 06. Monitoring the real estate market will be done to restrict the artificial raise of price of land and houses.

Monitoring system to monitor the housing market has to be taken to ensure that all development and activities are following the government policies and guidelines. Housing market should be monitored at a periodic interval.

HDS 07. Building construction rule and safety regulation need to be formulated and followed during construction of building.

Formulation and monitoring on building construction rules and safety regulations have to be made to ensure safety on the construction site. Precautions have to be taken on construction site to provide safety for the labors and others. Access for fire fighting vehicles, emergency exit, first aid tools on the site etc. have to be provided to ensure a safe construction site. A building code focusing the local practice and culture needs to be prepared for the design and construction of houses.

HDS 08. Undertake appropriate tax policy on both urban property and housing to avoid the unfair distribution of land and vacant houses.

Implementing authority needs to undertake appropriate tax policy to prevent unfair distribution of land and houses. Tax policy should be made in such a way that low- and middle-income group will have the maximum benefits and can afford to own a land or house. Policy should also be taken to restrict the vacant houses. To discourage the ownership of real-estate for speculative business tax need to restructured and staggered on urban real estate property instead of building and income category.

HDS 09. Undertake slum improvement program. In some cases, relocation plan needs to be undertaken.

All slum areas need to be identified and proper improvement plan must be taken to improve the living quality of the slum dwellers and to ensure fundamental needs of life. Proper relocation plan needs to be formulated to relocate the slum dwellers in other areas with proper income generation activities. Slum dwellers are also part of the urban life and they provide various urban services which are very necessary to the urban people

CHAPTER EIGHT: INFRASTRUCTURE

Supply of Infrastructure like water supply, power, gas etc cannot be unlimited. Therefore, the issues need to be addressed from both supply and demand side. Unlimited supply of infrastructure can't be sustainable.

INF 1. Direct infrastructure provision where the Structure Plan intends to direct new development

INF 2. Identify the demand for infrastructure to meet the present and forecasted population.

INF 3. Identify appropriate agencies and funding including private investment to ensure that infrastructures are provided sufficiently in time.

INF 4. Regularly prepare and update Multi-Sector Investment Plan (MSIP) to coordinate investment in infrastructure facilities sequentially.

8.1 Water Resource Management and Supply

Water resources play key role in the livelihood pattern of the local inhabitants with a complex set of relationships. An efficient management of this resource can promote the quality of life of the local people to a great extent. This issue is one of the most vital one in the preparation of Structure plan of a city.

For the purpose of future planning of the water supply system in the Upazila, estimates of water demand over the plan period are determined. According to Journal of Water and Health published by IWA and funded by AusAID in 2006 *(Milton et. al, 2006)* water consumption pattern of rural area of Bangladesh has been calculated as following

- Drinking purpose- 3.53 (l/D)
- Cooking -6.71(l/D)
- Bathing -27.26 (l/D)
- Domestic washing -12.18 (l/D)
- Toileting and cattle feeding- 12.75 (l/D)

Total consumption- 62.47 (l/D). The planning team uses this rate to calculate water demand for the planning area.

According to this study, by the year 2041 the demand of water in the city will be 11133.31 gallon per day (gpd) or 42,172 litter per day for an estimated population of 351,430 people assuming an average consumption of 31.7006 gpd or 120 litter per day per person.

Table 5: Water demand forecast

Union Name	Population, 2011	Population, 2022	Water demand (thousand litre)	Population, 2031	Water demand (thousand litre)	Population, 2041	Water demand (thousand litre)
Barguna Paurashava	32,235	40,019	4,802	46,388	5,567	53,464	6,416
Ayla Patakata	19,782	21,332	2,560	22,600	11,300	24,009	2,881
Badarkhali	26,201	29,725	3,567	32,608	16,304	35,812	4,297
Barguna	20,599	21,876	2,625	22,921	11,460	24,082	2,890

Burir Char	29,542	30,848	3,702	31,917	15,958	33,104	3,972
Dhalua	25,700	28,631	3,436	31,029	15,515	33,694	4,043
Gaurichanna	27,675	32,613	3,914	36,653	18,327	41,142	4,937
Keorabunia	17,755	18,402	2,208	18,931	9,466	19,520	2,342
M.Baliatali	28,944	31,514	3,782	33,617	16,808	35,953	4,314
Naltona	19,705	22,530	2,704	24,841	12,421	27,410	3,289
Phuljhury	13,205	16,885	2,026	19,896	9,948	23,241	2,789
Total	**261,343**	**294,375**	**35,325**	**321,401**	**143,073**	**351,430**	**42,172**
Total in Gallons			**9325.80**		**37771.34**		**11133.31**

INF 5. Regarding the local wetland ecosystem, the use of pesticides and chemical fertilizers must be strictly limited to the acceptable level.

The wetland ecosystem is severely harmed by the indiscriminate use of chemical fertilizers and pesticides. According to a study, 15% of used pesticides end up in nearby bodies of water. The different forms of life that are present in the food web are then impacted by the organic and inorganic compounds.

INF 6. Fish sanctuaries should be used to protect important aquatic habitats.

Fish sanctuaries can offer endangered fish species a secure environment in which to reproduce. This may also clear the way for migrating fish. Maintaining the wetlands' ecosystem can add resources to the water bodies. Prior to disposing of industrial waste.

INF 7. Excreta from people should not be dumped into rivers or canals using water containers or hanging latrines.

It is concerning that human waste from the restrooms of watercraft like launches, steamers, and ferries is dumped directly into the water, which seriously contaminates the environment. Many water-borne diseases like cholera and diarrhea frequently spread as a result of these violations. Open, unhygienic hanging latrines are a significant threat to water pollution.

INF 8. Groundwater extraction should cease to be the sole source of water for the water supply system, and be replaced by treated surface water.

8.2 Power

Provision of Electricity is most essential for supplying power and energy to the Upazila. In the urban area people are highly dependent on the electricity for both domestic and commercial consumption. For smooth functioning of the community services by public and private sectors, electricity supply has to be ensured round the year. With the growth of population and increase in the level of urbanization, electricity consumption will also increase in the future. From the World Bank standard, at present Energy consumption per capita is around 497 kWh of electricity. As the growth of our country people's lifestyle, its assume that every year this demand will increase 3% per year. An estimation of electricity consumption for the Upazila is given below:

Table 6: Electricity demand

Union Name	Population, 2022	Electricity Consumption (kwh)	Population, 2031	Electricity Consumption (kwh)	Population, 2041	Electricity Consumption (kwh)
Barguna Paurashava	40,019	19,889,443	46,388	29,279,642	53,464	43,869,725
Ayla Patakata	21,332	10,602,004	22,600	14,264,894	24,009	19,700,513

Badarkhali	29,725	14,773,325	32,608	20,581,844	35,812	29,385,429
Barguna	21,876	10,872,372	22,921	14,467,506	24,082	19,760,413
Burir Char	30,848	15,331,456	31,917	20,145,691	33,104	27,163,388
Dhalua	28,631	14,229,607	31,029	19,585,195	33,694	27,647,511
Gaurichanna	32,613	16,208,661	36,653	23,135,007	41,142	33,758,945
Keorabunia	18,402	9,145,794	18,931	11,949,058	19,520	16,017,077
M.Baliatali	31,514	15,662,458	33,617	21,218,714	35,953	29,501,126
Naltona	22,530	11,197,410	24,841	15,679,391	27,410	22,491,193
Phuljhury	16,885	8,391,845	19,896	12,558,156	23,241	19,070,333
Total	294,375	146,304,375	321,401	202,865,097	351,430	288,365,653
Total in mwh		**146304**		**202865**		**288,366**

INF 9. Solar energy systems, Windmill and biogas plants should be promoted as renewable energy sources.

Bangladesh is a tropical nation with good year-round solar radiation coverage. Barisla can meet a large portion of her energy needs from rooftop photovoltaics because there are no obstacles in the way of the sun's rays. Additionally, extensive use of biogas plants can provide a sizeable portion of the energy required for cooking.

INF 10. New industries should have a provision of providing a certain amount of energy from their own sources, preferably renewable sources.

This policy can support the trend of looking for alternative sources of energy while assisting the city in coping with the power crisis.

8.3 GAS

Gas has a higher combustion efficiency than other fossil fuels. Gases emit very little carbon that has been burned. A more efficient use of gas can lessen the need for electricity produced by coal-fired power plants. 45 cubic feet Per capita /day has been considered for the calculation.

Table 7: Gas demand

Union Name	Population, 2011	Population, 2022	Gas Requirement (thousand cubic feet/day)	Population, 2031	Gas Requirement (thousand cubic feet/day)	Population, 2041	Gas Requirement (thousand cubic feet/day)
Barguna Paurashava	32,235	40,019	1,801	46,388	2,087	53,464	2,406
Ayla Patakata	19,782	21,332	960	22,600	1,017	24,009	1,080
Badarkhali	26,201	29,725	1,338	32,608	1,467	35,812	1,612
Barguna	20,599	21,876	984	22,921	1,031	24,082	1,084
Burir Char	29,542	30,848	1,388	31,917	1,436	33,104	1,490
Dhalua	25,700	28,631	1,288	31,029	1,396	33,694	1,516
Gaurichanna	27,675	32,613	1,468	36,653	1,649	41,142	1,851
Keorabunia	17,755	18,402	828	18,931	852	19,520	878
M.Baliatali	28,944	31,514	1,418	33,617	1,513	35,953	1,618

Naltona	19,705	22,530	1,014	24,841	1,118	27,410	1,233
Phuljhury	13,205	16,885	760	19,896	895	23,241	1,046
Total	**261343**	**294375**	**13246.88**	**321401**	**14463.05**	**351430**	**15814.36**
Total in Metric Ton			**13.25**		**14.46**		**15.81**

INF 11. The national gas network needs to be linked up to Barguna Sadar Upazila as soon as possible.

8.4 Telecommunication

The foundation of trade and commerce is communication. Comfort in urban life is a requirement for effective communication.

INF 12. Everyone in Barguna Sadar should have access to the Broadband wireless Internet.

E-mail, net-to-phone communication, and video conferencing are just a few examples of the many communication methods that can be based on the Internet and have a catalytic effect on trade, commerce, and education.

INF 13. To prevent health risks, mobile phone service provider towers should be placed as far away as possible.

The signal propagation from mobile phone towers is said to pose health risks. Thus, it is best to avoid placing them too close to one another.

Sewerage

Sewerage generated from the urban dwellers should be treated in such a way that it cannot leave any negative impacts on the environment.

INF 14. Utilizing accessible resources and low-cost technologies, sewer disposal should be managed.

A comprehensive sewerage network is a very expensive option that takes a long time to implement. Therefore, it is important to emphasize in-situ sewage treatment and disposal in areas without a conventional sewerage network, particularly in those that are close by. This can be accomplished by implementing low-cost technologies for the treatment and disposal of liquid waste (such as, septic tanks, small bore sewerage systems, soak pits, etc.). There should under no circumstances be any discharge of untreated sewage into nearby surface water bodies. Human waste should be encouraged and made as easy to compost as possible so that its economic and environmental value can be realized.

8.5 Solid Waste

Solid waste has the potential to harm the environment. In order to maintain the environmental quality, this problem needs to be resolved right away. As per Waste Concern, an NGO working on the waste management system of Bangladesh, per capita per day waste generation rate for the Paurashavas is 0.25 Kg and the waste collection efficiency for the Paurashavas is only 54%.

Assuming this rate of waste generation and collection efficiency is constant in the estimation of the amount of total generated waste and backlog in Paurashava and Unions of the Upazila, the estimates are made over different phases of the plan period.

Table 8: Waste generation

Union Name	Population, 2011	Population, 2022	Water demand (thousand litre)	Population, 2031	Water demand (thousand litre)	Population, 2041	Water demand (thousand litre)
Barguna Paurashava	32,235	40,019	10,005	46,388	11,597	53,464	13,366
Ayla Patakata	19,782	21,332	5,333	22,600	5,650	24,009	6,002
Badarkhali	26,201	29,725	7,431	32,608	8,152	35,812	8,953
Barguna	20,599	21,876	5,469	22,921	5,730	24,082	6,020
Burir Char	29,542	30,848	7,712	31,917	7,979	33,104	8,276
Dhalua	25,700	28,631	7,158	31,029	7,757	33,694	8,423
Gaurichanna	27,675	32,613	8,153	36,653	9,163	41,142	10,286
Keorabunia	17,755	18,402	4,601	18,931	4,733	19,520	4,880
M.Baliatali	28,944	31,514	7,879	33,617	8,404	35,953	8,988
Naltona	19,705	22,530	5,633	24,841	6,210	27,410	6,852
Phuljhury	13,205	16,885	4,221	19,896	4,974	23,241	5,810
Total	**261343**	**294375**	**73593.75**	**321401**	**80350.30**	**351430**	**87857.57**
Total in Metric Ton			**73.59**		**80.35**		**87.86**

INF 15. Solid waste must be separated at the source into various categories such as biodegradable, recyclable metals, papers, and so on.

Using low-cost local technology, biodegradable waste can be converted into compost. Metals and papers can also be reused in industry.

INF 16. To the greatest extent possible, solid waste should be recycled.

Polybags or environmentally friendly containers can be provided for household waste sorting. This will sort various types of solid waste into the desired recycling categories. Separation at the source can be accomplished successfully by raising public awareness about the project.

Infrastructure for Transportation

INF 17. Roads should be classified according to their primary function, and a comprehensive network should be constructed while keeping this hierarchy in mind.

INF 18. Throughout the network, proper terminal facilities will be built.

Modal shift points are critical components of the transportation network. Significant infrastructures, such as modal transfers between roadways and waterways, docking facilities, major bus and truck terminals, rail stations, and airports, should be built in response to demand by identifying suitable locations through appropriate studies.

CHAPTER NINE: COMMUNITY FACILITIES

Community facilities particularly education, health, recreation facilities, shopping and markets, etc. are the key aspects for the growth of an urban territory. Community facilities planning and management have become important for the extra population in the next twenty years for the Barguna Sadar Upazila. This chapter chalks out the policies to guide the future provisions of the community facilities that will be required for the upcoming population in next 20 years. **Table 9** is showing Land Requirement for community facilities.

9.1 Land Requirement For Community Facilities

Table 9: Land Requirement for community facilities

Land use Category		Standards/Population	Land Requirement (acre) in 2022	Land Requirement (acre) in 2031	Land Requirement (acre) in 2041
Education	Nursery	0.08 acre per 1,000 population served	23.19	25.99	28.31
	Primary School	0.08 acre per 1,000 population served	23.19	25.99	28.31
	Secondary School	0.1 acre per 1,000 population served	28.99	32.48	35.38
	College	0.08 acre per 1,000 population served	23.19	25.99	28.31
Health	Small Clinics	0.04 acre per 1,000 population served	11.60	12.99	14.15
	Hospital	0.04 acre per 1,000 population served	11.60	12.99	14.15
Community organization	Community Center/ Mosque	0.04 acre per 1,000 population served	11.60	12.99	14.15
Recreation	Cinema Hall	0.5 acres per 20000 population served	7.25	8.12	8.85
	Stadium	5-10 acres per Pourashava			
	Play Gourd/ Playfield	0.08 acre per 1,000 population served	23.19	25.99	28.31
	Park	0.12 acre per 1,000 population served	34.79	38.98	42.46
Commercial	Corner Shop/Kutcha bazar	0.04 acre per 1,000 population served	11.60	12.99	14.15

9.2 Community Facility Policy

CF 1. Planning and coordination units have to be introduced in Paurashava and union parisads for providing, coordinating and managing different types of community facilities.

Team of Professionals with knowledge of planning along with public representatives and leaders would make up an excellent coordination body for providing, coordinating and managing different types of community facilities.

CF 2. Regular evaluation and review should be done concerning land use for facilities.

Every year the concerned department will analyze the existing condition of the facilities and identify the future demand and adjust the demand of land for the facilities according to the plan document. Their function will be to update data from the primary field survey, to maintain the database and analyze to find the actual supply and demand condition. They would create guidelines for land allotment for various facilities according to the plan.

CF 3. Setting the standards and location of community facilities

The community facilities (school, playground, primary health care center, etc.) should be within the waking distant. There has to be defined standards for different community facilities that include the necessary features that a facility must provide.

CF 4. Encourage private entrepreneur to invest in the community facilities sector

This is still a very latent sector for private entrepreneurs in the country. Generally, government is responsible to provide the services. But if private entrepreneurs encouraged to invest in this sector as business venture or as Corporate Social Responsibility (CSR).

CF 5. Ensure a kitchen market for every community

There should be designated place for grocery, kitchen commodity shops for every community.

CF 6. Allow hawkers to operate their business at different points at some predetermined time.

In spite of being a part of informal business, Hawkers play a vital role to the flow of urban economic chain. But due to their misappropriate location, they hamper the normal circulation of local people. They create traffic jam. Hawkers' market can ensure the local people get the facilities easily.

CF 7. Establish internet-based information center at urban growth center and rural hat-bazaar.

IT center is that place where people can get all kinds of up-to-date information through electronic communication as well as online application and utility bill payment can be done. People can also send and receive personal messages and mails electronically through the information center. Concerned authority would establish ITC (Information and Technology Center) in its area. In rural area GCM (Growth Centre Markets) should be the place where information centers are set up.

CF 8. All the service providing authorities will develop E-network system and provide their services by using internet

Service providing Local authority (e.g., PDB, ISP, Paurashava etc.) and different institutions (e.g., schools, colleges, university, etc) to come under internet network and they will develop an internet base network system to serve their stakeholders effortlessly and speedily for payment of electricity bill, school fees, city corporation tax, water bill, etc. So that people can easily access his/her present status here.

CF 9. Identify the potential recreational places

Three potential ecotourism sites have been proposed in Gora Padma Beach, of Naltona Union, Golbunia tourist spot and Suranjana Eco Tourism Resort of Dhalua union. The khals are the local natural resources that should be protected against harmful activities. The banks of these channels can be built as recreational sights. People can go there for getting a fresh breath. Suitable places should be identified for Community Parks. Different types of plantations can be done in them. A buffer area of 50 meters from river bank and 10 meters from canal bank have been preserved for that.

CF 10. Ensure play lots and play ground with the community centers and schools

It will be compulsory to comply with the prescribed standard for open space and play ground while providing planning Permission.

CF 11. Ensure full coverage of the eligible population under the Non-Formal Education (NFE) Program by the first ten years of the Plan implementation period.

Under the Non-Formal Education Policy Bangladesh, 2007 the country has taken initiative to provide education incorporating basic literacy, lifestyle, work skills, general culture and facilities for lifelong learning and enhancement of earning capabilities. Promoting and ensuring the implementation of NFE program will support the idea of increasing value addition to the existing production system and diversifying them. It will help to materialize idea of innovation.

CF 12. Identify, promote and protect historical and culturally sensitive places

Concerned authority will identify and protect historical and culturally sensitive places.

CF 13. Create an Education and Research zone

A designated area will have to be reserved and developed as an education and research zone specially for agricultural research as the upazila is famous for agricultural products like water Mallon. This zone should be outside of the core city area and should be easily accessible from different parts of the city. Local scholars can get the chance to show their potentiality and creativity here. It can work closely with local industries and entrepreneurs and act as the think tank for the community.

CHAPTER TEN: FLOOD CONTROL AND DRAINAGE DEVELOPMENT POLICIES

At present inundation is occurred due to localized storm rainfall (internal flood), river water overflow and also due to other causes affecting drainage system within Barguna Sadar Upazila. External flood is not occurring in the study area due to tidal affect from Khagdun, and Payra River. The reason behind this occurrence of flooding is mostly man made.

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

FCD 1. Encroachment of exiting natural channel/khals to be identified and removed

FCD 2. 20 feet from canal bank is considered as ecologically sensitive area (ESA). Any kind of development is sstrictly prohibited in ESA.

FCD 3. Unauthorized cultivation on the bed of the khal or channel to be identified and stopped.

People used to cultivate in the bed of the channel and ultimately the channel will get blocked in future, so, this practice must be stopped.

FCD 4. No drain should be constructed inside a natural channel, reducing its area of flow.

FCD 5. Construction of road should ensure that they don't obstruct natural flow of water and movement of fish species.

In some area it is observed that buildings are constructed on channels and access roads are constructed across the natural slope, obstructing its flow. It not only obstructs rain water flow but also hampers the movement of fish species and its life cycle.

FCD 6. Identify and conserve big ponds. These water bodies will work as flood retention pond resource for fish cultivation and vital components to retain ecological balance.

Now a days, big pond or water shed are filled up for residential building or industrial purposes. To address the urban flooding, ponds at strategic locations has been identified under the Natural Water Body Protection Act 2000.

FCD 7. Identify points of uncontrolled disposal of solid wastes into the exiting drainage channel and take measures to stop these.

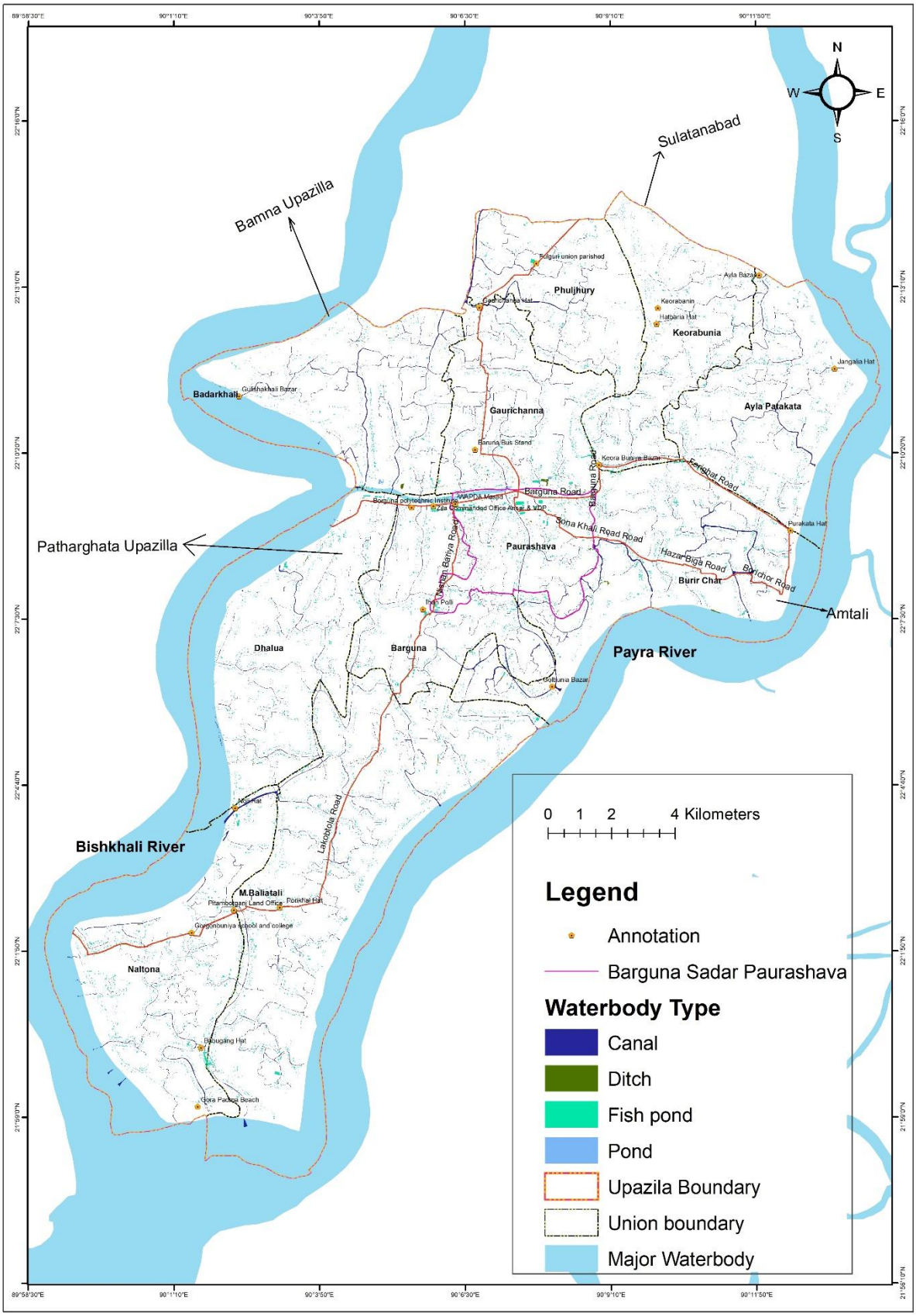
The khal is gradually silted up due to uncontrolled disposal of solid wastes and garbage. This reduces the flow capacity of the channel. These also pollute the water of the channel which may harmful to human and fishes.

FCD 8. Motivate the people and grow communal awareness and abide by the drainage channels encroachment law.

There should seminar and symposium to motivate the people and stakeholder making them aware about the bad side of the encroachment and abide by the encroachment law.

FCD 9. Preserve and enforce right of way over exiting natural channel.

Every river and natural channel there are a bank line for their alignment. These bank lines should be preserved and these are their right of way. No encroachment inside their right of way to be allowed.



Map 4: Waterbodies of Barguna upazila

CHAPTER ELEVEN: URBAN LAND DEVELOPMENT POLICIES

It is seen from the projection of population that by the year 2041, the population of the project area will be 354965 and, therefore, a total of 70993 nos of dwelling units will be required by that time assuming an average household size of 5 persons. The population of Barguna Sadar Upazila has not gone beyond its limit. Still there is lots of scope for planning and developing the upazila. The population density of the project area in 2011 was only 17 persons per acre while projected calculation shows that in 2041, the density will be 22 persons per acre. Through population projection 93622 new people has to be accommodated in next 20 years.

To guide, attract and manage investment in land development following policies are chalked out for the implementing Authority.

ULD 1. Land use change to be guided and controlled in accordance to overall objectives set in the urban area plan.

ULD 2. Development density of urban land to be limited to the extent of infrastructure provision.

Development density needs to be restricted into the limit of the infrastructures carrying capacity. If the load of the development goes beyond the carrying capacity of the infrastructure, then frequent failure of the services will lead low quality urban environment.

ULD 3. Demand and supply side issues need to be addressed while providing infrastructure.

Supply of Infrastructure like road, water supply, power etc. cannot be unlimited. Therefore, the issues need to be addressed from both supply and demand side. Unlimited supply of infrastructure can't be sustainable.

ULD 4. Optimization of land resource should be through sustainable use and equitable distribution of land.

Land is one of the scarce resources in Bangladesh; therefore, optimization of this resource is a vital strategy for this plan set. We have chosen the strategy of optimization against maximization to make sure that this scarce resource is utilized in manner which is ecologically sustainable and also socially equitable distributed among different groups of people.

ULD 5. Ensure that serviced land is made available for all income groups.

Ensure that all public and private land development projects have a portion, as determined by the urban area plan, allocated for the low- and middle-income groups (LIG & MIG)

ULD 6. Promote urban up-gradation projects through slum up-gradation, urban conservation and redevelopment, land readjustment etc.

ULD 7. Explore and identify different forms of public private partnership to ensure that infrastructures are provided and serviced land is available as and when required.

ULD 8. Provide infrastructure in newly expanding urban areas with two folds objectives: to encourage concentration of development within the newly expanded urban area and to control environmental burden on the ecology at a sustainable level.

Infrastructure development plan can be used as an effective tool to increase concentration of development as determined in this Structure Plan. While providing infrastructure it should be kept into

account that ecology has a limit to take environmental burden; therefore, infrastructure to be provided at a sustainable manner.

ULD 9. Encourage the development of unused and underdeveloped land within the existing urban area.

ULD 10. Use fiscal and infrastructural tools to guide the growth of the town towards the area which are regarded as suitable for development and away from those areas which are considered as unsuitable.

ULD 11. Discourage land speculation and urban sprawling into the fringe of the existing urban area.

ULD 12. Identify ecologically sensitive and culturally valuable sites and protect them.

Ecologically sensitive and culturally valuable sites need to be protected by law and the cost of protection must come from public exchequer. If these common resources are left to market force, then they will be valued on the basis of individuals benefit rather than valuing them in terms of their long-term contribution to the community or/and on the total ecological process.

ULD 13. Identify zones prone to natural "extreme events" to prevent disaster.

Initiatives should be taken to identify zones which are prone to natures "extreme event" and take remedial measures to avoid disaster to take place. It needs to be mentioned that disaster is a function of extreme events of nature and human action. Disaster risk is an unresolved problem of development. Relation between Urbanization and Disaster are extremely complex and clearly context specific. Climate change may increase the frequency of the extreme events of nature.

ULD 14. Identify and reserve land for future infrastructure development.

ULD 15. Identify zones with especial economic value and ensure most efficient use of them.

Immediate identification of land and land corridors are essential. Land corridors for future infrastructural development need to be brought under public authority to avoid unnecessary displacement in the future.

Identify zones like river banks, both sides of canals and highly accessible land by the side of the highways to be evaluated and identified for especial investment.

CHAPTER TWELVE: RURAL LAND DEVELOPMENT POLICIES

Demand for Rural Land Development Policies starts with the recognition that rural land and ecologically sensitive areas need to be protected from haphazard and unplanned urban encroachment. Preservation and enhancement of rural economy and gradual development of livelihood played the central role in formulating Rural Land Development Policies.

Though large part of the growing population will be accommodated through infill and densification of existing urban area, but even then, some rural land will be required to be transformed into urban use. The challenge is to guide the land use change as directed by the Structure Plan Map. Large number of the growing rural population has to be accommodated in designated Growth Centers through providing infrastructure and Community facilities.

Accordingly following policies are set out for the implementing Authority.

RLD 1. **Non-agricultural use of land to be concentrated in a limited numbers of growth center as identified in the structure plan map.**

RLD 2. **Limit industrial development outside the existing urban area and proposed urban area.**

Though most of the industrial development will be directed in the periphery of urban zone of the Structure Plan area; but some small and medium size investments, which will have direct linkage with agricultural production network will opt for rural location. These investments should be limited into the selected Growth Centers as shown in the Structure Plan Map.

RLD 3. **Identify ecologically sensitive areas and protect them from encroachment, pollution and change of land use.**

Population growth of Bangladesh has not been arrested to its desired rate. More over the urban population growth is the summation of natural growth and migration. Land for agricultural use is becoming scarce due to the pressure of population growth and unplanned sprawling of urban area. For food security and ecological protection rural land and ecologically sensitive areas need to be protected from haphazard and unplanned urban encroachment.

As there will be natural increase of population and some migration into the rural zone of the Structure Plan Area of Barguna Sadar Upazila so at some rate agricultural land will be required to be converted into non-agriculture use. The policy of the Structure Plan is to restrict these non-agricultural activities into a few numbers of selected Growth Centres. Above two policies will help to protect valuable land and also ensure efficient investment in infrastructure.

RLD 4. **Ensure that development is in accordance with the broad land use zoning shown in the structure plan map.**

RLD 5. **Incubator type investment in the form of small and medium enterprises to get priority and to be encouraged.**

Objective of the Structure Plan is to improve the living standard of the inhabitants of Barguna Sadar Upazila. Mega investment usually displaces people through land acquisition, bringing migrant of high-income group, creating income disparity in a very short span of time etc. On the other hand, small scale incubator type investment helps local people to diversify their products and services, get higher value addition of their goods and services, and become innovative. Small and medium size enterprises help people to become innovative and creativity flourishes.

RLD 6. Ponds, canals and wetlands to be identified and preserved as vital resources for development of agro-economy and tourism.

The present economy of Barguna Sadar is based on agriculture, fishery and river communication. The objective of Structure Plan is to build a strong and sustainable economy, based on the existing livelihood pattern of the people of Barguna Sadar. In persuasion of this policy agro-industry, tourism and water transport need to be given priority; for development of these sectors ponds, canals and wetlands must be identified, recovered and protected.

RLD 7. Initiate full analysis of natural slope of the land and alter the present trend of rural road development ignoring the natural drainage system.

RLD 8. Construction of rural road must take into account of the natural slope and drainage pattern of the rural land.

CHAPTER THIRTEEN: ENVIRONMENT AND DISASTER MANAGEMENT

Environmental and disaster management policies are promulgated focusing primarily on factors leading to environmental sustainability and its interaction with livelihood. Both environmental processes and livelihoods are dynamic in nature. In a predominantly agrarian country like Bangladesh, people live in close proximity to the nature, obtain their livings from it and adapt their lifestyle to it. They affect the nature, and become affected by it. Thus, the natural systems are indispensable parts of human life here.

In the recent decades, radical urbanization and industrialization trends tend to hamper this balanced and symbiotic aspect of both nature and human life, leaving largely irreversible adverse impacts on natural environment and consecutively livelihood of those living on this nature. Although cannot be ceased completely, such tendencies must be brought under control so as to save both nature and its dependents.

Following environmental and disaster management policies were designed to integrate the complex dynamics of natural processes and human subsistence, rather than to segregate them, in a mutually beneficial manner.

Disaster arising from climate change or non-climate change phenomena is very common in Bangladesh. People of the country are highly resilient to disasters like, flood, cyclone, and river bank erosion. Remarkable disasters that strike Barguna Sadar Upazila are, tropical storm, Salinity and monsoon flooding.

EDM 1. Ensure proper control mechanism regarding flood, riverbank erosion, sea-water intrusion and salinity.

Justification

Natural disasters, such as floods, inundation of water, cyclones, erosion etc, are threats to safety and loss of human life and properties. This has to be given due consideration in the development processes.

Strategies

Building new and enhancing existing drains; identifying inundation area and depression area for taking necessary measure for infrastructure development; facilities such as water treatment plant, septic tanks, toilets etc should be constructed above flood level to avoid inundation level.

The strategy of implementing disaster-resilient infrastructure can be adopted to face the challenges of future disasters.

Implementation Agencies

The local government authorities, particularly the Upazila Parishad should work through different committees formed as per National Disaster Management Plan at the local levels. The Disaster Management Directorate under the Ministry of Disaster and Relief should be monitoring such actions for people's safety and national security purposes.

EDM 2. Construct adaptive and flood-storm-surge resilient building; extension and improvement of multipurpose cyclone shelters.

Justification

Proactive action for sustainable infrastructure is necessary to tackle climate change impacts. Multipurpose cyclone shelter should be a solution to comprehensive and productive use of structure. The plan should propose embankment construction considering people who live in the area between the rive and the wall (strategies or compensation provision to their homes, farms, animals, pastures, livelihoods); the plan should also recommend measures to include protection from saline water, river

bank and khal protection schemes, rehabilitation of polders, as well as an extension of polders, canal excavation, construction of new embankments, protection and extension of irrigation systems, excavation of river and branch channels, and multipurpose cyclone shelters.

Strategies

Infrastructure should be built higher above the flood plain. Build Using Flood Resistant Materials – Materials that can withstand contact with floodwaters for at least 72 hours without suffering major damage are considered flood resistant. Construct coastal embankments and polders to control flooding; construct sluices to facilitate drainage.

Flood proofing critical infrastructures such as hospitals, power stations, industrial plants, major communication networks require development of embankments, barriers, water control structures etc. Steps are also needed for extension and improvement of multipurpose cyclone shelters and preparation of guidelines for designing climate change resilient infrastructure. Upazila level public sector development agencies need to follow guidelines during development of infrastructure.

Implementation Agencies

The local government authorities, particularly the Upazila Parishad should work through different committees formed as per National Disaster Management Plan at the local levels. The Disaster Management Directorate under the Ministry of Disaster and Relief should be monitoring such actions for people's safety and national security purposes.

EDM 3. Take necessary measures to educate people about the dangers of climate change in all spheres of life.

Justification

Awareness would cause people to take proactive measures to create resilience against the negative impacts of climate change.

Strategies

Program initiative by the Upazila Parishad in collaboration with the Department of Disaster Management to educate people about climate change and its consequences.

EDM 4. Adopt climate change resilient production technology in agriculture including seed.

Justification

To avoid disaster in agricultural production, prior action to evolve new agro-tech in agriculture is necessary to cope with climate change.

Strategies

Research program initiative by BADC and BRRI to evolve new technology and paddy Resilient to climate change.

EDM 5. Identification, protection and management of environmentally sensitive and biologically potential areas.

Justification

Preservation of environmentally sensitive areas can serve as safeguard to biodiversity and disaster.

Strategies

1.Identify critical habitat areas of crab, crocodile, deer, dolphins, fox, migratory ducks, reptiles, resident birds, resident waterbirds, sea turtles, sea gull, wild boar, wild buffalo, wild cat, hilsha sanctuary etc. proposal has been made considering the mentioned areas to remain undisturbed.

2. Earmark environmentally sensitive areas in the master Plan.

3. Control development in those areas; take over land if possible to preserve the areas.

EDM 6. Organize and keep activated the disaster management committees at various levels of the administration.

Justification

Regular meeting of Disaster Management Committees will keep members conscious about their responsibilities.

Strategies

Hold regular meeting of Upazila, Union Disaster Management Committees.

Implementing Agency

In Bangladesh, the implementing agency responsible for addressing climate change is the Ministry of Environment, Forest and Climate Change (MoEFCC). The MoEFCC is the primary government body in Bangladesh responsible for formulating and implementing policies, plans, and programs related to environmental conservation, forest management, and climate change mitigation and adaptation.

EDM 7. Necessary planning and management measures to be adopted for preservation and enhancement of surface water quality

Justification

Water is a valuable element of nature which supports as well as bears life. Hence there must be proper planning and management measures aimed at preserving and improving the quality of surface water resources.

Strategies

Restrictions should be imposed on discharge of untreated domestic and industrial sewage (liquid waste) into surface water sources. Also, use of chemical fertilizers and insecticides in agricultural fields should be avoided so that storm water runoff from these fields cannot result in pollution of nearby surface water bodies.

EDM 8. **Surface water bodies (particularly rivers) should be used as major sources of potable water supply to city dwellers in order to reduce dependence on groundwater.**

Justification

The primary source of water supply in Barguna Sadar is groundwater extracted through deep tube wells. Groundwater alone is not sufficient to meet ever increasing demand for potable water since the rate of groundwater recharge is much lower than the rate of its extraction, which results in lowering of water table. Besides, recently arsenic has been detected in groundwater at some locations within study area, although within tolerable limits.

Strategies

Considering these factors, surface water bodies, especially rivers, should be used as major sources of potable water supply to city dwellers. However, groundwater can be used at less urbanized adjoining areas where piped water supply network has not yet been extended.

EDM 9. Productive use of ponds to be promoted in order to enhance their role in economic development.

Strategies

Emphasis should be placed on the use of these ponds for fisheries and duck raising and integrate them with cattle rearing and poultry farming. Such integration will lower the costs of pisciculture since wastes generated from poultry and cattle rearing can be used to produce fish food and applied in the ponds.

EDM 10. Solid waste management to be focused on resource recovery and employment generation.

Strategies

Emphasis should be placed on providing sites for composting plants (in case of organic waste components) and recycling plants (in case of inorganic waste components) rather than dumping grounds or landfill sites. Landfill sites have many associated disadvantages. Leachate and landfill gas are produced in landfill sites due to decomposition of waste, and they may cause negative consequences if not removed regularly. Again, as the waste under the soil cover gets degraded, it looses volume over a long time and the earth above gets subsided consequently.

Therefore, establishment of resource recovery plants (composting and recycling plants) instead of landfill sites should be emphasized. These resource recovery facilities should aim at generation of employment for the poor.

EDM 11. Community based waste collection system to be promoted and sustained.

Strategies

Promoting and sustaining community-based waste collection system can be a step towards effective solid waste management system. In this process separation of organic and inorganic components of the waste can be performed at the source of waste generation, preferably by using separate bins for different types of litter. Also placing waste transfer stations at suitable locations should be an important consideration during detailed planning phases.

EDM 12. Sewage disposal to be managed using low-cost technologies and ubiquitous materials.

Strategies

Providing a comprehensive sewerage network is a very costly option and takes considerable time for implementation. Hence in-situ treatment and disposal of sewage should be emphasized in those areas that are not yet covered by conventional sewerage network, especially the adjoining areas. This can be achieved by adopting low-cost technologies for liquid waste treatment and disposal (such as, pour-flush pit latrine, septic tank & soak pit etc.). Untreated sewage should by no means be allowed to be discharged in adjacent surface water bodies. Conversion of human waste into compost and thus realizing its economic and environmental value should be encouraged and facilitated.

EDM 13. Location of noxious industries should be subject to strict control in order to prevent industrial pollution.

Strategies

Severe restrictions should be imposed on establishment of highly noxious industries in the vicinity of major population centers. Spatial location of such industries, especially those categorized as *Orange B* and *Red* by Department of Environment, People's Republic of Bangladesh, should be arranged in the form of industrial agglomerations and establishment of industries in a scattered manner outside these

agglomerations should not be permitted. There must be compulsory provision of CETP in each industrial agglomeration which will be operated and maintained collectively by industry owners. Thus, they will be able to enjoy some economies as well as ensuring prevention of industrial pollution. No new industrial development should be allowed upstream to major population centers in order to preserve the quality of surface water source.

EDM 14. Conservation of local ecosystem and biodiversity should be addressed in every development scheme.

Justification

Barguna Sadar is endowed with a rich biodiversity which is demonstrated by abundance of local flora and fauna. But unregulated and insensible activities of mankind have pushed a number of species to the verge of extinction.

Strategies

In order to prevent this tendency, comprehensive environmental impact study should be conducted prior to implementation of every development scheme in order to understand its potential impacts on ecosystem. Local plant species should be prioritized for landscaping and arboriculture purposes. These local floras will attract local fauna by providing suitable abode for them. The sides/banks of large inland water bodies should be retained as far as possible in their natural state so as to protect the habitats of these species and avoid major damage to the ecosystem.

EDM 15. Identification and conservation of ecologically sensitive areas with unique ecosystems and rich biodiversity to be emphasized.

Strategies

Areas with unique ecosystems and rich biodiversity will be identified as ecologically sensitive areas. Relevant authorities will take necessary measures for conservation of such areas.

EDM 16. **Sustainable management of wetland resources to be integrated with livelihood of local communities.**

Justification

Wetlands are abundant in natural resources on which the livelihood of many people depend. This symbiosis of man and nature has been subsisting since ancient times. Wetlands offer habitats to a number of species as well.

Strategies

No urban intrusion should be allowed to wetlands characterized by rich natural habitat and high agricultural productivity. Rather these areas should be preserved through sustainable interfacing between wetland biodiversity and livelihood of local people.

EDM 17. Initiatives to be taken for preservation of khals in order to enhance their functions of drainage and recharging ground water reserve.

Justification

Due to encroachment of the drainage canals, natural siltation and dumping of solid wastes in the drains and canals, the natural drainage capacity of the canals reduced gradually. Consequently, the existing drainage system often fails to drain out the storm water run-off which results in prolonged water logging.

Strategies

Adequate depth and width of khals must be preserved in order to retain their function as natural drainage channels, and also promote their role in recharging groundwater reserve through infiltration. Illegal encroachments on these khals must be identified and removed. Also, all the impediments on the major surface run-off routes to these khals in must be eliminated to avoid water logging in the study area.

EDM 18. Physical development schemes that put both the lives and livelihoods of people under vulnerable state should be avoided.

Justification & Strategies

Physical development projects of almost all kinds require acquisition of land for their implementation. Often such acquisitions lead to damage or even complete destruction of the livelihood of affected people. As a result, these people become more vulnerable to various natural and other types of disasters. Where deep-rooted means of livelihood of a large number of people is involved, in such instances physical development schemes should give way to sustainability of their livelihoods. This is necessary to avoid large scale progression of vulnerability.

EDM 19. Proactive, rather than reactive, disaster management system should be adopted.

Strategies

A comprehensive disaster management approach should be adopted with special focus on disaster preparedness and disaster risk reduction. Emphasis should be given on indigenous coping mechanisms.

EDM 20. Strategic Environmental Assessment (SEA) to meet balanced environmental, social and economic objectives in policies, plans and programs.

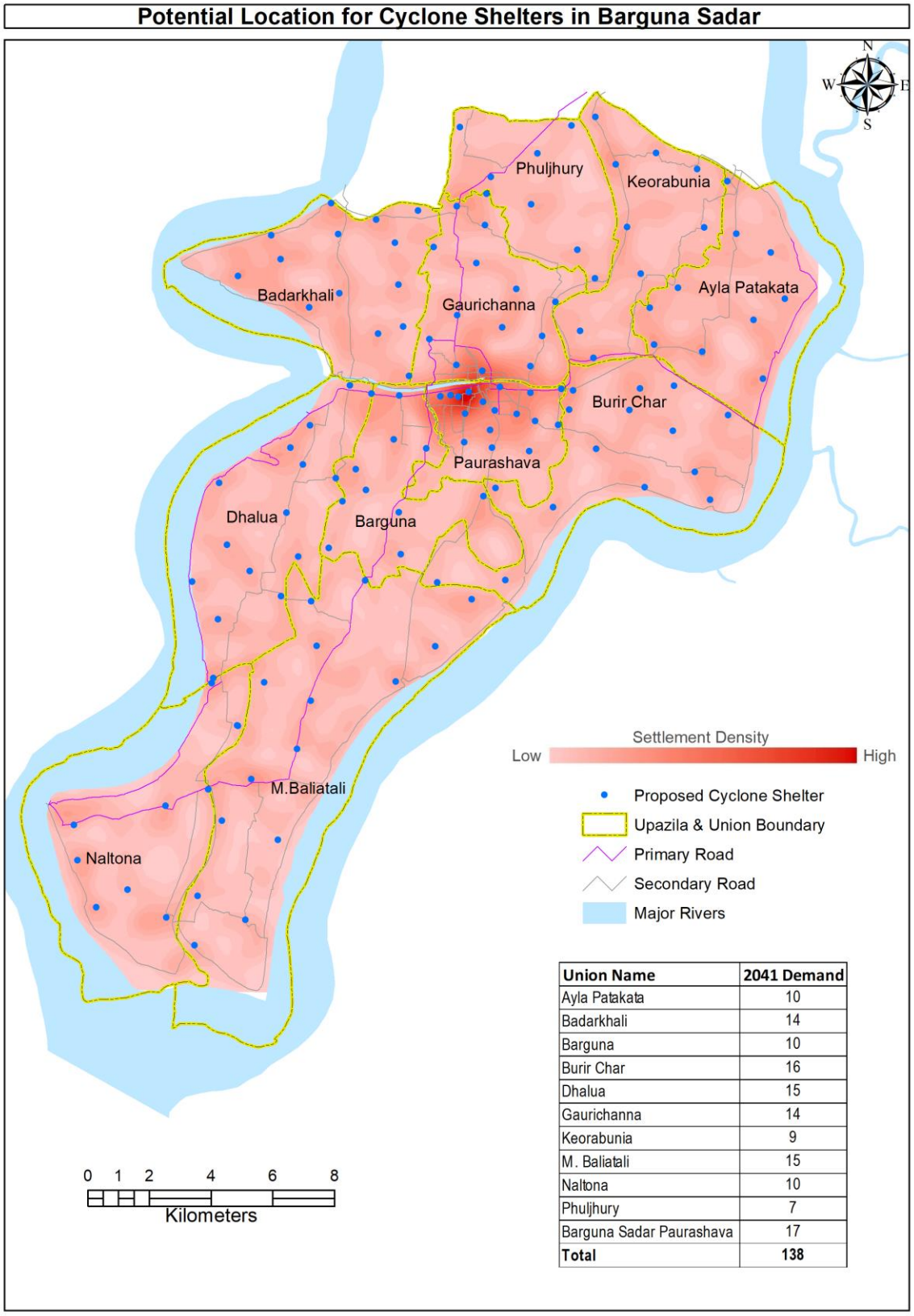
Justification & Strategies

Strategic Environmental Assessment (SEA) addresses the linkages and trade-offs between environmental, social and economic considerations. This approach is sometimes called sustainability appraisal/assessment. It involves an integrated assessment of the environmental, social and economic factors, and sometimes even broader factors such as institutions and governance dimensions. Whereas EIA is conducted at project level, SEA appraises policies and programs in the context of political economy factors and institutional settings. Thus, it emphasizes strengthening institutional and governance capacity for managing environmental effects and opportunities. A high tier body can be entrusted with the responsibility of conducting SEA.

EDM 21. Development of brick fields and physical structures along the riverbank to be controlled.

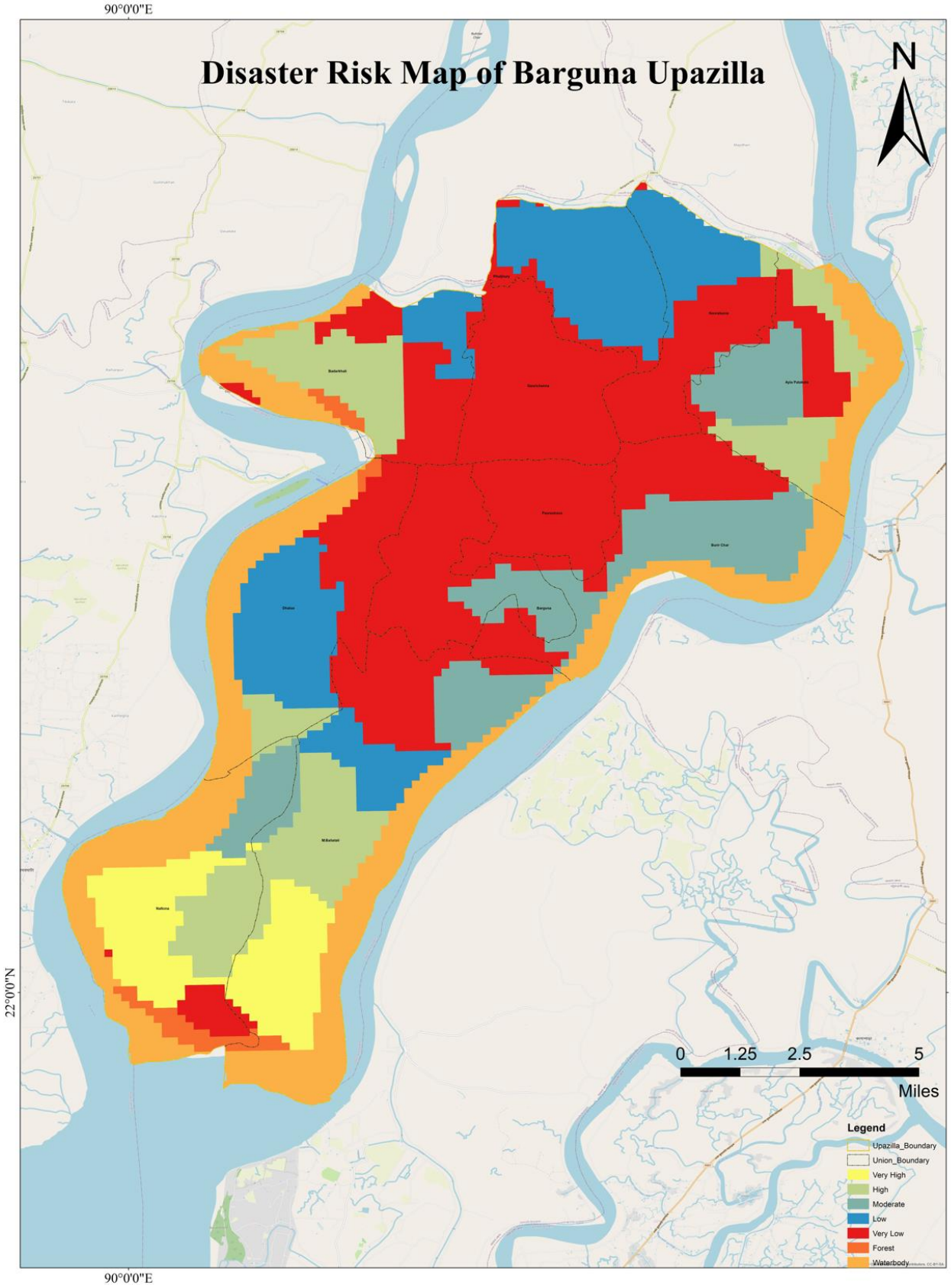
Justification & Strategies

Riverbanks must be protected from uncontrolled activities from an environmental point of view. There are guidelines in this respect from the Ministry of Water Transport from the resolutions of its meeting held on 29.10.2003 that any structure to be built within 50 metres of the riverside should get clearance from BIWTA before applying for permission from the planning authority and that construction of brick fields should be completely prohibited within 200 metres of the river. These guidelines should be adopted, and strictly followed and proper monitoring should be done as the policy of this structure plan.



Union Name	2041 Demand
Ayla Patakata	10
Badarkhali	14
Barguna	10
Burir Char	16
Dhalua	15
Gaurichanna	14
Keorabunia	9
M. Baliatali	15
Naltona	10
Phuljhury	7
Barguna Sadar Paurashava	17
Total	**138**

Map 5: Potential Location for Cyclone Shelters



Map 6: Disaster Risk Map

Source: Disaster Atlas, BBS 2018

CHAPTER FOURTEEN: PROTECTION OF COMMON RESOURCE

"… man, who knows the price of everything and the value of nothing"

- Oscar Wilde, Irish author and playwright

The power and innovation of the free market has enabled many changes including an improvement in the quality of people's daily life. Despite its wide-ranging achievements, though, there are still events that expose the terrible limitations of the market mechanism. Conservation of natural resources and protection of the cultural heritage of communities are some of the major ones among these phenomena. In the quest for profit and economic growth, the patrons of free market usually demean almost every other aspect of human life. As Dr. Muhammad Yunus, in *'Creating A World Without Poverty'*, portrays:

"Capitalism takes a narrow view of human nature, assuming that people are one-dimensional beings concerned only with the pursuit of maximum profit. The concept of the free market, as generally understood, is based on this one-dimensional human being."

The sole focus on economic solvency, in this way, has created a very flat interpretation of human life. In market economies, almost every component and experience of life can be assessed on its monetary value. Culture, heritage and nature, things that transcend any economic valuation, are viewed from this shallow perspective and are often the target of sacrifice in the name of economic growth and prosperity. Therefore, a strong safety mechanism has to be developed to protect the natural and cultural resources of Barguna Sadar. Quite ironically, these resources themselves can become major sources of revenue in the long run-in addition to preserving cultural identity and ecological balance, if properly designed and maintained; more than the common development schemes they are destroyed for.

The policies laid out for this purpose are as follows:

CON.01 Identify and preserve Ecologically Sensitive Area (ESA)

Major sites of ecological interest should be immediately identified and declared as ESA. Any development or activity that disrupts the local ecosystem of the area must be prohibited. Because any disturbance in these areas can propagate and affect the environment of the entire region.

CON.02 Locate and conserve 'Heritage Sights'

Places of historic interest, both cultural and religious, should be declared as 'Heritage Sights' and any alteration or unauthorized development in these places should be strictly restricted.

CON.03 Distinct unit has to be formed within concerned authorities e.g. Paurashava/Union Parishad regarding environment and conservation issues

A separate wing concerned with preservation of natural and cultural resources will work to identify and take necessary structural and institutional steps. They will also work to raise awareness among people. A strong and continuous monitoring mechanism should be in place to protect them from encroachment and illegal occupation.

CON.04 Preventing intrusion into the protected areas by identifying and minimizing the root causes of illegal encroachment and occupancy

Natural resources like khals and open spaces are often intruded for financial gains and used for different commercial and industrial purposes. But sometimes the reasons are much deeper. Landless/homeless people from various parts of the city or an evicted group sometimes take shelter in these places. The word 'conservation' means very little to people whose basic needs of food, shelter and security haven't been met. Whatever the reasons are, in-depth analysis can reveal the pattern of intrusion. The findings

can be disseminated among the proper authorities for taking action to eliminate the sources of illegal intrusion. This can substantially reduce the recurring need of eviction from critical sights.

CON.05 Bringing up the ecologically and culturally valuable sights into prominence and making them functional

People have to be aware of the presence of these critical areas and be informed about their significance. That way, it'd be harder for them to get lost in oblivion. They also have to be made functional and intertwined with the livelihood pattern of the local people. Natural resources can be used to create parks and recreational facilities and historic sites can be turned to major tourist spots. The socio-economic fabric created this way will naturally protect these resources from dissolution.

CON.06 Encourage public participation through central and local conservation committees

Active participation of the local people makes the task of conservation a lot easier and more effective. When people are conscious of their resources, they create a strong point of identity around those resources. It becomes very difficult then to abuse or destroy them. A central committee can be formed in this respect for Barisal taking members from professionals, local leaders, and representatives of different government bodies. Some local groups can also be formed with the participation of community members based on administrative regions or some special area of interest. They will work to raise awareness among people and help create social consensus to protect the common resources of the community.

CHAPTER FIFTEEN: SAPTIAL SUITABILITY RANKING

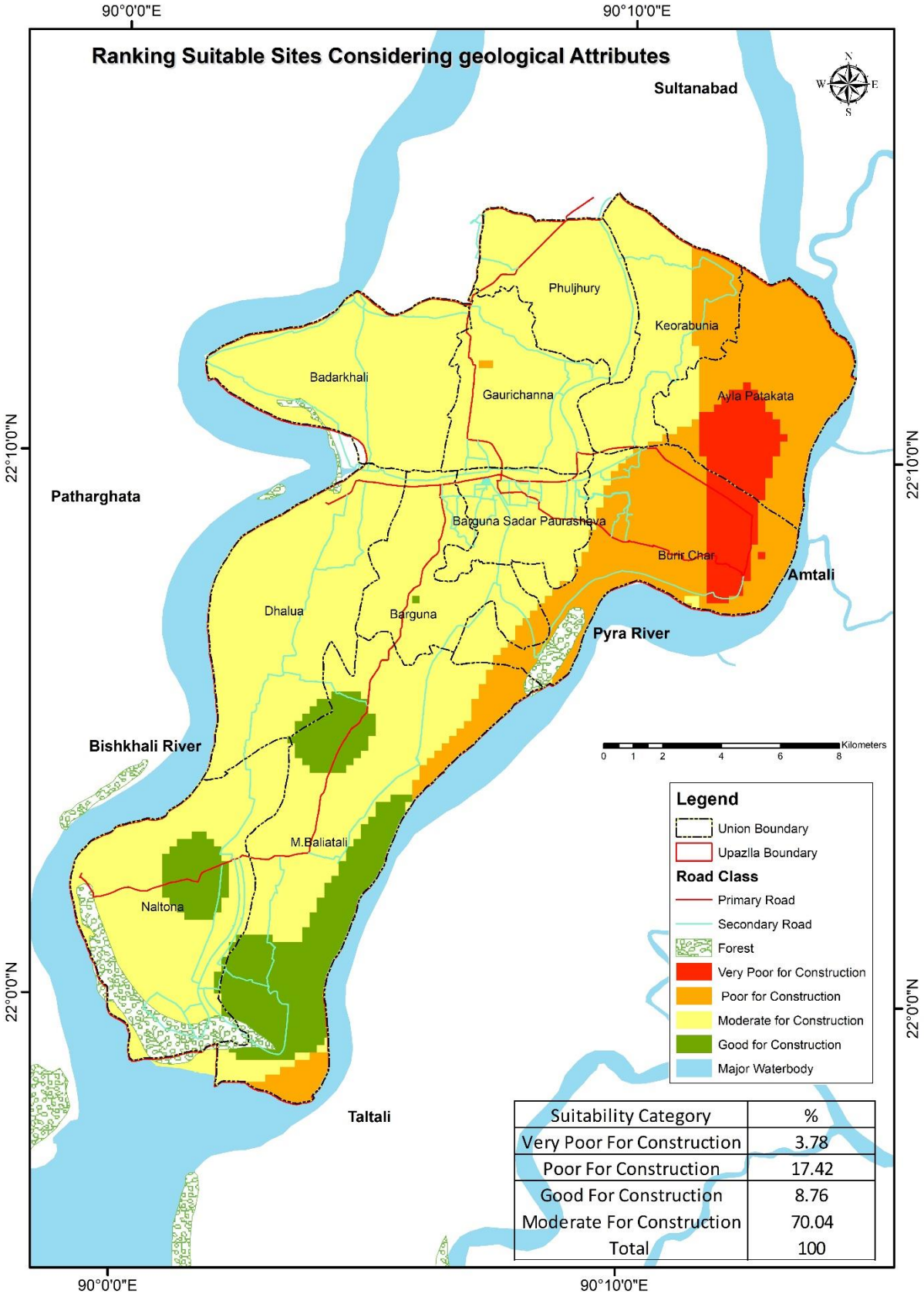
15.1 Suitable Site Ranking-Findings From Suitability Analysis

15.1.1 Ranking Suitable Areas based on Geological Attributes

Geological attributes are important to ensure the safe, stable, and economic design and construction of government or authorities project. For example, ground motion is more directly related to damage to buildings and infrastructure in an earthquake than the magnitude of the earthquake itself. Construction technology commonly employs pile foundations in a variety of scenarios, such as when there is an unstable layer of soil beneath the surface that is incapable of supporting the weight of the building in a case like an earthquake- in such case the load must be transmitted to the layer of firmer soil or rock beneath the weak layer. Besides earthquakes, the liquefaction phenomenon is an unsupportive environment of built structures by altering previously solid ground into a liquefied softened condition. these damages increase during earthquakes. A two-step multi-criteria decision-making (MCDM) technique has been applied to rank Geological suitability sites. PGA, Foundation layer depth, Soil Type, Liquefaction Potential Index, and Building Height Recommendation have been considered as important dependent variables to find out the relative weight of these variables AHP pairwise comparison has been applied. After getting the weighted value, the weighted sum model was applied to find the final suitability map (**Error! Reference source not found.** 07), Around 3.78 percent area was found very oor suitable, and 70 percent was found moderately suitable for infrastructure development such as government buildings, hospitals, recycling centers, etc.

Table 10: Suitability ranking based on geological attributes

Suitability Category	Percentage of Land (%)
Very poor for construction	3.78
Poor for construction	17.42
Good for construction	8.76
Moderate for construction	70.04
Total	100



Suitability Category	%
Very Poor For Construction	3.78
Poor For Construction	17.42
Good For Construction	8.76
Moderate For Construction	70.04
Total	100

Map 7: Ranking of suitable sites considering geological attributes

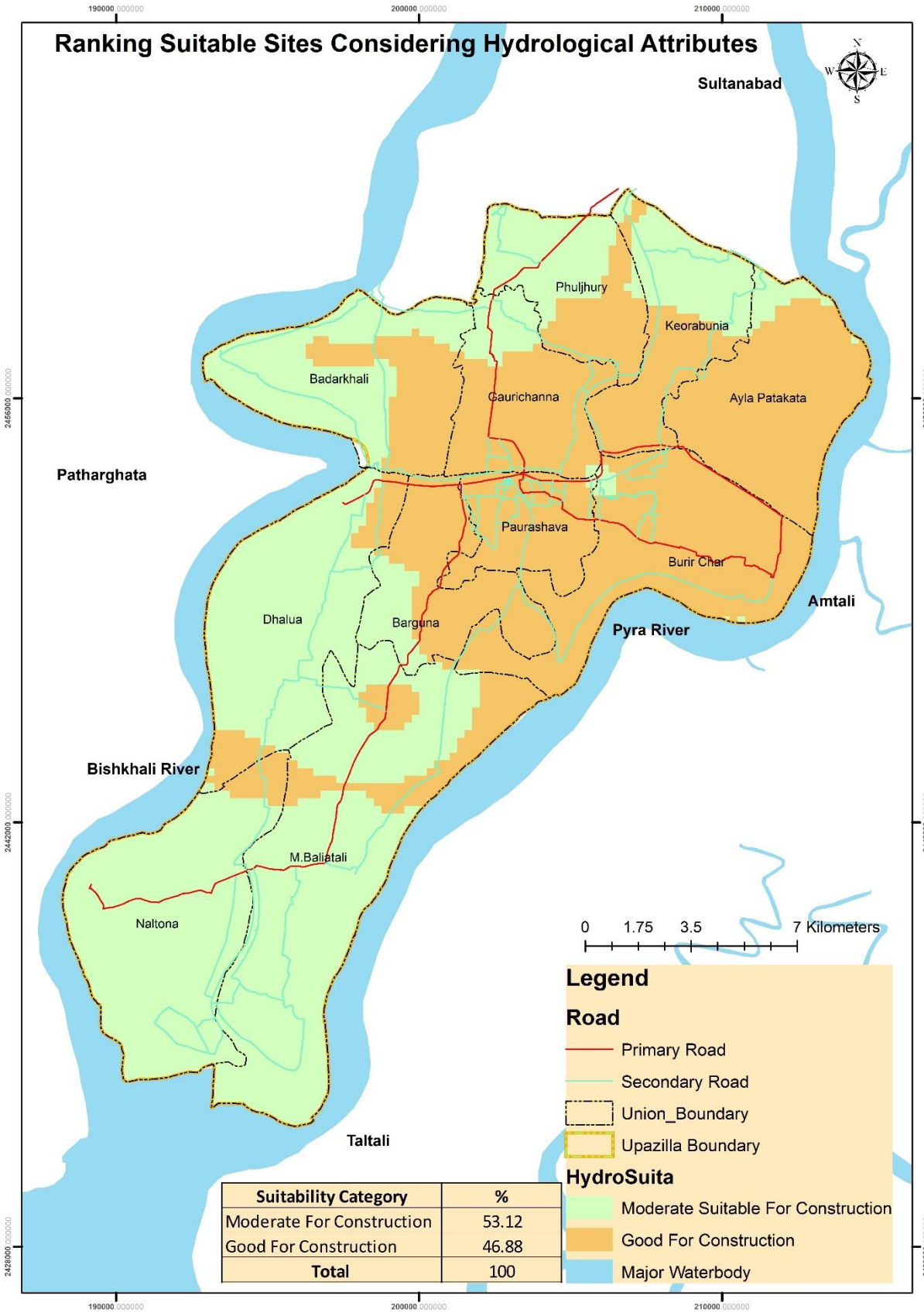
15.1.2 Ranking Suitable Areas based on Hydro-geological Attributes**: -**

Most natural processes rely on water. It shapes the landscape by transporting silt and solutes to lakes and oceans. The hydrogeological study has been conducted to understand water flow and distribution below the earth's surface Suitable sites based on hydrological attributes have been judged considering the availability of quality groundwater for human use. To rank the water quality, WQI has been taken into account, and to rank, the availability of freshwater findings from slug tests and water head depth in the dry season has been considered.

Map 4 illustrates the findings of the suitability analysis. It is found that 53.12 percent of the area was found hydro-geologically moderate, and 46.88 percent were with good attributes.

Table 11: Ranking Suitable Areas based on Hydro-geological Attributes

Suitability Category	**Percentage of Land (%)**
Good for construction	46.88
Moderate for construction	53.12
Total	100



Map 8: Ranking of suitable sites considering quality and quantity of groundwater

15.2 Ranking Growth Centers Considering The Existing Function

The numeric range has been explored to classify growth centers into rural trade and commerce centers, higher-order rural service centers, middle-order rural service centers, and lower-order rural service centers based on score. Public services such as schools, colleges, health centers, etc. will be encouraged within the different level service centers and major economic activities will be encouraged within rural trade and commerce centers.

15.2.1 Growth Center Ranking Criteria:

Growth centre ranking based on it's influence or potential future growth.

1. Growth Centre Boundary (Boolean)
2. Proximity to government administrative units/services (Distance Weightage)
3. Proximity to basic service and facilities (Education, Health, Recreation, Religious) (Distance Weightage)
4. Ratio of Number of shops and Future Population (weightage) Per capita shop

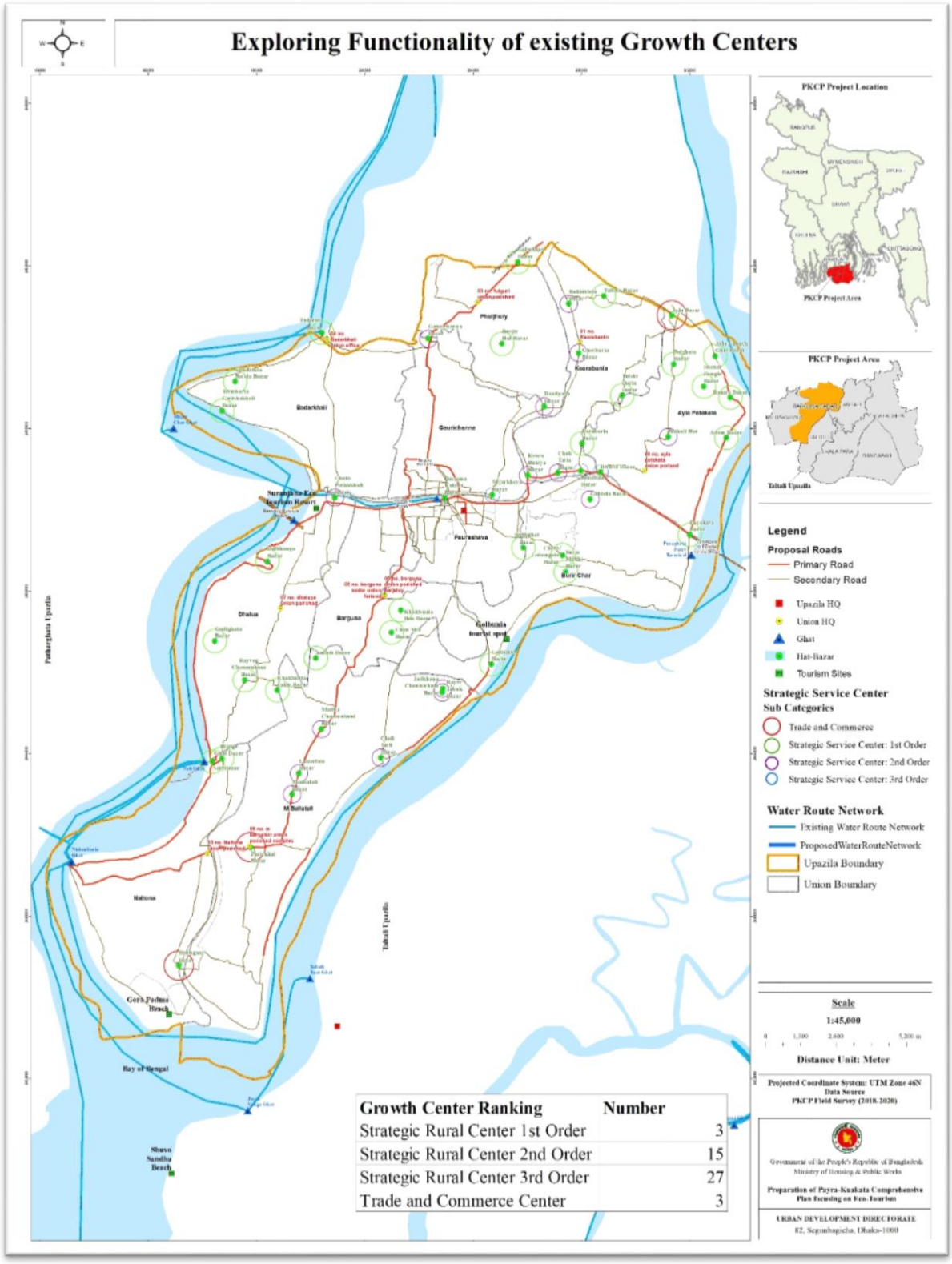
15.2.2 Weighted Score

Table 12: Weighted Score for classifying growth Centers

Factor/Services	Weight per unit		Factor/Services	Weight per unit
Education			Recreational & Religious	
Primary School	1		Club/Community Center	1
NGO School / Kinder Garten	1		Cinema Hall	1
Junior High School	1.5		Stadium/Lawn Court	1
High School	2		Mosque/Temple/Church/Majar	0.5
High School & College	3		Administrative	
Madrasa	1.5		Upazila HQs Office	6
College	3		Union HQs Office	2.5
Technical Institute	3		Police Station/ Fari	1
Library / Institute	0.5		Post Office	1
Health			Fire Service	1.5
Upazila Health Complex	4		Commerce	
Sub-Health Center/ Hospital	2		Wholesale	2.5
Family Welfare Center/ Community Clinic	2		Retail	2
Private Clinic	1		Bank	3

Table 13: Ranking of Growth Center

Growth Center Ranking	Number of Growth Center	Growth Center Name
Trade and Commerce Center	3	Ayla Bazar
		Babuganj Bazar
		Parirkhal Bazar
Strategic Rural Center 1st Order	3	Douatola Bazar
		Itbaria Bazar
		Sujarkheya Bazar
Strategic Rural Center 2nd Order	15	Badamtola Bazar
		Boikali Hat
		Chali Tatla Bazar
		Chali Tatli Bazar
		Choto Potkhkhali Bazar
		Gabtola Bazar
		Gaurichanna Bazar
		Ghotbaria Bazar
		Jailkhana Choumuhuni Bazar
		Keora Buniya Bazar
		Lakurtola Bazar
		Maitha Choumuhuni Bazar
		Monsatoli Bazar
		Rayer Tabak Bazar
		Roadpara Bazar
Strategic Rural Center 3rd Order	27	Adom Bazar
		Amtoli Bazar
		Ayla Launch Ghat Bazar
		Badhghat Bazar
		Bridge Ghat Bazar
		Burjir Hat Bazar
		Chan Mia Bazar
		Choto Lobongola Bazar
		Dalbhanga Bazar
		Fuljhuri Bazar
		Golachipa Bazar
		Golbunia Bazar
		Gudighata Bazar
		Khakbunia Bou Bazar
		Khakbunia Fakir Bazar
		Latabaria Bazar
		Nali Bazar
		Polghata Bazar
		Purakata Bazar
		Ramra Bazar
		Rayvog Choumuhuni Bazar
		Shonar Bangla Bazar
		Surjo Mukhi Bazar
		Taltala Bazar
		Tetulbaria Botola Bazar
		Tetulbaria Gulishakhali Bazar
		Tulshi Baria Bazar



Map 9: Ranking of growth centers considering the existing function

15.3 Suitable Site Ranking- Findings From The Multicriteria Analysis

15.3.1 Infrastructure Suitability

Infrastructures are the basic facilities and equipment required to produce a product or deliver a service. Infrastructures should supply the necessary conditions and equipment to carry out the necessary business tasks and operations, as well as aid in reaching the intended product and service conformance. As a result, it is intimately linked to the product or service and has a direct bearing on its quality. The primary purpose of a suitability analysis for infrastructure development is to ensure infrastructure is intact, sustainable, and stable; will support the organization in achieving quality targets and plans. Infrastructures encompass all of the tools, applications, interfaces, and facilities required to bring products or services to market, from concept to delivery and post-delivery. To rank suitable sites for infrastructure development geological attribute of the upazila, disaster risk, elevation, and building height zones has been considered. Due to the upgradation of construction technology, it is possible to reach a foundation depth of 25 to more than 30 m. side by side Upazila's soil condition is suitable for low-rise and high-rise building construction (Table 14).

Table 14: Area percentage of ranks and other land uses

Ranks	Area in percentage
Very Less Suitable	0.29%
Less suitable	2.71
Moderately suitable	7.82%
Suitable	17.98%
Highly suitable	11.53%
Other land uses	
Agriculture	39.58%
Forest	2.37%
Char	0.54%
River	17.18%
Grand Total	100%

15.3.2 Ranking Suitable Areas for Human Settlement

The human settlement environment includes both surface spaces and space places that are inextricably linked to human activity and life. Barguna Upazila is a seaside location with a low level of urbanization. However, it comes with a slew of issues, including a scarcity of high-quality water and the threat of disaster. As a result, hydro-geological and geological features, proximity to roadways, elevation, and disaster risk level have all been taken into account when ranking human settlement sites

Table 15: Ranking of suitable sites for human settlement

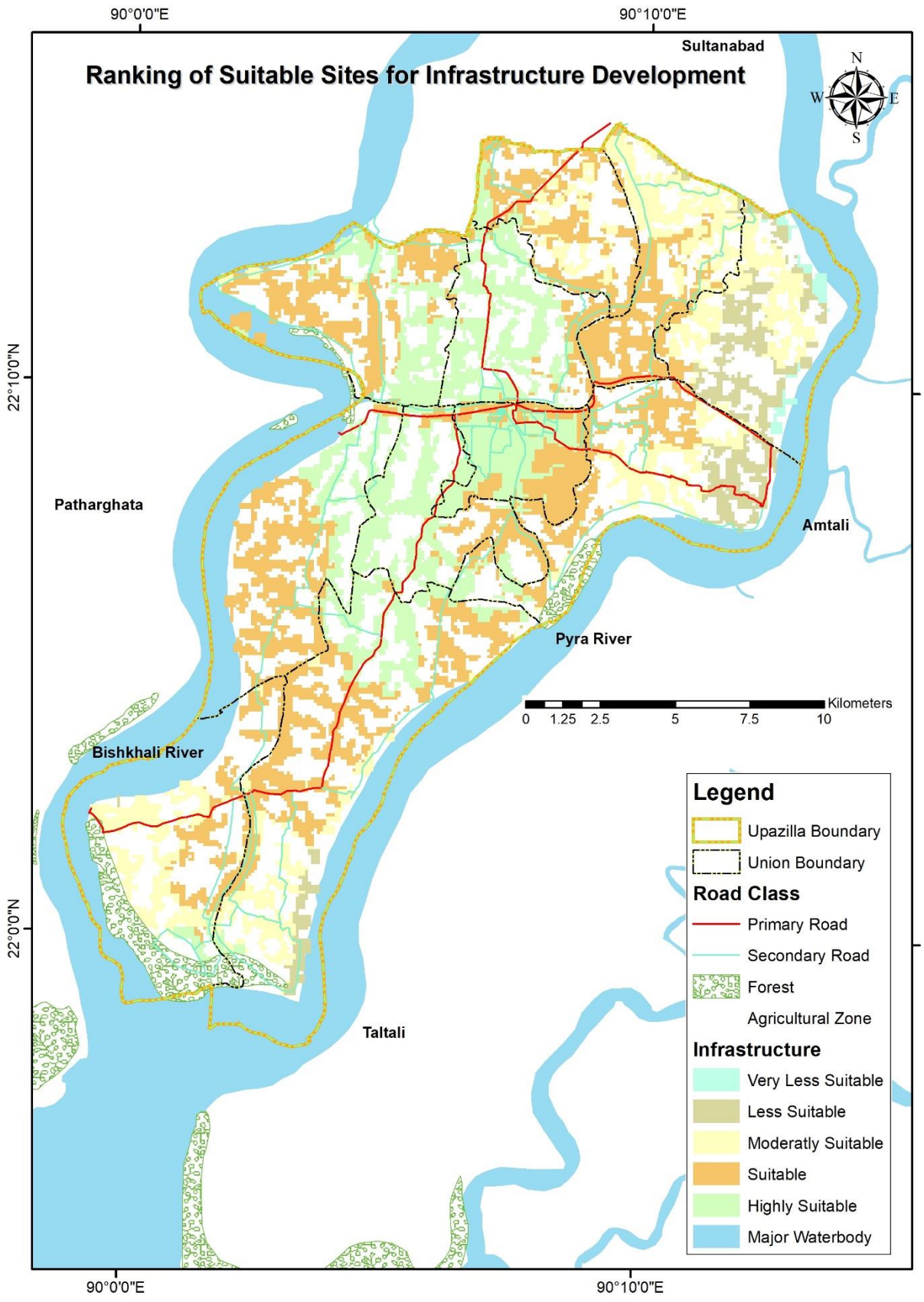
Ranks	Area in percentage
Less suitable	2.95%
Moderately suitable	16.82%
Suitable	20.51%
Other land uses	
Agriculture	39.58%
Forest	2.37%
Char	0.54%
River	17.18%
Grand Total	100.00%

15.3.3 Ranking Suitable Areas for Potential Economic Region

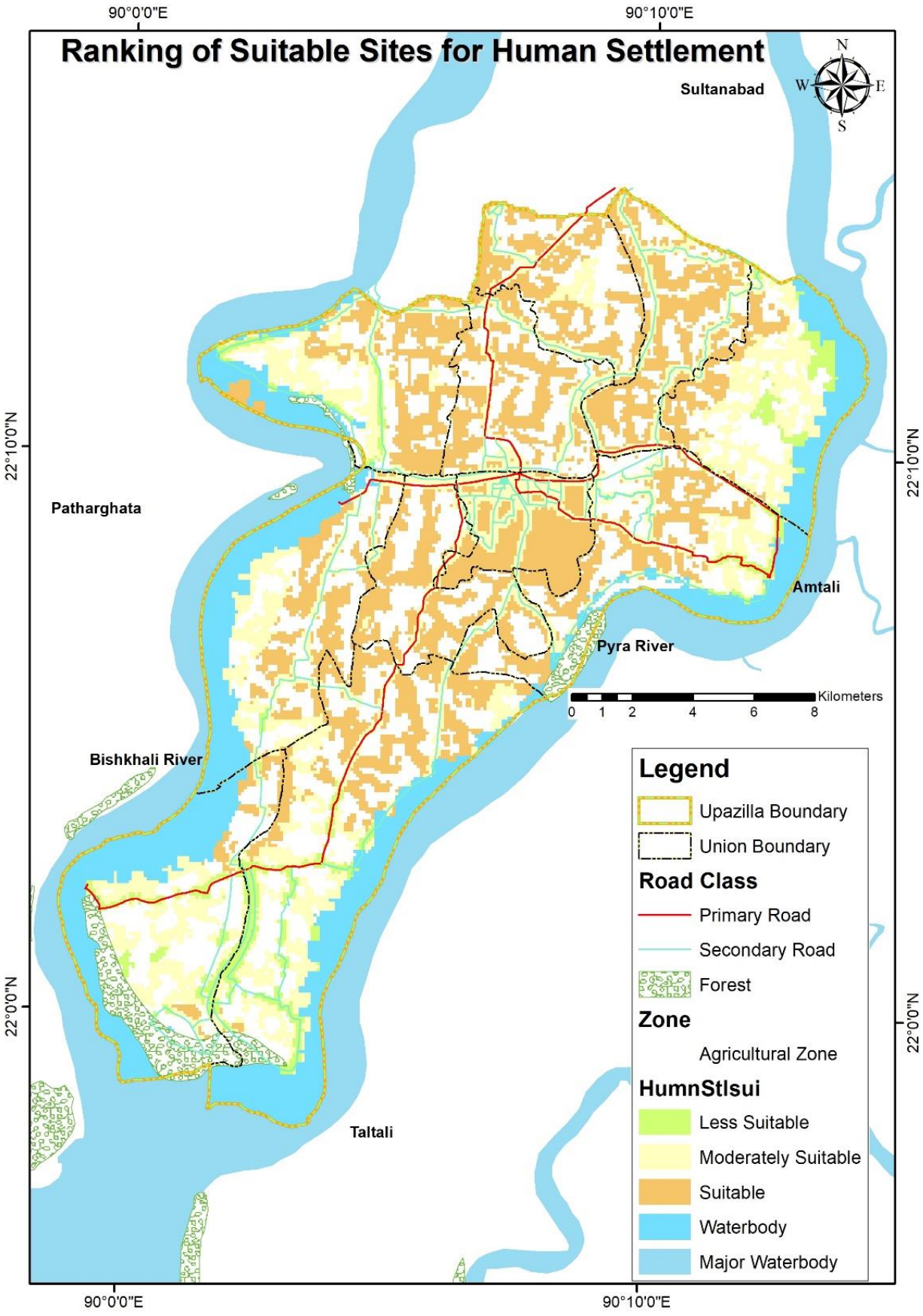
The location of growth centers directly affects land use and the ecosystem. Rapid infrastructure development and the uncontrolled growth of cities' economic hubs result in the inefficiency of infrastructure facilities, loss of agricultural land, water bodies, and open spaces, and a variety of microclimatic changes. The upazila's exceptional rise of growth centers will result in an uneven distribution of basic services such as transportation and communication. Geological and hydro-geological attributes of the upazila, disaster risk level, existing growth center location, and existing road proximity.

Table 16:Area percentage of ranks and other land uses

Ranks	Area in percentage
less suitable	0.25%
Moderately suitable	12.62%
suitable	27.30%
Highly suitable	0.04%
Other land uses	
Agriculture	39.58%
Forest	2.37%
Char	0.54%
River	17.17%
Grand Total	100.00%



Map 10: Ranking of Suitable sites for infrastructure development



Map 11: Human Settlement Suitability

Map 12: Ranking of suitable sites for the potential economic region

CHAPTER SIXTEEN: STRATEGIC LAND USE ZONING

16.1 Existing Land Use

Except for the core area of Paurashava, topographically, Barguna Upazila is mainly rural. Some wards are mainly containing urban characteristics. But in recent years, communication development has already impacted the growth and expansion of activities within the Paurashava. The existing land use of the Upazila shows that 40.43 percent of the land is used for agricultural activity, and another mentionable land-use area is 13.71 percent Rural settlement/Residential, 3.45 percent 2.09 vacant land, and 2.03 percent forest area. Table 17 illustrates existing land use statistics in detail.

Table 17: Existing Land use of Barguna Upazila

Type	Area in Acre	Percentage
Administrative/Public Service	85.35	0.07
Agriculture	47042.78	40.43
Canal	223.96	0.19
Commercial	92.75	0.08
Community Service	85.55	0.07
Education & Research	190.74	0.16
Forest	2366.82	2.03
Health Service	3.38	0.00
Manufacturing & Processing	99.10	0.09
Mixed Use	3.03	0.00
Open Space & Recreational	21.64	0.02
Residential	15954.08	13.71
Service Activity	15.34	0.01
Transportation & Communication	1127.12	0.97
Vacant Land	2432.20	2.09
Vegetation	4892.45	4.20
Waterbody	41727.35	35.86
Total	**116363.66**	**100.00**

Map 13: Existing land use

16.2 Various Govt. Project Location

Table 18: Ongoing Government Projects in Barguna Sadar Upazila

ID	Project	Authority	Area in Acre
1	132/33kv Grid Power Plant	DC Office, Barguna	4.51
2	Barguna circuit house	DC Office, Barguna	2.09
3	Barguna Sadar Model Mosque	DC Office, Barguna	0.18
4	Boroitola Ferry Terminal - Bainchotki Ferry Terminal	Bangladesh Bridge Authority	25.46
5	Construction of Electricity Distribution Center	DC Office, Barguna	2.98
6	Costal Town Development Project	DC Office, Barguna	5.15
7	NSI Office Barguna	DC Office, Barguna	9.95
8	Public Library	DC Office, Barguna	0.29
10	Textile Vocational at Barguna	DC Office, Barguna	1.99
11	Treasuary building constuction at Barguna	DC Office, Barguna	0.98
14	Road Constraction Project (Ferry Ghat)	Road and Highway Department	3.30
16	Construction of Cyclone Shelter Project (2nd Phase)	Department Of Disaster Management	0.04
17	Construction of Cyclone Shelter Project (2nd Phase)	Department Of Disaster Management	0.04
18	Construction of Cyclone Shelter Project (2nd Phase)	Department Of Disaster Management	0.05

ID	Project	Authority	Area in Acre
1	132/33kv Grid Power Plant	DC Office, Barguna	4.51
2	Barguna circuit house	DC Office, Barguna	2.09
3	Barguna Sadar Model Mosque	DC Office, Barguna	0.18
4	Boroitola Ferry Terminal - Bainchotki Ferry Terminal	Bangladesh Bridge Authority	25.46
5	Construction of Electricity Distribution Center	DC Office, Barguna	2.98
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7	NSI Office Barguna	DC Office, Barguna	9.95
8	Public Library	DC Office, Barguna	0.29
10	Textile Vocational at Barguna	DC Office, Barguna	1.99
11	Treasuary building constuction at Barguna	DC Office, Barguna	0.98
14	Road Construction Project (Ferry Ghat)	Road and Highway Department	3.30
16	Construction of Cyclone Shelter Project (2nd Phase)	Department Of Disaster Management	0.04
17	Construction of Cyclone Shelter Project (2nd Phase)	Department Of Disaster Management	0.04
18	Construction of Cyclone Shelter Project (2nd Phase)	Department Of Disaster Management	0.05

Map 14: Ongoing Government Projects in Barguna Sadar Upazila

16.3 Composite Structure Plan

16.3.1 Plan zone definition

For future planned 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. The Upazila has been divided into 11 strategic zones, these are, Agriculture, Char land, Forest, coastal afforestation, Potential Economic region, River, Circulation Network, Rural settlement, Urban core area, Urban fringe, and waterbody.

Agriculture: Agricultural zoning is a type of zoning that allows people to keep their farming traditions. The term "agriculture zone" refers to an area that is ideal for agricultural production, including both crops and livestock. Land used for annual crops such as cereals, other technical crops, potatoes, vegetables, and melons, as well as land left fallow, land used for permanent crops such as fruit plantations, and land used for natural grasses and livestock grazing. The permissible activities in the agricultural zone are Vegetable Cultivation, Livestock, Horticulture, Dairy Farming, Cash Crop Cultivation, Botanical Garden, Aquaculture and Fisheries, Agricultural Shelter, and Gazing.

Urban core: The term "urban core" refers to places with high population density, as well as strong roadways, pathways, and market share. The built-up area is another name for this area. The location with the greatest concentration of services is referred to as this. It also has the population density and concentration at its highest point. There are disparities in the amount of service provision within this area, especially between the formally constructed and planned areas and the majority of unplanned areas. In the planned area, the level of service should be maintained. Autorickshaw stands, banks and financial institutions, bus and auto passenger stops, highways, garages, retail shops, restaurants, rickshaw stands, educational facilities, electric substations, fire stations, health facilities, high schools, hospitals, parking facilities are all permitted activities in the Urban Core Area.

Urban fringe: The urban fringe, also known as the outskirts, urban, peri-urban, or urban hinterland, is a terrain boundary between town and country, or a transition zone where urban and rural activities mix and frequently clash. According to demographic projections, this zone will require additional land for future urban planning. Existing physical growth patterns and potential areas must be taken into account when planning new urban land development. Road, drain, walkway, west transfer station, and other civic services will be supplied as new facilities and services. In the year 2032, this area is expected to expand. Autorickshaw stands, banks and financial institutions, bus and auto passenger stops, highways, garages, retail shops, restaurants, rickshaw stands, educational facilities, electric substations, fire stations, health facilities, high schools, hospitals, parking facilities are all permitted activities in the Urban Fringe Area.

Rural settlement area: People live in a vast landscape with few houses with greeneries where people are often depending on agriculture, farming, and fishing activities for their sustainability. the areas with a relatively low density of population and located outside the paurashava area, on rural roads, or high way where there are isolated houses or open ground are called rural settlement areas. This zone will be facilitated with all types of amenities so that people can live a healthy and happy life. Any kind of activities that will not hamper the natural and cultural environment and will follow national laws and regulations will be allowed within the zone. Basic living facilities will be provided within the zone.

Waterbody: A waterbody is defined as any natural or manmade collection of water, including rivers, streams, creeks, ditches, swales, lakes, ponds, marshes, wetlands, and groundwater. This category includes water with an area equal to or more than 0.25 acres, excluding canals, irrigation canals, and rivers. Development and building activities are prohibited within 10 meters on either side of the canal in this region. There is no development or industrial activity allowed within 50 meters on both banks of the river.

Potential Economic Zone: Potential economic zone is a specially marked territory within the Upazila that has attributes to attract national as well as foreign investment to generate employment opportunities. In this zone, the investor will get geological, hydrological, and better communication facility benefit to earn profit within a short time. The zone has been declared to facilitate rapid economic growth and to connect the Upazila with the mainstream of the national economy. Authority will offer special incentives and security to attract local, national, and international investment. Autorickshaw stands, banks and financial institutions, bus and auto passenger stops, highways, cottage industry, dairy farming, garages, garments, knitting factories, industrial classes 1, industrial classes 2, retail shops, restaurants, and rickshaw stands are all permitted activities in the potential economic zone.

Char Land: Any deposit in a river course or estuary that is surrounded by the waters of an ocean, sea, lake, or stream is referred to as a "char." Char refers to riverine sand and silt landmasses in Bengali. This is also a landmass that may be seen in rivers and oceans for a certain amount of time each year. Living in the chars is risky and insecure since these areas are prone to violent and unexpected flooding as well as erosion and land loss. Vegetable cultivation, livestock, dairy farming, cash crop cultivation, agricultural shelter, and gazing for a set length of time in a year are all permitted activities in the char.

Coastal Afforestation: By stabilizing coasts and creating a green belt, coastal afforestation attempts to improve climate-resilient ecosystems and livelihoods. The landmass is also successfully protected from excessive flooding and erosive processes by this green belt. To establish well-stocked plantations, vacancy filling and sometimes replanting are done.

Forest: a sizable area primarily covered in trees and vegetation. It does not include land that is predominantly under agricultural use or other use. This could be naturally made or man-made.

Circulation Network: major circulation covering primary and secondary roads.

Waterbody: A naturally occurring watercourse that flows in one direction—typically toward an ocean, sea, lake, or river. A river could finish up in the ground at the end of its journey without flowing into another body of water.

Agricultural Processing Zone: Agricultural Processing Zone may contain production facility for food and drink items made out of agricultural products, Cold storage facility for agricultural products, packaging and marketing of agricultural products etc.

Eco-Tourism Site: Sites for all nature-based forms of tourism in which the main motivation of the tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas.

Eco-Town: A town consisting of houses that are built in a way that is designed to cause less damage than usual to the environment, for example, by using power from sun or wind, not using much electricity, and not producing much carbon dioxide. Ecotown is an ecologically stable and economically resilient community.

Renewable Energy Generation site: site in which renewable energy is produced such as solar power plant, Windmill etc.

Proposed Urban Area: the area in which the existing urban area is more likely to expand to.

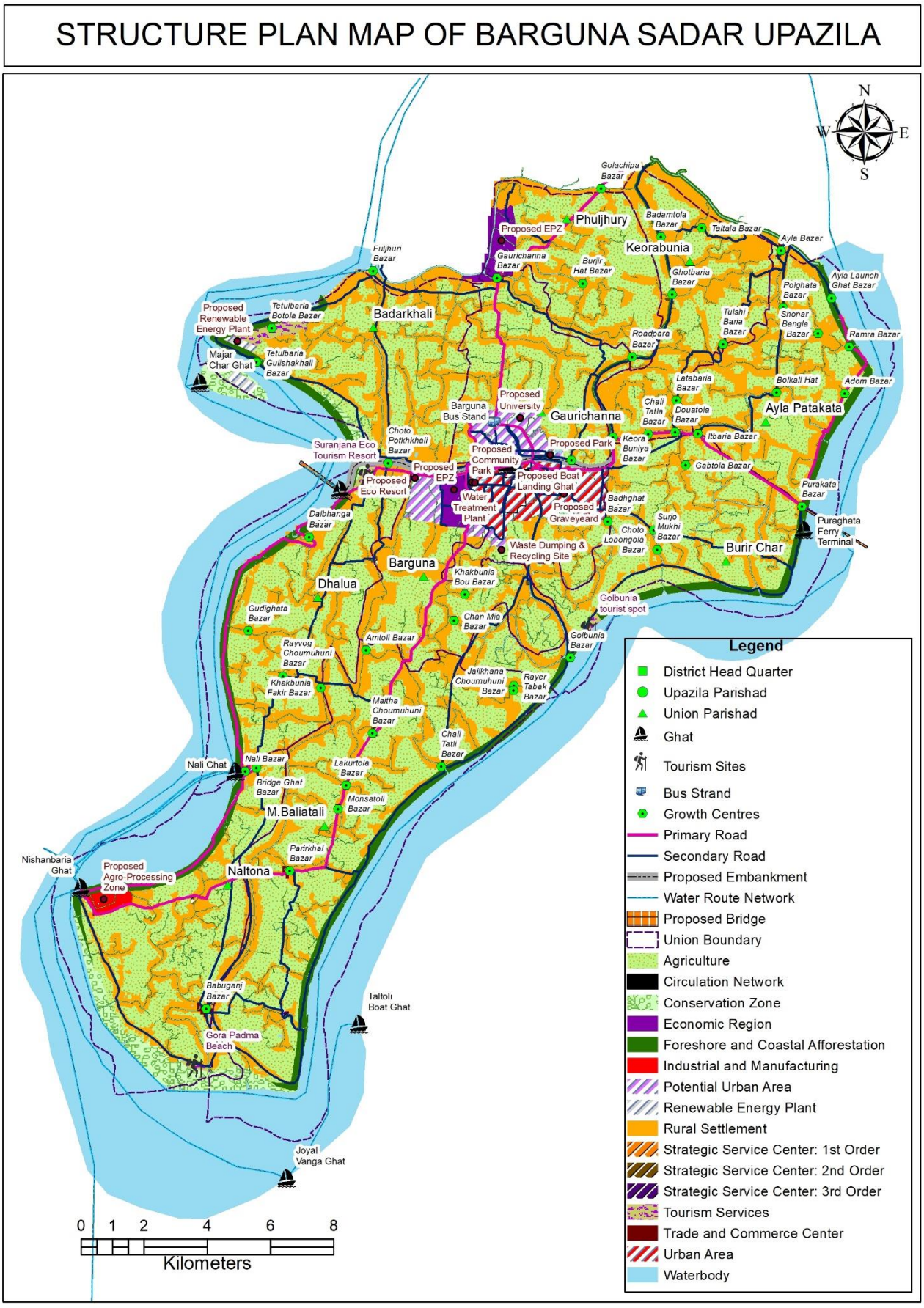
Waste Disposal Site: Designated place for waste disposal.

16.3.2 Structure plan of Barguna Upazila

Agricultural lands are cultivated and cultivable lands that have to be protected for the food safety of the country, it is about 30.41 % of the total upazila area; Road network (1.50 %) which includes primary and secondary roads; Rural settlement (23.52 %) encompasses rural housing structures and surrounding vacant land and vegetation- which is the second heights land use. Urban area covers 1.39 % of the upazila, Coastal afforestation covers 6.02 % area mainly proposed near riverside, and 33.17 % water body that includes canals and ponds. This structure plan has proposed 0.67 % of land as the Potential economic zone. It is expected that this zone will assist and encourage government and private investors to invest. Investment in industrial development will help to achieve the objective of the structure plan which is to enhance the residents' socioeconomic position.

Table 19: Percentage of the area of proposed zones

Strategic Zones	Area in Acre	Percentage
Agriculture	35380.59	30.41
Circulation Network	1743.49	1.50
Conservation Zone	1608.85	1.38
Economic Region	775.18	0.67
Foreshore and Coastal Afforestation	7006.05	6.02
Industrial and Manufacturing	171.50	0.15
Potential Urban Area	1315.40	1.13
Renewable Energy Plant	136.37	0.12
Rural Settlement	27373.74	23.52
Strategic Service Center: 1st Order	45.73	0.04
Strategic Service Center: 2nd Order	111.54	0.10
Strategic Service Center: 3rd Order	46.22	0.04
Tourism Services	366.83	0.32
Trade and Commerce Center	72.16	0.06
Urban Area	1615.29	1.39
Waterbody	38594.71	33.17
Total	**116363.66**	100.00



Map 15: Structure plan map of Barguna Upazila

16.3 Development Control Stretegy

- Existing agricultural land has been classified by cropping pattern to promote the high agricultural value of high-yielding agricultural land. To secure food security, the structure plan recognizes high agricultural value lands. Given the expected future population growth in settlement areas, high agricultural lands, such as triple and double-cropped land, will continue to be used for agriculture.
- It is recommended that the urban sub-central area and rural sub-central area settlements areas in diverse places of the urban and rural sections of Barguna Upazila be preserved to accommodate future population expansion. It is necessary to specify existing rural settlement areas to be kept in their morphological characteristics during the Structure Plan period to achieve compact development and preserve high-value agricultural fields.
- According to the Structure Plan's policy and strategy, developed in the sub-central zones will be regulated, and only limited interventions in service demand will be permitted in the intermediate zones. Non-agricultural activity expansion will be discouraged, and the development of non-permitted land uses will be regulated.
- Any non-compatible development will be controlled in the central area of the urban area and rural trade and commercial zones. Activities, as specified in the sector policy in the Structure Plan Report, will be allowed only in the national interest /societal interest.
- The high initial investment in developing tourism facilities can be questionable as the site is directly exposed to the sea. Moreover, as there is ECA on the side, heavy construction requires checking whether it violates the ECA rules and guidelines.

16.3.1 Land use Control

Land use zoning is an evitable element of development plans that regulates the haphazard land use and ensures enough space for proper uses and creates homogeneous land uses. Land use zoning practices have been practiced in local planning systems since the beginning of the post-World War II in the form of physical planning approach. The aim of land use zoning is outlined below:

Land use control or regulation and land use development will ensure sustainable development of the environment and urban growth. Enables issuance of land use clearance for development.

The land use development proposals are prepared considering the permitted, conditional and non-permitted uses of land in the Structure Plan Zones (SPZs). The matrix (Below Table) prepared in this respect will guide the development process in the Upazila in general. The projects that are required for major development interventions at the Upazila level are considered in the structure plan of the Upazila. The details of the priority projects are provided in the Action Area Plan of the Paurashava and the Urban Promotion Areas (UPAs) at union level of the Upazila.

16.3.2 Permitted & conditional uses of different Land use category

Table 20: Permitted & conditional uses of different Land use category

Permitted use	O	Agriculture Zone	Conservation Zone	Potential Economic Zone	Coastal Afforestation	Foreshore	Rural Settlement	Strategic Service Centre	Eco-Tourism Site	Urban Core	Potential Urban Area	Eco-Town	Industrial/Processing Zone
Conditional use	C												
Plan review required	P												
Not permitted	N												
LAND USES													
Agriculture. Forestry & Grazing		O	O	N	O	C	C	N	N	C	C	O	N
Aquaculture & Fisheries		C	O	N	O	N	C	N	N	C	C	O	N
Brick fields		N	N	C	N	N	N	N	N	N	N	N	P
Cemeteries *I* Graveyard		N	N	N	N	N	O	N	N	O	O	O	N
Cinemas		N	N	N	N	N	C	O	N	O	O	O	N
Clinics, Medical		N	N	N	N	N	O	O	O	O	O	O	P
Clubs		N	N	N	N	N	O	O	O	O	O	O	N
Colleges & Universities		C	N	N	N	N	O	O	P	O	O	P	N
Farm		O	N	N	N	C	O	O	O	O	O	O	N
Dwellings-Minimal Housing		N	N	N	N	N	O	O	O	O	O	O	N
Dwellings-Single/Multi Family		O	N	N	N	N	O	O	O	O	O	O	N
Flood Management Structures		O	O	O	O	O	O	O	O	O	O	O	N
Hospitals (with morgue)		N	N	N	N	N	O	O	O	O	O	O	N
Hotel /Guest House		N	N	N	N	P	O	O	O	O	O	O	N
Hotel International Class		N	N	N	N	P	O	O	O	O	O	O	N
Industrial, Orange A		N	N	O	N	N	C	N	N	N	N	N	O
Industrial, Orange B		N	N	O	N	N	C	N	N	N	N	N	O
Industrial, Red		N	N	O	N	N	N	N	N	N	N	N	O
Institutions		N	N	N	N	N	O	N	N	N	N	N	O
Major Development		C	C	C	N	C	O	O	O	O	O	O	P
Offices, Services		N	N	N	N	N	O	O	O	O	O	O	N

Parking Facilities, Commercial	N	N	C	N	N	O	O	O	O	O	O	P
Petrol Stations	N	N	N	N	N	O	O	O	O	O	O	N
Public Uses & Structures	N	N	N	N	N	O	O	O	O	O	O	N
Recreation Facilities, Outdoor	N	C	N	N	C	O	O	O	O	O	O	N
Religious Uses & Structures	N	N	N	N	N	O	O	O	O	O	O	C
Repair Shops, Major	N	N	N	N	N	O	O	O	O	O	O	C
Repair Shops. Minor	N	N	N	N	N	O	O	O	O	O	O	C
Retail Shops & Restaurants	N	N	N	N	N	O	O	O	O	O	O	C
Schools, Private	N	N	N	N	N	O	O	O	O	O	O	N
Schools, Government, Religious	N	N	N	N	N	O	O	O	O	O	O	N
Shopping Centres, Large Market	N	N	N	N	N	O	O	O	O	O	O	N
Stadium, Sports	N	N	N	N	C	O	O	O	O	O	O	N
Terminals, train, bus	N	N	N	N	N	O	O	O	O	O	O	N
Trade Centers	N	N	N	N	N	O	O	O	O	O	O	N
Utility Installations	N	N	N	N	N	O	O	O	O	O	O	N
Ware Housing & Distribution	N	N	N	N	N	O	O	O	O	O	O	N
Waste Disposal & Processing	N	N	O	N	O	O	O	O	O	O	O	N

CHAPTER SEVENTEEN: IMPLEMENTATION PHASING OF PROPOSALS, RESPONSIBLE AGENCIES AND RELEVANT ISSUES

17.1 Introduction

The most important responsibility for the stakeholders is to implement the plan. This chapter outlines the numerous steps that must be followed to carry out the plan's recommendations. The whole planning process's most crucial step is effective implementation.

17.2 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.

17.3 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. Barguna Sadar 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).

The Agricultural Extension Department of the Ministry of Agriculture, the Ministry of Water Resources and the Ministry of Fisheries and Livestock with the help of Upazila Parishad will play the key role to control development in the Urban Promotion Control Area (UPCAs). For any non-agricultural development within the UPCAs will require No Objection Certificate (NOC) from these authorities.

The Upazila Parishad have the overriding tasks of supervising the implementation of the Action Area Plans across the UPAs within the Upazila with the help of Union Parishads. The governmental agencies performing diverse sectorial responsibilities within the Zila, Upazila, Paurashava and Union Parishads have to coordinate their functions with the local governments of the respective areas of jurisdiction. The Urban Development Directorate (UDD) is to assist this implementation process and provide No Objection Certificate (NOC) for governmental projects.

The Plan implementation authority will be responsible for the implementation of the Structure Area Plan of the Upazila as per the Local Government Act.

17.4 Institutional strengthening

In Bangladesh, the central Government Grant is an important source of income for the Paurashavas. Such grant supplements the income of a Paurashava from local sources in order to fulfil its functional responsibilities. At present, Central Grants are of the following types:

a) Direct grants (non-development grants)

b) Subvention (Salary Support)

c) Matching grants (Linked to Projects)

d) Development grants (Block grants)

The priority areas constituting coastal development strategy need to be translated into programs and projects. Projects must be formulated through an institutional process. These projects intended for implementation over a specified duration will form part of the Investment Plan to be updated on an annual basis. Projects will have indicative budget requirements and duration of implementation, as well as implementation arrangements.

17.5 Priority areas

The Coastal Development Strategy puts forward a set of priority areas that should constitute the Investment Strategy which has a direct correspondence to the objectives of the investment strategy spelt out in the coastal zone policy as indicated above. These are as follows:

- Mitigation of natural disasters, safety and protection.
- Environmental management – protection and regeneration of the environment.
- Water resources management.
- Rural livelihoods and sustainable economic opportunities for coastal communities.
- Productive economic activities and focused development of tourism and fisheries sectors

17.5 Capacity Building of Local Actors

Local governments lack the capacity and resources to carry out their responsibilities properly. To raise working capability, training programs should be arranged and modern office and working equipment should be installed.

17.5.1 Local actors

They represent the public and the private sectors. The public sector encompasses all relevant central government agencies, Paurashavas and city corporations, while the private sector includes formal and informal enterprises and services, local communities and relevant NGOs.

- **Local Government Bodies**

Capacity building of local government bodies needs to focus on strengthening managerial, technical, financial and regulatory capabilities. Capacity building in holding tax administration is also vital as it is a major source of revenue. Further, enhanced capacity in cost accounting systems is needed to control service and monitor cost-effectiveness and efficiency.

- **Private Sector Organizations**

Both formal and informal private sector enterprises need to build capacity in various aspects affecting urban development.

17.5.2 Capacity building tools

Appropriate capacity building tools need to be developed to acquire the skills related to urban development and management. Public sector training and technical assistance programmes would be very useful for local government technical and managerial staff. Public information and outreach programs can be designed by local governments and NGOs to promote public participation and support.

17.5.3 Institutions for capacity building

Undergraduate and post-graduate level education in managerial, technical, financial and regulatory aspects is offered by various Universities and Institutes in the public and private sectors. Particular emphasis should be placed on planning education. Steps should be taken to strengthen planning education and increase the output of graduate planners. Steps should also be taken to train various professionals, especially engineers, in various aspects of urban planning so that they can carry out development activities in conformity with urban planning principles and regulations.

17.5.4 Involving Local Stakeholders in Urban Development

Effective partnerships between local governments and the private sector can generate considerable benefits. Private companies, informal sector enterprises, CBOs, and NGOs can provide urban services, mobilize finance (or voluntary labour), introduce innovative technologies and undertake land development activities. Private sector actors with whom partnership arrangements can be made include the following:

17.5.5 Community-based organizations (CBOs)

These organizations are formed when neighborhood residents get organized and join forces to improve local security, housing quality, basic utilities, social services and the neighborhood environment. Municipal community partnership (MCP) has now emerged as an innovative institutional model. MCPs are particularly suitable for delivering specific goods and services, e.g. sanitation, refuse collection, roads and environmental maintenance, social housing etc. MCPs should be developed as part of an overall municipal strategy.

17.5.6 Non-governmental Organization (NGOs)

Unlike CBOS, Non-governmental organizations usually originate outside of the communities with which they work. NGOs may be understood as a “third system” between the public and private, concentrating their support at the community level while at the same time mediating between the community and the government. NGOs are effective agents for building local awareness, mobilizing community action, enabling access to credit, strengthening CBOs etc. In the context of vast needs, limited capacity and constrained financial resources, the local governments should recognize the role of NGOs as partners in urban development and management activities.

17.5.7 Private enterprises

These include informal workers and small-scale enterprises as well as large-scale business firms that may be entrusted with the task of operating or developing infrastructure facilities and urban services. The private sector enterprises can play more productive and sustainable roles in urban development by working in partnership with local government, especially in delivering certain urban services, formulating and implementing local economic development strategies and taking part in Philanthropic activities for the promotion of social good and environmental quality.

17.6 Role of Urban Development Directorate

The multifaceted professional requirements of the plan for execution make it difficult to implement the Structure Plan. For the plan to operate effectively, an appropriate authority to oversee the tasks undertaken under the plan would be needed.

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.

17.7 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 analyse 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. The Structure plan documents should be reviewed periodically once in every 10 years. The aim of the review will be to analyse the status of implementation of plan provisions and the changing physical growth pattern. The level of infrastructure development in terms of population and economic growth in particular needs to be assessed for actions during the remaining period 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.

17.8 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.

17.9 Plan Review Committee

A Plan Review Committee would be required for reviewing the cases of demand for change the plan special plan requirements. A Plan Review Committee can serve this purpose following the recommending made by UDD Composition of this Plan Review Committee can be as follows:

Convener – Secretary, Ministry of Housing and Public Works

Member – Joint-Secretary (Local Government Division), Ministry of Local Government, Rural Development and Cooperatives

Member – Joint-Secretary, Ministry of Agriculture,

Member – Joint-Secretary, Ministry of Land,

Member – Joint-Secretary, Ministry of Environment,

Member – Joint-Secretary, Ministry of Water Resources,

Member – Joint-Secretary, Ministry of Road Transport and Bridges

Member – President, Bangladesh Institute of Planners (BIP)

Member – Head, Department of Urban and Regional Planning, BUET.

Member – Deputy Commissioner (DC), Patuakhali District

Member-PD, PKCP Project, Urban Development Directorate (UDD)

Member Secretary – Director, Urban Development Directorate (UDD), Ministry of Housing and Public Works

17.10 Development Control

Any unauthorized or unlawful development within the Upazila should be controlled to fulfill the aim of planned development. Following are some measures that the concerned Local Government Authority may apply.

Restrictions on development are required in certain cases in order to stop illegal construction and encroachment. For example, no low land can be filled up and no obstruction to drainage system will be allowed. Prior permission of the Local Governments in the respective areas of jurisdiction will be required for filling of any low lands. Ponds should not be allowed to fill up as they are a good source of urban water supply as well as serve as open space.

Infrastructures are developed by public sector agencies for public benefit. But in case of some developments, it is observed that major benefits are reaped by a particular section of the community where development takes place. This is particularly true for road construction.

In the BC Rules 1996, specific provisions are made for parking in housing and commercial areas. But no provision has been suggested for mixed use areas. According to the rules in commercial area, 23 sq.m area has to be reserved for every 200 sq. m of commercial space. The BC Rules for parking in the commercial area can also be applied for mixed-use areas under the current plan.

17.11 Execution of Development Proposals

The government agencies should respect the plan provisions and the legal provisions of EBBC Act 1952. When the plan will be ignored by the government agencies, the general public will have little respect for it and plan will gradually lose its credibility as a statutory document.

Many public agencies will be responsible for carrying out infrastructure development. The Local Governments within the Upazila will execute many projects for public interests. The extent of execution of proposals by public sector agencies will largely depend on the size of resources made available for implementing the development schemes. The PPP approach for execution of development projects can be adopted by the local governments.

It should be recognized that planning is an integral part of administration. It should not be expected that planned development would be highly remunerative in the immediate future, but it is sure that execution

of development proposals, in the long run, will accrue positive dividends. It will improve health and comfort of the people that will lead to increased comfort for living and efficiency for working.

The plan proposals are time-bound and proposals that are not executed in time will lose their viability over time. As development proceeds, it will be difficult to find suitable vacant land for infrastructure development, which may negatively impact on physical and social environment. Timely execution of development project is therefore important

17.12 Resource Mobilization for Development

Implementation of development projects proposed in the plan will be a challenging task as they will require huge amount of resources. The development projects are expected to be executed by a number of agencies. However, it is beyond doubt that the Local Governments will have to shoulder the heaviest financial burdens. The Local Governments suffer from resource constraint. This calls for increasing revenue earning by generating new revenue sources.

17.13 Scope for Land Acquisition

Due to low supply and higher demand, land value is higher in urban areas compared to rural hinterland. As a result, land acquisition through legal process is cumbersome and lengthy in urban areas.

Land acquisition is expensive in the urban areas as land owners are generally unwilling to offer their lands for development as it is a lucrative source of income in urban areas. It is comparatively easier to acquire land in fringe than in the core areas. Fringe areas are usually characterized by low density, where land value is also comparatively low.

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ANNEXURE I

Table A1: Status of Physical and Aggregate Properties

Parameters	Unit	Bishkhali	Buriswar-Payra	BD Standards	Remarks
Temp.	^{0}C	31	30	20-30	Within the range
pH	Value	7.2	7.1	6.5-8.5	Within the range
TDS	mg/l	86	74	1000	Within the range
EC	µS/cm	173	148	1200	Within the range
Salinity	ppt	0.1	0.1	0	Within the range
TSS	mg/l	4	11	50-150	Within the range
Turbidity	NTU	49	52	50	Within the range
Alkalinity	mg/l	30	40	20-120	Within the range
Hardness	mg/l	145	180	200-500	Within the range

Source: PKCP Project, UDD, 2022

Table A2: Status of Inorganic Non-metallic Constituents

Parameters	Unit	Bishkhali	Buriswar-Payra	BD Standards/WHO*	Remarks
Chloride	mg/l	20	20	250	Within the range
Sodium	mg/l	6	6	200*	Within the range
Potassium	mg/l	3	4	12*	Within the range
Nitrate	mg/l	8.5	6.6	2.5	Within the range
Phosphate	mg/l	0.2	0.1	0.5	Within the range
Sulphate	mg/l	13	15	400	Within the range

Source: PKCP Project, UDD, 2022

Table A3: Status of Aggregate Organic Constituents

Parameters	Unit	Bishkhali	Buriswar-Payra	BD Standards	Remarks
DO	mg/l	5	5	5 or more	Within the range
BOD	mg/l	2	2	Less than 10	Within the range
COD	mg/l	8	8	Less than 25	Within the range

Source: PKCP Project, UDD, 2022

Table A4: Status of Metal Constituents

Parameters	Unit	Bishkhali	Buriswar-Payra	EPR'86, India	Remarks
Iron	mg/l	0.5	0.4	0.1	Higher than the standard
Zinc	mg/l	0.03	0.03	2	Complied the standard
Manganese	mg/l	0.05	0.23	3	Complied the standard

Lead	mg/l	0.005	0.005	2	Complied the standard
Chromium	mg/l	0.011	0.012	0.05 (BD, Drinking)	Complied the standard
Nickel	mg/l	0.030	0.030	5	Complied the standard
Copper	mg/l	0.030	0.030	1 (BD, Drinking)	Complied the standard
Cadmium	mg/l	0.00015	0.00015	0.005 (BD, Drinking)	Complied the standard

Source: PKCP Project, UDD, 2022

Table A5: Status of Oil & Grease and Phenol

Parameters	Unit	Bishkhali	Buriswar-Payra	Standards	Remarks
Oil & Grease	mg/l	<2.0	<2.0	10 (ECR'2017 ammed.)	Within the standard
Phenol	mg/l	<0.5	<0.5	-	-

Source: PKCP Project, UDD, 2022

Table-A6: Soil pH, EC and Soil Texture of the sampling sites

Sampling site	Soil pH	Electrical conductivity(EC) (dS/m)	Soil Texture			
			Sand	**Silt**	**Clay**	**Type**
Agricultural field	6.3	1.74	39.46	38.34	22.2	Loam
	4.5	1.34	43.61	36.25	20.14	Loam
	8.1	5.26	44.9	44.89	10.2	Loam
	7.7	2.24	41.47	44.4	14.13	Loam
	5.0	6.63	48.15	40.61	18.27	Loam
	8.0	4.30	55.38	34.48	10.14	Sandy Loam
Urban area	7.6	4.69	43.55	28.22	28.23	Clay Loam
	5.5	1.35	44.79	38.85	16.36	Loam
Peri urban area	7.3	5.29	48.51	39.13	12.36	Loam
	8.0	5.23	53.25	36.58	10.16	Sandy Loam
	4.1	0.78	47.1	42.73	10.17	Loam
Mangrove forest	7.3	1.47	57.19	32.62	10.19	Sandy Loam

Source: PKCP Project, UDD, 2022

Table-A7: Air Quality of the Study Area

Unit	PM_{10} $\mu g/m^3$	$PM_{2.2}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_x $\mu g/m^3$	CO mg/m^3	VOC $\mu g/m^3$
Averaging Period	24h	24h	24h	24h	8h	-
AAQ-1	82.6	41.6	6.8	32.6	0.75	<4.2
AAQ-2	79.6	39.6	6.2	30.2	0.65	<4.2
AAQ-3	86.2	44.6	7.3	35.6	0.56	<4.2
AAQ-4	75.6	40.8	6.5	32.5	0.65	<4.2
AAQ-5	78.4	42.5	6.2	28.2	0.72	<4.2
AAQ-6	77.3	39.2	<6.0	26.9	0.68	<4.2
AAQ-7	79.4	38.6	<6.0	26.4	0.62	<4.2
AAQ-8	80.7	40.8	6.5	30.2	0.66	<4.2

AAQ-9	83.9	45.2	6.3	30.8	0.73	<4.2
AAQ-10	82.7	42.7	6.2	29.8	0.78	<4.2
AAQ-11	81.2	41.3	6.4	29.7	0.72	<4.2
AAQ-12	86.3	44.7	7.4	36.5	0.69	<4.2
Standard (National)	150	65	80	80 (Annual)	5 (8 Hr)	-
Standard (International)	150	75	125	200 (1Hr)	-	-

Source: PKCP Project, UDD, 2022

Table-A8: Noise Quality of Different Land Use Types in the Study Area

Barguna Sadar					
Location ID	**Zone**	**Morning (dB)**	**Std. (Noise control rules, 2006) (dB)**	**Evening (dB)**	**Std. (Noise control rules, 2006) (dB)**
NL-1	Commercial	75	70	59	60
NL-2	Commercial	63	70	53	60
NL-3	Commercial	61	70	74	60

ANNEXURE-II

Appendix B: ESO Objectives, Indicators and Institutions Responsible for Monitoring

This table is a work-in-progress. It will be updated again in the Final SEMP, and will require to be further developed by the SCU during year 1 in consultation with implementing agencies, and kept under rolling review throughout the next 20 years.

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
Forest, Protected areas and biodiversity	1	Reduce over-exploitation/ degradation of habitats, loss of biodiversity and ecosystem(s) integrity and services	1	Status of the mud crab (Scylla spp.) as a key indicator of aquatic biodiversity in the PKCP region	None yet	None yet	None yet	None yet	Ministry of Fisheries and Livestock (MoFL) Secretary, MoFL, email: secretary@mofl.gov.bd, Phone: 9545700 & Ministry of Environment Forest and Climate Change (MoEFCC) Secretary, MoEFCC, email: secretary@moef.gov.bd, Phone: 9540481	Department of Fisheries (DoF) Director General, DoF email: dg@fisheries.gov.bd, Phone: 9562861 & Bangladesh Forest Department (BFD) Chief Conservator of Forests, BFD email: ccf-fd@bforest.gov.bd, Phone: 01999000001	Department of Fisheries (DoF) 1. Director, Finance & Planning, DoF. email: ddfinance@fisheries.gov.bd Bangladesh Forest Department (BFD) 2. Conservator of Forests, Wildlife and Nature Conservation Circle, BFD, Dhaka. email: mihir_fd@yahoo.com, Cell: 01712566001	Annual	Survey needed and the SCU will finalize all the need assessment.
			2	Status of suitable habitat for dolphin (in sanctuaries & hotspots)	Poor Good Very good1	Very good	2018 -19	BFD, 2020	Ministry of Environment Forest and Climate Change (MoEFCC) Secretary, MoEFCC, email: secretary@moef.gov.bd, Phone: 9540481	Bangladesh Forest Department (BFD) Chief Conservator of Forests, BFD. email: ccf-fd@bforest.gov.bd Phone: 01999000001	BFD 1. Conservator of Forests, Wildlife and Nature Conservation Circle, BFD, Dhaka. email: mihir_fd@yahoo.com,	Propose Every 3 years	
			3	Area of Protected (PA) Forests and other designated areas	Hectare	Reserve forests 43,453	2022	BDF 2022	Ministry of Environment Forest and Climate Change (MoEFCC) Secretary, MoEFCC, email: secretary@moef.gov.bd, Phone: 9540481	Bangladesh Forest Department (BFD) Chief Conservator of Forests, BFD. email: ccf-fd@bforest.gov.bd	BFD 1. Conservator of Forests, Wildlife and Nature Conservation Circle, BFD, Dhaka.	Propose Every 3 years	

1.Poor: Where the environmental factors and food accessibility for dolphins is not enough for basic life cycle requirements and where interference by fishermen and boat movement disturbance is high.

Good: Where the environmental factors and food accessibility for dolphins is enough for basic life cycle requirements, and interference by fishermen and boat movement disturbance is low.

Very good: Where the environmental factors and food accessibility for dolphins is abundant for basic life cycle requirements, and there is no interference by fishermen and boat disturbance.

Appendix

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
										Phone: 01999000001	email: mihir_fd@yahoo.com,		
Waste and Pollution	2	Reduce poor management and unsafe disposal of solid and liquid waste (urban & industrial)	4	Capacity of recycling plants in the PKCP Area	Very good/Good/ Moderate / Poor/ Very poor2	0	2022	Local consultations	Ministry of Environment Forest and Climate Change (MoEFCC) Secretary, MoEFCC, email: secretary@moef.gov.bd, Phone: 9540481	Department of Environment (DoE) Director General, DoE email: dg@doe.gov.bd Phone: 8181800	DoE 1. Director, NRM, DoE, email: dirnrm@doe.gov.bd, Cell: 01718114188 2. Director, Barishal Divisional Office, DoE,	Annually	
			5	Total volume waste per capita in Amtali, Kalapara and Brguna Sadar	Kg/ person/ day	0.11, 0.20, 0.24 respectively	2022	Calculated	Ministry of Environment Forest and Climate Change (MoEFCC) Secretary, MoEFCC, email: secretary@moef.gov.bd, Phone: 9540481	Department of Environment (DoE) Director General, DoE email: dg@doe.gov.bd Phone: 8181800	DoE 1. Director, NRM, DoE, email: dirnrm@doe.gov.bd, Cell: 01718114188 2. Director, Barishal Divisional Office, DoE,	Annually	
			18	No hrs. in which noise exceeds 45dBA in the ‘Silent Zone’ in the reserve forests)3	Hrs./day	0 4	2022	CEGIS 2022	Ministry of Environment Forest and Climate Change (MoEFCC) Secretary, MoEFCC, email: secretary@moef.gov.bd, Phone: 9540481	Department of Environment (DoE) Director General, DoE email: dg@doe.gov.bd Phone: 8181800	DoE 1. Director, Department of Environment, Dhaka Laboratory Office E-mail: dhakalab@doe.gov.bd, Cell: 01712125880	Methodology, duration and coverage to be revised	Survey needed

2Very good =The state where all the municipal solid waste in urban areas of PK Region is recycled and properly managed without posing any threats to environment, and 70-90%) of waste is converted into resources.

Good = The state where all the municipal solid waste in the urban areas of PK Region is recycled and properly managed without posing any threats to environment, with 50-69% of waste converted into resources.

Moderate = The state where 50 –75% of the municipal solid waste in the urban areas of PK Region is recycled and properly managed without posing any threats to environment, with 30-49% of waste converted into resources.

Poor = The state where around 25% of the municipal solid waste in the urban areas of PK Region is recycled and properly managed only, with no waste comverted into resources.

Very Poor = The state where less than 25% of municipal solid waste in the urban areas of PK Region is recycled and properly managed, with no waste converted into resources.

3Bangladesh standard (Environmental Conservation Rule-ECR-1997) for Silent zone (45 dBA)

4Discontinuously when Cargo and ships move and honk

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
											2. Director, Air Quality Management, Department of Environment. Mail: nazmul@doe.gov.bd, Cell: 01819427358		
Climate change and disasters	4	Reduce vulnerability to climate change and natural disasters (floods, storm surges, etc.)	26	Storm surge inundation	% of PK Region	Cyclone Sidr: 10	2007	WB, 2011	Ministry of Disaster Management and Relief (MoDMR) Secretary, MoDMR email: secretary@modmr.gov.bd Phone: 9540877	Department of Disaster Management (DDM) Director General, DDM email: dg@ddm.gov.bd, Phone: 8835495	DDM 1. Deputy Director (Research) Disaster Management Division, email: nurulhaquechowdhury@gmail.com, Mobile: 01711399633	Event based – the data are only collected after the event	Storm surge inundation
			27 (a)	Salinity intrusion (Surface water & ground water)	% of Region: 1PPT in SW	71.5	2011	CEGIS Bay of Bengal Model	Ministry of Water Resources (MoWR) Secretary, MoWR email: secretary@mowr.gov.bd, Phone: 9576773 & Ministry of Local Government, Rural Development & Co-operatives	Bangladesh water Development Board (BWDB) Director General, BWDB email: dg@bwdb.gov.bd, Phone: 222230011 & Department of Public Health Engineering (DPHE) Chief Engineer, DPHE, email: ce.dphe@gmail.com. Phone: 55130752	BWDB Chief Engineer (Civil), Hydrology, email: ce.hydrology@bwdb.gov.bd, Phone: 029550815 DPHE Superintending Engineer (Ground Water Circle), email: se.gwc@dphe.gov.bd, Phone: 02-9342485	Continuous	Measure this in wells. There are a number of monitoring wells. The monitoring is already in place
			27 (b)	As above	% of Region: 5PPT in SW	52.5	As above	As above	As above	As above	As above	As above	As above

Appendix

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
			28	Number of Households severely affected5 during cyclone, storm surge, extreme flood or related climate change event	No.	31,228 on average per annum (from 2015-2020)	2015 - 2020	BBS, 2022	Ministry of Environment Forest and Climate Change (MoEFCC) Secretary, MoEFCC, email: secretary@moef.gov.bd, Phone: 9540481	Bangladesh Bureau of Statistics Statistics and Informatics Division Ministry of Planning	Bangladesh Bureau of Statistics Statistics and Informatics Division Ministry of Planning	calamity/ event based Data collated every 5 years	Existing monitoring system already in place
Economic growth	5	Ensure significant economic development and diversification, and increase in economic growth	29	Per capita GDP for PK Region (in constant price of 2010)	PPP6 international $	2096	2018 -19	BBS, 2019	Ministry of Planning Secretary, Statistics and Informatics Division (SID) email: secy@sid.gov.bd, Phone: 02-55007373	Planning Commission Director General, Planning, Commission, E-mail: hamidul.haque@imed.gov.bdPhone (Office): 9180677, Mobile: 01718022712 & Statistics and Informatics Division (SID), Additional Secretary, Informatics Wing, SID email: addlsecy@sid.gov.bd, Phone: 55007377	Bangladesh Bureau of Statistics (BBS) Director General, BBS, E-mail: dg@bbs.gov.bd, Phone: 02-55007056	Annually	
			30	GDP for PK Region (in constant prices of 2010)	PPP international $ billion	44.29			same as above	same as above	same as above	Annually	
			31	GDP in PK Region as share of national GDP	%	14	2018 -19	Est.	same as above	same as above	same as above	Annually	

5Severely affected means: house, crops, livestock, fish farms destroyed

BBS (2022). Bangladesh Disaster-related Statistics 2021: Climate Change and Natural Disaster Perspectives—Final Draft. Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.

6 PPP: purchasingpowerparity

Appendix

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
			32	Industry as share of GDP of PK Region	%	24.08	2018 -19	BBS, 2019	same as above	same as above	same as above	Annually	
Employment	6	Enhance opportunities for employment and new/improved livelihoods (particularly for fisheries, agriculture, eco-tourism)	33	People employed in industry in PK Region	% of total people employed	5	2012	BBS, 2012	Ministry of Industries (MoI) Secretary, MoI, email: indsecy@moind.gov.bd, phone: 02-47120800	Bangladesh Industrial Technical Assistance Centre (BITAC) Director General, BITAC email: dg@bitac.gov.bd, phone:8870700	Bangladesh Industrial Technical Assistance Centre (BITAC)	Annually	
Health and sanitation	7	Improve health services and health of society (e.g. by reducing vulnerability to diseases)	34	No of health service providing organization	No.	352 beded 5 hospitals in five Upazilas, 60 bedded private hospitals in two upazila	2021	PKCP Regional Plan	Ministry of Health and Family Welfare (MoHFW) Secretary, Health Service Division, MoHFW email: secretary@hsd.gov.bd, phone: 9577199	Directorate General of Health Services (DGHS) Director General (Health), email: alamdr2003@ yahoo.com, phone: 55067172 & Bangladesh Bureau of Statistics (BBS) Director General, BBS, E-mail: dg@bbs.gov.bd, Phone: 02-55007056	DGHS 1. Director DGHS, Khulna Division Email: kdho@ld.dghs.gov.bd Mobile: 01711195754, 01716821339 BBS 2. Director, Census/computer Wing, Bangladesh Bureau of Statistics (BBS), email: mahfuz.bablu@gmail.com, phone: 02-55007331	Annually	
			35	Life expectancy	Yrs	72.10	2018	BBS, 2019	Ministry of Health and Family Welfare (MoHFW) Secretary, Health Service Division, MoHFW email: secretary@hsd.gov.bd, phone: 9577199	Directorate General of Health Services (DGHS) Director General (Health), email: alamdr2003@ yahoo.com, phone: 55067172 & National Institute of Population Research and Training (NIPORT)	RPTI 1. Regional Population Training Institute (RPTI), Barishal 2. Director, Census/computer Wing, Bangladesh Bureau of Statistics (BBS), email: mahfuz.bablu@gmail.com, phone: 02-55007331	Annually	

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
										Director General, NIPORT, email: dg.niport1977@gmail.com, phone: 9662495			
Education. skills and training	8	Improve access to education for all, increase attendance (by reducing drop-out rates), and improve skills development and training	36	Enrolment in higher secondary education (16+ years)	% of population	22.42	2019	PKCP Regional Plan, 2019	Ministry of Education (MoEDU) Secretary, MoEDU, email: Secretary@moedu.gov.bd Phone: 9576679	Directorate of Secondary and Higher Education (DSHE) Director General, DSHE, email: dg@dshe.gov.bd, Phone: 9553542 & BANBEIS Director General, BANBEIS, email: dg@banbeis.gov.bd, phone: 02-9665457	DSHE 1. Deputy Director, DSHE, Khulna Email: ddkhl@yahoo.com, Mobile: 01712141429 BANBEIS 2. Chief Statistics, BANBEIS, email: alamgir_asif@yahoo.com, phone: 02-55151815	Annual	
Migration	9	Reduce migration from rural (including disaster-prone and risk-prone) areas to urban areas	37	Rate of migration to urban areas in PK Region	%	3.24	2019	BBS, 2019	Ministry of Planning Secretary, Statistics and Informatics Division (SID) email: secy@sid.gov.bd, Phone: 02-55007373 & Ministry of Expatriates' Welfare and Overseas Employment	1. Bangladesh Bureau of Statistics (BBS) Director General, BBS, E-mail: dg@bbs.gov.bd, Phone: 02-55007056 2. Bureau of Manpower, Employment and Training (BMET) Director General, BMET, email: dg@bmet.gov.bd, phone: 49349925 3. Statistics and Informatics Division (SID) Additional Secretary, Informatics Wing, SID email: addlsecy@sid.gov.bd, Phone: 55007377	Statistics and Informatics Division (SID) 1. Additional Secretary, Informatics Wing, SID email: addlsecy@sid.gov.bd, Phone: 55007377 BBS 2. Joint Director, BBS, Khulna, Email: mostofa43@gmail.com, Mobile: 01720212215 2. Refugee and Migratory Movements Research Unit (RMMRU), University of Dhaka E-mail: info@rmmru.org, Tel: + 880-2-9360338	Annually	Rate of migration to urban areas in PK Region
Conflicts and security	10	Reduce conflicts over use of land	38	No of fisher-farmer land-related disputes / clashes	No.	None yet	None yet	http://peaceobservatory-cgs.org/#/d	Ministry of Public administration (MoPA)	Divisional Commissioner, Khulna Division	Divisional Commissioner office.	Annual	Need Study to cover both

Appendix

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
								ivision/district	Secretary, MoPA, email: secretary@mopa.gov.bd, Phone: 02-9570100	email: divcomkhulna@mopa.gov.bd, phone: 01713400394	1. Additional Divisional Commissioner (Revenue)		reported and unreported cases
Food	11	Improve food security	39 (a)	Status of food security - as measured by availability,	Very good7	Moderate	2020	https://foodsecurityindex.eiu.com/Index	Ministry of Food Secretary, Ministry of Food, email: secretary@mofood.gov.bd, phone: 029540088	Directorate General of Food Director General, Directorate of Food, Dhaka, emial: dg@dgfood.gov.bd, phone: 02-9584834	Regional Controller of Food Regional Food Department, Barishal Division	annual	
		Improve food security	39 (b)	quality	Good	Moderate	As above	As above	As above	As above	As above	As above	
		Improve food security	39 (c)	safety food to all people at all time	moderate	Moderate	As above	As above	As above	As above	As above	As above	
Power and energy	12	Enhance the capacity of power generation and distribute sustainable power to the consumer.	40	At present total power Generation in the Barishal Region (PKCP is the part of Barishal Region)	MW	2265	2020	BPDB, 2020; Daily Production Report, PGCB	Ministry of Power Energy and Mineral Resources (Power Division) Secretary, Power Division, email: secy@pd.gov.bd, phone: 02-9511030	Bangladesh Power Development Board (BPDB) Chairman, BPDB, email: chairman@bpdb.gov.bd, Phone: 9562154 Bangladesh Rural Electrification Board (BREB)	BPDB 1. Member, Generation, BPDB, email: member.generation@bpdb.gov.bd, phone: 9564667 2. Deputy Secretary, Development-5, Power Division Mobile: +8801817508251	Standing indicator – only changes when a new power station is built	

7Very Good: Food affordability, availability, quality and safety is good enough or surplus to all people at all time. It includes safe and nutrition food to meet dietary need.

Good: Food affordability, availability, quality and safety is sufficient or just enough to feeding all the people at all time.

Moderate Good: Food affordability, availability, quality and safety is not enough to feeding all the people at all time.

Poor: Food affordability, availability, quality and safety is insufficient or deficit to meet demand and need improve access to sufficient, safe and nutrition food to meet dietary need.

Link SEA

https://en.wikipedia.org/wiki/Global_Food_Security_Index

https://foodsecurityindex.eiu.com/Index

Themes		Objective		Indicator	Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
										Chairman. BREB Mobile: 88028900007 Email: chairman@reb.gov.bd	Email: dev-5@pd.gov.bd		
		Increase production and consumption of energy	41	Power production per capita (installed capacity	W / capita	122	2020	BPDB, 2020 and Expert Judgement	Ministry of Power Energy and Mineral Resources (Power Division) Secretary, Power Division, email: secy@pd.gov.bd, phone: 02-9511030	Bangladesh Power Development Board (BPDB) Chairman, BPDB, email: chairman@bpdb.gov.bd, Phone: 9562154	BPDB 1. Member, Generation, BPDB, email: member.generation@bpdb.gov.bd, phone: 9564667 2. Deputy Secretary, Development-5, Power Division Mobile: +8801817508251 Email: dev-5@pd.gov.bd	25	
	13	Increase access to affordable energy	42	Power production per GDP (installed capacity)	W / 1000 $ international (PPP, constant prices of 2010)	58.1	2020	BPDB, 2020	Ministry of Power Energy and Mineral Resources (Power Division) Secretary, Power Division, email: secy@pd.gov.bd, phone: 02-9511030	Bangladesh Power Development Board (BPDB) Chairman, BPDB, email: chairman@bpdb.gov.bd, Phone: 9562154	BPDB 1. Member, Generation, BPDB, email: member.generation@bpdb.gov.bd, phone: 9564667 2. Deputy Secretary, Development-5, Power Division Mobile: +8801817508251, Email: dev-5@pd.gov.bd	26	
Tourism	14	Improve tourism management and behaviour to limit noise, pollution and other negative impacts and remain within the carrying capacity of the Exclusive	43	Visitors to the various destinations of the project area. Like: Number of visitors to the Exclusive Tourist Zone, Sonar char	No.	On the weekend, Sonar Char was visited by 80-100 tourists, compared to 30-40 tourists on Sunday	Jan 2023	Union level Consultation	1. Ministry of Environment Forest and Climate Change (MoEFCC) Secretary, MoEFCC, email: secretary@moef.gov.bd, Phone: 9540481 2. Ministry of Civil Aviation & Tourism (MOCAT)	A K Shamsuddin Chairman, Char Montaz 01715332567 Md. Mosaref Hossain Union Parishad Member, 7 no. ward 01735727636	BFD 1.Conservator of Forests, Barishal Circle. MOCAT Deputy Secretary (Tourism 1)	Daily	

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
		Tourist Zone (ETZ)		No. of tourists for river/sea cruising		through Thursday. Still there were no river or sea cruising facilities			Secretary, MoCAT, email: secretary@mocat.gov.bd, phone: 02-9514884	1. Bangladesh Forest Department (BFD) Chief Conservator of Forests, BFD. email: ccf-fd@bforest.gov.bd Phone: 01999000001 2. Bangladesh Parjatan Corporation (BPC), Chairman, BPC, email: chairman@parjatan.gov.bd, phone: +88 02 44826504	Email: dstourism1@mocat.gov.bd		
Infrastructure, transportation and communications	15	Improve connection of communities, and improve access to infrastructure, services and facilities	44	Number of Educational Institute (Primary School, Secondary school, College, Technical and Vocational institutes)	Nos	1230	2021	UDD, 2021	Ministry of Education (MoEDU) Secretary, MoEDU, email: Secretary@moedu.gov.bd Phone: 9576679 Ministry of Primary and Mass Education (MoPME) Secretary, MoPME, email: scy@mopme.gov.bd Phone: +88-02-55100484 9576679	Directorate of Secondary and Higher Education (DSHE) Director General, DSHE, email: dg@dshe.gov.bd, Phone: 9553542 & BANBEIS Director General, BANBEIS, email: dg@banbeis.gov.bd, phone: 02-9665457		Standing figure until new railway is built Update figure	
			45	Density of roads in PK Region	Km roads per 100 Km2	22.13	2022	RHD & LGED 2022	Ministry of Road Transport and Bridges Secretary, Road, Transport and Highways Division, email: secretary@rthd.gov.bd, phone: 02-9511122	Road, Transport and Highways Division Secretary, Road, Transport and Highways Division, email: secretary@rthd.gov.bd, phone: 02-9511122	Roads and Highways Division Deputy Secretary, Estate Branch, Roads and Highways Division, Email: dsestate@rthd.gov.bd, Mobile: 01716442348	Standing indicator – only changes when a new road is built	
	16	Optimize the existing and future physical footprint of transport	46	Extent of railways in PK Region	Km	214	2022	BR, 2022	Ministry of Railways (MoR) Secretary, Ministry of Railways, email:	Ministry of Railways (MoR)	Addl. Director General (Infra), Bangladesh Railway, Email: adgi@railway.gov.bd, Mobile: 01711505301	Standing figure until new railway is built	

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
		services (rail, road, air, waterways)							secretary@mor.gov.bd, phone: 9578199	Secretary, Ministry of Railways, email: secretary@mor.gov.bd, phone: 9578199		Update figure annually	
			47	Ships carrying coal handled at Payra Port	Nos	102	2022 8	PPA website	MoS	Traffic Department, Payra Port Authority			
			48	Amount of Coal handled at Payra Port	Metric Ton	28,12,669	2022	PPA website	MoS	Traffic Department, Payra Port Authority			
			49	Other Commercial Cargo Ships handled at Payra Port	Nos	19	2022	PPA website	MoS	Traffic Department, Payra Port Authority			
			50	Other Commercial Cargo Handled at Payra Port	Metric Ton	210,387	2022	PPA website	MoS	Traffic Department, Payra Port Authority			
			51	Domestic Lighterage/Bulk head ships handled at Payra Port	Nos	825	2022	PPA website	MoS	Traffic Department, Payra Port Authority			
			52	Domestic Lighterafe/Bulk head cargo handled at Payra Port	Metric Ton	980,909	2022	PPA website	MoS	Traffic Department, Payra Port Authority			
Urban area expansion	17	Sustainable and eco-friendly development of urban area	53	Existing urban area (Paurashava)	%	1.38	2023	Payra Kuakata Comprehensive Plan Focusing	Ministry of Housing and Public Works Ministry of Housing and Public Works	UDD Director, Urban Development Directorate		Standing figure until new plans are	

8 Data available up to December 31, 2022

Themes	Objective		Indicator		Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
								on Eco-Tourism	Secretary, Ministry of Housing & Public Works secretary@mohpw.gov.bd, phone: 55100465 (office)	director.UDD1965@gmail.com Phone: 223382728 (Office)		implemented.	
Agriculture	18	Increase agricultural productivity	54	Milk demand	M M Ton/yr	0.21	2018	DLS, 2018	Ministry of Fisheries And livestock (MoFL) Secretary, MoFL, email: secretary@mofl.gov.bd, phone: 9545700	Department of Livestock Services (DLS), Dhaka DG, DLS	Upazila Livestock Officer (ULO), of respective Upazila	Annually	
			55	Meat demand	M M Ton/yr	0.20	2018	DLS, 2018	Ministry of Fisheries And livestock (MoFL) Secretary, MoFL, email: secretary@mofl.gov.bd, phone: 9545700	Department of Livestock Services (DLS), Dhaka DG, DLS	Upazila Livestock Officer (ULO), of respective Upazila	Annually	
			56	Rice and Non-Rice crop production	Million Metric (MM Ton)/yr	Rice – 451,578 MT; Non-rice – 352,202 MT	2021-22	DAE field report and CEGIS calculation based on field survey, 2022	Ministry of Agriculture (MoA) Secretary, MoA, email: secretary@moa.gov.bd, phone: 9540100	Department of Agriculture Extension (DAE) Director General, DAE email: dg@dae.gov.bd,	Deputy Director of Department of Agricultural Extension (DDDAE) of Barguna and Patuakhali District email: dg@dae.gov.bd, Phone: 55028369 Upazila Agriculture Officer (UAO) of the respective upazila	Annually	
Fisheries	19	Promoting inland fisheries	57	Fish production in PKCP Region	MT/yr	0.81	2018	DoF, 2019	Ministry of Fisheries and Livestock (MoFL) Secretary, MoFL, email: secretary@mofl.gov.bd, Phone: 9545700	Department of Fisheries (DoF) 1. Director General, DoF email: dg@fisheries.gov.bd, Phone: 9562861	District Fisheries Officer (DFO) Director, Finance & Planning/ PSO(FRSS), DoF Email: ddfinance@fisheries.gov.bd, Mobile: 01712581599	Annually	

Themes		Objective		Indicator	Unit	Baseline figure	Year of baseline data	Source	Concern Ministry	Institution responsible for data Gathering	Supported by	How often	Resources needed (budget, equipment, training, etc…)
		Promoting inland fisheries	58	Fish production in PKCP Region	MT/yr	0.81	2018	DoF, 2019	Ministry of Fisheries and Livestock (MoFL) Secretary, MoFL, email: secretary@mofl.gov.bd, Phone: 9545700	Department of Fisheries (DoF) 1. Director General, DoF email: dg@fisheries.gov.bd, Phone: 9562861	District Fisheries Officer (DFO) Director, Finance & Planning/ PSO(FRSS), DoF Email: ddfinance@fisheries.gov.bd, Mobile: 01712581599	Annually	
Water Resources	20	Increase dry season freshwater flow in rivers	59	Average daily dry season (Jan-May) discharge on Gorai at Railway Bridge	Cumec	84	1997 - 2019	BWDB	MoWR	Bangladesh Water Development Board Director General dg@bwdb.gov.bd, dg.bwdb.bd@gmail.com Phone: 01318234567	Bangladesh Water Development Board (relevant district office)	Daily	
		Reduce high/peak water level in Tetulia channel during monsoon season	60	Average daily monsoon (Jul-Aug-Sept) WL in Tetulia Channel	mPWD	2.75	1989 - 2002	BIWTA	MoWR	Bangladesh Water Development Board Director General dg@bwdb.gov.bd, dg.bwdb.bd@gmail.com Phone: 01318234567	Bangladesh Water Development Board (relevant district office)	Daily	

ANNEXURE-III-

Project Team

Prepared by:

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Junior GIS Expert
Payra Kuakata Comprehensive Plan Focusing on Eco-Tourism

Guided by:

Dr. Sarwar Jahan
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Regional Planner
Payra Kuakata Comprehensive Plan Focusing on Eco-Tourism

Khandakar Masudur Rahman
Urban Planner
Payra Kuakata Comprehensive Plan Focusing on Eco-Tourism

Reviewed by:

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Assaduzzaman

Senior Planner, UDD