



Regional Flyway Initiative · Site Study

May 2026

RFI Priority Site · Hatiya Island (including Nijhum Dwip National Park)

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General Site Information

Country	Bangladesh			
RFI Site Name	Eastern Meghna Delta (Hatiya Island, Nijhum Dwip)	ID003		
City/ Municipality, Province, Region	Noakhali District, Chattogram Division			
Geographical coordinates	22.08°N 91.07°E	Area (has)	16,335 ha	
Key species	Indian Skimmer <i>Rynchops albicollis</i> , Ganges River Dolphin <i>Platanisia gangetica</i>			
Key habitats (biomes)	intertidal mudflats, sandflats and salt-flats, mangroves, coastal brackish and saline lagoons, estuarine waters and shallow marine waters, with extensive mudflats and sand bars on Nijhum Dweep and Domar Char			
Key ecosystem services	Global climate regulation, flood hazard regulation, storm hazard regulation; provisioning services (fisheries)			
Key drivers of change	Commercial and residential development			
Conservation status (mark all that applies)	<input checked="" type="checkbox"/>	Protected Area	<input checked="" type="checkbox"/>	Flyway Network Site
	<input type="checkbox"/>	Ramsar Site	<input type="checkbox"/>	Others _____
IBA/ KBA name (and number) and other designations	Ganges- Brahmaputra -Meghna Delta			
Management Stakeholders	Bangladesh Forest Department			
With management plan?	Yes			
Project concept themes	Sustainable fisheries, coastal wetland restoration			
Length of project	5 years			
Sector/s	To be confirmed			
No. of potential beneficiaries	30,000 people			
Indigenous Peoples	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	Yes _____
Anticipated Implementation Risks	Reduced incomes for fishing communities if more stringent fishing regulations are implemented, noise from infrastructure development			
Estimated Project Budget (US\$)	6,150,000 over five years			
Potential Source/s of Financing	<input type="checkbox"/>	Loan	<input type="checkbox"/>	Private Sector
	<input type="checkbox"/>	Grant	<input type="checkbox"/>	Public-Private Partnership

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Abbreviations

ADB	Asian Development Bank
BDT	Bangladesh Taka
CREL	Climate Resilient Ecosystems and Livelihoods
CSR	Conservation Status Review
DMC	Developing Member Country
EAAFP	East Asian-Australasian Flyway Partnership
IBA	Important Bird and Biodiversity Area
NGO	Non-governmental Organisation
RFI	Regional Flyway Initiative
TESSA	Toolkit for Ecosystem Services Assessment
USAID	United States Agency for International Development
USD	United States Dollars

Executive Summary

Nijhum Dwip National Park (22.08°N, 91.07°E) is a coastal protected area located in the outer estuary of the Meghna, in Noakhali District, Chattogram Division. It includes the coastline of the southern tip of Hatiya Island, the islands of Nijhum Dweep and Domar Char, and several smaller islands. Nijhum Dweep (or Char Osman) surfaced to the south of Hatiya Island during the 1960s as a result of sediment deposition, and afforestation since 1972 has allowed the island to be settled. The key wetland habitats in Hatiya and Nijhum Dwip are intertidal mudflats, sandflats and salt-flats, mangroves, coastal brackish and saline lagoons, estuarine waters and shallow marine waters, with extensive mudflats and sand bars on Nijhum Dweep and Domar Char. As a whole, the site's coastal protection services from mangroves are estimated at 12,635 USD/ha while stored carbon ranges from 300,000 to 814,000 tonnes. Nijhum Dwip National Park was designated in 2001 and established as an EAAFP Flyway Network Site in 2011 with the Bangladesh Forest Department being the main landowner and management authority. Fishing provides the main sources of income for the majority of over 30,000 residents that live on the coasts of Nijhum Dwip and adjacent parts of Hatiya Island, while other important economic activities are cultivation of rice, vegetables and fruits, grazing by domestic livestock, river transportation and local trade, and collection of fuelwoods.

Drivers of change impacting Hatiya Island include expansion of commercial and residential areas, which significantly modify the natural landscape and contribute to habitat degradation while housing and settlement developments further exacerbate the problem by fragmenting habitats. Coastal fish resources are also in decline from overharvesting. Annual and perennial non-timber crop production was identified as a moderate threat to the site's ecological character. The government passed a 65-day no-take policy for fishing, which has been attributed to the recovery of the commercially important Hilsha *Tenualosa ilisha* fisheries. Yet, the impact of the fishing ban, together with the broader pattern of declining fisheries across Bangladesh's coastal waters and climate change has heightened the vulnerability of many coastal households. The high vulnerability of local communities and limited access to alternative livelihoods demonstrate the need to identify tangible alternatives, including through nature-based tourism and boat operators, strengthening the resilience of existing fishing communities.

Over time there is a clear need to expand (hard) infrastructure to encourage (artisanal) nature-based tourism including through the construction of shelters and signages while building the capacity of ecotourism operators to cater to the needs of tourists through microfinancing. This needs to be complemented by revised site management plan and a more robust biodiversity monitoring framework to assess the status of migratory waterbirds and other biodiversity, with a focus on the Indian Skimmer *Rynchops albicollis* and several shorebirds. The capacity of local fishing communities and the co-management frameworks can be further strengthened and this needs to include improved access to financing (microloans), while promoting sustainable fishing practices and fishing take regulations. There are also opportunities to scale up the model of fish sanctuaries that already exist. Finally, there is a need to carry out carefully planned restoration of degraded mangroves in the southern (foreshore zone) part of Nijhum Dwip (including Domar Char) to sustain resilience of the coastal wetlands, in complement with coastal protection using nature-based approaches along eroding areas of coastline, and deposits of sediment, rubble (some distance from the coast) or through the use of oyster reefs.

1. Background of the Regional Flyway Initiative

In July 2021, the Asian Development Bank made a commitment to develop a long-term Regional Flyway Initiative (RFI) in the East-Asian Australasian Flyway (EAAF) (Sovereign Project 55056-001) to protect and restore priority wetland ecosystems and the associated ecosystem services they provide in the EAAF, the most threatened migratory bird flyway globally. The Initiative is slated for implementation in nine ADB developing member countries (DMCs) in East, South and Southeast Asia: Mongolia, People's Republic of China (PRC), Bangladesh, Viet Nam, Cambodia, Philippines, Thailand, Malaysia and Indonesia. In 2023, the geographic scope of the RFI was further extended to two DMCs in Southeast Asia and the Pacific respectively, Lao PDR and Papua New Guinea.

The primary aim of the RFI is to enhance and expand the existing efforts in conserving and managing wetlands of the highest priority for migratory birds within the EAAF through innovative loan and grant financing, and at scale. Consultations and analyses over the development period help identify key interventions to strengthen the management of wetlands, enabling the implementation of nature-based solutions while strengthening biodiversity protection. Over time, the RFI seeks to leverage collaborative opportunities by developing partnerships among important stakeholders including national governments, civil society organizations, communities, regional organizations like the East Asian-Australasian Flyway Partnership (EAAFP), development agencies, the private sector, and other relevant entities.

Through the RFI Technical Assistance (TA) implemented over the RFI's development phase from 2021 to 2024, BirdLife International takes the lead in providing and coordinating technical support for development of the RFI. This is carried out in collaboration with the EAAFP and a consortium of international non-governmental organizations including Wetlands International and the Paulson Institute, as well as two universities, namely the University of Southampton, UK and the National University of Singapore. Over the development phase, the TA team undertook a site selection analysis to identify priority wetland sites in all 10 countries based on recent bird data benchmarked against internationally accepted criteria under the Convention on Wetlands of International Importance (or Ramsar Convention), EAAFP Flyway Network Sites and Important Bird and Biodiversity Areas (IBAs). The team further developed ecosystem services profiles for prioritised wetlands using a multi-pronged approach used the TESSA ecosystem services assessment tool, and data-driven modelling of water-based ecosystem services and stored carbon.

In Bangladesh, a total of 20 wetland sites, including many Asian Waterbird Census count sites, were initially assessed through data analysis and expert consultation, of which eight (8) were defined and identified to be RFI priority sites on the basis that they support more than 1% the flyway population of at least one EAAF migratory waterbird species. Five of the RFI sites identified in Bangladesh are coastal wetlands, a consequence of the country's long coastline, with the largest cluster of priority sites being the Sundarbans and the Meghna Delta, which consist of a cluster of three sites. 17 EAAF species exceeded the 1% threshold at the site level in Bangladesh, with species such as Masked Finfoot reaching in excess of 50% of its flyway (and global) population (eastern Sundarbans) and the Spoon-billed Sandpiper. Other species with important non-breeding populations in the Bangladesh include the Indian Skimmer *Rynchops albicollis* and the Baer's Pochard *Aythya baeri*.

2. Site profile of Hatiya Island (including Nijhum Dwip National Park)

Location: This RFI site is located in the outer estuary of the Meghna River, in Noakhali District, Chattogram Division, southern Bangladesh. It includes the coastlines of Hatiya Island, the nearby, rapidly accreting islands of Nijhum Dwip and Domar Char, and several smaller islands.

Area: The Hatiya Island RFI site has an area of 16,335 ha

Altitude: 0-1.5 m asl.

Geographical coordinates: 22.08°N, 91.07°E

Description of site: Hatiya Island is one of the largest and most densely populated of the low-lying islands in the outer Gangetic (Meghna) delta, with a long history of human settlement. The entire island is surrounded by an embankment, constructed by the Water and Power Authority to protect it from tidal insurgence, but there are extensive intertidal mudflats outside this seawall at Mach Char Char in the northwest and at Sagaria in the southeast, and the shape of the island is subject to continuous change because of erosion and tidal insurgence. Nijhum Dwip (Char Osman) surfaced to the south of Hatiya Island during the 1960s as a result of sediment deposition, and afforestation since 1972 has allowed the island to be settled. The main habitats in Hatia Island and the associated islands are intertidal mudflats, sandflats and salt-flats, mangroves, coastal brackish and saline lagoons, estuarine waters and shallow marine waters, with particularly rich and extensive mudflats and sand bars on Nijhum Dwip and Domar Char. These habitats provide rich feeding grounds for waterbirds, and high-tide roosts for shorebirds. The AWC counting locations in this site are Bahauddin Char east mudflat, Char Birbira, Char Kalam, Domar Char, East Nijhum Dwip, Hatiya north, Hatiya Island east coast, Jahajmara, Nijhum Dwip northeast char, and northwest Nijhum Dwip.

Site administration, management and land tenure: Nijhum Dweep National Park was designated in 2001 and established as an EAAFP Flyway Network Site in 2011. The Bangladesh Forest Department is the landowner and the management authority for the park, and a management plan is available to download (UNEP-WCMC 2024, <https://eaaflyway.net/the-flyway/flyway-site-network>). The waters around Nijhum Dwip were designated as a Marine Reserve/ Marine Protected Area in 2019, with the Fisheries Department as the management authority (UNEP-WCMC 2024). Most of Hatia Island, Ghasiar Char and Maulvir Char and the whole of Shahebani Char are under private ownership, part of Ghasiar Char is owned by the Forest Department and most of Char Bhata is owned by the Government and under the control of the Forest Department.

Social and economic values: Hatia Island is densely populated with numerous towns and villages and a ferry port at Char Bhata, and areas that have been afforested. The smaller islands have a more dynamic physical environment, with frequent erosion and accretion, which influences the potential for human habitation and economic activities. Around 15,000 people live on Nijhum Dweep and the neighbouring islands, including about 70% engaged in fishing and 30% engaged in agriculture and livestock (see also Ilyas & Thompson 2018). Fishing provides one of the main sources of income, and the other important economic activities are cultivation of rice, seasonal vegetables and various fruits, grazing by domestic

livestock, river transportation and local trade, and collection of fuelwoods from afforested areas. There is a large landless population, who are employed seasonally as farm labourers, earth-cutting workers or in fishing activities.

Nijhum Dwip National Park protects a large part of the newly accreted island of Nijhum Dwip, which today supports 2,600 hectares of (regenerated) forest and woodland cover, and more than 10,000 ha of the surrounding coastal waters and the shoal of Domar Char. Nijhum Dwip directly supports an estimated 30,000 residents (as at 2016), of which the majority (70%) are involved in fishing, especially for the economically important Hilsha (Ilyas & Thompson 2018) while some are involved in artisanal fish aquaculture.

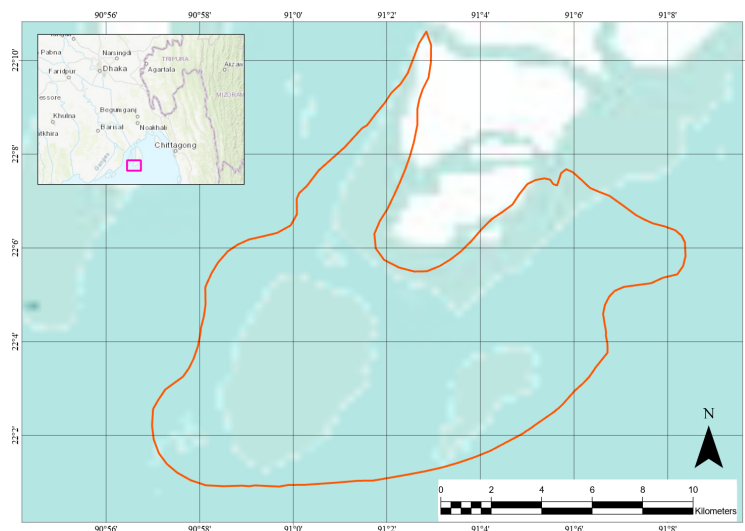


Figure 1 Map of Nijhum Dwip Domar Char and Hatiya, showing its boundary (in red) and location within Bangladesh (in pink, inset map) (data from EAAFP Site Information Sheet).

3. Biodiversity value of Hatia Island (including Nijhum Dwip National Park)

3.1. Key Habitats

Hatia Island is one of the largest and most densely populated of the low-lying islands in the outer Gangetic (Meghna) delta, with a long history of human settlement. Nijhum Dwip (Char Osman) surfaced to the south of Hatia Island during the 1960s as a result of sediment deposition, and afforestation since 1972 has allowed the island to be settled. The main habitats in Hatia Island and the associated islands are intertidal mudflats, sandflats and salt-flats, mangroves, coastal brackish and saline lagoons, estuarine waters and shallow marine waters, with particularly rich and extensive mudflats and sand bars on Nijhum Dwip and Domar Char.

3.2 Importance of Hatia Island to migratory waterbirds

The intertidal wetlands in Hatia Island (including Nijhum Dwip National Park) are important feeding and roosting habitats for migratory waterbirds. Count data from the 2018-2022 Asian Waterbird Census (AWC) was used in the RFI priority sites analysis there. Several counts were conducted there annually, and the results of these were averaged over this five-year period and then compared to the Conservation Status Review (CSR1) 1% population estimates to calculate a score for each species. The three migratory waterbird species (Table 1) were found to regularly exceed the 1% population thresholds during these five years, and the CSR1 scores for these species were summed to produce the overall site score.

Hatia Island, including Nijhum Dwip National Park is exceptionally important for Indian Skimmer (EN), one of the most threatened waterbirds in tropical Asia, with the CSR1 score indicating that this site regularly supports more than 10% of the flyway (and global) population of the species. In addition to this highly threatened waterbird, the AWC recorded small numbers of five other threatened and near-threatened waterbird species on Hatia Island between 2018-2022, namely Black-headed Ibis *Threskiornis melanocephalus* (NT), Black-tailed Godwit *Limosa limosa* (NT), Spoon-billed Sandpiper *Calidris pygmaea* (CR), Curlew Sandpiper *Calidris ferruginea* (NT) and Spotted Greenshank *Tringa guttifer* (EN). Two threatened raptor species also occur, Greater Spotted Eagle *Clanga clanga* (VU) and Eastern Imperial Eagle *Aquila heliaca* (VU).

Table 1 List of migratory species (based on EAAFP list of species) with globally significant congregations in Nijhum Dwip and Hatia Island.

Species name	IUCN	Average count	CSR1	CSR1 score
Indian Skimmer <i>Rynchops albicollis</i>	EN	429	40	10.7

Species name	IUCN	Average count	CSR1	CSR1 score
Lesser Sandplover <i>Charadrius mongolus</i>	LC	1,495	300	5.0
Black-headed Ibis <i>Threskiornis melanocephalus</i>	NT	125	100	1.2

3.3 Other notable biodiversity

Much of Nijhum Dwip and the other islands have been planted with mangroves by the Forest Department, creating unique man-made stands of coastal mangroves. Several globally threatened mammals and reptiles occur in the Central Meghna Delta, including Asian Small-clawed Otter *Aonyx cinereus* (VU), Ganges River Dolphin *Platanisia gangetica* (EN) and Yellow Monitor *Varanus flavescens* (EN).

4. Ecosystem services

4.1. Ecosystem services provided by Hatia Island (including Nijhum Dwip National Park)

Hatiya Island overlaps with various coastal habitats, providing valuable regulating ecosystem services (Table 3). The results from the RFI workshop¹ highlights the top ecosystem services provided by the site, emphasising their essential and non-substitutable nature (Figure 2). Regulating services such as global climate regulation, flood hazard regulation, and storm hazard regulation, are crucial for the region. These services have positively benefited communities at all distances. Erosion and salinity regulations benefit both within and adjacent communities.

¹ Asian Development Bank. (2024, May 27–29). *Bangladesh: Wetland Ecosystem Services Workshop* [Workshop]. Srimangal, Moulvibazar, Bangladesh. <https://events.development.asia/learning-events/bangladesh-wetland-ecosystem-services-workshop>

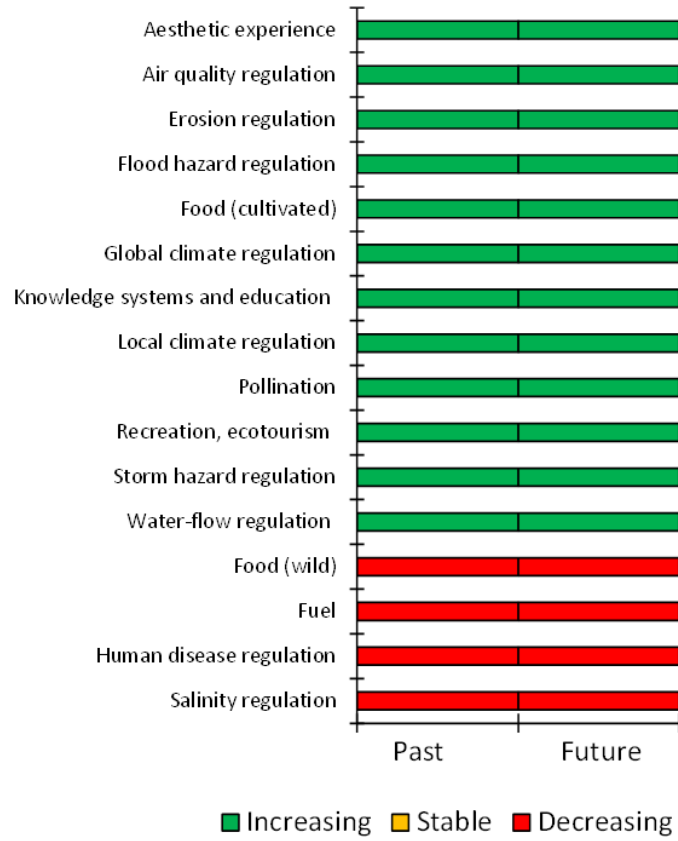


Figure 2 List of ecosystem services provided by Hatiya Island (including Nijhum Dwip National Park), as identified through stakeholder consultation at the Regional Flyway Initiative (RFI) workshop.

Table 2 List of top ecosystem services provided by Hatiya Island (including Nijhum Dwip National Park).

Ecosystem services	Essential or non-substitutable	Benefits to communities			Change	
		Within the site	Adjacent to the site	Distant to the site	Past	Future
<i>Regulating services</i>						
Global climate regulation	Yes	✓	✓	✓	Increase	Increase
Flood hazard regulation	Yes	✓	✓	✓	Increase	Increase
Storm hazard regulation	Yes	✓	✓	✓	Increase	Increase
Erosion regulation	Yes	✓	✓		Increase	Increase
Salinity regulation	Yes	✓	✓		Decrease	Decrease

4.2. Global climate regulating services

Based on systematic reviews (Chen and Lee, 2022; Stankovic et al., 2023), the amount of carbon stored in Hatiya Island's wetlands (including Nijhum Dwip National Park) is estimated to range from 300,000 to 814,000 tonnes, while the annual carbon sequestration rate is estimated to be between 5,870 and 6,490 tonnes per year.

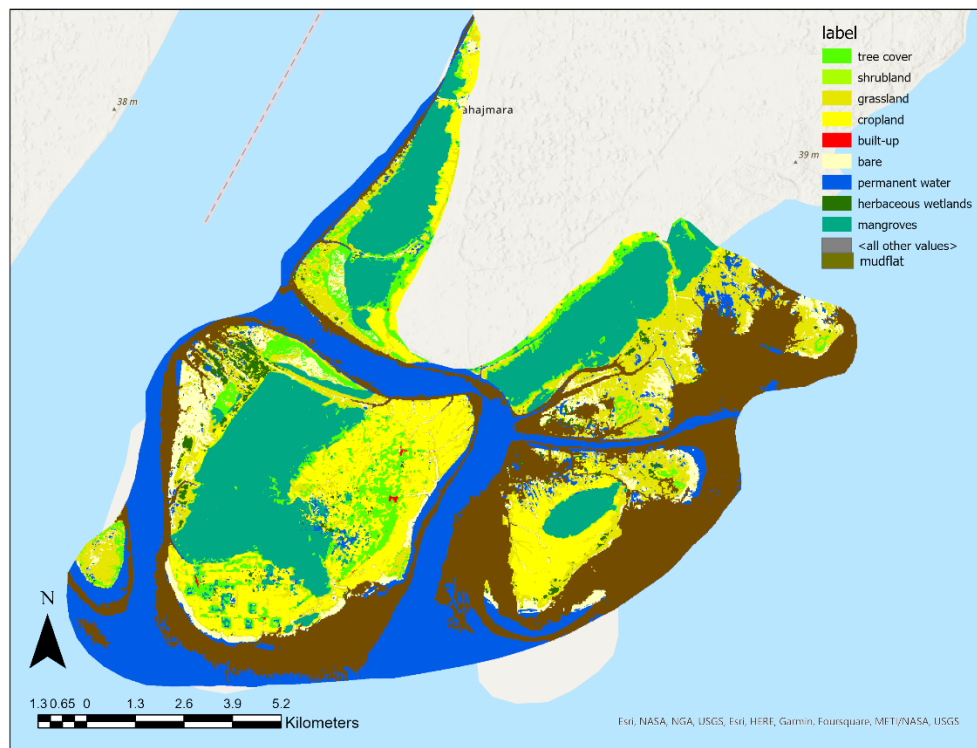


Figure 3 Map of Nijhum Dwip, showing the relative distribution of different land cover types (map: Radhika Bhargava).

4.3. Coastal protection services

The coastal protection services provided by the Hatiya Island were assessed using both biophysical indices and monetary values (see Tables A1 and A2, and Annex 1 for details). When compared to both the average of the five RFI coastal sites and the average of all other coastal areas in Bangladesh (Table A3 in Annex 1), Hatiya Island shows some only partly mixed results in terms of risk level:

1. for the potential exposure to coastal hazards, Hatiya Island is below average compared to RFI coastal sites (index: 3.10 vs. 3.13), but above average compared to all other coastal areas (index: 3.10 vs. 2.99);

2. for the contribution to reducing coastal risk as a proportion of population density within 2.5 km of the coast, Hatiya Island should be considered below these averages for RFI coastal sites and all other coastal areas because it was estimated as zero; but
3. for the contribution to reducing coastal risk as a percentage of the maximum potential exposure, Hatiya Island is consistently above average (5.06% vs. 2.39% for RFI coastal sites and 5.06% vs. 1.69% for all other coastal areas).

In monetary terms (see Table A4 in Annex 1), Hatiya Island ranks below both the national RFI and overall country averages in terms of total annual benefits per ha of mangroves (21,346 vs. 165,936 or 18,638 USD/ha). Moreover, Hatiya Island is also well below the average of all RFI coastal sites in Bangladesh regarding benefits against 100-year return period storms (19 vs. 544 million USD).

5. Drivers of change and their potential impacts on Hatiya Island (including Nijhum Dwip National Park)

5.1. Current drivers of change and their level of impact

Stakeholders at the RFI workshop² identified several drivers of change impacting Hatiya Island, and their corresponding levels of impact on the wetland site (see Table 3). High-impact drivers include commercial and industrial areas, which significantly modify the natural landscape and contribute to habitat degradation. Housing and settlement developments further exacerbate the problem by fragmenting habitats and altering land use.

Annual and perennial non-timber crop production poses moderate threats to the site's ecological balance (medium impact). Other medium-impact drivers include dams within or upstream of the wetland, which alter the hydrological regime and disrupt the natural water flow. Energy generation projects, such as hydropower dams and solar panels, have moderately modified the site. Additional medium-impact activities include erosion and siltation, fishing and harvesting of aquatic resources, garbage and solid waste, habitat clearing, and habitat shifting. Household sewage, urban wastewater, industrial mining, and livestock farming have a medium-level impact on the wetland. Other moderate threats include isolation from natural habitats, loss of keystone species, oil and gas drilling, shipping lanes and canals, recreational activities, and tourism infrastructure.

² Asian Development Bank. (2024, May 27–29). *Bangladesh: Wetland Ecosystem Services Workshop* [Workshop]. Srimangal, Moulvibazar, Bangladesh. <https://events.development.asia/learning-events/bangladesh-wetland-ecosystem-services-workshop>

Table 3 Drivers of change and their potential impact on the integrity of Hatia Island (including Nijhum Dwip National Park) based on consultations with stakeholders.

Driver of change	Impact
Commercial and industrial areas	High
Housing and settlement	
Annual and perennial non-timber crop production	Medium
Dams within or upstream of the wetland site, which alter the hydrological regime	
Earthquakes/tsunamis	
Energy generation, including from hydropower dams, wind farms and solar panels	
Erosion and siltation/deposition	
Fishing, killing and harvesting of aquatic resources	
Garbage and solid waste	
Habitat clearing	
Habitat shifting and alteration	
Household sewage and urban wastewater from outside the wetland site	
Increased fragmentation within the wetland site	
Industrial, mining and military effluents	
Isolation from other natural habitats	
Livestock farming and grazing	
Loss of keystone species	
Oil and gas drilling; extraction of sand	
Ports with large scale loading and unloading of goods	
Recreational activities and tourism	
Sewage and wastewater from wetland site facilities	
Shipping lanes and canals	
Storm and flooding	
Temperature extremes	
Wood pulp and plantations	
Activities of site managers	
Agricultural and forestry effluents	
Air-borne pollutants	
Collecting terrestrial plants or plant products (non-timber)	
Dams, hydrological modification and water management/use	
Desertification	
Destruction of cultural heritage buildings, gardens, sites, etc.	
Drought conditions	
Droughts	
Drug cultivation	
Excess energy	
Excess ponding of water onsite	
Fire and fire suppression	
Hunting, killing and collecting of terrestrial animals	
Introduced genetic material	
Invasive animal species	
Invasive plant species	
Logging and timber harvesting	
Loss of cultural links, traditional knowledge and/or management practices	
Loss of hydrological connectivity	
Marine and freshwater aquaculture	
Mining and quarrying	
Natural deterioration of important cultural wetland site values	
Other 'edge effects' that degrade the wetland site values	
Pathogens	
Research, education and other work-related activities	
Restoration for conservation	
Roads and railroads	
Tourism and recreation infrastructure	
Utility and service lines	
Vandalism, destructive activities or threats to staff and visitors	
Water extraction/diversion within the wetland site or catchment	

5.2. Potential alternative state of Hatiya Island (including Nijhum Dwip National Park) under current drivers of change

Nijhum Dwip's stakeholders at the RFI workshop³ defined the most plausible future alternative state (to 2035), and how this will translate to a net change in the cover of different types of wetland habitat types within this wetland (current habitat cover vs future alternative cover; Figure 4). The alternative state of

³ Asian Development Bank. (2024, May 27–29). *Bangladesh: Wetland Ecosystem Services Workshop* [Workshop]. Srimangal, Moulvibazar, Bangladesh. <https://events.development.asia/learning-events/bangladesh-wetland-ecosystem-services-workshop>

the site assumes there will be no changes in the current drivers of change impacting the site, and the current management regime.

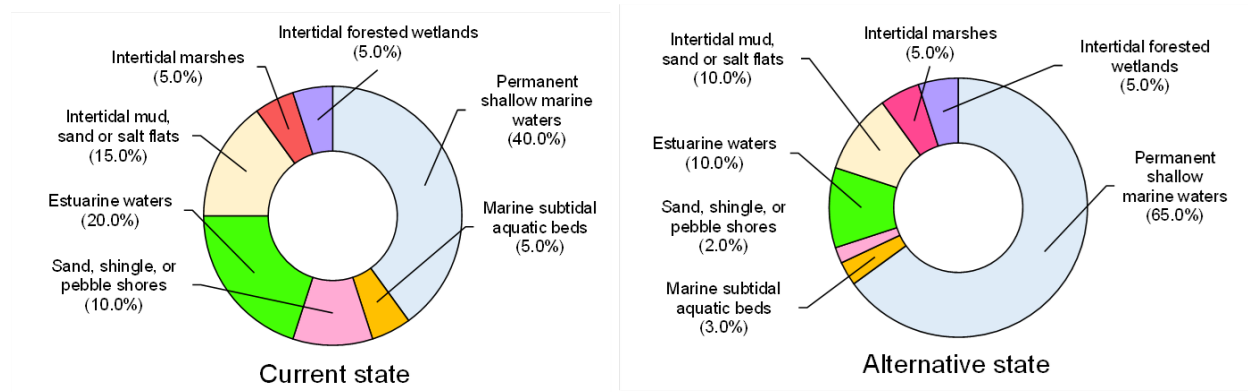


Figure 4 The proportional change in the extent of different habitat types between the current and alternative states of Hatiya Island (including Nijhum Dwip National Park).

5.3. Expected changes in the ecosystem services of Hatia Island

Stakeholders at the RFI workshop⁴ documented the future trends in the provision of ecosystem services in Hatiya Island (including Nijhum Dwip National Park), indicating if the ecosystem services provided by this site (to 2035) will increase, decrease, or will remain stable if the current drivers of change impacting this site will continue in their present condition, with the intervention remains unchanged.

Figure 2 and Table 2 highlight that regulating services such as global climate regulation, flood hazard regulation, storm hazard regulation, and erosion regulation have shown an increase in the past, with further increases expected in the future. However, salinity regulation has experienced a decrease in the past and is projected to continue decreasing.

In the alternative state, the loss of 33% of intertidal mudflat will result in a loss of stored carbon, estimated to be between 70,600 and 117,000 tonnes, and a decrease in carbon sequestration rate (carbon accumulation) by approximately 1,060 tonnes per year.

A loss of 0 ha of mangroves as presented in Table A5, is not expected to result in any reduction in coastal protection as estimated in 4.3. However, those results suggest that while Hatiya Island’s existing mangroves offer some critical biophysical protection, especially in mitigating worst-case scenarios, the overall effectiveness and economic return of current coverage is limited—highlighting opportunities for targeted restoration to improve both impact and efficiency.

⁴ Asian Development Bank. (2024, May 27–29). *Bangladesh: Wetland Ecosystem Services Workshop* [Workshop]. Srimangal, Moulvibazar, Bangladesh. <https://events.development.asia/learning-events/bangladesh-wetland-ecosystem-services-workshop>

6. Capacity needs in Hatiya Island (including Nijhum Dwip National Park)

The stakeholder consultation and analyses with stakeholders representing government and civil society identified at least eight stakeholder groups with defined roles in the governance and sustainable management of wetlands in Hatiya Island, including Nijhum Dwip National Park. The Bangladesh Forest Department (BFD), the single most important stakeholder, for instance, currently (and is expected to) play key roles in ensuring that Nijhum Dwip, especially the area and coastal waters protected within the national park is well managed and protected (Table 1) and have undertaken reforestation activities on newly accreted land; it however faces major capacity limitations for site management and enforcement of regulations on the ground.

The second largest stakeholder group is the fisheries department, which exercise jurisdiction on fishing activities and the livelihoods of communities living on the coast off Hatiya (Ilyas & Thomson 2018). In 2014, the Climate Resilient Ecosystems and Livelihoods (CREL) project supported by USAID introduced co-management structures for Nijhum Dwip and formed a co-management council and committee with representation of 25 villages, whilst establishing a fish sanctuary on the Muktara channel to strengthen fish protection (Ilyas & Thomson 2018). Overall, the high reliance of local communities on coastal fisheries as the main source of livelihoods herein also means that a government-implemented ban on fishing for 65 days in coastal and marine waters each year (Khan et al. 2023), has particular socioeconomic consequence, while increasing poverty levels for some communities (Islam et al. 2024).

Table 4 Stakeholder groups and their corresponding capacity gaps and needs in Hatiya Island, including Nijhum Dwip National Park.

Stakeholder group	Current role in wetland management (Positive or Negative)	Possible future role in wetland management	Current capacity for sustainable wetland management	Form of capacity development (e.g. training, organisational strengthening etc.)
Forest Department	Management of Nijhum Dwip. Implement biodiversity conservation regulations. Establishing forest plantations.	Conservation & Protection Site and biodiversity management. Wetland restoration and research	Relatively high but there are limitations.	Organisation strengthening through human resources. Strengthen logistics and field coordination
Fisheries Department	Management of fish resources. Implement regulations on fish catches, including fishing tools.	Sustainable management of fish populations. Support aquaculture development. Fish	Relatively high but there are technical capacity gaps.	Training to strengthen awareness of policy frameworks and biodiversity conservation.

Stakeholder group	Current role in wetland management (Positive or Negative)	Possible future role in wetland management	Current capacity for sustainable wetland management	Form of capacity development (e.g. training, organisational strengthening etc.)
		conservation and monitoring.		Strengthen logistics and field coordination.
Local communities	Co-management of the site under existing frameworks. A key beneficiary from the site.	Stronger participation in site management. Sustainable resource use practices. Build stronger awareness.	Low capacity with major gaps. Also challenges of localised poverty due to irregular income (for fishers).	Organisation strengthening through improving human resources.
Local district administration and local government	Land litigation and support development activities.	Stronger role in land use planning and disaster management, sustainable resources use. Drive economic and policy development.	Low capacity	Organisation strengthening through improving human resources. Training to strengthen awareness of policy frameworks and co-management structures.
Fishers and boat owners	A key beneficiary of wetlands – roles in resource. Contributes to coastal pollution and unsustainable harvests if regulations are weak.	Implement new practices for sustainable fishing. Contribute to biodiversity monitoring. Provide community leadership. Eco-friendly transport policies.	Low to limited capacity	Incorporation into cooperatives & co-management structures. Training to strengthen awareness of policy frameworks and participation in co-management structures.
Bangladesh Navy	Border patrol and enforcement of regulations.	Support environmental protection.	Low to limited capacity	Strengthen awareness of environmental issues.
Tourist operators (and tourists)	Support local livelihoods through tourism revenue. Contributes pollution	Strengthen awareness of environment coasts. Tourism	Low to limited capacity	Strengthen awareness of tourism industry of

Stakeholder group	Current role in wetland management (Positive or Negative)	Possible future role in wetland management	Current capacity for sustainable wetland management	Form of capacity development (e.g. training, organisational strengthening etc.)
	and waste management issues.	industry to improve monitoring.		environmental issues.
Conservation non-government organisations	Support community development and the establishment of frameworks for conservation. Support biodiversity monitoring and research.	Strengthen advocacy of key conservation issues and research.	Moderate to high capacity	Support capacity building activities for local communities and government administrations.

7. Opportunities for RFI interventions

7.1 Recommended Interventions

One positive intervention for managing the declining fish stocks around Nijhum Dwip is the creation of a fish sanctuary in the Moktara channel, but its impact may be limited over the short term (Ilyas & Thompson 2018). It may be necessary for new areas of fish sanctuaries to be established around Nijhum Dwip, in complement to policies regulating take during certain times of the year, and policies on fishing net usage (for instance, on net mesh size) to reduce unsustainable take. The limited access to livelihoods for local communities here demonstrate the need to identify tangible alternatives, including through nature-based tourism and boat operators, while improving the resilience of existing fishing communities to seasonal fluctuations in fish harvests. Currently, there are limited ecotourism operators in Hatiya Island, and equally, limited infrastructure for tourists, both domestic and foreign. There are clear gaps to expand (hard) infrastructure to encourage nature-based tourism including through the construction of shelters and signages on Nijhum Dwip, while building the capacity of ecotourism operators to cater to the needs of tourists through microfinancing. This needs to be complemented by a site management plan and a more robust biodiversity monitoring framework, which may be brokered by the Forest Department in collaboration with NGOs.

The capacity of local fishing communities and the co-management councils can be further strengthened, and this may involve improved access to financing (microloans), while promoting sustainable fishing practices and take regulations around Nijhum Dwip. There are also opportunities for the Fisheries Department to replicate the model of fish sanctuaries that already exist, in coordination with the Forest Department.

Restoration of degraded mangroves in the southern (foreshore zone) part of Nijhum Dwip (including Domar Char) may be needed to sustain resilience of the coastal wetlands. Existing stands of mangroves have been successively damaged by annual cyclones in the Bay of Bengal, but they still perform important roles in coastal protection and as fish sanctuaries. This can be complemented by coastal protection using nature-based approaches involving a combination of wooden structures erected along eroding areas of coastline, and deposits of sediment, rubble (some distance from the coast) or oyster reefs.

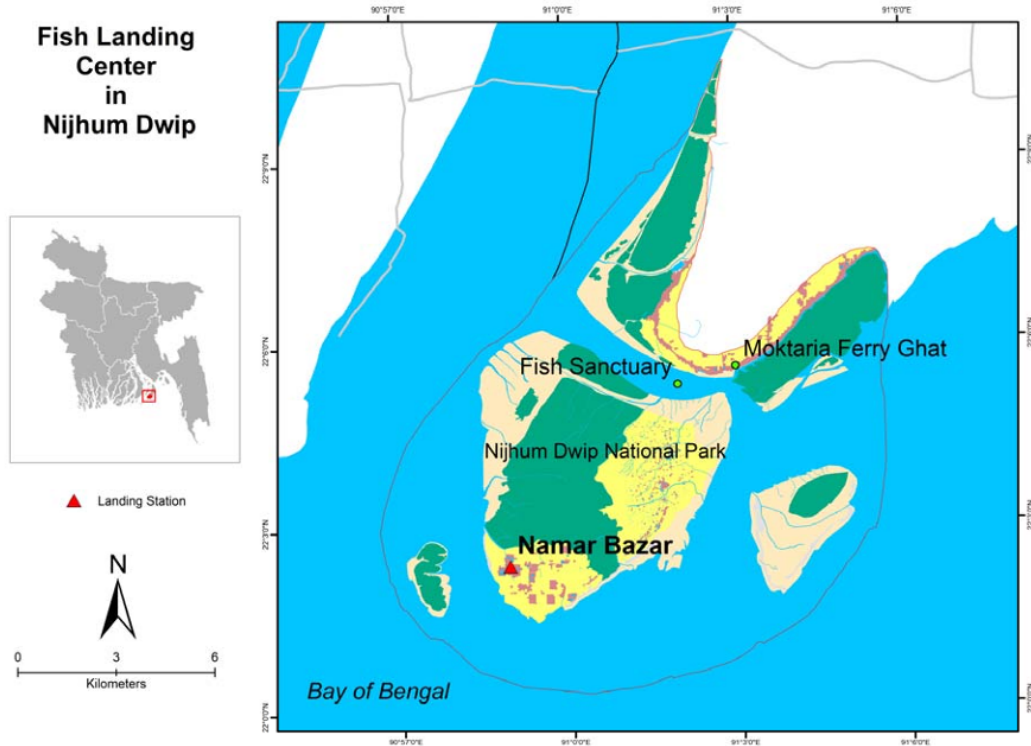


Figure 5: Map showing location of Nijhum Dwip National Park, the fish landing centre on Hatiya and the fish sanctuary created during the CREL project (map adapted from Ilyas & Thompson 2018).

Table 5 Summary of key RFI interventions proposed for Nijhum Dwip and southern Hatiya Island.

Intervention	Outcome	Indicators	Cost	Timeframe	Potential Stakeholders
<i>Component 1: Coastal wetland habitat protection and management</i>					
Creation of (2) new fish sanctuaries using lessons from the existing fish sanctuary in Moktara channel, with support from co-management council.	Coastal fisheries, including stocks of high-value fish such as Hilsha, is better managed.	Number of fishery management policies facilitated Number of established fish sanctuaries	500,000.00	5 years	Forest Department Fisheries Department Local communities Local administration and local government

Intervention	Outcome	Indicators	Cost	Timeframe	Potential Stakeholders
Improved monitoring of migratory waterbirds, including shorebird species, and local threats to biodiversity such as illegal hunting	Restoration of wildlife populations. Increased protection for migratory species.	Number of monitoring activities conducted employing standardized methodology Number of wildlife protection policies facilitated	50,000.00	2 years	Fishers Conservation NGOs
<i>Component 2: Restoration of degraded wetlands</i>					
Restoration of degraded areas of mudflats and mangroves.	Restoration of wildlife populations. Increased protection for migratory species.	Area of restored mangrove ecosystem	500,000.00	5 years	Forest Department Fisheries Department Local communities Local administration and local government Fishers Conservation NGOs
<i>Component 3: Strengthening sustainable wetland-based ecotourism</i>					
Build capacity for alternative livelihoods with a focus on ecotourism development. Creation of microcredit opportunities for small ecotourism operators and targeted training for interested households.	Improved livelihoods for some local communities, through alternative income streams	Number of people benefitting from livelihood activities, with up to 30% beneficiaries from women, youth, elderly, indigenous people, and other vulnerable groups	200,000.00	2 years	Forest Department Fisheries Department Local communities Local administration and local government Fishers Tourist operators
Construct new infrastructure for ecotourism			300,000.00	2 years	Conservation NGOs

Intervention	Outcome	Indicators	Cost	Timeframe	Potential Stakeholders
		on livelihood activities and microcredit Number of ecotourism infrastructure established			
Socioeconomic surveys and consultation with local communities			50,000.00	1 year	
Total investment for five years			6,150,000.00		

7.2 Potential Financing

The estimated project budget is USD 6,150,000 over five years. This project budget covers socioeconomic surveys, stakeholder consultations, construction of new ecotourism and coastal protection infrastructure, capacity-building activities for local communities on sustainable fisheries and ecotourism, mangrove restoration, creation of two new fish sanctuaries, and the updating of the site management plan with the incorporation of a biodiversity monitoring framework.

If around half of the proposed USD 500,000 investment in Hatiya Island is allocated to mangrove restoration, this would enable the rehabilitation of approximately 25 hectares based on average restoration costs. With estimated coastal protection benefits of USD 21,346 per hectare annually (see Section 4.3), this nature-based component could yield approximately USD 533,650 in annual benefits—resulting in a benefit–cost ratio of more than 10:1 for the nature-based component alone. When combined with complementary investments in hard infrastructure, the intervention offers a highly cost-effective and resilient approach to reducing coastal risk. By contrast, prioritizing short-term land uses such as aquaculture may offer immediate returns but would come at the cost of diminished long-term protection, making mangrove restoration a prudent and forward-looking strategy.

7.3 Proposed Institutional Arrangements

A track record of local community participation and empowerment has been developed in Nijhum Dwip (e.g. the CREL project funded by USAID), which has culminated in the establishment of a co-management council and committees. Other local communities can be more involved in the conservation and co-

management of wetland sites. This, for instance, may involve strengthening the enforcement of take policies, creating new fish sanctuaries, and addressing unsustainable fishing activities.

Capacity-building and awareness activities may be led by the Bangladesh Forest Department and the Fisheries Department, in coordination with local administrations, and implemented over a period of 3-5 years. Civil society organisations with a focus on biodiversity conservation and fisheries (rural) development can play a major role in leading and delivering training activities. The Fisheries Department, in coordination with the local administration, may work with conservation organisations to update and implement the site management plans.

7.4 Project Beneficiaries

Nijhum Dwip directly supports an estimated 30,000 residents (as at 2016), of which the majority (70%) are involved in fishing, especially for the economically important Hilsha (Ilyas & Thompson 2018) while some are involved in artisanal fish aquaculture.

There are few indigenous communities in Nijhum Dwip and Hatiya (as with coastal areas in general), but there are major opportunities to strengthen the representation of women and poor fishing communities (including fishing households unrepresented in any wider frameworks), in establishing and/or influencing co-management structures that can otherwise affect their livelihoods.

7.5 Anticipated Implementation Risks

Social Safeguards: As a result of declining fish stocks in coastal waters, the Bangladesh Government passed a 65-day no-take policy, which has been attributed to the recovery of some Hilsha fisheries (Islam et al. 2023). Nonetheless, the impact of the fishing ban, together with the broader pattern of declining fisheries across Bangladesh's coastal waters and the longer-term impact of climate change, has impacted the socioeconomic status of fishing communities, and as a result, heightened the vulnerability of many coastal households (Hossain et al. 2023). Siam et al. (2020) estimated the monthly income of a local fisher at about 7,000-8,000 BDT (c. 55-60 USD) and is sensitive to seasonal fluctuations in fish stocks. Scoping studies will be needed to assess the impact of fishing quotas on domestic incomes and the challenges of implementing quotas in a complex environment.

Environment: Ecotourism has been identified as a key project concept theme. The proposed interventions include new infrastructure that would enhance the tourism experience in the area. Building these infrastructures, however, would induce noise that may disturb the wildlife in the area. Planning with the stakeholders is critical before any infrastructure development.

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Annex 1. Supplementary information on coastal protection services

To further validate the identification of the top ecosystem services by means of stakeholder consultation, an expectedly essential or non-substitutable regulating service across all RFI sites, namely coastal protection and flood mitigation (i.e., storm and flood hazard regulation), was assessed based on a combination of globally available datasets supplemented by web-based tool Co\$tingNature (Mulligan, 2022). Estimates for coastal protection by mangroves (after the effects of coral reefs) were spatially inferred in QGIS from a selection of metrics expressing different biophysical and monetary values modelled by Chaplin-Kramer et al. (2023) and Menéndez et al. (2020), respectively.

The key metrics selected for biophysical values (Table A1) were current maximum potential exposure to coastal hazards, which is a vulnerability risk index calculated in InVEST^[1] for several hazard variables (i.e., wind, waves, sea level rise, geomorphology, and bathymetry) in the hypothetical absence of current mangrove extent, and nature’s (i.e., the mangroves’) contribution to reducing this coastal risk, both as an absolute value multiplied by the local population affected and a percentage of the maximum potential exposure.

Table A1. Contribution of mangroves to coastal protection as a critical natural asset in Hatia Island based on site-level (biophysical) values inferred from Chaplin-Kramer et al. (2023) and expressed as ranges to represent the resulting uncertainty. Key metrics are in italics.

Critical contribution of mangroves to coastal protection (metrics)	Risk levels
Current population density within 2.5 km of the coast (number of people per hectare)	791 – 836
<i>Current maximum coastal risk to be mitigated, or potential exposure to coastal hazards (unitless index)</i>	<i>3.03 – 3.16</i>
Maximum coastal risk to be mitigated, or potential exposure to coastal hazards in 2050 according to IPCC’s Shared Socioeconomic Pathway #1 ‘Sustainability’ (unitless index)	3.40 – 3.55
Maximum coastal risk to be mitigated, or potential exposure to coastal hazards in 2050 according to IPCC’s Shared Socioeconomic Pathway #3 ‘Regional Rivalry’ (unitless index)	3.64 – 3.79
Maximum coastal risk to be mitigated, or potential exposure to coastal hazards in 2050 according to IPCC’s Shared Socioeconomic Pathway #5 ‘Fossil-fueled Development’ (unitless index)	3.82 – 3.98
Current proportional risk reduction, nature’s contribution to reducing coastal risk as a proportion of maximum coastal risk (unitless index)	0.14 – 0.18
<i>Nature’s contribution to reducing coastal risk as a proportion of population density within 2.5 km of the coast (# of people per hectare)</i>	<i>0.03 - 0.04</i>
<i>Nature’s contribution to reducing coastal risk as a percentage of the maximum potential exposure (%)</i>	<i>4.36 -5.75</i>

The key metrics selected for economic values (Table A2) were the annual expected flood protection benefits to total stock, which is the monetary value of the averted damages to the industrial and residential stocks (i.e., property) in 2015 US\$, the same total annual benefits expressed per hectare of

mangroves, and the total benefits in the event of a 100-year return period storm, which are the rarest of cyclonic conditions but cause the most flood damages to property (i.e., maximum level of coastal protection by mangroves).

Table A2. Coastal protection benefits offered by mangroves in Hatia Island based on site-level (monetary) values inferred from Menéndez et al. (2020) and expressed as ranges to represent the resulting uncertainty. Key metrics are in italics.

Benefits of mangroves in terms of coastal protection (metrics)	Avoided costs (US\$)
Mangrove extent (hectares) ²¹	48 – 7,257
Annual expected flood protection benefits to people (number of people)	15,773 – 17,461
Annual expected flood protection benefits to Industrial Stock (US\$)	12,310,016 – 13,626,971
Annual expected flood protection benefits to Residential Stock (US\$)	7,270,752 – 8,048,595
<i>Annual expected flood protection benefits to Total Stock (US\$)</i>	<i>18,588,404 – 20,577,036</i>
<i>Annual expected flood protection benefits to Industrial Stock per hectare of mangroves (US\$ per hectare)</i>	<i>20,262 – 22,430</i>
1-in-100-year return period damage in terms of area flooded (number of hectares)	1,595 – 1,700
<i>Total expected flood protection benefits of mangroves per 100-year return period storms (US\$)</i>	<i>5,510,419 – 5,874,365</i>

Table A3. Biophysical benefits from RFI coastal wetland sites (expressed as ranges to represent the resulting uncertainty) and at the national level.

Site name	Max pot exp (index)	Risk reduction (index * pop)	Risk reduction (% max pot exp)
Central Meghna Delta	3.11 (±0.02)	17 (±2)	0.61 (±0.11)
Eastern Meghna Estuary	3.09 (±0.05)	No Data	No Data
Eastern Sundarbans	2.91 (±0.02)	29 (±2)	4.00 (±0.16)
Nijuhum Dwip NP & FNS	3.10 (±0.06)	0 (±0)	5.06 (±0.69)
Sanadia Island FNS	3.45 (±0.08)	89 (±32)	2.27 (±0.80)
Bangladesh RFI average	3.13	26	2.39
Bangladesh national average	2.99	38	1.69

Table A4. Monetary benefits from RFI coastal wetland sites (expressed as ranges to represent the resulting uncertainty) and at the national level.

Site name	Total annual benefits (US\$)	Per mangrove area (US\$/ha)	For 100-yr return period storms (US\$)
Central Meghna Delta	385,472,048 (±48,974,595)	794,504 (±100,942)	1,476,259,077 (±858,019,635)
Eastern Meghna Estuary	8,289,751 (±48,734)	1,050 (±6.17)	53,592,048 (±786,645)
Sundarbans	167,762,956 (±54,512,767)	5,607 (±1,822)	1,098,664,838 (±3,285,219,032)

Site name	Total annual benefits (US\$)	Per mangrove area (US\$/ha)	For 100-yr return period storms (US\$)
Nijhum Dwip NP & FNS	19,582,720 (±994,316)	21,346 (±1,084)	19,090,534 (±19,325,668)
Sonadia Island FNS	22,061,094 (±20,477,324)	7,176 (±425)	72,607,057 (±992,19)
Bangladesh RFI average	120,633,714	165,936	544,042,711
Bangladesh RFI total	603,168,569	Not Applicable	2,720,213,554
Bangladesh national average	15,050,804	165,936	87,177,719
Bangladesh national total	872,946,651	Not Applicable	4,533,241,399

Table A5. Key habitat types in Hatiya Island (including Nijhum Dwip National Park) based on stakeholder-based assessment at the Regional Flyway Initiative workshop in May 2024.

Habitat type	Current state		Alternative state (2035)	
	Area (ha)	Cover (%)	Area (ha)	Cover (%)
Permanent shallow marine waters	6534.0	40.0	10617.7	65.0
Marine subtidal aquatic beds	816.7	5.0	490.0	3.0
Sand, shingle, or pebble shores	1633.5	10.0	326.7	2.0
Estuarine waters	3267.0	20.0	1633.5	10.0
Intertidal mud, sand or salt flats	2450.2	15.0	1633.5	10.0
Intertidal marshes	816.7	5.0	816.7	5.0
Intertidal forested wetlands	816.7	5.0	816.7	5.0
Total	16335.0	100.0	16335.0	100.0