



Preparation of Payra Kuakata Comprehensive Plan Focusing on Eco-Tourism Project
Urban Development Directorate (UDD)
Ministry of Housing and Public Works
Government of the People's Republic of Bangladesh

Draft Action Area Plan
For
Sonar Char Exclusive Tourist Zone

November, 2022

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Executive Summary

The overall goal of the Action Area Plan is to achieve Eco-tourism for foreign tourist and ecofriendly development of the Sonar Char and surrounding Char by integrated planning and implementation through government authority, private investor's involvement and community participation for optimum utilization of resources and reduction of poverty in this region. The Action Area Plan includes five Char namely Sonar Char, Char Montaz, Andar Char, Char Taposhi and Char Hare from Patuakhali district under Rangabali Upazila.

The Action Area Plan (AAP) is re-examining land uses in the Sonar Char and adjacent areas for ecotourism. It outlines comprehensive land use distributions and establishes a schedule for implementing ideas in regions of transition, such as Sonar Chars. There are two types of infrastructure that need to be developed for feasible the project for a long run.

The objectives for Sonar Char Action Area Plan are to make Sonar Char and its surroundings a home for future foreign tourists and also to provide tourists with high-quality services and facilities for achieving an environmentally friendly development strategy. Sonar Char is located near the Bay of Bengal on the southern boundary of Patuakhali's Rangabali Upazila. .Soar Char covers a total area of around 18 square kilometers. In Sonar Char and Char Taposhi/Kolagasi, there is a substantial mangrove forest. In the northern half of the Char Hare, there is a mangrove forest. The largest land mass of these char is Char Montaz. The road and pathways are available in the char Montaz and Andar cahr. Waterways are only communicable ways to reach Char Hare, Sonar Char and Char Taposhi/Kolagasi. Only 19569 people live in Char Montaz and 3782 people live in Andar Char. The shape and size frequently change according to Landsat 7-8, it is clearly showing that the size of some char is increasing whereas some char lose land on a regular basis. The Sonar Char Wildlife Sanctuary has a low salinity. This Char has a lower saline content. The degree of saltiness fluctuates depending on whether it is wet or dry. Climate change is already causing rising air temperatures, melting glaciers and shrinking polar ice caps, rising sea levels, increased desertification, and more frequent extreme weather events such as heat waves, droughts, floods, and storms. Water transport is the primary mode of transportation between the islands or Char in Sonar Char and the surrounding area. Road networks exist in Char Montaz and Andar Char. The Ministry of Road Transport and Bridges will be responsible for the development of all roadways. Biodegradable paths will be built in the Sonar Char, Andar Char, and Char Hare for environmentally friendly development initiatives. There is an existing helipad which is situated in Char Montaz. In the Sonar Char, a flexible and adaptable floating dock for boats as well as speed boat Ghat has located. It is also found that about 72.94% of Land is covered with water body and 12.15 % is agriculture Land. Majority of land use has covered with water body on these chars and also agriculture has covered second largest portion of land uses.

From suitability analysis, suitable location for ecotourism of sonar char has identified. In geological suitability analysis, around 21.2 percent area found moderately suitable and 74.2 percent found less suitable as well as 4.6% area are not suitable. And it is found that char montaz and Andar Char are situated in less suitable area, From hydro-geological suitability analysis, it is

found that the 95.4% percent of the area was found hydro-geologically moderately suitable, only 4.6 percent of the area was not Suitable. About 75.64% area is least suitable area which is the majority portion of sonar char and surrounding areas as well as 17.18% area is less suitable and only 1.8% area is highly suitable area for human settlement. From disaster risk, Andar Char and Sonar Char have a low disaster risk. The majority of Sonar char and Char Taposhi/Kolagasi is covered with forest. Development suitability and tourism suitability have done to identify suitable location. From tourism suitability analysis, is found that 48.04% area are less suitable area according to tourism potentiality. Only 1.5% area is suitable for tourism and all proposals are given based on suitable site.

Specific proposals have given according to suitable location. Andar Char is the perfect location to develop luxury and modern facilities for tourists. There are plenty of facilities that will be developed to serve as more authentic and eco-friendly facilities for foreign tourists. Sonar Char has no permanent residents and is an ecological landmass. The Bangladesh government or a Public-Private Partnership (PPP) will fund the development of this area. Foreign tourists will be able to enjoy the natural beauty of this Char and the adjacent Char. Sonar Char consider as the forest area due to the presence of dominant vegetation cover. There is also no human settlement. Its enriched biodiversity can be the destination of national and international tourist. Due to the lack of a better communication, utilities, and services, it is estimated that Sonar Char will take at least five years to develop as a tourist Sites. So, the government has devised a number of initiatives, plans, programs, and actions to address the problem for making the sonar char as an exclusive tourist zone. For making the sites as exclusive sites for tourism, the government different level integration had been taken to make it fruitful.

CHAPTER ONE:

1.1 Background of the Action Area Plan for Sonar Char

On February 25, 2012, the Honorable Prime Minister of the People's Republic of Bangladesh committed during a gathering at the M.B. College ground in Kalapara Upazila, Patuakhali district, that the Sonar Char in Rangabali Upazila will be developed exclusively for foreign tourists. There will be a tourist zone developed in the Kuakata, Taltoli, and Patharghata Upazilas.

The Honorable Prime Minister's aim is for the Sonar char and adjacent area to be developed as an exclusive international tourist zone in the future, which is her dream and guidance. The Action Area Plan of Sonar Char is a strategy for gaining a better understanding of Sonar Char's natural environment and transforming the area into a viable eco-friendly tourist destination for visitors for the long run. This tourist spot will be developed for both domestic and international tourists. Exclusive tourist zone is a place where Tourists are looking for a luxury trip want their dreams to become reality. They look for something unique, above their expectations with superb service where their needs and wants are fulfilled. This includes exclusivity, privacy, and everything from relaxation to adventure, with pampering and extras. Exclusive tourist zone have hotels, cottages, beach villas, night clubs, a convention hall and an amusement park.

1.2 Objectives

The main purpose of the Action Area Plan is to accelerate the transformation of Sonar Char and surrounding Char into a tourist spot for foreigners. The Action Area Plan for Sonar Char has been developed with the aid of a wide-ranging public consultation process and has been supported and informed by a series of technical studies. Three objectives were identified for Sonar Char Action Area Plan, which are:

- To make Sonar Char and its surroundings a home for future foreign tourists.
- To provide tourists with high-quality services and facilities.
- To achieve an environmentally friendly development strategy.

1.3 Location of the Project Area

Sonar Char is located near the Bay of Bengal on the southern boundary of Patuakhali's Rangabali Upazila. A vast mangrove forest and a long beach can be found here. Small and big waves assaulted the shoreline. People may observe the sunrise and sunset from the beach at Sonar Char. As the sea level rises, Sonar Char takes on a new beauty. Sonar Char is only an hour and a half away from Galachipa's launch dock by speed boat. To the south, Sonar Char is located between Char Montaz, Rangabali, and Andar Char. Soar Char covers a total area of around 18 square kilometers. This is a significant ecological area. This is a coastal mangrove plantation and reserve woodland. This place is known as a saline tidal floodplain since it is located near a coastal area. The Ganges tidal floodplain is the physiography of this site. Sonar Char lies in the Pathuakhali district's Rangabali Upazila. The Sonar Char has been designated as a Wildlife Sanctuary.

Table 1: Area of Sonar Char and Surrounding Areas

Name of Char	Approximate Total Area (Acre) GIS Calculation
Char Montaz	17728.46
Char Andar	1682.87
Char Hare	1173.87
Sonar Char	4968.67
Char Boro Taposhi/Kolagasi	2887.59
Total	28441.46

Source: PKCP project, UDD, 2019

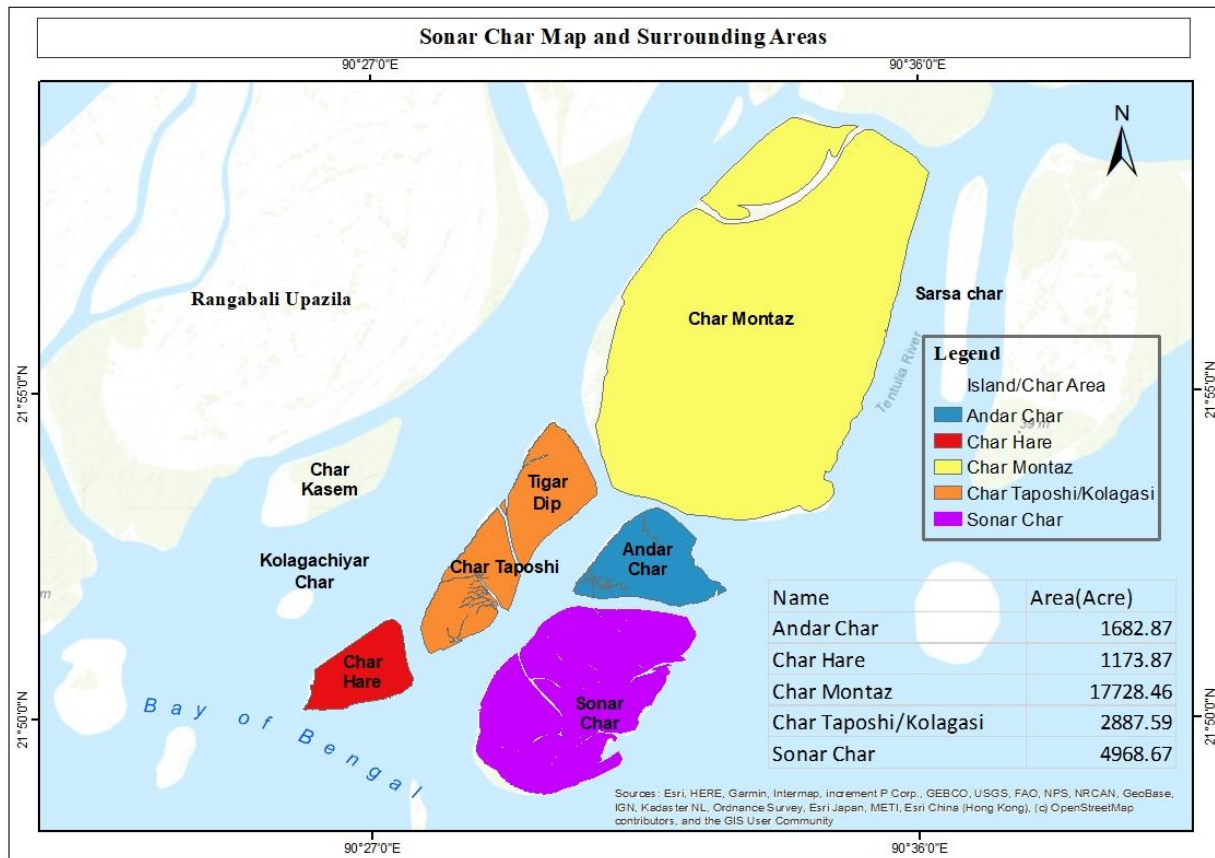


Figure 1 Location of Sonar Char and Surrounding Char

Source: PKCP project, UDD, 2019

1.4 Demographic Profile of Sonar Char and Surrounding Char

The only places where people live are Char Montaz and Andar Char. Char Montaz is home to the majority of the residents in this area. Andar Char and Char Montaz are more solid and livable. In Sonar Char and Char Taposhi/Kolagasi, there is a substantial mangrove forest. In the northern

half of the Char Hare, there is a mangrove forest. The largest land mass of these char is Char Montaz. The road and pathways are available in the char Montaz and Andar char. Waterways are only communicable ways to reach Char Hare, Sonar Char and Char Taposhi/Kolagasi.

Table 2: Distribution of Population and Area of Char

Name of Char	Total Population (BBS 2011)	Approximate Total Area (Acre) GIS Calculation
Char Montaz	19569	17728.46
Char Andar	3782	1682.87
Char Hare	0	1173.87
Sonar Char	0	4968.67
Char Boro Taposhi/Kolagasi	0	2887.59
Total	23351	28441.46

Source: BBS, 2011 & PKCP project, UDD, 2019

1.5 Transportation System at Sonar Char and Surrounding Areas

Road Network: Road network exists only in Char Montaz and Andar Char. Numerous well-maintained roadways are available in Char Montaz. Locals in Andar Char have access to two important roadways.

Total length of road is 265 km whereas 249 km roads exist in char Montaz and 15 km road has found in Andar Char

Air Communication: It is expected that foreign tourists will prefer air transportation. To ensure air connectivity, the respective government authorities will develop a existing helipad of the Char Montaz.

Waterways: Near the Char Montaz's southern end, there is a large and modern boat dock. This pier will be upgraded to provide modern tourist amenities. In Sonar Char, Char Taposhi, Andar Char, and Char Hare, a flexible and adaptable floating dock for boats will be established.

1.6 Geological Condition of Sonar Char and Surrounding Area

Over the year, the shape and size frequently change. It is clearly showing that the size of some char is increasing whereas some char lose land on a regular basis. In Figure 2, there show some changes in shape and size of four char for five distinct years.

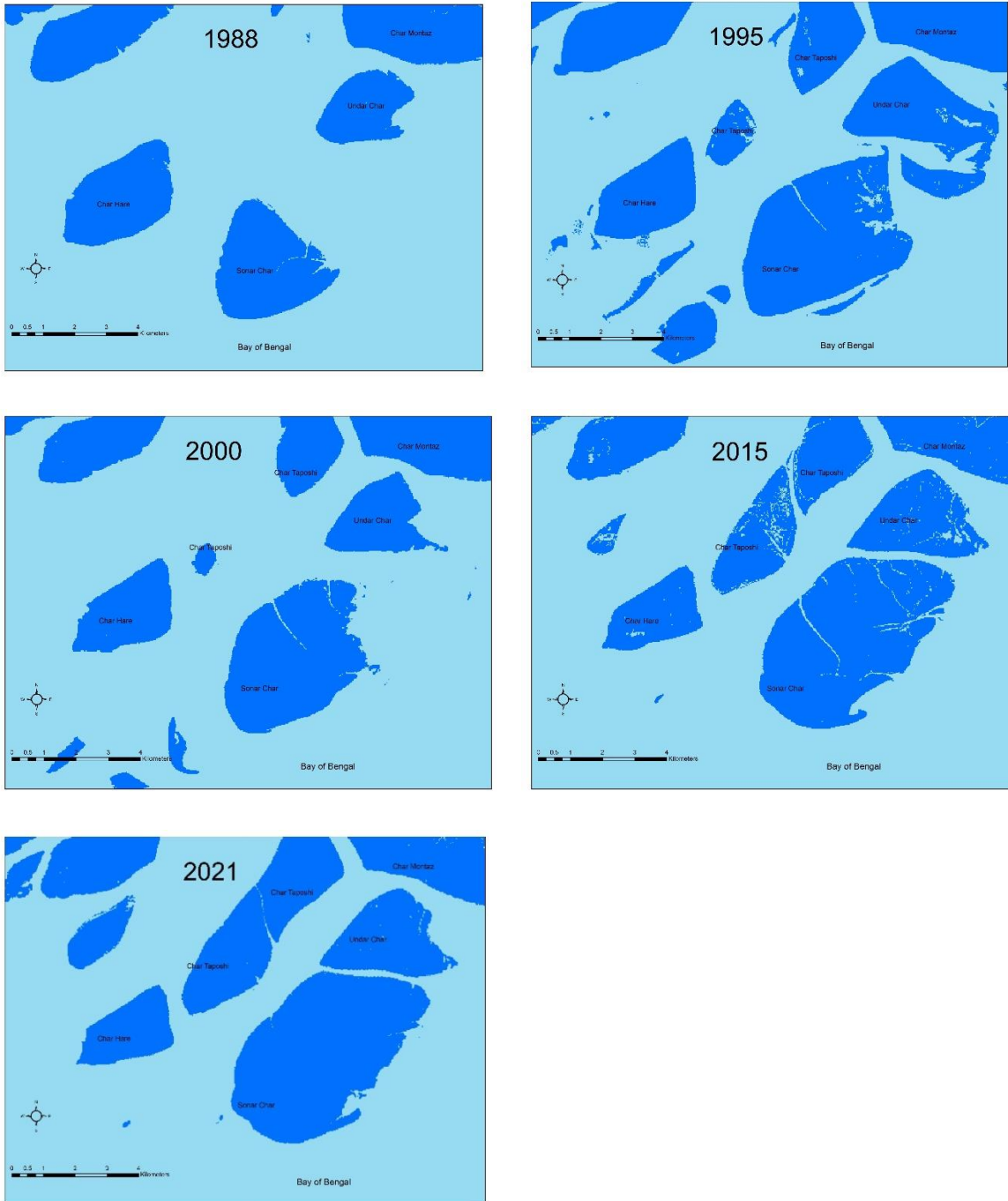


Figure 2: Changing of Area and Shape of Char over the Years

(Source: USGS Landsat 7-8)

Year 1988: There are three Char namely Char Hare, Sonar Char, and Andar Char. The size of this char was relatively smaller in 1988. The position of Sonar Char is located to the south of Andar Char. The distance from Andar Char to Sonar Char is around 10 nautical miles.

Year 1995: A new Char immerge was introduced, which was Char Taposhi/Kolagasi. The location of the Char Taposhi/Kolagasi is on the western side of Sonar Char and Andar Char. The size of the Andar Char increased significantly on the eastern coast of this island. Similarly, the size of Andar Char increased towards the eastern coast.

Year 2000: Char lost a significant amount of land in this year. The shape and size of Char are changing slightly. The area between the eastern banks of Andar Char and Sonar Char has been reduced.

Year 2015: In this year, all chars gain land. The area of this land increased significantly more than in the year 2000. In the last five years, Char Taposhi/Kolagasi has acquired the majority of the land.

Year 2021: The total area of these char and shapes has remained constant over the last five years, from 2015 to 2021. It is predicted that the soil conditions of these char are not stable. The areas of Chars change frequently over the year given in this figure.

1.7 Existing Land use of Sonar Char and Surrounding Areas

It is found that about 72.94% of Land is water body and 12.15 % is agriculture Land. Majority of water body has found on these chars and also agriculture has covered second largest portion of land uses.

Table 3: Existing Landuse of Sonar Char and Surrounding Areas

Landuse	Area (acre)	Percentage (%)
Agricultural	13155.72	12.15
Char Land	10568.06	10.13
Commercial	22.02	0.02
Education & Research	12.31	.01%
Forest	2899.22	2.68
Fallen Land	8.96	.01
Residential	2020.74	1.87
Vacant Land	41.17	0.04
Transport & Communication	168.19	.16
Waterbody	78963.229	72.94
Total	107859.62	100.00

Source: PKCP project, UDD, 2019

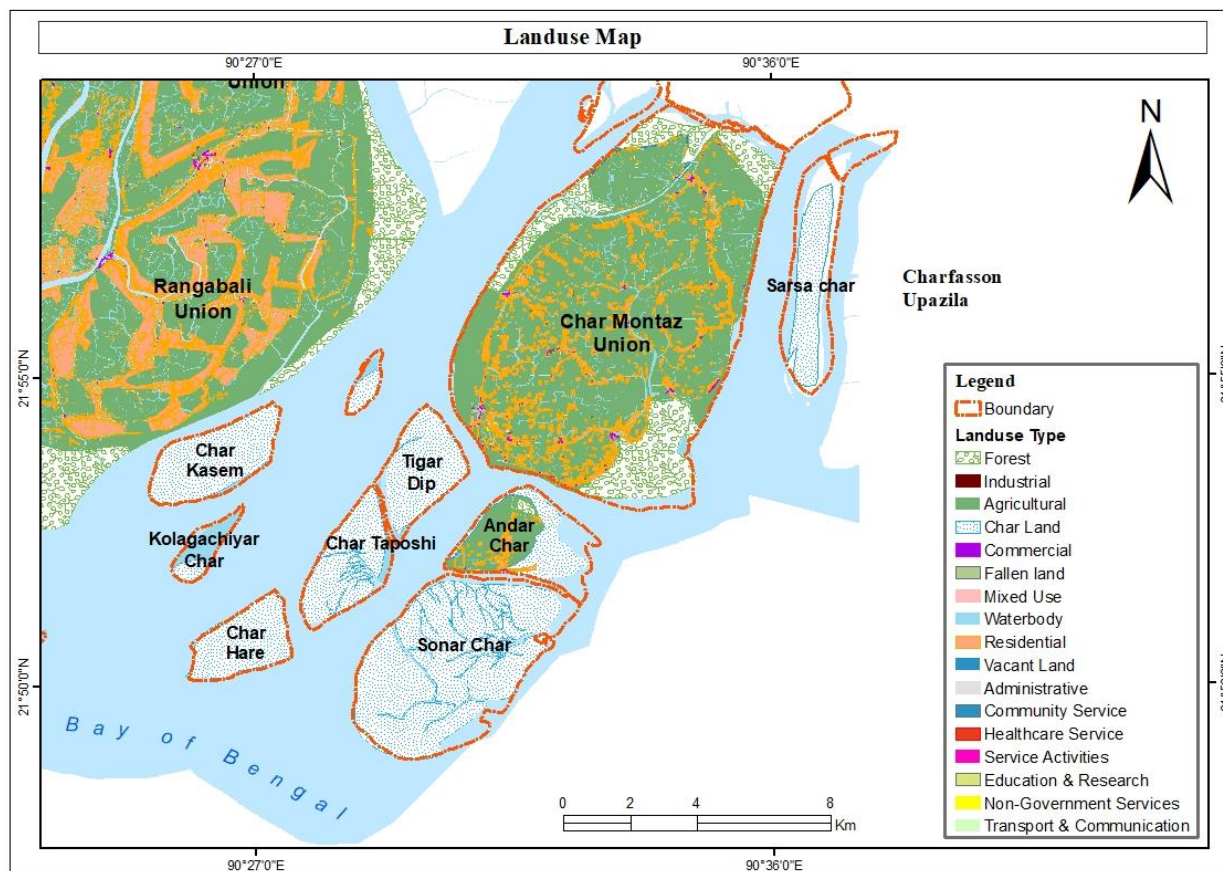


Figure 3: Existing Land use of Sonar Char and surrounding areas

Source: PKCP project, UDD, 2019

1.8 Ecology and Environment of Sonar Char

In Sonar Char, there is a forest beat office. The Sonar Char Wildlife Sanctuary has a low salinity. This Char has a lower saline content. The degree of saltiness fluctuates depending on whether it is wet or dry. In the north, the soils near Sonar Char are non-saline for most of the year, but become saline during the dry season. The north-east region of Char is prone to flooding during the rainy season. There are a lot of weeds in this area, and there are a lot of palm trees and bamboo chumps in the animal sanctuary. Wild geese, wild ducks, jungle fowls, cranes, and spines are among the bird species that call the area home. Plants naturally grow in this Char. The Patuakhali Forest Department planted kewra, Andari, khulsi, and koroi plants on up to 5.5 acres of land in 1975. As a result, Sonar Char has been transformed into a lovely forested land. Sonar char is home to a vast diversity of creatures, including foxes, bulls, boars, and monkeys. The forest service released a total of nine deer in sonar char in 1995. Tourists may find red crabs on the seashore to be an intriguing sight.

1.8.1 Flora and Fauna

Sonar Char is a significant place for Bangladesh's ecology and ecosystem. Sonar Char is home to a variety of wild animals, including deer, monkeys, and pigs, among others. Furthermore, 26,000

hectares of mangrove forest have been set aside. Sonar Char awoke in 2004, alongside the Char Montaz in the Bay of Bengal. The Patuakhali Coastal Forest Department subsequently reforested this char. Visitors see a variety of bird species. In addition to the 300 deer, the woodland is home to monkeys, wild buffaloes, pigs, and other wild creatures, according to estimates.

1.8.2 Weather and Climate of Sonar Char

The Paris Agreement of 2015 sets out a global framework to limit global warming to well below 2 °C, preferably to 1.5 °C (degrees Celsius), compared to pre-industrial levels. To achieve this global temperature goal, countries aim to reduce greenhouse gas emissions as soon as possible and achieve rapid reductions thereafter, based on the best available science and economic and social feasibility.

Mean yearly temperature, trend and anomaly, 1979–2022.

Sonār Char 21.83 N, 90.49 E.

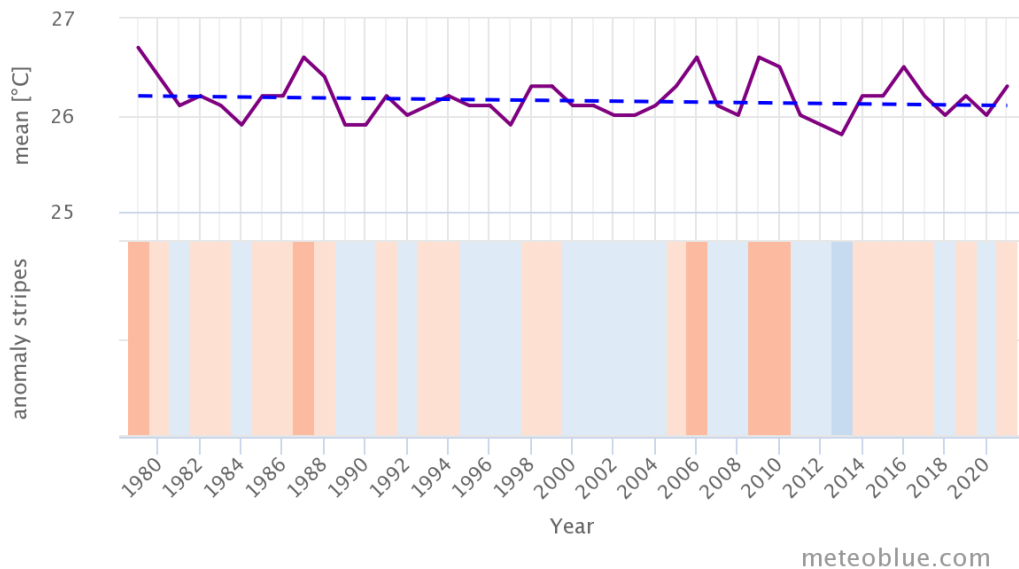


Figure 4: Temperature Trend Analysis of Sonar Char and Surrounding Area

(Source: Meteoblue, 2022)

Climate change is already causing rising air temperatures, melting glaciers and shrinking polar ice caps, rising sea levels, increased desertification, and more frequent extreme weather events such as heat waves, droughts, floods, and storms. Climate change is not globally uniform and affects some regions more than others. In the following diagrams, you can see how climate change has already affected the region of Sonar Char during the past 40 years. The data source used is ERA5, the fifth generation ECMWF atmospheric reanalysis of the global climate, covering the time range from 1979 to 2021, with a spatial resolution of 30 km. The data will not show conditions at an exact location. Micro-climates and local differences will not appear. Therefore, temperatures will often be higher than those displayed, especially in cities, and precipitation may vary locally, depending on topography.

The above graph shows an estimate of the mean annual temperature for the larger region of Sonar Char. The dashed blue line is the linear climate change trend. If the trend line is going up from left to right, the temperature trend is positive and it is getting warmer in Sonar Char due to climate change. If it is horizontal, no clear trend is seen, and if it is going down, conditions in Sonar Char are becoming colder over time. In the lower part of the graph, the so-called warming stripes appear. Each colored stripe represents the average temperature for a year-blue for colder and red for warmer years.

Mean yearly precipitation, trend and anomaly, 1979–2022.

Sonār Char 21.83 N, 90.49 E.

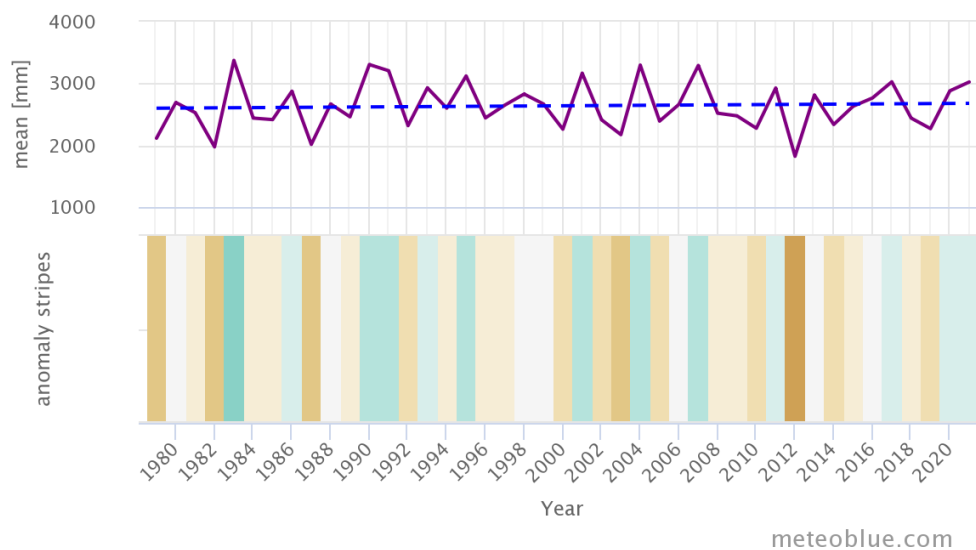


Figure 5: Precipitation Trend Analysis of Sonar Char and Surrounding Area

(Source: Meteoblue, 2022)

The top graph shows an estimate of mean total precipitation for the larger region of Sonar Char. The dashed blue line is the linear climate change trend. If the trend line is going up from left to right, the precipitation trend is positive and it is getting wetter in Sonar Char due to climate change. If it is horizontal, no clear trend is seen, and if it is going down, conditions are becoming drier in Sonar Char over time. In the lower part of the graph, the so-called precipitation stripes are shown. Each colored stripe represents the total precipitation of a year green for wetter and brown for drier years.

Monthly anomalies for temperature and precipitation 1979–2022.

Sonār Char 21.83 N, 90.49 E.

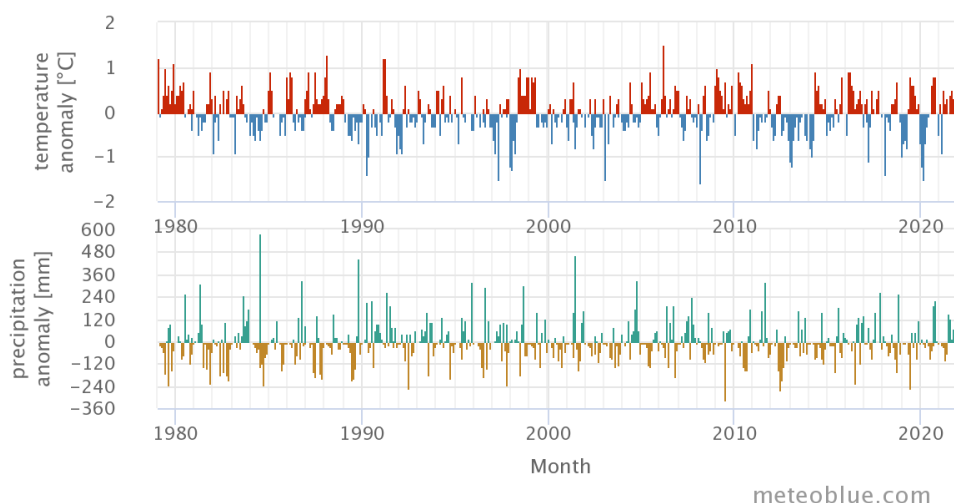


Figure 6: Monthly Precipitation and Temperature Trend Analysis of Sonar Char

(Source: Meteoblue, 2022)

The above graph shows the temperature anomaly for every month from 1979 up to now. The anomaly tells you by how much it was warmer or colder than the 30-year climate mean of 1980-2010. Thus, the red months were warmer and the blue months were colder than normal. In most locations, you will find an increase in warmer months over the years, which reflects the global warming associated with climate change. The lower graph shows the precipitation anomaly for every month from 1979 up to now. The anomaly tells you if a month had more or less precipitation than the 30-year climate mean of 1980-2010. Thus, green months were wetter and brown months were drier than normal.

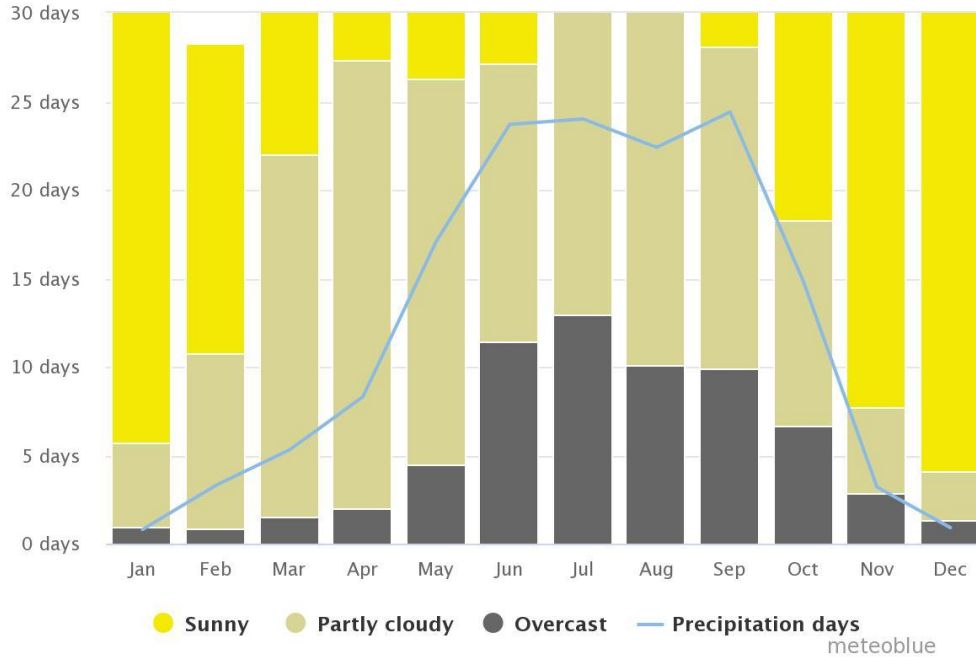


Figure 7: Cloudy and Sunny Days Sonar Char and Surrounding Areas

(Source: Meteoblue, 2022)

The ideal months to visit Sonar Char are November, December, January, and February. The weather becomes reasonably quiet throughout these months, and the days are longer than on other days of the year. The amount of precipitation is higher between April and October.

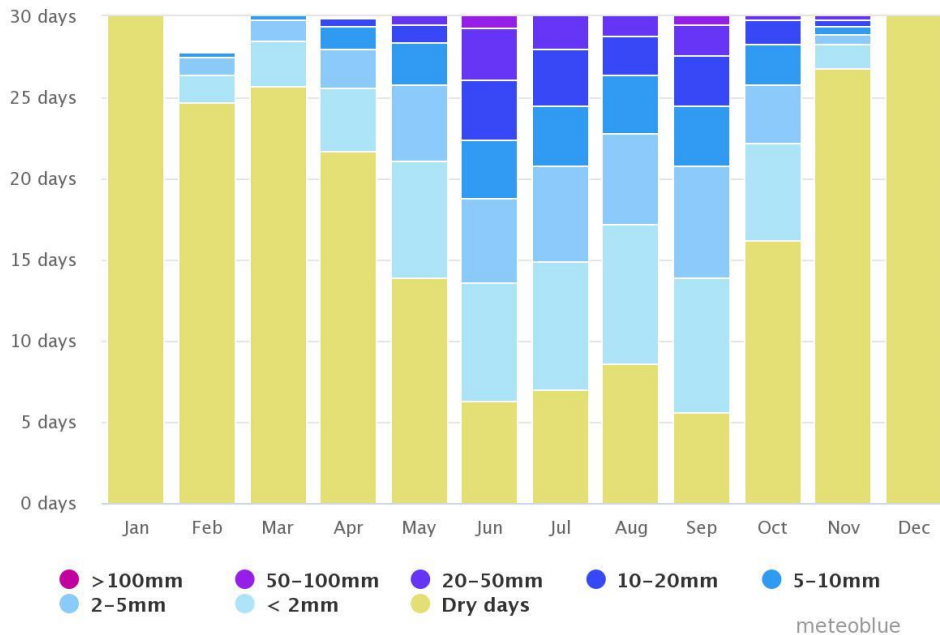


Figure 8: Amount of Precipitation in Months

(Source: Meteoblue, 2022)

The graph demonstrates that the weather becomes dry from November to March. These months are a better time to visit Sonar Char and the surrounding area.

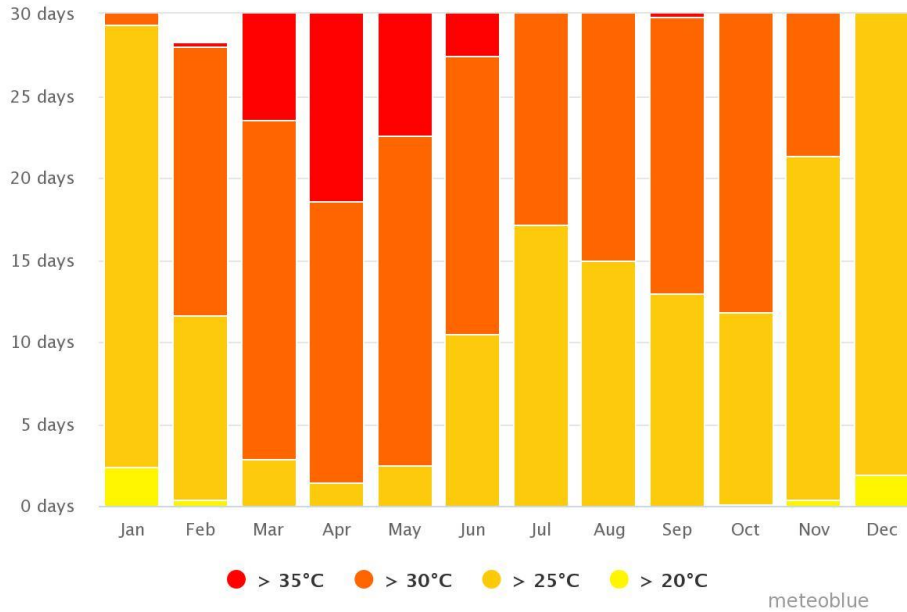


Figure 9: Temperature Variation in Sonar Char and Surrounding Areas

(Source: Meteoblue, 2022)

The months of November, December, and January are the coldest of the year. In the months of March, April, and May, the temperature is over 30 degrees.

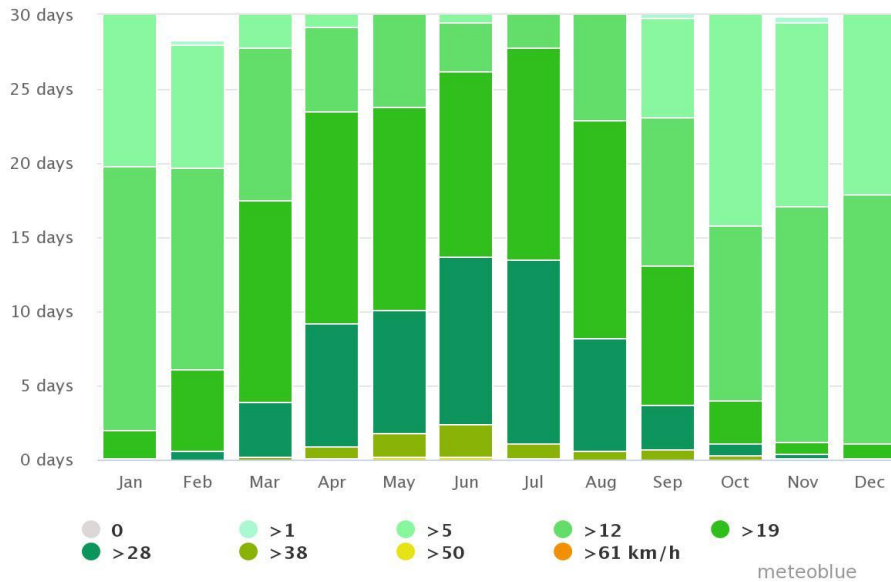


Figure 10: Wind Speed in the Months

(Source: Meteoblue, 2022)

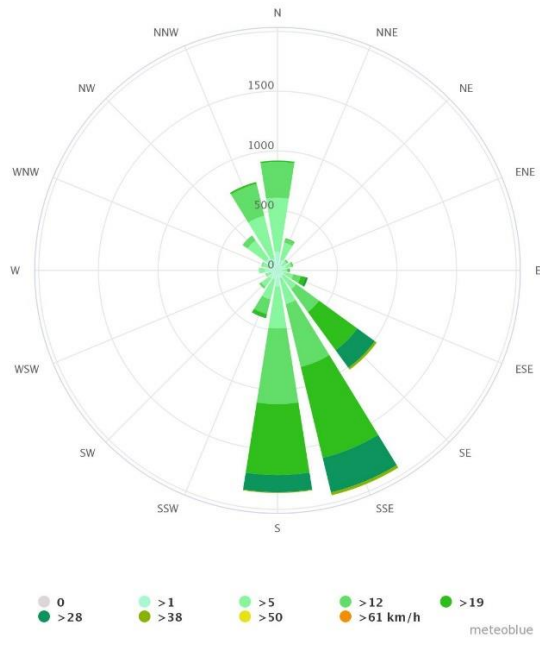


Figure 11: Wind Direction (Wind Rose Diagram) for Sonar Char and the Nearest Locations

(Source: Meteoblue, 2022)

The wind rose above shows that during this particular period a strong wind blew from the south-south-east, from the south and the southeast corner of the Sonar Char.

CHAPTER TWO

2.1 Suitable Site Ranking-Findings from Suitability Analysis

2.1.1 Ranking Suitable Areas based on Geological Attributes

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 has been considered as important dependent variable and to find out the relative weight of these variable AHP pairwise comparison has been applied. After getting the weighted value, the weighted sum model was applied to find the final suitability map (Figure 12)

Around 21.2 percent area found moderately suitable and 74.2 percent found less suitable as well as 4.6% area are not suitable. And it is found that char montaz and Andar Char are situated in less suitable area

Table 4: Area percentage of ranks

Ranks	Area in percentage
Moderately Suitable	21.2
Less Suitable	74.2%
Not Suitable	4.6%

Source: PKCP project, UDD, 2019

The study area of Sonar Char and the surrounding area are located in one Stable Continental Crust (SCC) section in Bangladesh. In Figure 12, Char Montaz and Andar Char are located in not suitable area in geological perspective.

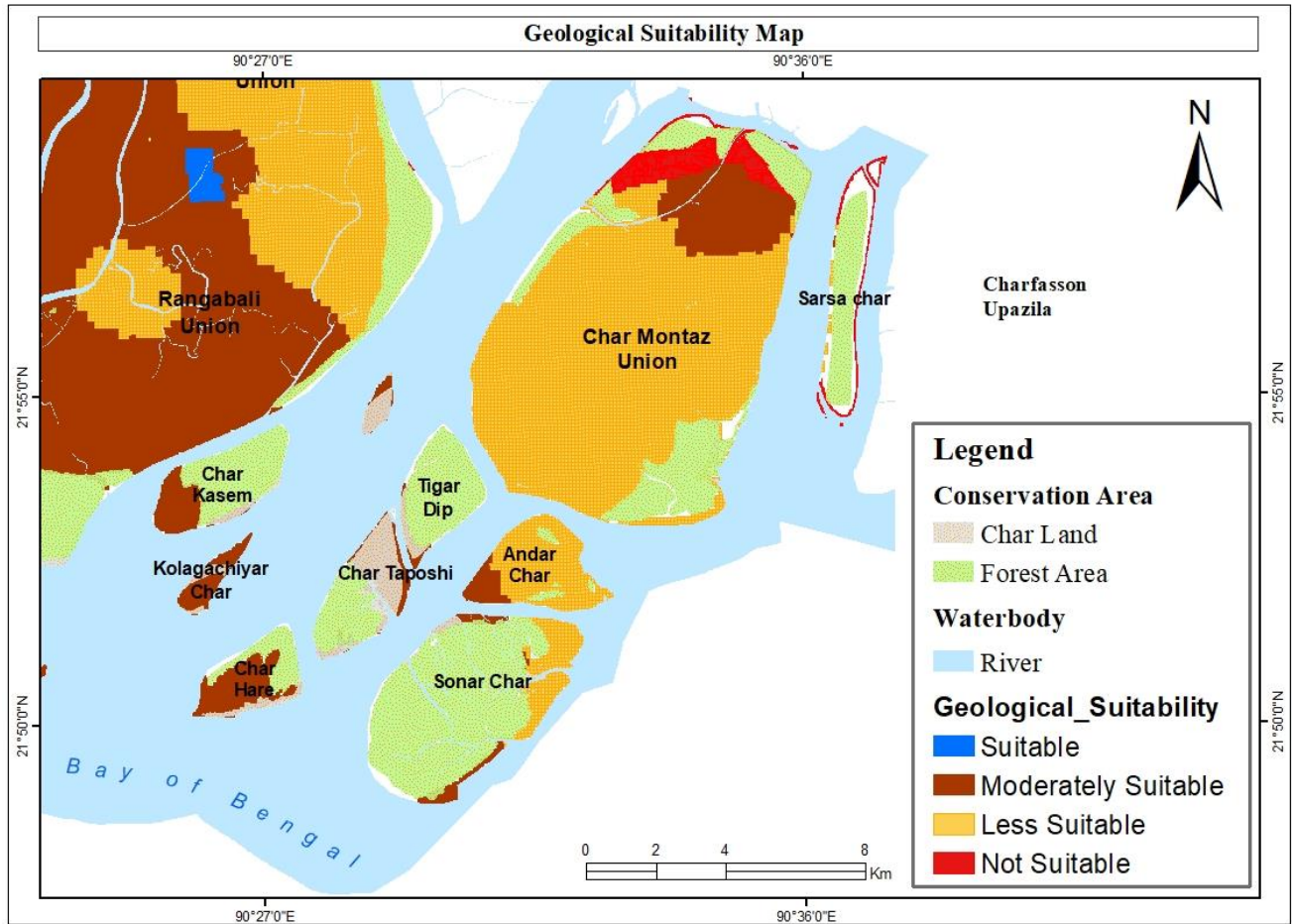


Figure 12: Geological Suitability Map of Sonar Char and Surrounding areas

Source: PKCP project, UDD, 2019

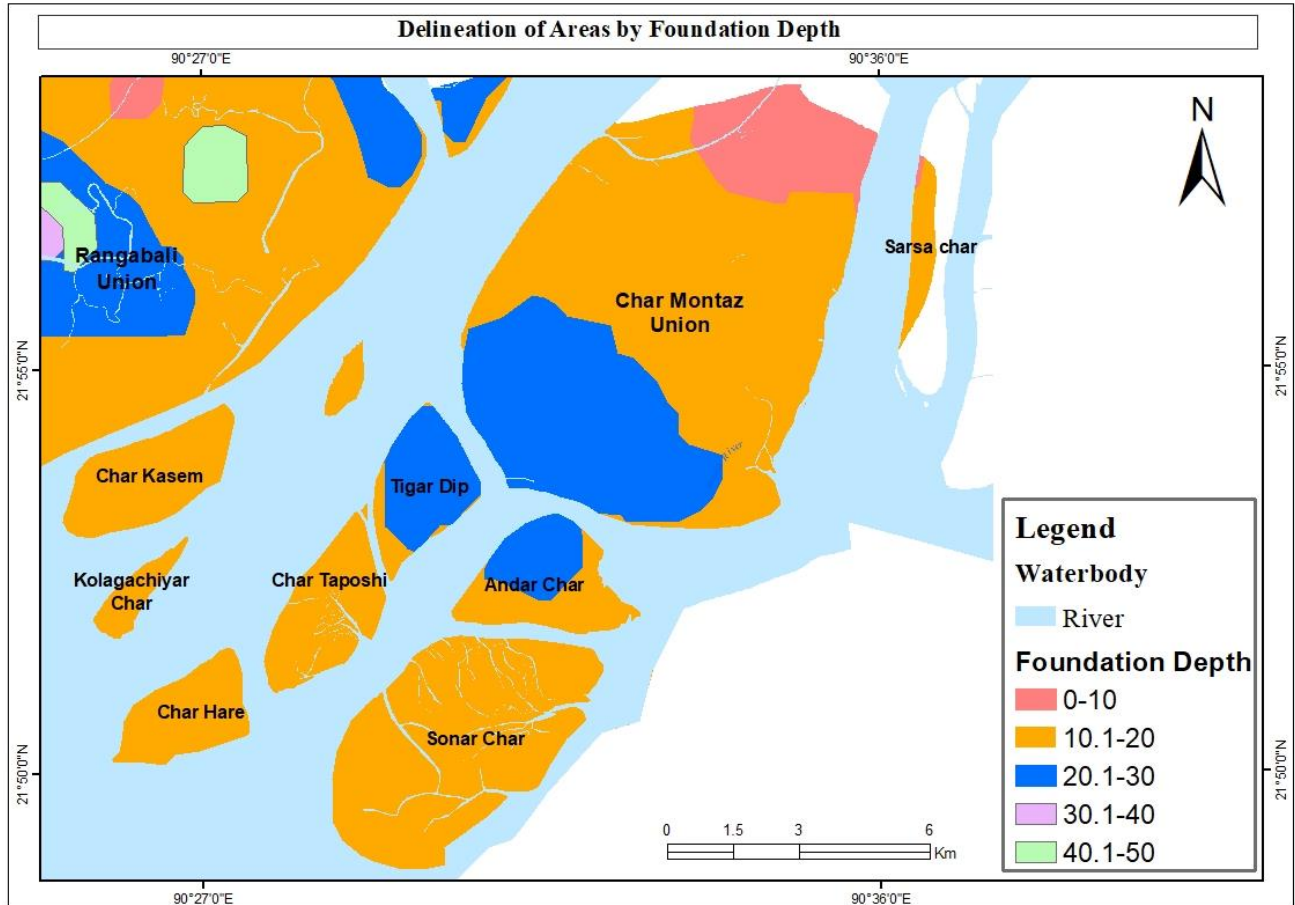


Figure 13: Foundation Depth of Sonar Char and Surrounding Area

Source: PKCP project, UDD, 2019

2.1.2 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. 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. It is found that the 95.4% percent of the area was found hydro-geologically moderately suitable, only 4.6 percent of the area was Not Suitable.

Table 5: Area percentage of ranks

Ranks	Area in percentage
Moderately Suitable	95.4%
Not Suitable	4.6%

Source: PKCP project, UDD, 2019

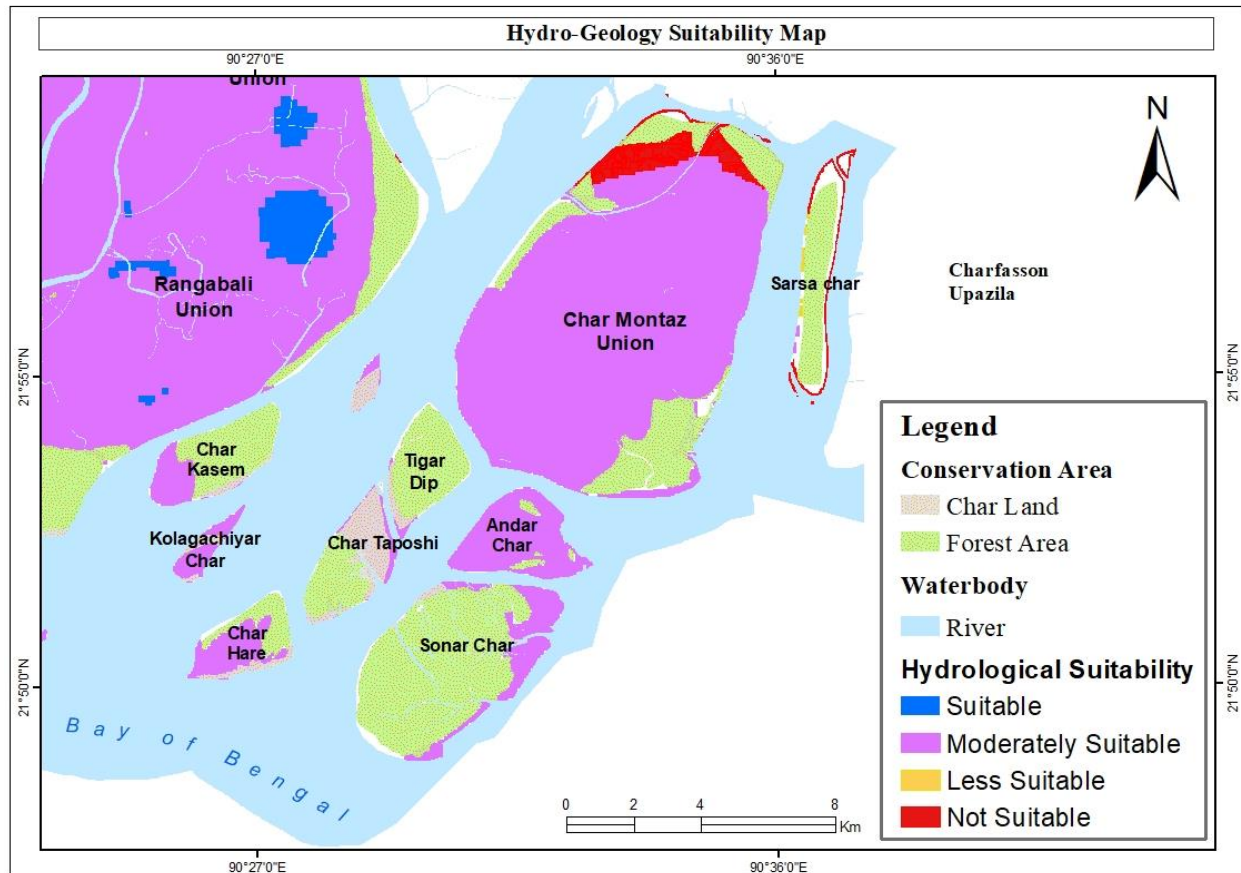


Figure 14: Ranking of suitable sites considering quality and quantity of ground water

Source: PKCP project, UDD, 2019

2.1.3 Disaster Risk of Sonar Char and Surrounding Area

People in the Sonar Char live in an extremely dynamic estuarine environment. A comprehensive disaster management program (CDMP) is being implemented. Lack of safe drinking water has been identified as the number one issue for coastal population. The coastal zone experiences extensive ecosystem degradation. The Bangladesh Bureau of Statistics generated this map in 2011 to show six natural disasters, including cyclones, floods, and drought. In this study, the number of human settlements in the studied area is considered. Andar Char and Sonar Char have a low disaster risk. The majority of Sonar char and Char Taposhi/Kolagasi is covered with forest.

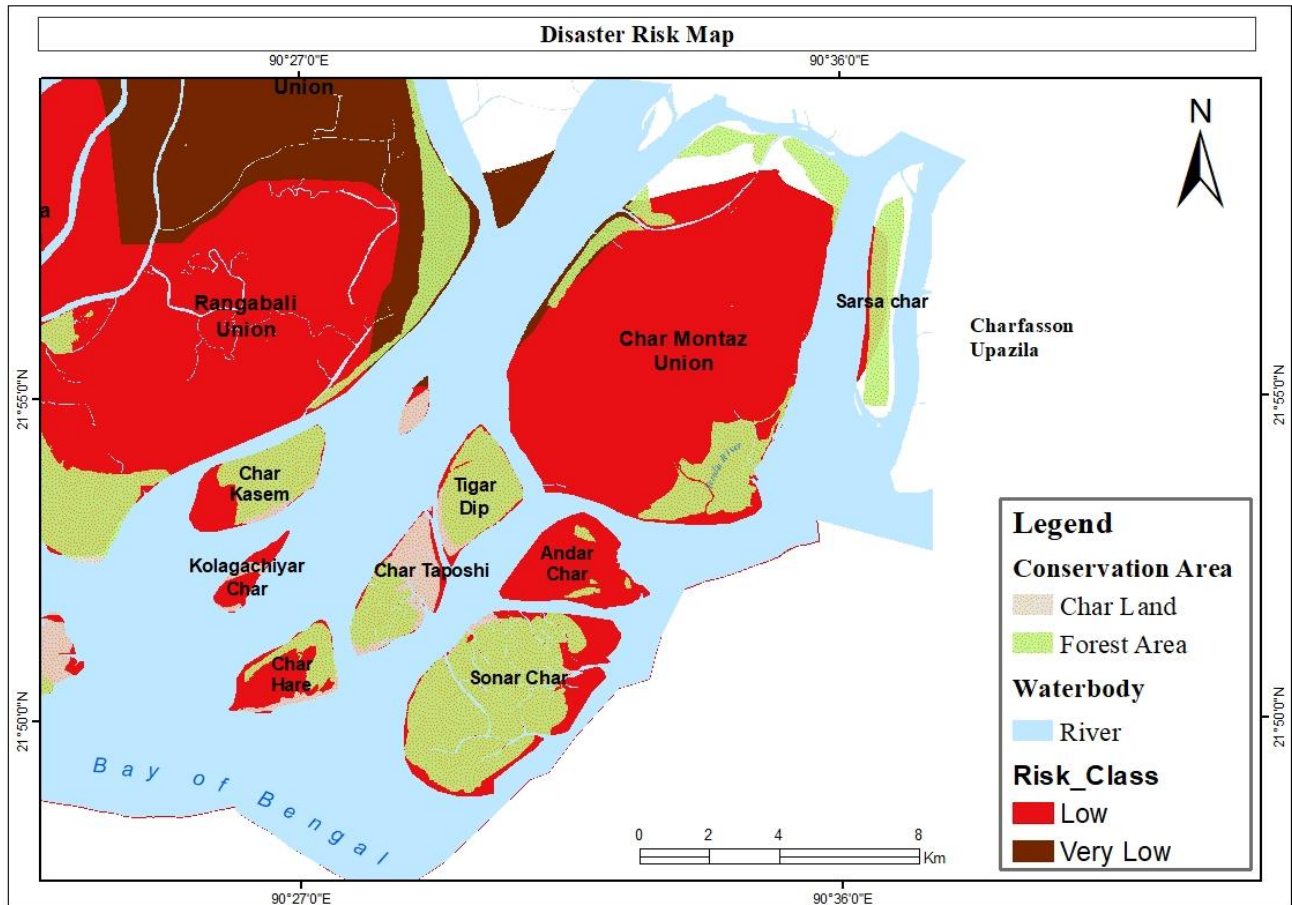


Figure 15: Disaster Vulnerability of Sonar Char and Surrounding Area

(Source: Disaster Atlas, BBS, 2018)

2.1.3 Earthquake Sensitivity Map

In Figure 15, Char Montaz and Andar Char are located in first degree sensitive low rise and first degree sensitive highrise buildings. Char Montaz and Andar Char are located in first degree for earthquake sensitivity.

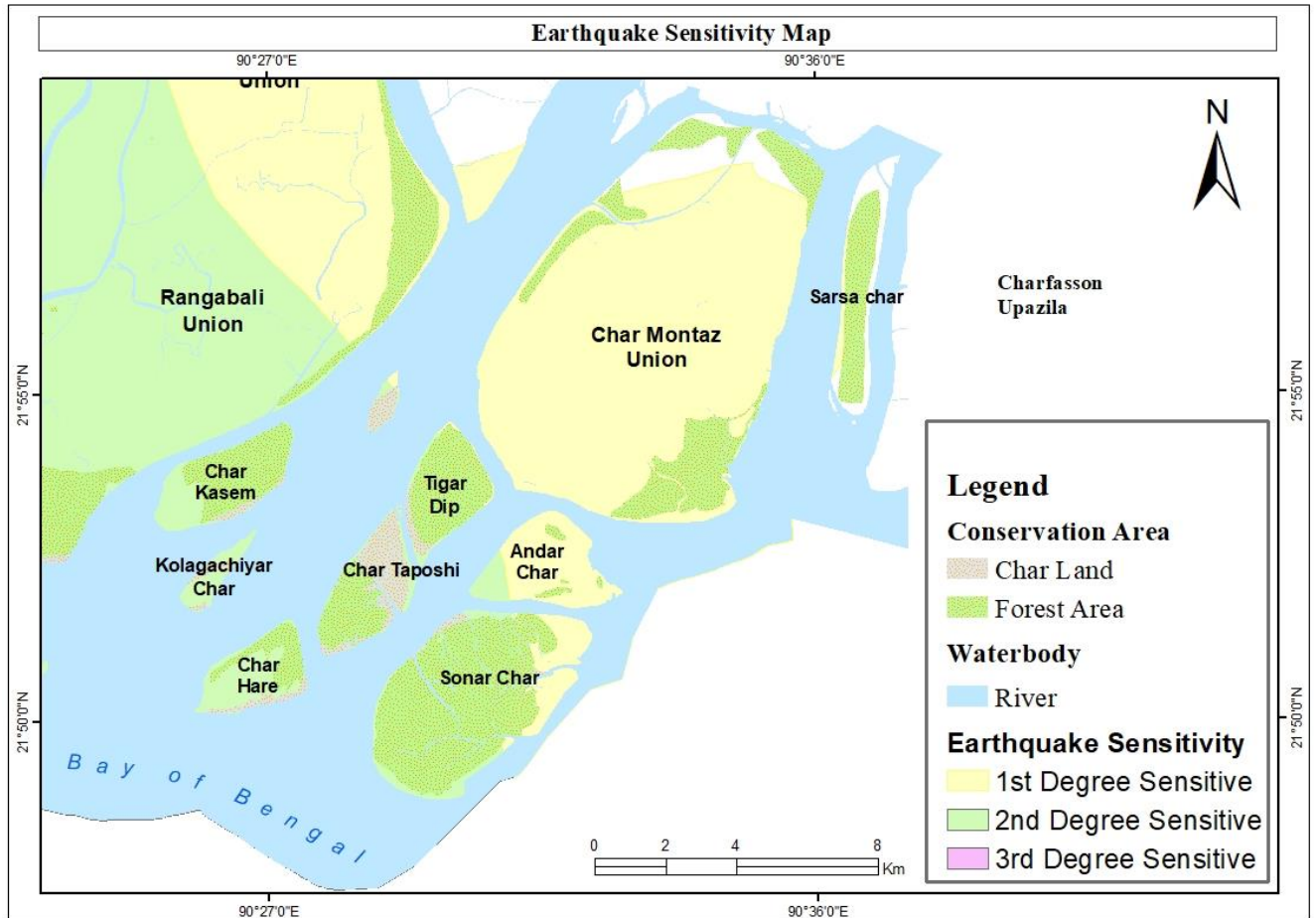


Figure 16: Earthquake Sensitivity Map of Sonar Char and Surrounding Area

Source: PKCP project, UDD, 2019

2.1.4 Structure Density Map

It is found that structures are found only char montaz area and some areas of sonar char area. Density of structures is very low in sonar char and surrounding area. Only minimum number of 13 to 17 structures is found in char montaz and andar char.

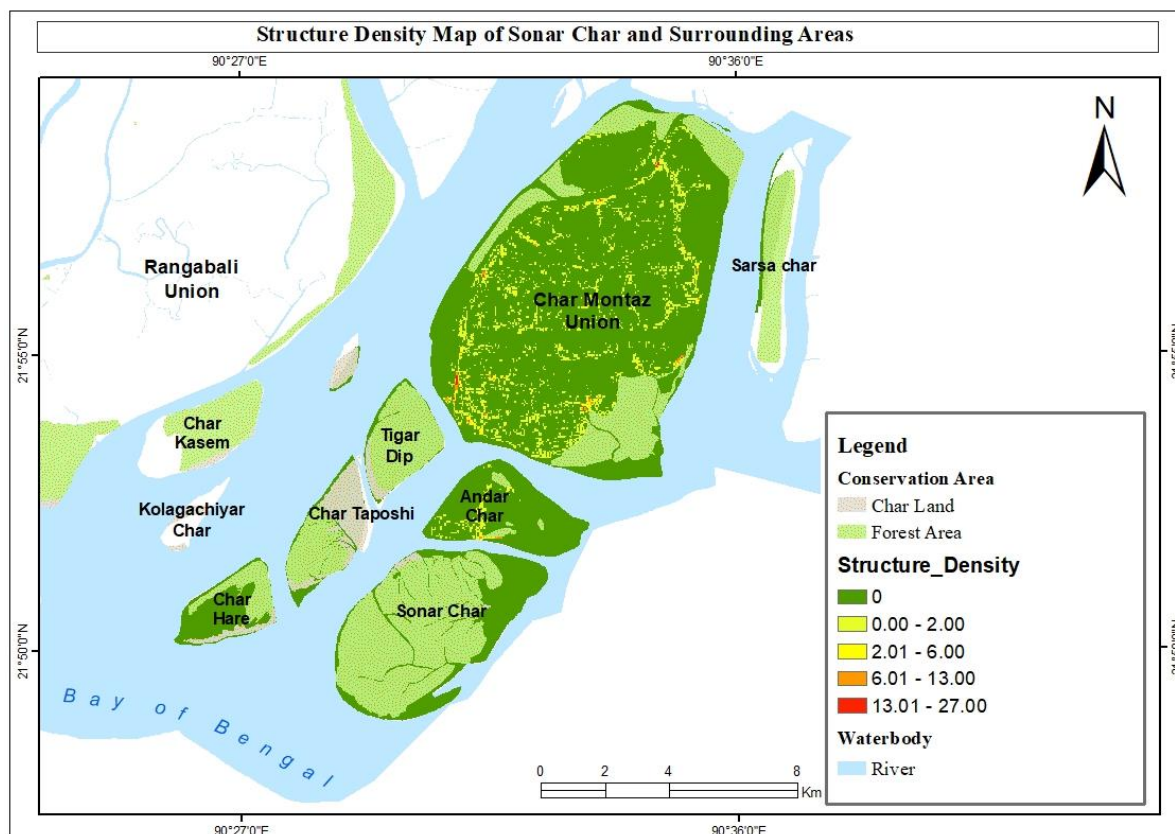


Figure 17: Structure Density Map of Sonar Char and Surrounding Area

Source: PKCP project, UDD, 2019

2.2 Suitable site ranking- findings from multi-criteria analysis

2.2.1 Ranking Suitable Areas for Infrastructure Development

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. To rank suitable sites for infrastructure development geological attributors of the upazila, disaster risk, and elevation and building height zones has been considered. Due to up gradation of construction technology it is possible to reach foundation depth 25 to more than 30 m. side by side the Upazila’s soil condition is suitable for low-rise building construction.

Table 6: Area Percentage of Ranks

Ranks	Area (acre)	Area (%)
Suitable	591.0514	1.87
Moderately Suitable	1681.083	5.31
Less suitable	1250.872	3.95

Least Suitable	28137.49	88.87
	31660.5	100

Source: PKCP project, UDD, 2019

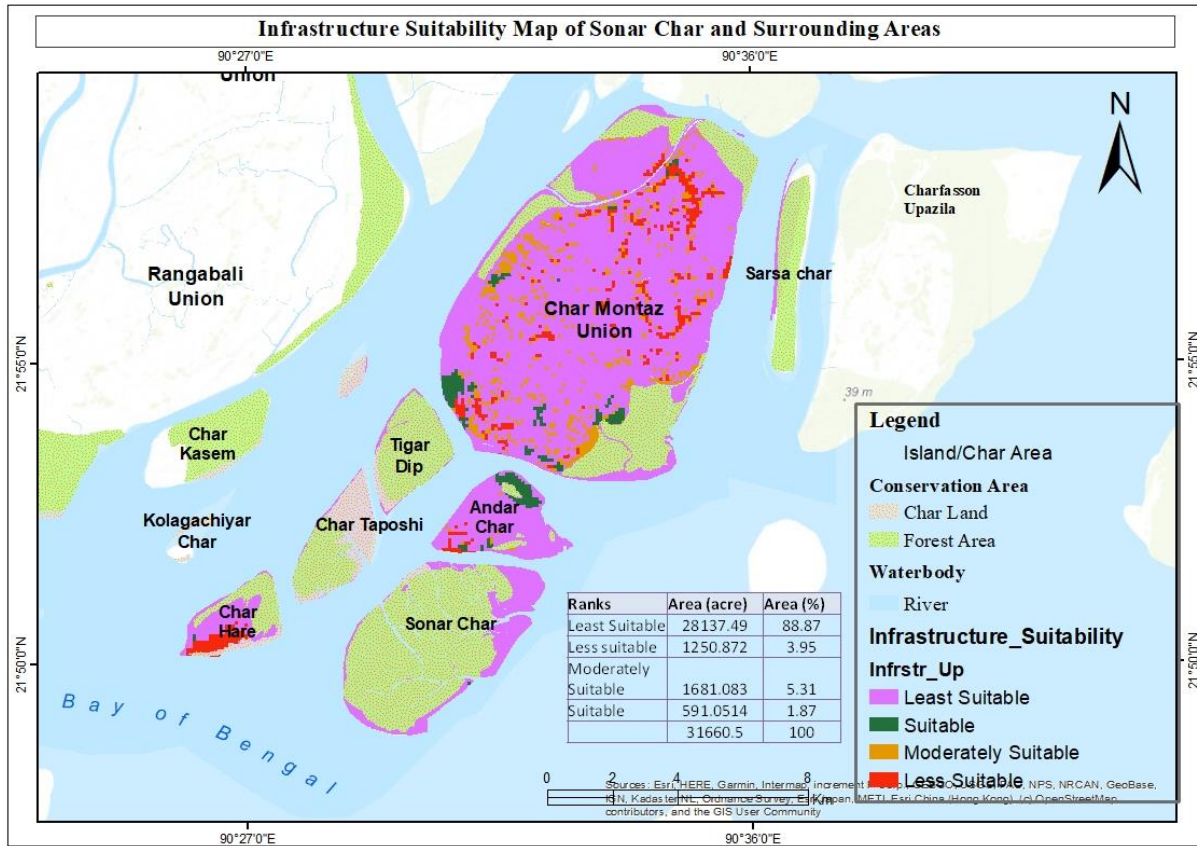


Figure 18: Infrastructure Suitability Map of Sonar Char and Surrounding Areas

Source: PKCP project, UDD, 2019

2.2.2 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. Sonar char and its surrounding areas 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 (Figure 7)

Table 7: Area Percentage of Ranks

Ranks	Area (acre)	Area (%)
Highly Suitable	591.0514	1.866841
Moderately Suitable	1681.083	5.309716
Less Suitable	5440.198	17.18292
Least Suitable	23948.17	75.64052
	31660.5	100

Source: PKCP project, UDD, 2019

About 75.64% area is least suitable area which is the majority portion of sonar char and surrounding areas as well as 17.18% area is less suitable and only 1.8% area is highly suitable area for human settlement

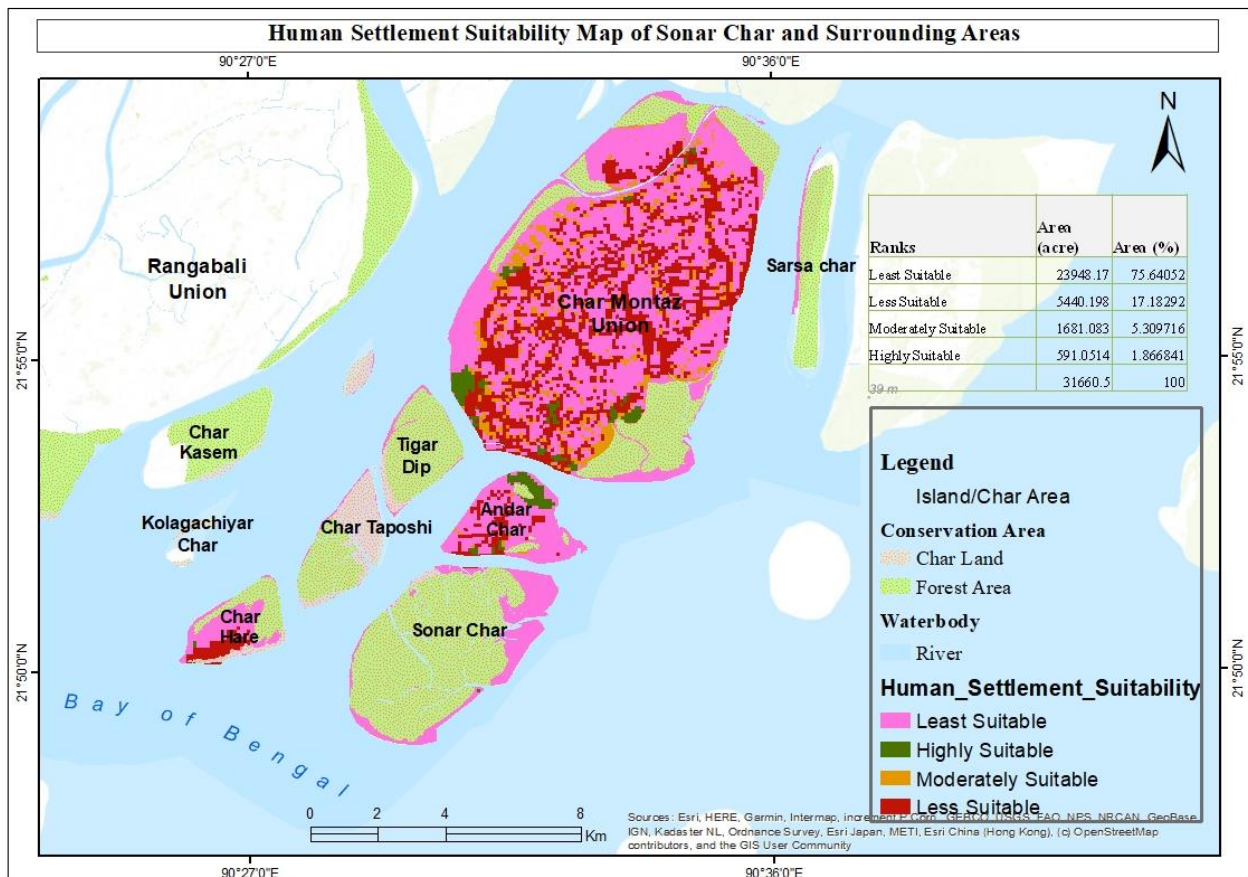


Figure 19: Human Settlement Suitability Map of Sonar Char and Surrounding Areas

Source: PKCP project, UDD, 2019

1.7.2 Development potentiality Map

Development potentiality has calculated by weighted overlay index tool in Arc GIS. Structure density, settlement suitability, Infrastructure suitability, Geological Suitability, Economic Region, Hydrological, Road Proximity, Water Quality, Rangabali Physical Feature parameters are selected to calculate development potential sites of sonar char and surrounding areas. In below table, all criteria and weightage has been given:

Table 8: Parameter and weightage of Development potentiality

Parameter		Data Requirement	Discussion	Category	Numeric Value	Normalized/Scale Value (1-9)	Weight (in 100)
1	Geological Suitability	Geological suitability data from a separate analysis from Regional Plan	A Geological suitability map will be produced showing which areas are geologically more suitable.	Not Suitable	1	1	10
				Less Suitable	2	3	
				Moderately Suitable	3	5	
				Suitable	4	7	
				Highly Suitable	5	9	
2	Hydro-Geological Suitability	Hydro-Geological Suitability data from a separate analysis from Regional Plan	A Hydro-Geological Suitability map will be produced showing which areas are hydro-geologically more suitable.	Not Suitable	1	1	10
				Less Suitable	2	5	
				Moderately Suitable	3	7	
				Suitable	4	9	
3	Infrastructure Development Suitability	Roads, Electricity availability data, Drinking water source, Hotels, Tour operator's information	Infrastructure Accessibility will indicate the areas with different infrastructure accessibility level.	Not Suitable	1	1	10
				Less Suitable	2	3	
				Moderately Suitable	3	5	
				Suitable	4	7	
				Highly Suitable	5	9	
4	Human Settlement	Human Settlement	A Human Settlement	Not Suitable	1	1	10
				Less	2	3	

Parameter		Data Requirement	Discussion	Category	Numeric Value	Normalized/Scale Value (1-9)	Weight (in 100)
	Suitability	t Suitability data from a separate analysis from Regional Plan	Suitability map will be produced showing which areas are more suitable for human Settlement.	Suitable			
				Moderately Suitable	3	5	
				Suitable	4	7	
				Highly Suitable	5	9	
5	Economic Region Suitability	Economic Region Suitability data from a separate analysis from Regional Plan	A Economic Region Suitability map will be produced showing which areas are more suitable for economic development.	Not Suitable	1	1	10
				Less Suitable	2	3	
				Moderately Suitable	3	5	
				Suitable	4	7	
				Highly Suitable	5	9	
6	Agricultural Suitability	Agricultural Suitability data from a separate analysis from Regional Plan	A Agricultural Suitability map will be produced showing which areas are more suitable for agricultural production.	Not Suitable	1	9	10
				Less Suitable	2	7	
				Moderately Suitable	3	5	
				Suitable	4	3	
				Highly Suitable	5	1	
7	Erosion & Deposition	Erosion & Deposition data	A map will be produced showing which areas more erosion prone or contained with relatively new deposited soil.	Newly Deposited Soil	1	1	10
				Relatively Matured Soil	2	9	
8	Land Form	Satellite imagery analysis data of	A Land Form Stability map will be produced	Most Stable	4	9	10
				Highly Stable	3	7	

Parameter		Data Requirement	Discussion	Category	Numeric Value	Normalized/Scale Value (1-9)	Weight (in 100)
		land stability Types	showing which areas are more stable in context of geographical formation. Typologies of tourism site will be useful to define the type of treatment required for the respective type of site to be developed.	Moderately Stable	2	5	
				Less Stable	1	1	
9	Disaster Risk	Disaster risk data from Regional Plan Analysis	A disaster risk map will be produced showing areas with different disaster risk level.	Highest Risk	1	1	10
				High Risk	2	3	
				Moderate Risk	3	5	
				Low Risk	4	7	
				Lowest Risk	5	9	
10	Structure Density	Structure Density layer from Structure Plan Analysis	Structural density of different land parcel will be shown in this map.	0 - 25.67	1	1	10
				25.68 - 83.43	2	3	
				83.44 - 164.72	3	5	
				164.73 - 308.04	4	7	
				308.05 - 545.5	5	9	

Source: PKCP project, UDD, 2019

Table 9: Area Percentage of Ranks

Ranks	Area (acre)	Area (%)
Suitable	3249.82	6.26
Moderately Suitable	13940.13	26.84
Less Suitable	16028.69	30.87
Not Suitable	18710.59	36.03
	51929.23	100.00

Source: PKCP project, UDD, 2019

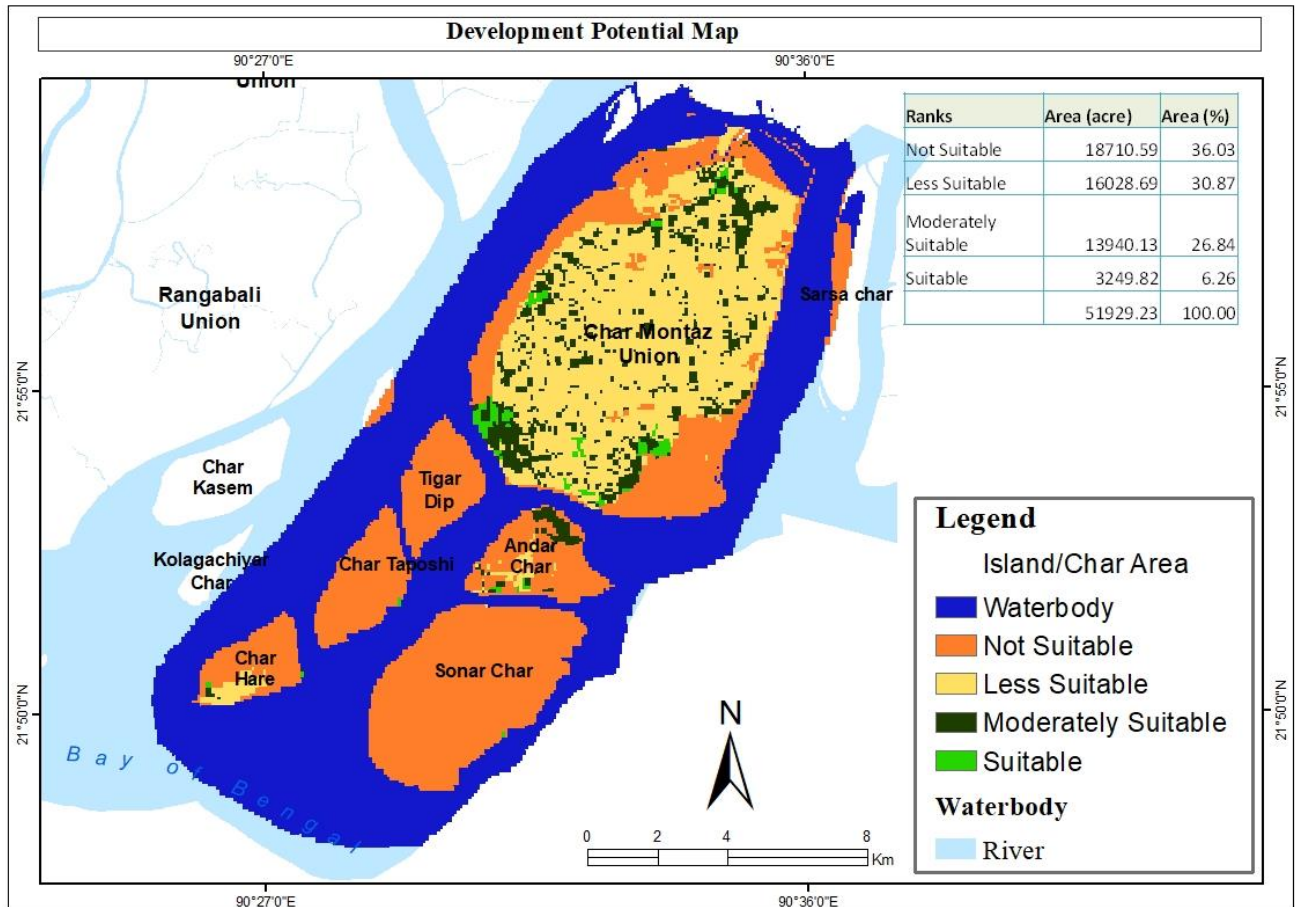


Figure 20: Development Suitability Map of Sonar Char and Surrounding Areas

Source: PKCP project, UDD, 2019

1.7.3 Tourism Suitability Map of Sonar Char and Surrounding Area

Some parameters are selected to calculate tourism suitable area in sonar char and surrounding areas. Geology, Hydrology, Bay of Bengal, Tourist Spot, Bazar Point, Structure Density, DEM, Storm Tract, Landuse, human settlement, Infrastructure settlement, Disaster are considered

Table 10: Parameter and weightage of Tourism potentiality

Parameter	Data Requirement	Discussion	Category	Numeric Value	Normalized/Scale Value (1-9)	Weight (in 100)	
1	Geological Suitability	Geological suitability data from a separate analysis from Regional Plan	A Geological suitability map will be produced showing which areas are geologically more suitable.	Not Suitable	1	5	
				Less Suitable	2		5
2	Hydro-Geological Suitability	Hydro-Geological Suitability data from a separate analysis from Regional Plan	A Hydro-Geological Suitability map will be produced showing which areas are hydro-geologically more suitable.	Not Suitable	1	3	
				Less Suitable	2		3
				Moderately Suitable	3		5
3	Infrastructure Suitability	Roads, Electricity availability data, Drinking water source, Hotels, Tour operator's information	Infrastructure Accessibility will indicate the areas with different infrastructure accessibility level.	Less Suitable	2	3	
				Moderately Suitable	3		5
				Suitable	4		3
				Highly Suitable	5		9
4	Human Settlement Suitability	Human Settlement Suitability data from a separate analysis from Regional Plan	A Human Settlement Suitability map will be produced showing which areas are more suitable for human Settlement.	Less Suitable	2	10	
				Moderately Suitable	3		5
				Suitable	4		3
				Highly Suitable	5		9
5	Bay of Bengal	Easy access to bay of Bengal	The Bay of Bengal is the northeastern part of the Indian Ocean, bounded on the west and northwest by	Not Suitable	1	10	
				Less Suitable	2		3
				Moderately Suitable	3		5

Parameter	Data Requirement	Discussion	Category	Numeric Value	Normalized/Scale Value (1-9)	Weight (in 100)	
		India, on the north by Bangladesh, and on the east by Myanmar and the Andaman and Nicobar Islands of India.	ely Suitable				
			Suitable	4	7		
			Highly Suitable	5	9		
6	Tourist Spot	Agricultural Suitability data from a separate analysis from Regional Plan	A Agricultural Suitability map will be produced showing which areas are more suitable for agricultural production.	Not Suitable	1	9	22
				Less Suitable	2	7	
				Moderately Suitable	3	5	
				Suitable	4	3	
				Highly Suitable	5	1	
7	Bazar Point	Erosion & Deposition data	A map will be produced showing which areas more erosion prone or contained with relatively new deposited soil.	Newly Deposited Soil	1	1	4
				Relatively Matured Soil	2	9	
8	Storm Tract	Satellite imagery analysis data of land stability Types	A Land Form Stability map will be produced showing which areas are more stable in context of geographical formation. Typologies of tourism site will be useful to define the type of treatment required for the respective type of site to be developed.	Most Stable	4	9	10
				Highly Stable	3	7	
				Moderately Stable	2	5	
				Less Stable	1	1	
9	DEM	Disaster risk data from Regional Plan Analysis	A disaster risk map will be produced showing areas with different disaster risk level.	Highest Risk	1	1	5
				High Risk	2	3	
				Moderate	3	5	

Parameter		Data Requirement	Discussion	Category	Numeric Value	Normalized/Scale Value (1-9)	Weight (in 100)
				e Risk			
				Low Risk	4	7	
				Lowest Risk	5	9	
10	Structure Density	Structure Density layer from Structure Plan Analysis	Structural density of different land parcel will be shown in this map.	0 - 25.67	1	1	5
				25.68 - 83.43	2	3	
				83.44 - 164.72	3	5	
				164.73 - 308.04	4	7	
				308.05 - 545.5	5	9	

Source: PKCP project, UDD, 2019

From table 11 it is found that 48.04% area are less suitable area according to tourism potentiality. Only 1.5% area is suitable for tourism and all proposals are given based on suitable site.

Table 11: Area Percentage of Ranks

Ranks	Area (acre)	Area (%)
Suitable	464.56	1.532192
Moderately Suitable	2784.88	9.185004
Less Suitable	14566.86	48.04401
Not suitable	12503.53	41.23879
	30319.83	100

Source: PKCP project, UDD, 2019

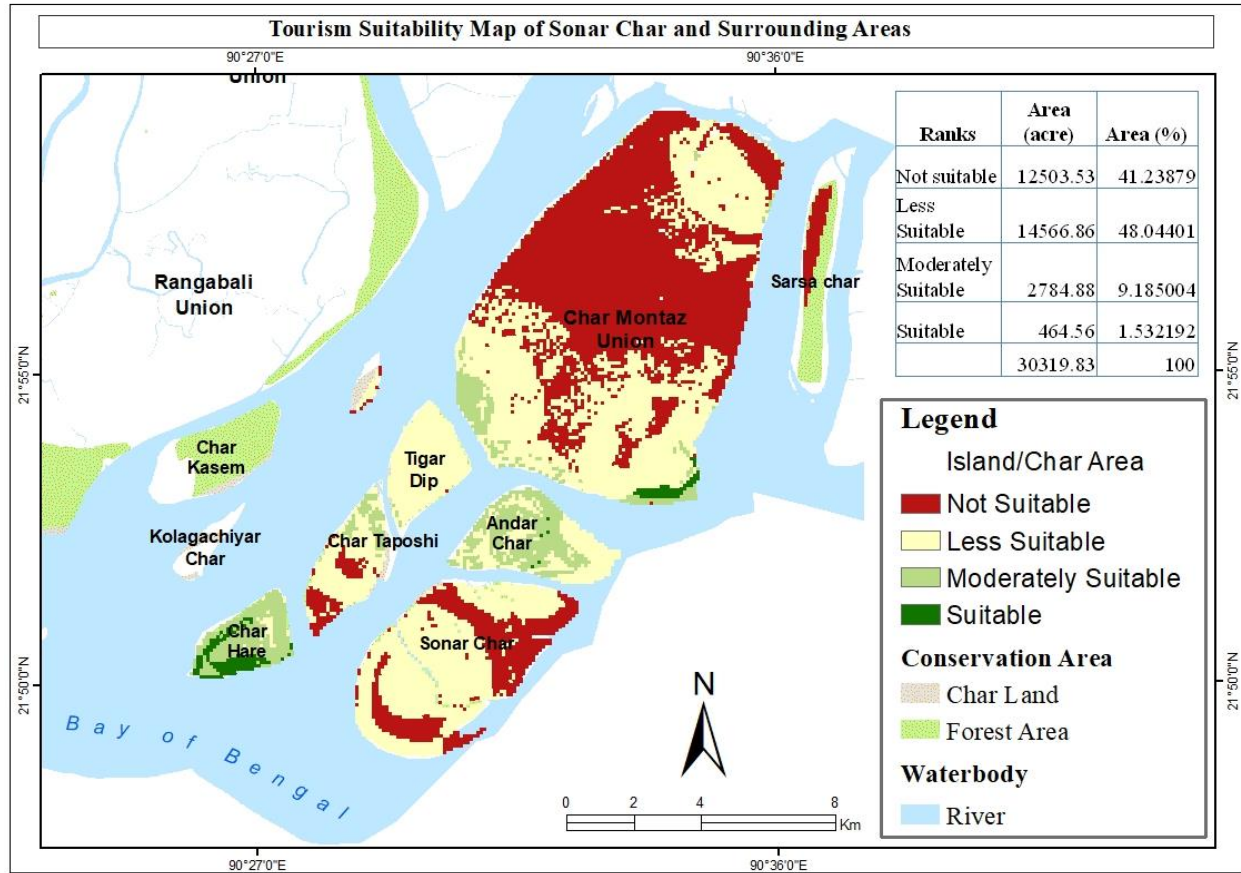


Figure 21: Tourism Suitability Map of Sonar Char and Surrounding Areas

Source: PKCP project, UDD, 2019

CHAPTER THREE

3.1 Understanding Tourism and Eco-tourism Facilities

Tourism has grown from the pursuits of a privileged few to a mass movement of people with the urge to discover the unknown environment, to undergo new experiences, and the desire to be both educated and entertained. Tourism is now a rapidly emerging and rapidly growing industry in both the global and rural economies, particularly in developing countries. The importance of tourism as an instrument of economic development and employment generation is recognized all over the world. Data from various global organizations, including the World Tourism Organization (WNTTO), show that tourism contributes significantly to a country's GDP and foreign exchange reserves. Bangladesh is a land of scenic beauty with verdant forests, reverie countryside and long structures of sun-bathed beaches, fearsome wilds, meandering rivers and venerable shrines, which hold high potential for tourism. This country needs a proper strategy and policy to attract both foreign and domestic tourists. Governments as well as private sectors may come forward to create the basis of the tourism industry. From the wide variety of tourism, we need to understand the tourism opportunities for our project.

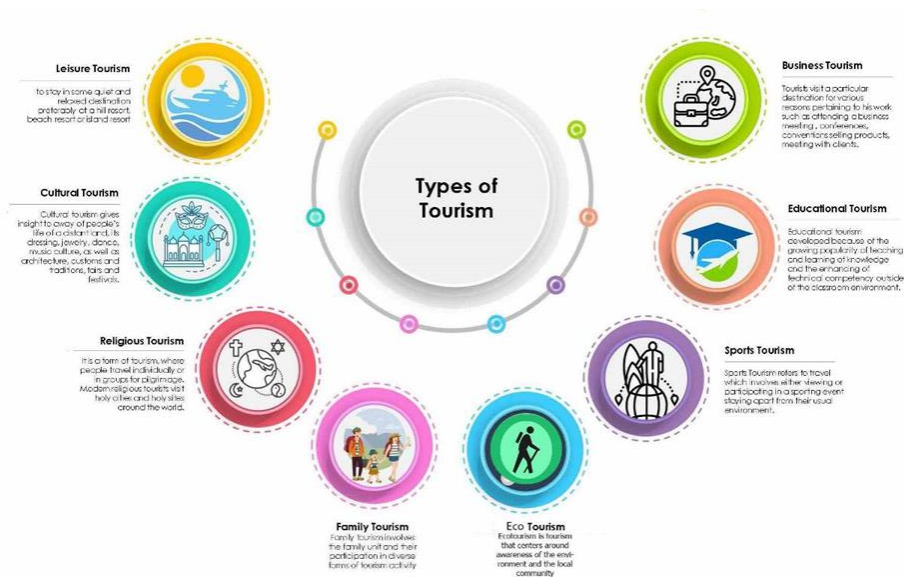


Figure 22: Types of Tourism

The project has an opportunity to explore leisure tourism, cultural tourism, family tourism, ecotourism, sports tourism, and educational tourism. The port area has a small possibility of business tourism. A survey may be needed to explore religious tourism.

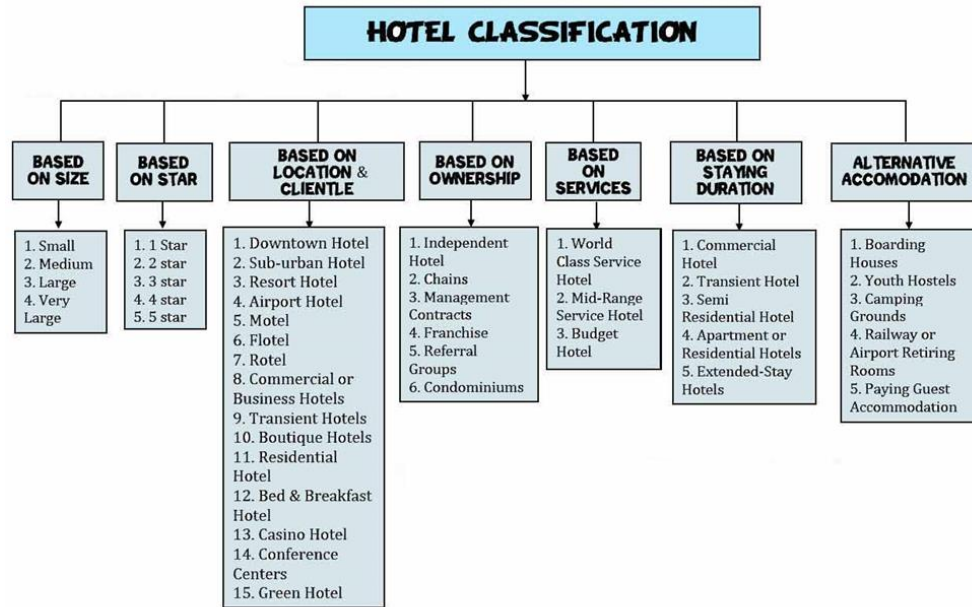


Figure 23: General Classification of Hotel

From the variety of hotel types, motels, resorts, and restaurants will have the opportunity to open or expand in the proposed area. These hotels and restaurants will serve both domestic and international tourists in the future. A good business model and research must be accommodated in Sonar Char.

3.2 Understanding of Eco-tourism and Community

Eco-tourism has become very important to our society, since it deals with the preservation of natural areas and the wellbeing of the local people and their communities. Issues arise when there is not an adequate understanding and interconnectedness between tourists, communities, and our environment.

This conflict has been present for years, and there is a need to inform the world about this crisis because of the destruction of our surroundings. Our future depends on saving our planet. Currently, people are focused on their own daily routines, not considering that ahead of us there is an issue that has been following us for such a long time, and there has been so little done to resolve it.

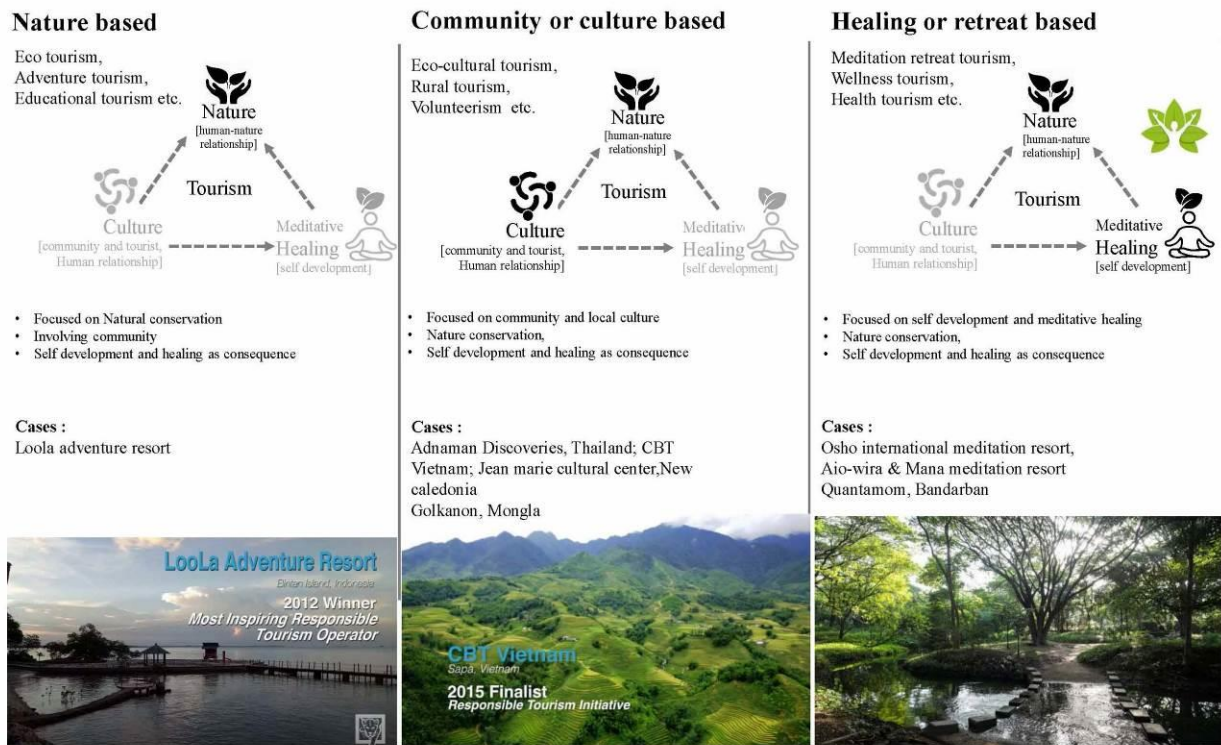


Figure 24: Relationship of Eco-tourism and Community

Eco-tourism is about caring for nature, trying to conserve our environment, with as minimal impact on our surroundings as possible. Again, sustainable architecture tries to minimize the negative environmental impact on the environment of buildings by enhancing efficiency and careful use of materials, energy, and space efficiency. In many cases, however, we, as designers, are not aware of "sustainable" architecture and its real meaning. With new discoveries and technologies, we have forgotten how to build with the environment. Therefore, the main challenge for us as designers is to find solutions that do not disturb the environment.

The proposal for designing a sustainable tourism model and/or an eco-lodge near an eco-tourist location should be connected to the community and nature. That will accommodate not only tourists coming to visit the area but also local people who are going to interact with the tourists in a social and cultural aspect. A sustainable model will be introduced, while at the same time giving these local people employment opportunities, improving their quality of life while still preserving their culture. Architects, designers, and planners have some social responsibility along with ecological design.

Successful characteristics of ecotourism include:

- Minimizing the negative impacts on nature and culture that can damage a destination.
- Educating the traveler on the importance of conservation.
- Stressing the importance of responsible business and working in cooperation with local authorities and people to meet local needs and deliver conservation benefits.
- Directing revenues to the conservation and management of natural and protected areas and biological diversity.
- Emphasizing the need for both regional tourism zonings and visitor management plans designed for either regions or natural areas that are slated to become eco-destinations.
- Emphasizes the use of environmental and social baseline studies as well as long-term monitoring programs to assess and minimize impacts.
- Maximizing economic benefit for the host country, local businesses and communities, particularly those living in and adjacent to natural and protected areas.
- Supporting the economic empowerment of communities through training and hiring local people, paying fair wages and benefits, buying supplies locally, and supporting local ownership or joint ventures with outside business or NGO partners of tourist families and concessions.
- Ensuring that tourism development does not exceed the social and environmental limits of acceptable change as determined by researchers in cooperation with local residents.
- Relying on infrastructure that has been developed in harmony with the environment: minimizing use of fossil fuels, conserving local plants and wildlife, and blending with the natural and cultural environment.

3.3 Architectural Indicators for Eco-Tourism

The following issues should be addressed well when designing the architectural conceptual model:

The Design: An efficient plan is a simple and effective method of limiting the environmental "footprint" of the building. He should be sensible to the local site context and ecology.

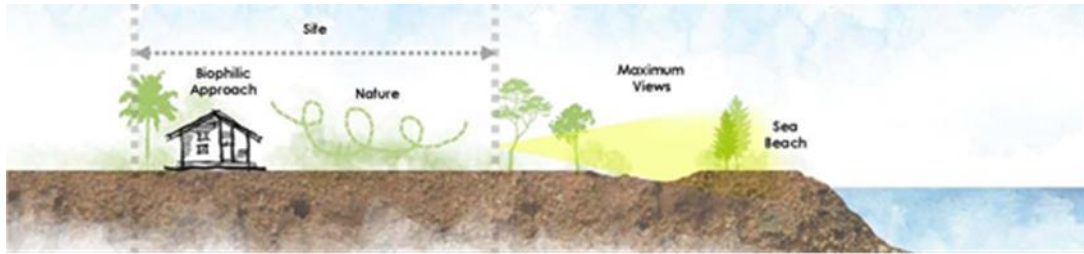


Figure 25: Efficient Planning with Nature and Sea

A conceptual design may be awarded after vigorous study of the site, community, climate, and context.

Structure and Materials: Sustainable structures and materials should be selected where building materials will be lightweight and allow for simple construction techniques. A limited number of materials should be used to minimize the amount of wastage.

Thermal Comfort: A combination of thermally sensitive design and openable windows allows for efficient and effective cooling from cross ventilation. By shading the house during hot summer days and opening it during the cool evenings, comfortable conditions can be maintained without air conditioning.

Ancillary Services: A well-connected network of back house hospitality will be the prime objective of a decent resort.

Site Specific Development Responses: Design should address the sites. Before designing the retreat, the designer should study the context. If the site is eco-sensitive, the design should be environmentally friendly.

Fire Protection Considerations: forest and non-permanent building materials are characterised by a high level of fire hazard. It will be the responsibility of designers to accomplish the considerations of fire detection (FDS) and fire protection systems (FPS).

Safety and Security: Safety and security are the prime responsibility of the complex operator and local authorities.

Water: The water source for the lodge is supplied by rainwater collectors from the roofs and preserves into tanks or ponds. This water is used for showers, kitchen use, and bushfire protection. Rainfall in the area is providing an adequate water supply.

Waste: organic kitchen waste is treated on site through a dry composting system. Waste is passed through a 'digester' where it is further filtered. Solid waste is recycled where possible. The retreats rely on an Envirocycle septic system. The Envirocycle system is an aerobic waste treatment system that recirculates clean, nutrient-rich water into the surrounding landscape.

3.4 Current Scenarios and Eco- tourism Potentials in Sonar Char and Surrounding Area

Sonar Char and the neighboring Char offer a plethora of tourist development potential. The region is home to a diverse range of flora and fauna, as well as numerous scenic wonders. The region is perfect for tourist development because of its forests, beaches, lakes, and rivers. An Action Area Plan was created based on a number of tourist-friendly areas. It finds five unique Chars with essential traits that may entice domestic and international tourists. The distinctive traits and facilities of five of these destinations make them appealing. There are two char (a small island) that have both mangrove forest and beaches. To ensure the correct development of these Char, an Action Area Plan was created to ensure the provision of adequate and proper tourist service infrastructure in order to attract tourists from both within and outside the country.

3.4.1 Sonar Char

Sonar Char is around 18 square kilometers in size. The trees had been uprooted, leaving Sonar Char bare. Recognizing Sonar Char's tourism potential, Bangladesh Parjatan Corporation (BPC) suggested a tourist complex that would contain a youth inn, a café, picnic huts, an outdoor party area, and eco-cottages. However, due to a lack of communication infrastructure, inadequate lodging, and inadequate utility services, the project is now unviable. Sonar Char is developing an ecotourism industry with unique foreign visitor amenities like private cottages, pavilions, and tents. This tourist attraction will be transformed into something like India's Aman-i-Khás, Indonesia's Amanwana, and the Philippines' Amanpulo.



Figure 26: Natural Beauty of Sonar Char and Surrounding Char

In 1975, the Patuakhali Forest Department assumed responsibility for reforesting the char. The department covered up to 5.5 acres of land with kewra, Andari, khulsi, and koroï plants. Many plants also grow on their own due to natural processes. Sonar Char was transformed into beautiful woodland because of these plants.



Figure 27: Beautiful Beach of Sonar Char

(Source: facebangla)

A large number of red crabs may be seen on the beach. Many different bird species can be seen, especially during the winter when migrant birds arrive. Sonar char is rich in biodiversity, including foxes, bulls, boars, monkeys, and other animals. In two rounds of Sonar Char in 1995, a total of nine deer were freed. At this time, there are no confirmed numbers on the overall number of deer in the Char, but many can be seen grazing throughout the woodland.

3.4.2 Andar Char

Sonar Char and Char Montaz are about two nautical miles away. Between Sonar Char and Char Montaz, this is the closest Char. This Char is expected to be created solely for international tourists, with a variety of modern facilities. The population of this Char is currently around 3782 people. A small wooded area can be found in the northern part of the Char. The remainder of the Char is used for agriculture. The geological conditions in this Char are generally stable, allowing for the construction of environmentally friendly infrastructure.

3.4.3 Char Taposhi/Kolagasi

The Sonar Char and Char Andar are located to the west of Char Taposhi/Kolagasi. This Char is ideal for a jungle adventure. The Char is densely forested with mangroves. Water, plants, and fauna are available to foreign visitors. It would be ideal to spend time in a tree house. In Char Taposhi/Kolagasi, there are no people.

3.4.4 Char Hare

Sonar Char and Char Taposhi/Kolagasi are located to the west of Char Hare. Unlike the Sonar Char and Char Taposhi/Kolagasi, this Char is geologically stable. A mangrove cover can be seen on the Sonar Char's southern side. Plenty of flat ground is accessible for construction along the Char's southern reaches. On the southern side of the Char Hare River, there is a long and magnificent beach. Camping and meditation are both allowed in this

CHAPTER FOUR:

4.1 Action Area Plan of Sonar Char and Surrounding Area

The Action Area Plan (AAP) is re-examining land uses in the Sonar Char and adjacent areas for ecotourism in order to make the most use of the available land. The Action Area Plan outlines comprehensive land use distributions and establishes a schedule for implementing ideas in regions of transition, such as Sonar Char.

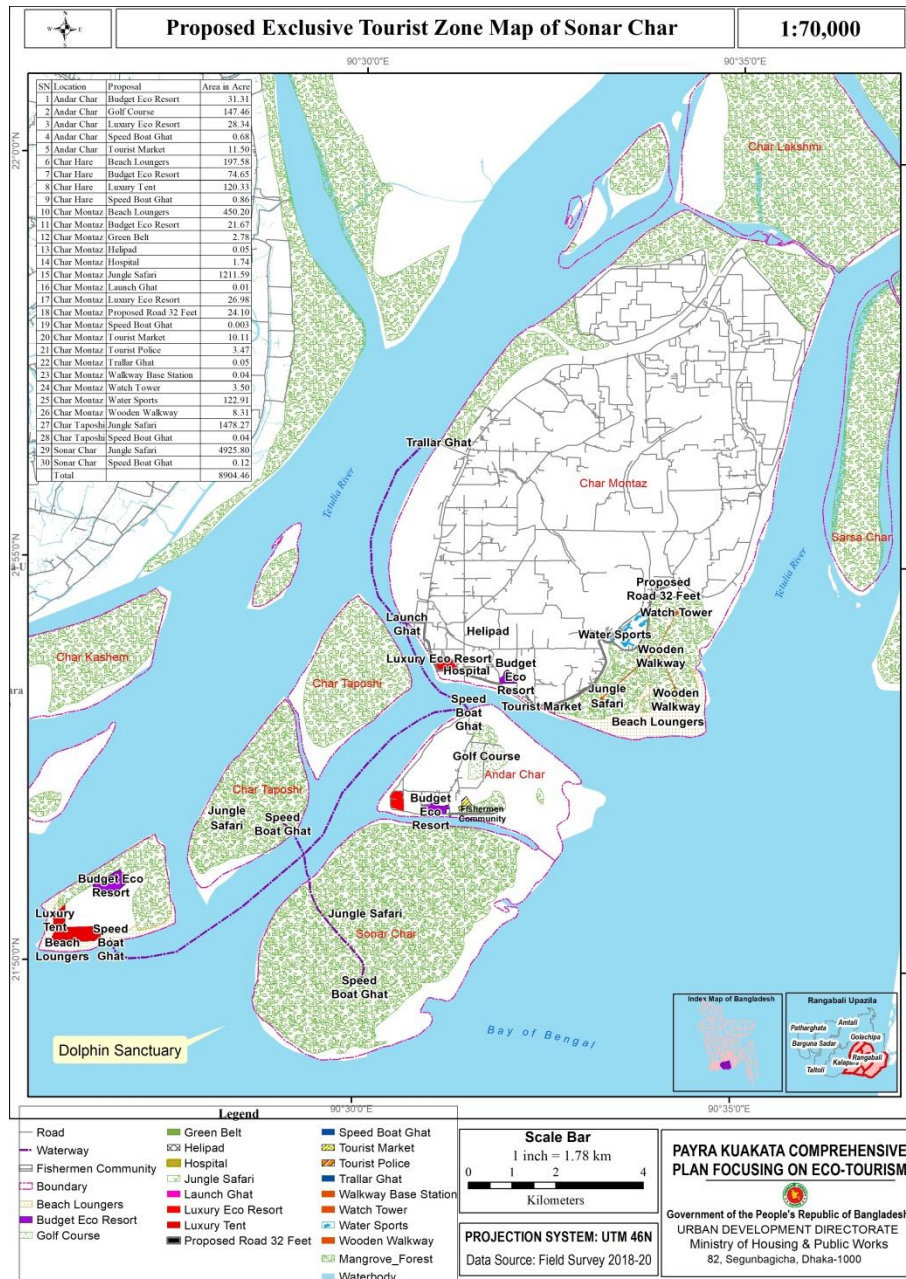


Figure 28: Action Area Plan of Sonar Char and Surrounding Area
Source: PKCP project, UDD, 2019

This involves considering the proposed land uses in the Sonar Char and surrounding Chars, as well as other relevant policies; consulting with the local community on current needs and priorities; taking advice from technical development specialists about what is possible; and putting together an Action Area Plan to guide the future development of the area. At each stage of the Action Area Plan preparation, the community and stakeholders have been contacted and invited to participate. Every step of the Action Area Plan's creation looked at local challenges that the new policy framework would address and identified viable development solutions. The Action Area Plan may also include other elements, such as design criteria. There are two types of infrastructure one is hard infrastructure and other is soft infrastructure that need to be developed for feasible the project for a long run. In the Sonar Char and nearby area, Char Montaz is the largest of the Char. For the significance of this place, a stunning roadside landscaping may be developed on both sides of the road. On the Char's southern shore, there is a boat dock, which will be completed with modern amenities for boats and water vehicles. Andar Char is located between Sonar Char and Char Montaz. The government can easily engage these people for future tourist-related facilities. Eco-resort, villa type tent, entertainment and sports area, and an adjustable dock for boats as well as speed boat ghat are among the amenities. The sonar char's action area is both environmentally benign and limited. Tourists can enjoy loungers, watch towers, tree houses, jungle safaris, rafting boats, floating docks, and flotels. To the east of Char Hare, Sonar Char and Char Taposhi/Kolagasi can be found. Along the Char's southern reaches, there is plenty of flat area to build luxury tents and relax areas. There is a mangrove forest in this area. Tourists can enjoy jungle safaris, rafting boats. Near Char Taposhi/Kolagasi , a movable dock must be constructed. This Char is located to the western side of the Char Andar and Sonar Char.

4.2 Specific proposals of Sonar Char and Surrounding Areas

According to tourism suitability analysis, suitable location has been found for development. Specific locational proposals have given below table:

Table 12: Specific proposals and location

SN	Location	Proposal	Area in Acre
1	Andar Char	Budget Eco Resort	31.31
2	Andar Char	Golf Course	147.46
3	Andar Char	Luxury Eco Resort	28.34
4	Andar Char	Speed Boat Ghat	0.68
5	Char Hare	Beach Loungers	197.58
6	Char Hare	Budget Eco Resort	74.65
7	Char Hare	Luxury Tent	120.33
8	Char Hare	Speed Boat Ghat	0.86
9	Char Montaz	Beach Loungers	450.20

SN	Location	Proposal	Area in Acre
10	Char Montaz	Budget Eco Resort	21.67
11	Char Montaz	Green Belt	2.78
12	Char Montaz	Helipad	0.05
13	Char Montaz	Hospital	1.74
14	Char Montaz	Jungle Safari	1211.59
15	Char Montaz	Launch Ghat	0.01
16	Char Montaz	Luxury Eco Resort	26.98
17	Char Montaz	Proposed Road 32 Feet	24.10
18	Char Montaz	Speed Boat Ghat	0.00
19	Char Montaz	Tourist Police	3.47
20	Char Montaz	Trallar Ghat	0.05
21	Char Montaz	Walkway Base Station	0.04
22	Char Montaz	Watch Tower	3.50
23	Char Montaz	Water Sports	122.91
24	Char Montaz	Wooden Walkway	8.31
25	Char Taposhi	Jungle Safari	1478.27
26	Char Taposhi	Speed Boat Ghat	0.04
27	Sonar Char	Jungle Safari	4925.80
28	Sonar Char	Speed Boat Ghat	0.12

Source: PKCP project, UDD, 2019



Figure 29: Proposals of Action Area Plan of Sonar Char and Surrounding Area

Source: PKCP project, UDD, 2019

4.3 Development Cost Calculation

This section determines a preliminary cost for the development of eco-tourism. The cost is calculated based on the function and use of the amenities. The use of eco-friendly design to promote tourism is a source of worry. Sonar Char is a protected area, so any construction or development is prohibited. All of the facilities in Sonar Char and the surrounding area will be environmentally friendly and have a low carbon footprint. In this location, biodegradable products and easily transportable structures should be prioritized during development. In Sonar

Char and the adjacent area, temporary structures such as luxury tents will be preferred. Local raw materials will be used to build flotel.

4.3.1 Development of Char Andar

Andar Char is located between Sonar Char and Char Montaz. This is the perfect location to develop luxury and modern facilities for tourists. There are plenty of facilities that will be developed to serve as more authentic and eco-friendly facilities for foreign tourists. This is a perfect location for foreign tourists to spend quality time. This Char has only four thousand people. The government can easily engage these people for future tourist-related facilities and services. Detail of the lay out plan of each facilities given below. Budget Eco resort, Luxury Eco resort, Golf Course, Speed Boat Ghat has proposed in Andar Char. A proposed Layout of Luxury Eco resort and luxury resort has given below in figure 30 and figure 31.



Figure 30: Proposed Layout Plan of Resort in Andar Char

Eco-resort, villa type tent, traditional type resort, entertainment and sports area, speed boat ghat adjustable dock for boats are among the amenities that could be built in this Char.

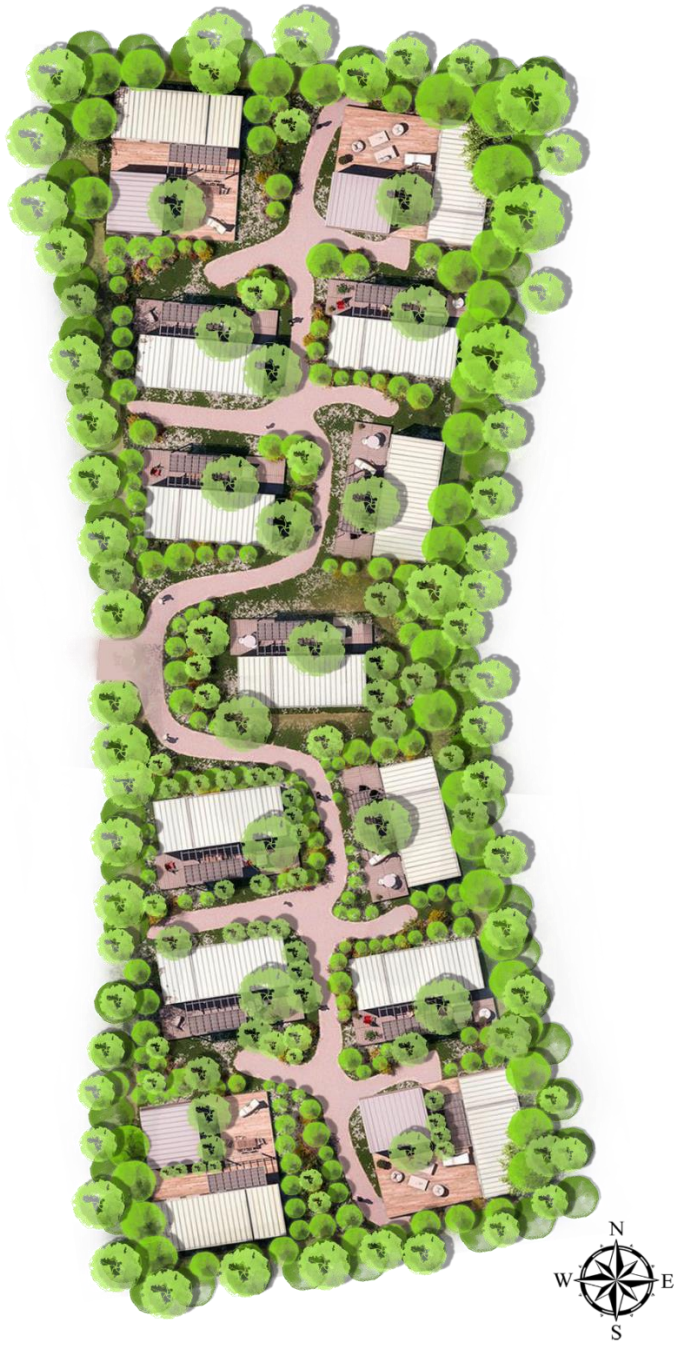






Figure 31: Proposed Layout Plan of Resort in Andar Char

Table 13: Approximate Cost for Development of Andar Char


Facilities /Items	Mauza (Andar Char), Plot	Quantity	Area (Sq. Feet)	Approximate Cost (Cr. Taka)	Tentative Theme
Eco-Resort					
Budget Eco Resort	170 (153)	20	800	8	 <p>Amanwana Tent Resort, Indonesia</p>   <p>Diphlu River Lodge, India Rua Resort, Indonesia</p>
Speed Boat Ghat Dock (Adjustable)	-	2	5000	0.50	 <p>Floating Dock China</p>


4.3.2 Development of Sonar Char

This is an ecologically sensitive area as well as a low-salinity animal sanctuary. There is a reserve forest in this area. The sonar char's action area is both environmentally benign and limited.

Tourists can jungle safaris in sonar char. Near Sonar Char, speed boat ghat, a movable dock must be constructed.

Table 14: Approximate Cost for Development of Sonar Char



Facilities/Items	Quantity	Area (Sq. Feet)	Approximate Cost (Cr. Taka)	Tentative Theme
Jungle Safari	-	-	8	 <p>Mangrove Jungle Safari</p>

Dock (Adjustable)	2	5000	0.50	 Floating Dock China
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4.3.3 Development of Char Taposhi/Kolagasi

There is a mangrove forest in this area. Tourists can enjoy jungle safaris. Near Char Taposhi/Kolagasi, a movable dock must be constructed. This Char is located to the western side of the Char Andar and Sonar Char.



Table 15: Approximate Cost for the Development of Char Taposhi/Kolagasi

Facilities/Items	Quantity	Area (Sq. Feet)	Approximate Cost (Cr.)	Tentative Theme
Jungle Safari	-	-	8	 Mangrove Jungle Safari
Dock (Adjustable)	2	5000	0.50	 Floating Dock China

4.3.4 Development of Char Hare

To the east of Char Hare, Sonar Char and Char Taposhi/Kolagasi can be found. This Char is geologically stable, unlike Sonar Char and Char Taposhi/Kolagasi. On the Sonar Char's southern bank, a mangrove cover may be seen. Along the Char's southern reaches, there is plenty of flat area to build on. A lengthy and lovely beach may be found on the Char Hare's southern shore. In this area, both camping and meditation are permitted. To convey the tourists from another Char, authority will need an adjustable dock. Beach Loungers, Budget Eco Resort, Luxury Tent and Speed Boat Ghat have proposed. Detail of the plan given below:

Table 16: Approximate Cost for the Development of Char Hare

Facilities/Items	Quantity	Area (Sq. Feet)	Approximate Cost (Cr. Taka)	Tentative Theme
Beach Loungers	100	-	2	 Beach Loungers in Caribbean Islands
Dock (Adjustable)	2	5000	0.50	 Floating Dock China
Watch Tower	4	-	1	

4.3.5 Development of Char Montaz

In the Sonar Char and nearby area, Char Montaz is the largest of the Char. The connectivity of this char can be relayed to the rest of the country. There is a road network in this part of the char. Beach Loungers, Budget Eco Resort, Green Belt, Helipad, Hospital, Jungle Safari, Launch Ghat, Luxury Eco Resort, Road Proposal, Speed Boat Ghat, Tourist Police, Speed Boat Ghat, Walkway Base Station, Watch Tower, Water Sports, Wooden Walkway has proposed in action area plan. A proposed layout plan of Resort has given below.



Figure 32: Proposed Layout Plan of Resort at Char Montaz



Figure 33: Proposed Layout Plan of Budget Hotel at Char Montaz

4.3.6 Transportation and Communication Facilities for Tourist

The major goal of this project is to create a comprehensive plan to boost tourism while also improving Sonar Char's socioeconomic and infrastructure development. The transportation model created as part of this project will optimize the overall transportation system as well as business operations related to major transportation hubs such as Payra Port and Kuakata Sea Beach, as well as other small-to-medium growth centers in the project area. For the future scenario, the model predicts that the projected land use change in the study region will greatly increase vehicular movement in the network, indicating that the proposed road network extension can be justified to manage future traffic demand. At the same time, the network will not become unduly congested, allowing for a reasonable amount of operational speed. This adds to the argument that the proposed road network is adequate.

The tourism business requires a flexible and well-organized transportation system. The water transport service is the primary mode of transportation between the islands or Char in Sonar Char and the surrounding area. This region, on the other hand, will establish a well-organized multimodal transportation infrastructure.

Road Network: Road networks exist in Char Montaz and Andar Char. In Char Montaz, there are numerous well-maintained roadways. Locals in Andar Char have access to two important roadways. The Ministry of Road Transport and Bridges will be responsible for the development of all roadways. Biodegradable paths will be built in the Sonar Char, Andar Char, and Char Hare for environmentally friendly development initiatives.

Air Communication: It is expected that foreign tourists will prefer to fly. The tour operator will be arranging a helicopter for air transport facilities. The respective government authorities will

develop a helipad near the hotel-motel zone of the Char Montaz. In the future, the plan and other facilities of air transport will be available near the Payra-Kuakata region.

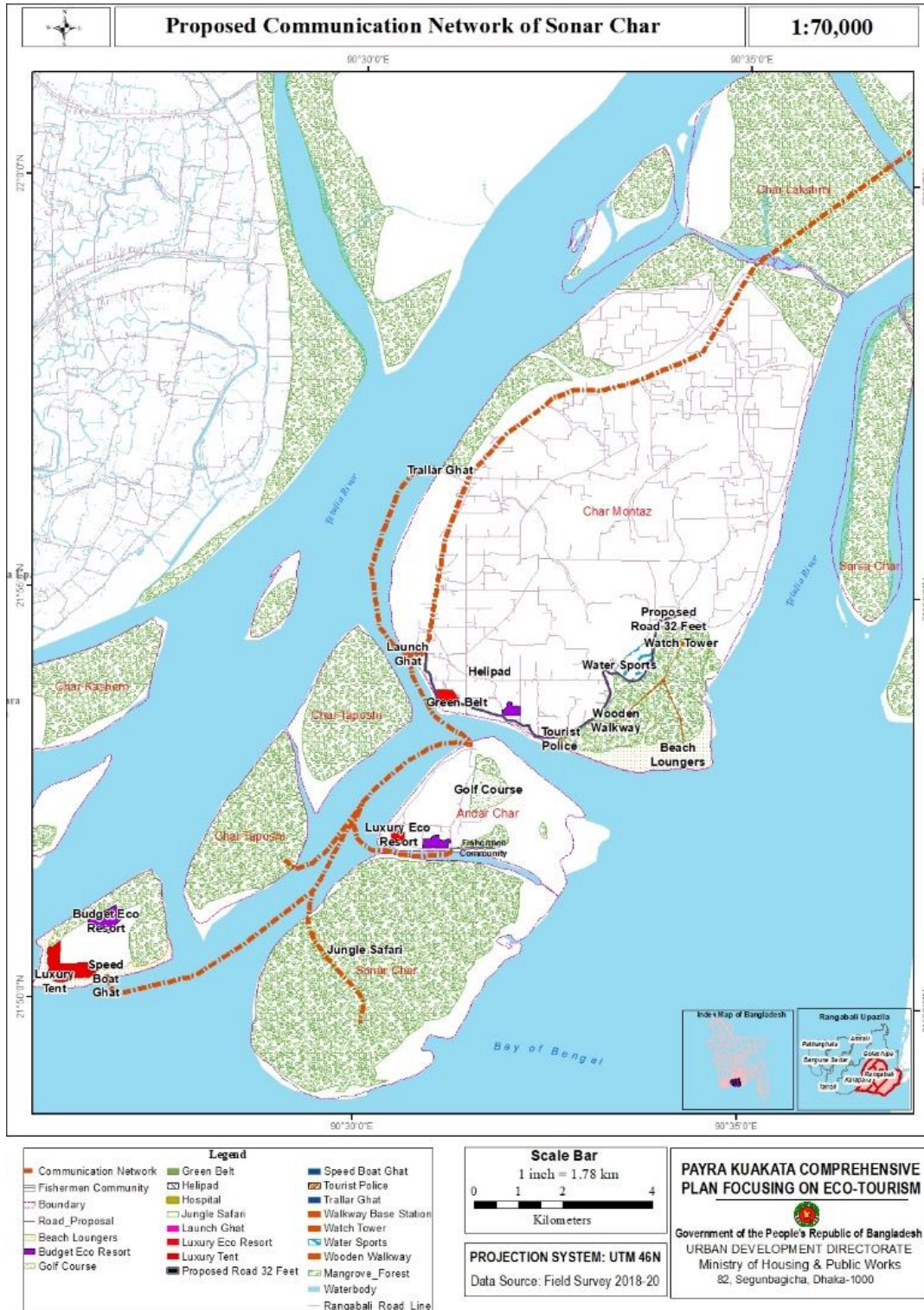


Figure 34: Proposed Communication Network of Sonar Char

Source: PKCP project, UDD, 2019

Waterways: Near the Char Montaz's southern end, there is a large and modern boat dock. This pier will be upgraded to provide modern tourist amenities. In the Sonar Char, Char Taposhi/Kolagasi , Andar Char, and Char Hare, a flexible and adaptable floating dock for boats will be located. In this region, a number of well-decorated and modern flotels will be available for foreign travelers. For jungle excursions and water sports, there will be a large number of rafting boats accessible. For connectivity among the Char, modern boats will be arranged.

This eco-friendly development process requires less intervention in the Sonar Char reserve forest area. The boat will be developed locally with modern facilities. Boats will be anchored in the water near the beaches. Boats will be used as hotel rooms, called flotels. Tourists enjoy the beauty of the water forest and beaches. During the Cyclones, boats will be docked in the canal in Sonar Char and in between Sonar Char and Andar Char.

Design Concept of Flotel/ House boat

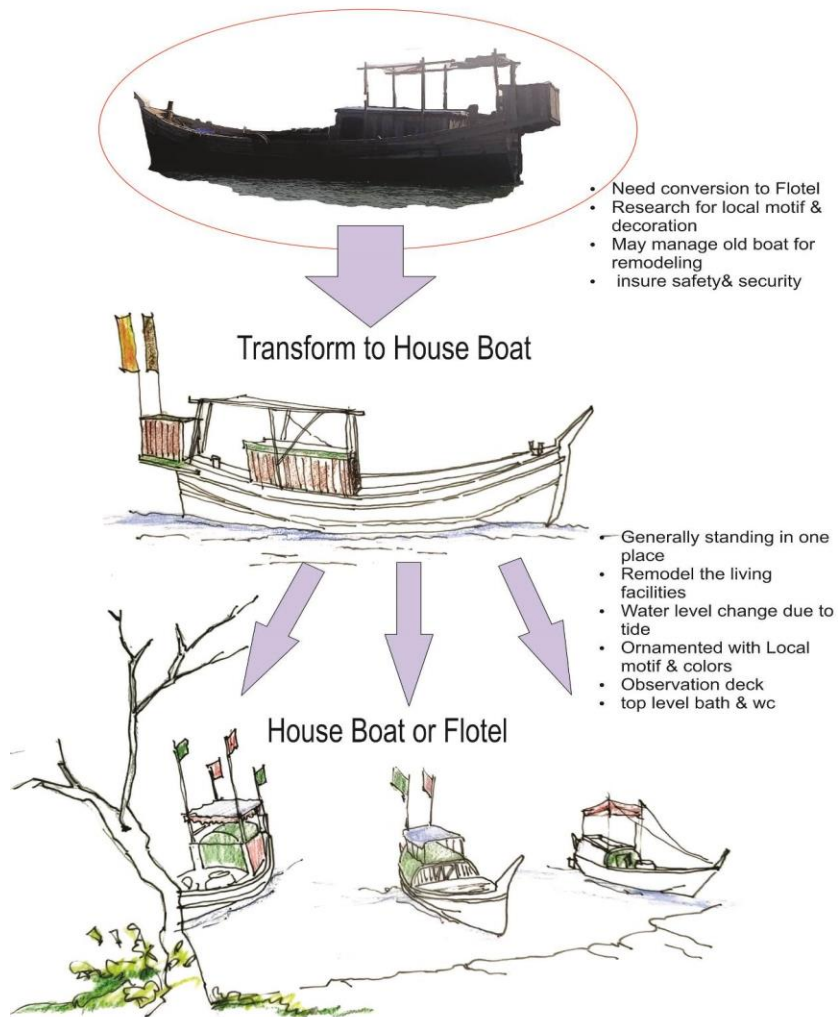


Figure 35: Anchored Flotel/Hotel Boat for Tourist in Water

Table 17: Approximate Cost for the Transportation System

Facilities/Items	Quantity	Area (Sq. Feet)	Approximate Cost (Cr. Taka)	Location
Helipad	1	3927	0.5	Char Montaz
Big Dock/Ghat	1	-	5	Char Montaz
Road-side Land Scape (Trees)	9850	-	1	Char Montaz, Char Andar
Bio-Degradable Pathways	-	1000000	50	Sonar Char, Char Andar, Char Montaz, Char Hare, Char Taposhi/Kolagasi ,
Total	-	-	56.5	

Table 18: Total Construction and Furnishing Cost

Name of the Location	Cost (Cr. Taka) BDT
Sonar Char	63.25
Andar Char	240.35
Char Montaz	308
Char Taposhi/Kolagasi	11.1
Char Hare	8.1
Total	630.8

Table 19: Annual Maintenance Cost

Name of the Location	Cost (Cr. Taka) (Including Salary and Utilities)
Sonar Char	0.5
Andar Char	3
Char Montaz	2
Char Taposhi/Kolagasi	0.2
Char Hare	0.2
Total	5.9

4.4 Benefit of Tourism

Environmentally sensitive places in the Sonar Char and neighboring areas need to be protected from hazardous human intrusion. Simultaneously, development initiatives for poverty reduction and livelihood activities must be fostered. The creation and implementation of an integrated Action Area Plan would be required to achieve these goals. Any development strategy is ultimately reduced to a set of programmed that cover all elements of development. Sonar Char Action Area Plans have been formulated based on problems and opportunities. Management of the coastal environment, including its protection and regeneration; management of the region's water resources; facilitation of sustainable economic opportunities for coastal communities; development of productive eco-tourism activities; development of infrastructure; and modern facilities are the main areas of focus.

4.4.1 Poverty Alleviation

Because of the minimal skill and investment requirements, much of the employment created in the tourism sector is accessible to the poor. Many tourism activities are suitable for people from disadvantaged backgrounds, notably in Bangladesh's coastline region. Meanwhile, poverty is widespread in Bangladesh's coastal region. Twelve million people are expected to live in poverty in this region (World Bank, 2016). That suggests there is an adequate supply of labor compared to demand, indicating the possibility of poverty alleviation. There are indications that this promise is being realized at least partially, if not completely; many poor people find jobs in tourism destinations. According to Farzana (2014), in the Kuakata sea beach area, 77.12 percent of the poor work in tourism-related occupations, compared to 74.05 percent for the entire population. However, the analysis reveals that there is still a lot of untapped potential for poverty reduction.

4.4.2 Employment Opportunity

Travel and tourism directly employed 1,328,500 people in 2013, with a 4.0 percent increase expected in 2014. Hotels, airlines, travel agents, and other passenger transportation industries are among the employers in this sector. It will rise at a 2.7 percent annual rate over the next ten years. Travel and tourism employed 2.8 percent of the workforce in 2013. This is expected to rise to 3.9 percent of total employment in 2014. By 2024, travel and tourism are expected to employ 4.2 percent of the workforce (Roy SC, Roy M., 2015).

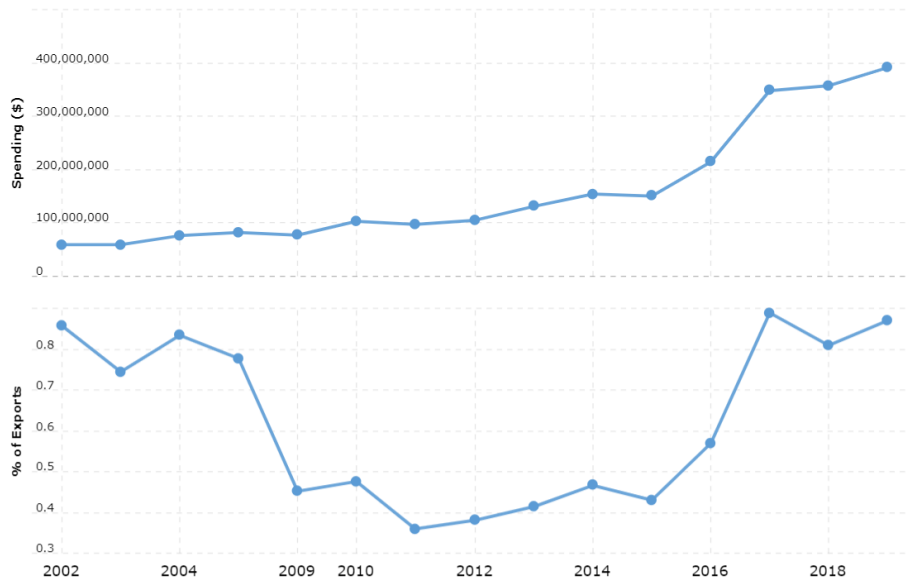


Figure 36: Economic Potentiality of Foreign Tourist for Bangladesh

(Source: World Bank, 2022)

International visitor arrivals climbed from 25 million in 1950 to 80 million in 1980, 527 million in 1995, and 1133 million in 2014, with 1.8 billion predicted by 2030. Similarly, international receipts received by destinations around the world have increased from \$2 billion in 1950 to \$104 billion in 1980, \$415 billion in 1995, and \$1.24 billion in 2014. (2015 Edition of UNWTO

Tourism Highlights) Tourism has a 9% direct, indirect, and induced impact on GDP, creating 1 in 11 jobs and accounting for 6% of global exports in 2014, according to the UNWTO.

The upward trend in visitor arrivals and profits is expected to continue. Emerging economies' market share climbed from 30% in 1980 to 45 percent in 2014 and is predicted to reach 57 percent by 2030, equating to more than 1 billion international visitor visits. The tourism industry's ongoing expansion around the world is encouraging, and countries are getting worried about enticing more tourists to their own places (Sultana S., 2016).

According to a World Bank study, international visitor spending has gradually increased from approximately \$8000000 in 2002 to \$40000000 in 2019. The tourism sector's share of exports is steadily increasing, rising from 0.6 percent to 0.9 percent by 2019.

Table 20: International Tourist Arrival in Bangladesh

Year	Tourists arrival
2000	199000
2001	207000
2002	207000
2003	245000
2004	271000
2005	208000
2006	200000
2007	289000
2008	467000
2009	267000
2010	139000
2011	157000
2012	160000
2013	104000
2014	134000
2015	126000
2016	182000
2017	237000
2018	267000
2019	323000

(Source: World Bank, 2019)

The return of investment for tourism in Sonar Char especially for foreign tourists is fretful. It is assumed in various studies shows that the number of foreign tourists rises gradually. Therefore, the return of investment of Sonar Char will be achieved.

4.4.3 Environmental Benefits

Because sustainable tourism is frequently based on ecotourism, it encourages local people to actively participate in management, raising public awareness of the importance of the environment and nature. As a result, local citizens favor the preservation of the tourist attraction. Furthermore, various fees and taxes collected from tourists might be used to compensate for environmental damage. Although Bangladesh cannot claim to have totally sustainable coastal and marine tourism, it appears to be on its way there. All of these advantages would be available to it (Nur Nobil M., Majumder M., 2019).

According to a survey by the World Travel and Tourism Council (WTTC), travel and tourism contributed 4.4 percent of GDP in 2013 and are anticipated to expand by 7.9% to 4.5 percent of GDP in 2014. It is expected to rise by 6.5 percent per year to 4.7 percent of GDP by 2024. It is worth noting that the total contribution includes direct, indirect, and induced contributions (Roy SC, Roy M., 2015).

4.5 Catchment Area of the Project

International tourists have a large and diverse catchment area. Domestic tourism is growing in popularity. During vacations and festivals, the beaches and tourist attractions are packed. The number of tourists is likely to increase in the future. Furthermore, providing luxurious facilities and services for international tourists may encourage additional visitors to visit tourist destinations. The Sonar Char will be equipped with a wide range of foreign-friendly features. Foreign tourists are expected to make use of the numerous facilities and services available in Indonesia, Malaysia, and Thailand. Every component of this tourist destination is a beautiful blend of forest, beaches, and sea. Sonar Char is suitable for foreign visitors due to its unique and different eco-friendly tourist attractions.

CHAPTER FIVE:

4.1 Source of Finance and Responsible Authorities

Sonar Char has no permanent residents. It is a significant ecological landmass. This area will be constructed solely for international visitors. This tourist attraction has become environmentally friendly. At the same time, foreign tourists will enjoy the natural beauty of this Char and the adjacent Char. The Department of Forestry will follow stringent guidelines in accordance with current laws and regulations in order to protect the island's current status, environment, and beauty. The Bangladesh government or a Public-Private Partnership (PPP) will fund the development of this area as a premier foreign tourism destination.

Table 21: Employing authority for Source of Finance

Construction and maintenance of Infrastructure	Source of Finance
Construction of Forest Office	Ministry of Environment, Forest and Climate Change
Boat dock in Sonar Char	Bangladesh Parjatan Corporation, Bangladesh Tourism Board and Public-Private Partnership (PPP)
Meditation Spaces	Ministry of Environment, Forest and Climate Change, Bangladesh Parjatan Corporation
Water Transport Facility (Boat)	Bangladesh Parjatan Corporation and Public-Private Partnership (PPP)
Maintain Reserve Forest	Ministry of Environment, Forest and Climate Change
Facilities for Jungle Safari	Ministry of Environment, Forest and Climate Change, Bangladesh Parjatan Corporation and Public-Private Partnership (PPP)
Family Gathering Space	Ministry of Environment, Forest and Climate Change and Bangladesh Parjatan Corporation and Public-Private Partnership (PPP)
Eco-resort and Entertainment Facilities	Bangladesh Parjatan Corporation and Public-Private Partnership (PPP)
Hotel and Motel	Bangladesh Parjatan Corporation and Public-Private Partnership (PPP)

Table 22: Areas of Concern for Environmental Assessment

Area of Concern		Step 1	Step 2	Step 3	Step 4
Habitats Management		Survey	Analysis	Presentation	Report
Species Management	Flora	Survey	Analysis	Presentation	Report
	Fauna	Survey	Analysis	Presentation	Report
Protected landscape	Agricultural	Survey	Analysis	Presentation	Report
	Forest	Survey	Analysis	Presentation	Report
	Mixed Use	Survey	Analysis	Presentation	Report
Protected Seascape	Marine ecology	Survey	Analysis	Presentation	Report

	Marine Biology	Survey	Analysis	Presentation	Report
	Marine Species	Survey	Analysis	Presentation	Report
Use of Natural Resources		Survey	Analysis	Presentation	Report
Strict Natural Reserve		Survey	Analysis	Presentation	Report

4.2 Period of Action Area Plan and Responsible Authorities

The Sonar Char and its environs are close to the sea. Due to the lack of a road network, air communication, utilities, and services, it is estimated that Sonar Char will take five years to develop as a tourist destination. The period of Action Area Plan is divided into eleven distinct phases.

Table 23: Period of Action Area Plan

	Year One				Year Two				Year Three				Year Four				Year Five			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Formulation of Sonar Chra Eco-tourism Development Committee																				
Community, Stakeholders Participation and Publicity																				
Feasibility Study																				
Preparation of Detail Design and Drawing																				
Design Discussion and Feedback Analysis																				
Formulation of Final Design																				
Tendering and Other Procedure																				
Resource Mobilization																				
Construction																				
Project Hand over to Sonar Chra Eco-tourism Development Committee																				
Formulation of Management Plan for the Sonar Chra Eco-tourism Development																				

Table 24: Involvement of Authority for Implementing Action Area Plan

Name of the Ministry/Department/Institutions	Responsibilities/Scope/Areas
Ministry of Environment, Forest and Climate Change	To ensure the guidelines and conditions of environmental laws and regulation before, during and after implementation of Action Area Plan (AAP)
Ministry of Home Affairs	To ensure the security of foreigner tourists, local

	community
Ministry of Foreign Affairs	To ensure the services and facilities of foreigner tourists
Ministry of Road Transport and Bridges	Construction of Infrastructure to ensure quality services and facilities for foreign tourists
Ministry of Health and Family Welfare	Construction of Health Infrastructure to ensure quality services and facilities for foreign tourists and local communities
Bangladesh Parjatan Corporation	Construction of Infrastructure to ensure quality services and facilities for foreign tourists
Bangladesh Tourism Board	Ensure quality services for foreign tourists
Payra Port Authority	To ensure the guidelines and conditions of laws and regulations before, during and after implementation of Action Area Plan (AAP)
Roads and Highways Department	Construction of road Infrastructure to ensure quality services and facilities for foreign tourists, and local communities
Local Government Engineering Department (LGED)	Construction of Rural Infrastructure to ensure quality services and facilities for foreign tourists and local communities
Bangladesh Coast Guard	To ensure the security of foreigner tourists, local community

4.3 Responsible Institution for Tourism in Bangladesh

Bangladesh Tourism Board: The Bangladesh Tourism Board was founded in 2010 to satisfy the high demand for tourism professionals in the commercial sector. It is a member of the World Tourism Organization of the United Nations (UNWTO).

Bangladesh Parjatan Corporation (BPC): BPC was founded in 1972 as an autonomous entity under the Ministry of Civil Aviation and Tourism. BPC's main goal is to expand the tourism industry and provide services to both domestic and international tourists.

National Hotel and Tourism Training Institute (NHTTI): Professional development leads to more effective management. Bangladesh Parjatan Corporation established NHTTI in 1974. This institute provides courses that provide qualified workers for the hotel and tourism industries. In 1994, NHTTI began a two-year diploma programme in hotel management. The institute also provides on-the-job training for BPC employees and hosts special tourism-related seminars and workshops.

4.4 Integration of Higher-level Plan

Bangladesh's coastal zone encompasses 19 districts that face the Bay of Bengal or are close to the sea, and the bay's exclusive economic zone (EEZ) is widely regarded as a vulnerable region. Bangladesh's government has already designated the area as "prone to hazardous ecological processes" (ERD, 2003). However, the zone has a lot of potential. Natural resources abound in coastal zones, and their economies are largely dependent on them. The government has devised a

number of initiatives, plans, programmes, and actions to address the problem of natural resource free-riding in this zone. The following is a summary of coastal area management strategies, plans, policies, and laws.

Table 25: Integration of Higher-level Plan

Existing Plan, Policies and Strategies	Tasks of Integration	Integration with Sonar Char Action Area Plan
<ul style="list-style-type: none"> ❖ National Tourism Policy, 2010 	<ul style="list-style-type: none"> ▪ Development and maintenance of tourism products by developing eco-tourism while maintaining ecological balance ▪ Prepare national, regional and zonal master plans to develop tourism industry ▪ Prepare an integrated tourism plan to develop tourism ▪ prepare and implement short, mid and long-term work plan and strategic paper ▪ Initiate vigorous campaign to attract foreign tourists ▪ Take integrated steps to attract foreign tourists ▪ Engage local government agencies to develop, expand and manage tourism ▪ Diversify the tourist attractions including the development of rural, riverine, agricultural, health, sports, alternative and community tourism 	<ul style="list-style-type: none"> • Basic guideline for taking any development work for the tourism sector in Bangladesh
<ul style="list-style-type: none"> ❖ Bangladesh National 		<ul style="list-style-type: none"> • To build boat

Existing Plan, Policies and Strategies	Tasks of Integration	Integration with Sonar Char Action Area Plan
Conservation Strategy (2016-2031)	<ul style="list-style-type: none"> ▪ Promote Conservation ▪ Enhancing Natural Resources ▪ Ensure Sustainable Development Goals (SDG). 	<ul style="list-style-type: none"> • dock in sonar char • To build meditation spaces • To maintain reserve forest • To facilities for jungle safari
❖ Coastal Development Strategy, 2006	<ul style="list-style-type: none"> ▪ Ensuring fresh and safe water availability ▪ Management of natural resources ▪ Improving people's livelihood conditions, particularly women Empowerment 	<ul style="list-style-type: none"> • To construct of forest office • To build meditation spaces • To facilitate water transport facility (boat, ferry etc.) • To maintain reserve forest • To facilities for jungle safari • To build family gathering space
❖ Coastal Zone Policy 2005	<ul style="list-style-type: none"> ▪ Providing guidelines to all agencies and organizations confine harvesting, extraction, or usage of coastal resources 	<ul style="list-style-type: none"> • To maintain reserve forest • To facilities for jungle safari
❖ Coastal Environmental Management Plan for	<ul style="list-style-type: none"> ▪ Socio-economic aspects into environmental 	<ul style="list-style-type: none"> • To facilitate water transport (boat, ferry

Existing Plan, Policies and Strategies	Tasks of Integration	Integration with Sonar Char Action Area Plan
Bangladesh 1988	challenges	etc.) <ul style="list-style-type: none"> • To facilities for jungle safari • To construct family gathering space
❖ The Environmental Court Act 2000	<ul style="list-style-type: none"> ▪ Jurisdiction, suitable punishments involving pollution in the Sonar Char 	<ul style="list-style-type: none"> • To build boat dock in sonar char • To build meditation spaces • To build water transport facility (boat, ferry etc.) • To construct family gathering space
❖ National Water Policy, 1999	<ul style="list-style-type: none"> ▪ Water management strategies at the local levels ▪ It addresses agricultural water usage with land use planning ▪ Advocates for utilization of surface water and groundwater 	<ul style="list-style-type: none"> • To construct of forest office • To construction of boat dock in sonar char • To build meditation spaces • To facilitate water transport (boat, ferry etc.) • To maintain reserve forest

Existing Plan, Policies and Strategies	Tasks of Integration	Integration with Sonar Char Action Area Plan
		<ul style="list-style-type: none"> • To facilities for jungle safari • To construct family gathering space
❖ National Environmental Management Plan, 1995	<ul style="list-style-type: none"> ▪ Advocate government agencies, NGOs, and the general public for fishing and agriculture-related initiatives 	<ul style="list-style-type: none"> • Basic guideline for taking development activities in coastal region
❖ Environmental Conservation Act, 1995	<ul style="list-style-type: none"> ▪ Control through mitigation of pollutants ▪ Addresses pollution-causing processes and activities ▪ Identify operations and processes in ecologically critical zones 	<p>Control the pollution during, before and after the construction of various facilities in Sonar Char given below:</p> <ul style="list-style-type: none"> • To construct of forest office • To build boat dock in sonar char • To build meditation spaces • To build water transport facility (boat, ferry etc.) • To maintain reserve forest • To facilities for jungle safari • To construct family gathering space
❖ National	<ul style="list-style-type: none"> ▪ Policy support to control polluting and 	Control the pollution during, before and after

Existing Plan, Policies and Strategies	Tasks of Integration	Integration with Sonar Char Action Area Plan
Environmental Policy, 1992	<p>environmentally degrading activities</p> <ul style="list-style-type: none"> ▪ Policy support for ensuring environmentally sound development ▪ Policy support for ensuring environmentally sound use of all-natural resources 	<p>the construction of various facilities in Sonar Char given below:</p> <ul style="list-style-type: none"> • To construct of forest office • To construct boat dock in sonar char • To build meditation spaces • To arranging water transport facility (boat, ferry etc.) • To maintain reserve forest • To facilities for jungle safari • To constructing family gathering space
❖ Bangladesh Delta Plan 2100	<ul style="list-style-type: none"> ▪ Ensure long-term water and food security, economic growth ▪ Resolving the Coastal Zone's difficulties and challenges ▪ Expansion, reclaiming additional land in the coastal zone 	<ul style="list-style-type: none"> • To follow Basic guideline for taking development activities in coastal region
❖ Bangladesh Climate Change Strategy and Action Plan (BCCSAP)	<ul style="list-style-type: none"> ▪ Ensure climate-resilient, and low-carbon development strategy 	<ul style="list-style-type: none"> • To ensure low-carbon or ecofriendly concept during

Existing Plan, Policies and Strategies	Tasks of Integration	Integration with Sonar Char Action Area Plan
2009		construction period
❖ National Adaptation Programmed of Action (NAPA) 20	<ul style="list-style-type: none"> ▪ Identified 15 priority activities in vulnerable regions, including general awareness-raising, capacity-building, and project implementation 	<ul style="list-style-type: none"> • To follow Basic guideline and for taking development activities in ecologically vulnerable region
❖ Land Use Policy 2001	<ul style="list-style-type: none"> ▪ It emphasized the need of coastal land zoning in particular 	<ul style="list-style-type: none"> • To follow guideline for land zoning

CHAPTER SIX

5.1 Exclusive Services and Facilities for Foreign Tourist

Sonar Char-based amenities are available to foreign visitors. This island is set in a stunning setting with thick mangrove forests, beaches, and waterways. Sonar Char provides a variety of environmentally friendly services. The entire region may be enjoyed by visitors, who will bring tranquil and pleasant memories with them. These areas are providing a unique combination of various facilities and attractions. Families can enjoy this area in various ways.

Leisure Tourism: Tourists may travel to learn more about the culture of a country and to enjoy a change in climate and location. Tourists seeking a break from the stresses of everyday life priorities rest, relaxation, and rejuvenation during their vacations. These guests like to stay in a tranquil and pleasant setting, such as an eco-resort, beach resort, or forest-based facility.

Family Tourism: The family unit is involved in many sorts of tourism activities as part of family tourism. This involves paying for visits to family and friends for social reasons. There are plenty of opportunities for participating in sporting event while away from home. These types of events typically serve as motivators for tourists to participate in activities like the mud game, jungle safari, and mini golf.

5.1.1 Char based Facilities and Services

Char Montaz: For international tourists, the authorities plan to build economic, business, and budget as well as luxury hotels in this Char. A large dock will be developed by the authorities to transport people to another Chars. For air-based communication, an existing helipad is situated in char montaz union parisad beside Char Montaz Secondary School

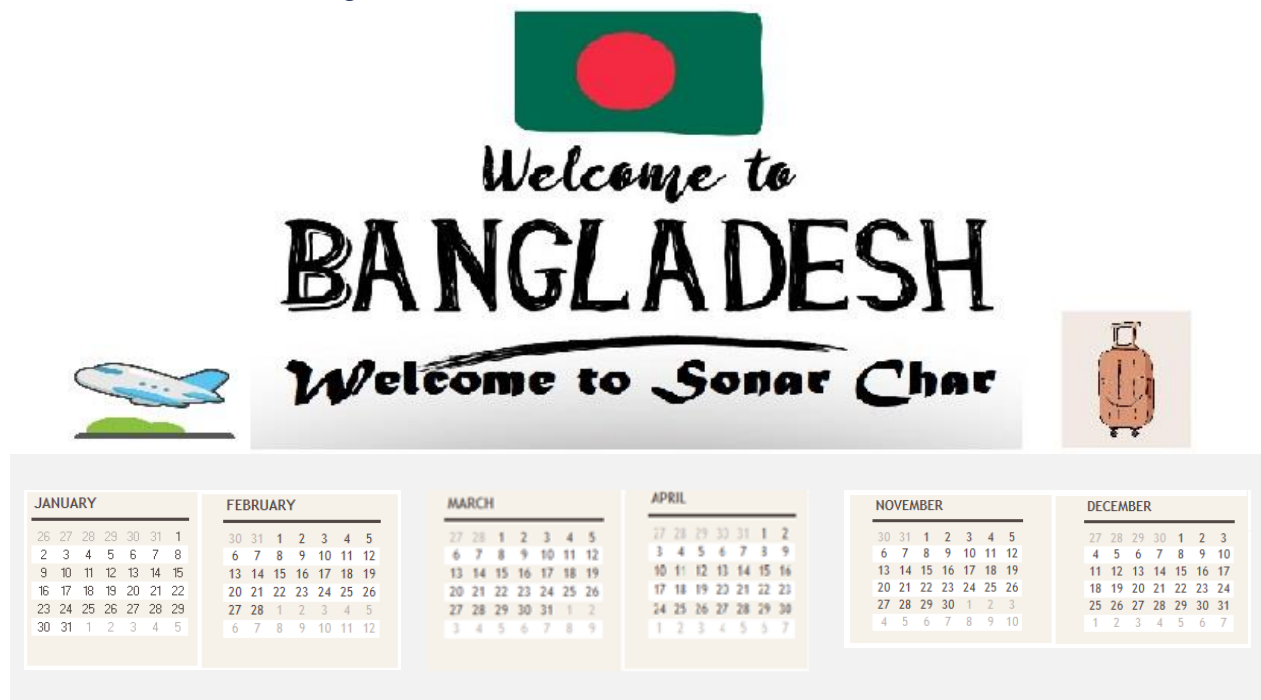
Andar Char: For international tourists, this is the primary zone or "buffer zone." This Char will include Budget Eco Resort, Golf Course, Luxury Eco Resort, and Speed Boat Ghat. This Char is a short distance from the Sonar Char.

Sonar Char: Sonar Char is an ecologically significant location. Tourists can use a variety of environmentally friendly facilities. Jungle safari, unique floating dock, speed boa ghat will include in the proposal.

Char Taposhi/Kolagasi: This Char is located on the sonar Char's western side. Tourists can see the lovely mangrove forest in Char. There are numerous options to go on a forest safari. Speed Boat Ghat has also proposed.

Char Hare: Sonar Char and Andar Char are both far away from this Char Hare. This Char is about two nautical miles west of Andar Char and four nautical miles west of Sonar Char. A mangrove forest can be found in a small area to the north of the Char. The southern part of the Char, on the other hand, boasts a fantastic beach. Beach Loungers, Budget Eco Resort, Luxury Tent, Speed Boat Ghat has proposed in action area plan

5.1.2 Tour Plan for Foreigners



- ❖ A Jungle Safari might be an exclusive attraction for foreign tourists. Tourists might enjoy the stunning beauty of the mangrove forest in Sonar Char, Char Hare, and Char Tree at House Taposhi/Kolagasi .
- ❖ Eco-friendly community resorts are available with decent services and facilities in Char Montaz. Exclusive facilities for tourist are located near the Sonar Char at Andar Char. Tourists can enjoy traditional folk music and dances in the playground.
- ❖ Eco-friendly tents or tree houses are located in this area. Tourists enjoy the tents and tree houses a lot.
- ❖ Boards or ferry are outfitted with a mix of traditional and modern amenities. Visitors can enjoy the journey in these boats.
- ❖ Loungers are located on the beaches in Sonar Char, Andar Char and Char Montaz. Tourists can enjoy the sunbath and the beauty of the sun.
- ❖ The most exciting location for tourist would be Char Hare. There is a perfect beach to see sunrise and sunset.

For Sonar Char, from below figure 36, the "mean daily maximum" (solid red line) depicts the maximum temperature on an average day for each month. The average minimum temperature is shown by the "mean daily minimum" (solid blue line). The average of the hottest day and coldest night of each month over the last 30 years is shown as dashed red and blue lines. People can plan their vacations based on the average temperatures and be prepared for hotter and colder days. Figure-001 shows that the months of January, February, March, October, November, and

December are the best months for international tourists to arrange their vacations. There are fewer odds of encountering a cyclone and precipitation at this time.

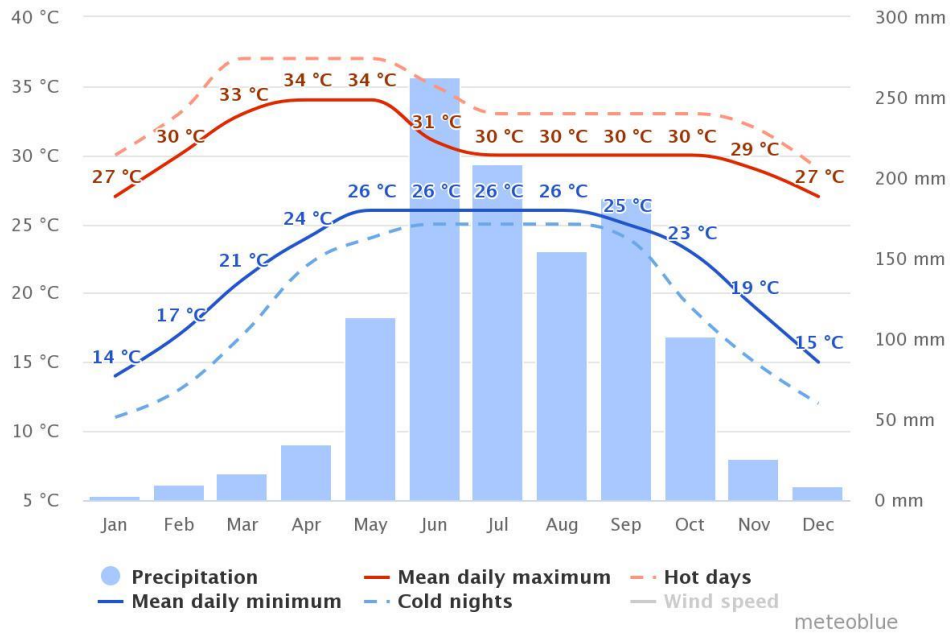


Figure 37: Weather of sonar Char and Surrounding Area:

(Source: Meteoblue, 2022)

5.1.3 Tourist Transport Route

The Sonar Char was declared an ecologically significant area. The modes of transportation are eco-friendly and more environmentally friendly. The transport system is designed on the basis of three key concerns. First of all, the mode of transportation is reliable in terms of the environment it operates in and is easy to operate. Secondly, the transportation system among the Chars and surrounding Sonar Char is based on water. Lastly, the modes of transport are luxury and comfort for foreign tourists.

5.1.4 Transportation System

Tourists come to Char Montaz by helicopter. A well-functioned and well-equipped helipad already exists at Char Montaz. Tourists also use the roads to come to the Char Montaz. A large dock will be located near the Char Montaz. Small boats will be distributed for tourists to transport them to and from Andar Char, which will be developed as an exclusive area for tourists. There is another welcoming dock located in Andar char for communication between tourists and Sonar Char. Tourists who are likely to visit Sonar Char, Andar Char, Char Taposhi/Kolagasi, and Char Hare will find an available dock.

All the pathways and roads in Sonar Char and Unda Char will be made of bio-degradable materials. Approximately ten kilometers of bio-degradable pathways will be constructed across the Chars.

5.1.5 Cyclone and Flood Preparedness for Foreign Tourists

Sonar Char and surrounding Chars are located in the disaster vulnerable area. Cyclones have frequently passed through this area historically. However, preparedness for natural disasters in the Sonar Char is a top priority for authorities. In the Char Montaz Hotel, this will be constructed to tackle natural disasters. The architectural and structural design of the hotel will be focused on natural disasters such as cyclones and floods. Moreover, the rapid evacuation process will be functional and collaborate with the national disaster preparedness process. The authorities will consider finding a place for safe evacuation from Sonar Char and surrounding areas if necessary. The months of October to March are relatively safe for tourists to visit Sonar Char. During other months of the year, authorities take extra measures for tourists.

5.1.6 Suitable Period in Sonar Char

The Bay of Bengal is close to Sonar Char and the adjacent locations. Natural disasters such as cyclones and tidal floods are expected to occur frequently in this region. This location has been shown to be affected by cyclones in the past. A calendar year is divided into three segments for a tour plan based on weather and the environment. Periods are listed below.

Table 26: Suitable Period in Sonar Char for Vacation

	Highly Suitable			Moderately Suitable				Less Suitable				
	Vacation Planning											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High												
Moderate												
Less												

Highly Suitable Period: The best times to visit the sonar char and adjacent areas are during the months of October and December, and January and March. October, November, and December are good months to start planning your trip to Sonar Char. The temperature is warm, ranging between 23 and 25 degrees Celsius. The days are bright and sunny. The scenery around Sonar Char, Andar Char, and the neighboring places will appeal to foreign visitors. Sonar Char is a tourist spot where visitors can enjoy the festive atmosphere on Christmas Day. Long, bright days and pleasant temperatures characterize the months of January to March. Rain and cyclones are less likely during these six months.

Moderately Suitable Period: The moderately suitable months for touring in the Sonar Char and surrounding areas are April, May, August, and September. Cyclones generally happen in this period of time. The respective authorities would be prepared to respond to any kind of natural disaster. Foreign tourists need extra caution during this period of the year. Bangladesh is well-known across the world for its quick response and disaster preparedness programs for responding to disasters.

Less Suitable Period: During the months of June and July, the amount of precipitation is higher in comparison to other months of the year. In addition, the probability of cyclones happening in

this region is higher in this particular period of time. It is estimated that during the period of natural disasters, there is a higher chance of creating a flood-like situation in the lower part of these Chars. Foreign tourists are highly discouraged from visiting Sonar Char and the nearby places.

5.1.7 Buffer Zone Concept for Foreign Tourist

The buffer zone concept is designed for foreign tourists. Andar Char is designed exclusively for foreign tourists. This Char is developed with various facilities. There is a welcome dock and luxury facilities such as an eco-resort, gym, swimming pool, mini golf ground, mud bath ponds, barbecue place, party place, police station, fire service station, health care center and other utility facilities. These premium facilities are provided for foreign tourists. In this char the privacy of foreign tourist will be considered exclusively.

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