



# Regional Flyway Initiative · Site Study

May 2026

## **RFI Priority Site · Tanguar Haor and Panabeel**

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## General Site Information

Country	Bangladesh		
RFI Site Name	Tanguar Haor	ID004	
City/ Municipality, Province, Region	Sunamganj District, Sylhet Division		
Geographical coordinates	25.13°N, 91.03°E	Area (has)	15,907 has
Key species	EAAF species: Common Pochard, Ferruginous Duck. Pallas's Fish Eagle.		
Key habitats (biomes)	permanent freshwater marshes/ pools, seasonal/ intermittent freshwater marshes/ pools, non-forested peatlands, permanent rivers/ streams/ creeks, seasonal/ intermittent/ irregular rivers/ streams/ creeks, permanent freshwater lakes, and seasonal/ intermittent freshwater lakes		
Key ecosystem services	Cultivated goods and harvested wild goods (provisioning services)		
Key drivers of change	Agricultural pollution, unsustainable fishing, habitat degradation		
Conservation status (mark all that applies)	<input type="checkbox"/>	Protected Area	<input type="checkbox"/>
	<input type="checkbox"/>	Ramsar Site	<input type="checkbox"/>
		Flyway Network Site	Others _____
IBA/ KBA name (and number) and other designations	Tangoar Haor and Panabeel		
Management Stakeholders	Department of Environment, Haor Management Board, Forest Department, Department of Fisheries, local government administrations		
With management plan?	Yes		
Project concept themes	Biodiversity protection, microfinance for small-scale fishers and rice farmers. Strengthening fisheries through new fish sanctuaries.		
Length of project	5 years		
Sector/s	Fisheries, agriculture		
No. of potential beneficiaries	Roughly 2,000 fisherfolks		
Indigenous Peoples	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
		Yes _____	
Anticipated Implementation Risks	Reduction of flood mitigation benefits, impact of the new fish harvesting regulations and fish sanctuaries on the livelihoods of the local communities		
Estimated Project Budget (US\$)	7,050,000 over five years		
Potential Source/s of Financing	<input checked="" type="checkbox"/>	Loan (to be identified)	<input type="checkbox"/>
	<input type="checkbox"/>	Grant	<input type="checkbox"/>
		Private Sector	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
MACH	Management of Aquatic ecosystems through Community Husbandry project
NGO	Non-governmental Organisation
RFI	Regional Flyway Initiative
RMO	Resource Management Organisation
TESSA	Toolkit for Ecosystem Services Assessment
THMP	Tanguar Haor Management Plan
USAID	United States Agency for International Development
USD	United States Dollars

## Executive Summary

Tanguar Haor and Panabeel (25.13°N, 91.03°E) is a large freshwater wetland that lies in the floodplain of the Surma River, one of the main tributaries of the Brahmaputra, near the base of the Meghalaya Hills (in adjacent India). One-third of the haor lies in Tahirpur Thana and the remaining two-thirds in Dharmapasha Thana, both of located in Sunamganj District, Sylhet Division. At 15,907 ha, Tanguar is the largest inland freshwater wetland in Bangladesh and supports large congregations of ducks such as Ferruginous Duck *Aythya nyroca* and other migratory waterbirds (e.g. Black-tailed Godwit *Limosa limosa*) together with the globally threatened Pallas's Fish-eagle *Haliaeetus leucoryphus*, Baer's Pochard *Aythya baeri* and Common Pochard *A. ferina*, although the numbers of wintering ducks have declined in recent decades. Tanguar Haor was designated as a Ramsar Wetland of International Importance in 2000, with its management authority being the Department of Environment, and further recognised as an EAAFP Flyway Network Site in 2011; some parts of Tanguar are further designated as Ecologically Critical Areas (ECAs) by the government. Provisioning services through cultivated and harvested wild goods are the most important ecosystem services identified for Tanguar, not surprising given the site's importance to rice cultivation at the national level.

As with most of wetlands in Bangladesh's haor basin, a development priority for Tanguar Haor is to strengthen access and benefit-sharing for impoverished communities, especially for households whose sole form of livelihood is fishing or rice cultivation. This can be done through strengthening existing co-management structures for fisheries management by increasing local community participation, establishing new means of microfinance for local people to access credit, while improving guidance and regulation for sustainable fisheries (including implementation of quota for fishing take, good practices for sustainable fisheries), and the creation of new fish sanctuaries to complement existing ones. To date, at least five fish sanctuaries have been established in Tanguar Haor but there is a need for more to protect the wetland's stretched fisheries. Meanwhile, there are large gaps to address for biodiversity conservation at this site, and this is expected to include efforts to strengthen local awareness of wildlife such as migratory waterbird species and Fishing Cat, and participation in biodiversity monitoring, while leveraging on ecotourism as an alternative livelihood for local communities: this may be strengthened by improving access to wetlands and associated infrastructure for short-term tourists.

Improving water management through science-based management plans, new infrastructure and flood management and warning systems are also important and has been identified as an urgent gap to address for Tanguar Haor. This may require construction of new water management channels and associated structures, given the demand for water from surrounding paddy fields. Finally, there are opportunities for the development of biodiversity conservation and monitoring mechanisms, in alignment with the THMP. Wildlife populations (e.g. migratory waterfowl, fishing cat) appear to be showing signs of recovery based on existing data and to enhance biodiversity conservation there are opportunities for (1) improving habitat management (currently limited) of vegetation for migratory species such as waterbirds, including the control of floating vegetation (e.g. water hyacinth) and the restoration of degraded areas of aquatic vegetation and stronger protection of existing areas of reedbeds, and (2) woodland restoration through targeted planting.

# 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. Three sites are floodplain wetlands in the Haor Basin of northern Bangladesh, in the watershed of the Brahmaputra. 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*, one of the most threatened duck species in Asia.

## 2. Site profile of Tanguar Haor and Panabeel

*Location:* Tanguar Haor and Panabeel is a large freshwater wetland that lies in the floodplain of the Surma River, one of the main tributaries of the Brahmaputra River in northeast Bangladesh, near the base of the Meghalaya Hills (in adjacent India). One-third of the wetland lies in Tahirpur Thana and two-thirds in Dharmapasha Thana, both of which are located in Sunamganj District of Sylhet Division (Figure 1).

*Area:* The area of the Tanguar Haor RFI site is 15,907 ha. The wetland covers an area of up to 9,727 ha during the rainy season, of which 2,802 ha is permanent wetland that remains during the wet season. During the dry season, the wetland shrinks to become several (more than 80) smaller beels.

*Altitude:* 2.5-5.5 m asl.

*Geographical coordinates:* 25.13 N, 91.03 E

*Description of site:* Tanguar Haor and Panabeel is one of the last remaining (semi-) natural floodplain wetlands in Bangladesh. The open waters of the lake are characterised by free-floating plant species, and the haor wetland is characterised by some of the last remnants of swamp forest in Bangladesh, dominated by *Barringtonia acutangula* (hijal) and *Pongamia pinnata* (koroach). Reedbeds are also present, with *Phragmites karka* (nal) and other emergent species but have been severely reduced in area because of collecting for fuel and thatch. The haor is flooded during the northern summer monsoon (June-September), when the waters reach 6-10 metres in depth in the beels, and in the dry northern winter months the water depth in the beels ranges from 2-6 metres. The waters in Tanguar haor are mostly backed up from the Baulai-Surma river system, with some inflow from streams from the Meghalaya hills, in India, to the north. The AWC counting locations at Tanguar Haor and Panabeel are Chatainna Beel, Hatirgatha Beel, Hatir Kada, Lessamara, Rupaboi, Rupa Boi Beel, Rowa Beel and Tanguar Haor.

*Site administration, management and land tenure:*

Tanguar Haor is recognised as a Ramsar site and as an 'ecological critical area' since 1999, supporting more than 140 fish species and important fish breeding areas (Alam et al. 2015; Sultana et al. 2022).

The management authority is the Department of Environment, and a management plan is available (UNEP-WCMC 2024). Tanguar Haor was established as an EAAFP Flyway Network Site in 2011. All wetlands in Bangladesh are government property controlled by the Ministry of Land, and Tanguar Haor is monitored by the local *upazila* and district land administrations. The haor wetlands are designated as Ecologically Critical Areas (ECAs), which are also managed by the Department of Environment, with Tanguar Haor managed by the Deputy Commissioner, Sunamganj, Department of Environment. The Forest Department is responsible for Wildlife Conservation; the Bangladesh Haor Development Board under the Ministry of Water Resources is responsible for water management and water control infrastructure; and the



### 3. Biodiversity value of Tanguar Haor and Panabeel

#### 3.1. Key habitats

Tanguar Haor and Panabeel is one of the last remaining (semi-) natural floodplain wetlands in Bangladesh. The open waters of the lake are characterised by free-floating plant species, and the haor wetland is characterised by some of the last remnants of swamp forest in Bangladesh, dominated by *Barringtonia acutangula* (hijal) and *Pongamia pinnata* (korocho). Key habitat types in Tanguar Haor, based on the stakeholder-based assessment at the Regional Flyway Initiative workshop in May 2024, included permanent freshwater marshes/ pools, seasonal/ intermittent freshwater marshes/ pools, non-forested peatlands, permanent rivers/ streams/ creeks, seasonal/ intermittent/ irregular rivers/ streams/ creeks, permanent freshwater lakes, and seasonal/ intermittent freshwater lakes.

#### 3.2 Importance of Tanguar Haor to migratory waterbirds

The extensive freshwater wetlands at Tanguar Haor and Panabeel support large congregations of ducks and other migratory and resident waterbirds, although the numbers of migratory ducks visiting the lake have declined in recent decades. Count data from the 2018-2022 Asian Waterbird Census (AWC) was used in the RFI priority sites analysis. Multiple 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 five migratory waterbird species in 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.

In addition to Ferruginous Duck and Black-tailed Godwit, the AWC recorded small numbers of three globally threatened and near-threatened species at Tanguar Haor and Panabeel during 2018-2022, namely Common Pochard *Aythya ferina* (VU), Baer's Pochard *Aythya baeri* (CR) and Falcated Duck *Mareca falcata* (NT). Two threatened raptor species occur, a breeding population of Pallas's Fish-eagle *Haliaeetus leucoryphus* (EN) and wintering Greater Spotted Eagle *Clanga clanga* (VU) (see also Chowdhury et al. 2022).

Tanguar Haor and Panabeel are rich in grassland and marsh-dwelling passerines, including a breeding population of Bristled Grassbird *Schoenicola striatus* (VU). The threatened Swamp Grass-babbler *Laticilla cinerascens* (EN) and Marsh Babbler *Pellorneum palustre* (VU), both specialist species restricted to the Brahmaputra floodplains of India and Bangladesh, have also been reported to occur there.

Table 1 EAAF waterbird species that exceed their 1% flyway thresholds based on CSR1.

Species name	IUCN	Average count	CSR1	CSR1 score
Ferruginous Duck <i>Aythya nyroca</i>	NT	6,294	1,000	6.3
Garganey <i>Spatula querquedula</i>	LC	7,472	1,400	5.3
Black-tailed Godwit <i>Limosa limosa</i>	NT	2,800	1,600	1.8
Gadwall <i>Mareca strepera</i>	LC	10,346	7,100	1.5
Common Teal <i>Anas crecca</i>	LC	10,656	7,700	1.4

### 3.3 Other notable biodiversity

Tanguar Haor and Panabeel include one of the last remnants (at Rangchi, in the southwestern part of the haor) of the *Barringtonia-Pongamia* swamp forests, the climax vegetation that was once widespread in the Haor basin and provided habitat for many species. Tanguar Haor is an important spawning and breeding ground for 135 fish species, a sizeable proportion (50%) of the freshwater fish species found in Bangladesh, including threatened species such as the Giant Devil Catfish *Bagarius bagarius* (VU). At least three threatened reptile species occur there, the Yellow Monitor *Varanus flavescens* (EN), Indian Roofed Turtle *Pangshura tecta* (VU) and Indian Flapshell Turtle *Lissemys punctata* (VU), and two threatened mammal species, Indian Pangolin *Manis crassicaudata* (EN) and Fishing Cat *Prionailurus viverrinus* (VU).

## 4. Ecosystem services

### 4.1. Ecosystem services provided by Tanguar Haor and Panabeel

Tanguar Haor and Panabeel feature diverse wetland habitats, offering valuable provisioning, regulating, and cultural ecosystem services (Fig. 2). The results from the RFI workshop<sup>1</sup> highlights the top ecosystem services provided by the site, emphasising their essential and non-substitutable nature (Table 2). Provisioning services for cultivated and wild food benefit local and adjacent communities. Regulating services such as local climate regulation and flood hazard regulation are crucial, positively impacting

<sup>1</sup> 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>

communities at all distances. Cultural services, specifically nature-based recreation and ecotourism, significantly benefit communities within, adjacent to, and distant from the site.

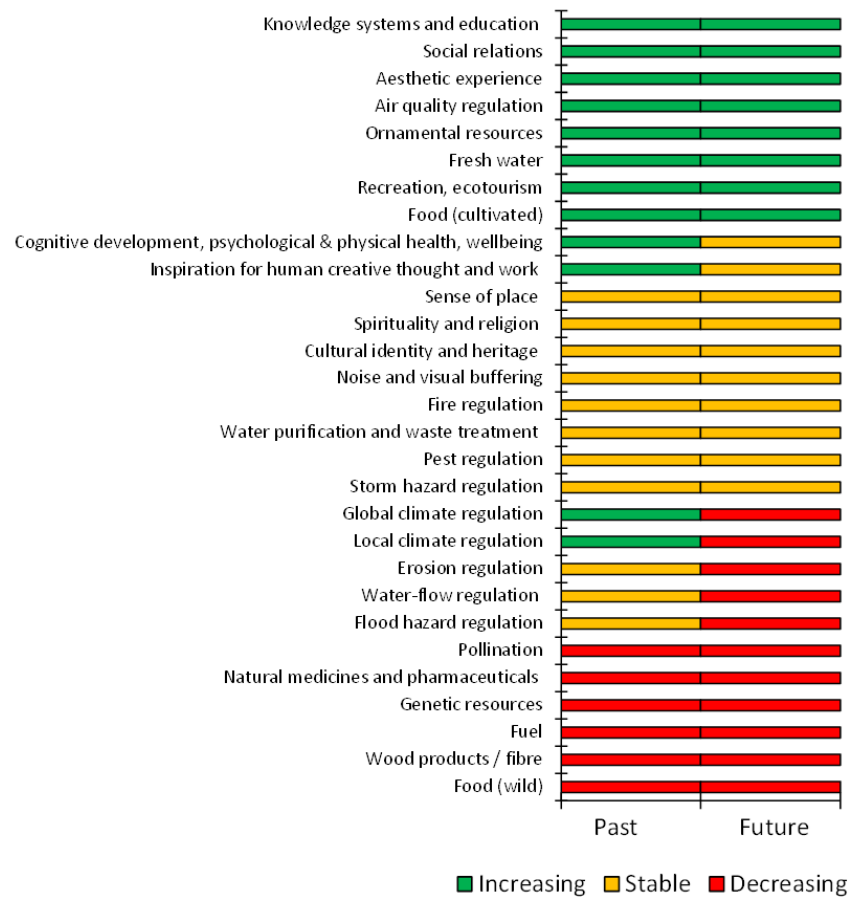


Figure 2 List of ecosystem services provided by Tanguar Haor and Panabeel, as identified through stakeholder consultation at the Regional Flyway Initiative workshop.

Table 2 List of top ecosystem services provided by Tanguar Haor and Panabeel.

Ecosystem services	Essential or non-substitutable	Benefits to communities			Change	
		Within the site	Adjacent to the site	Distant to the site	Past	Future
<i>Provisioning services</i>						
Food (cultivated)		✓	✓		Increase	Increase
Food (wild)	Yes	✓	✓		Decrease	Decrease
<i>Regulating services</i>						
Local climate regulation	Yes	✓	✓	✓	Increase	Decrease
Flood hazard regulation		✓	✓	✓	No change	Decrease
<i>Cultural services</i>						
Recreation, ecotourism		✓	✓	✓	Increase	Increase

## 4.2. Global climate regulating services

Based on the look-up values from a FAO report (Dondini et al. 2023) and IPCC (2006), the amount of carbon stored in Tanguar Haor and Panabeel is estimated to range from 1,000,000 to 1,450,000 tonnes, while the annual carbon sequestration rate estimated to be between 7,760 and 13,500 tonnes per year.

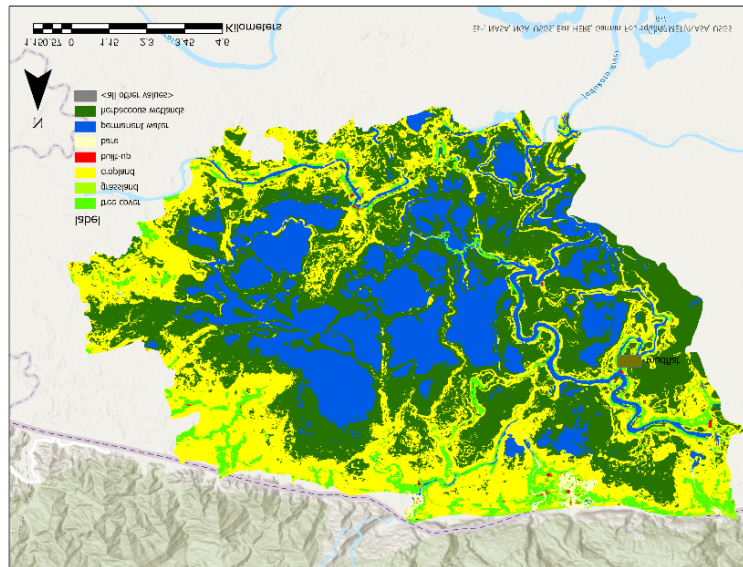


Figure 3 Map of Tanguar Haor, showing the relative distribution of different land cover types (map: Radhika Bhargava).

## 4.3. Flood mitigation services

The flood mitigation services provided by Tanguar Haor were assessed using biophysical values only (see Table A1 and Annex 1 for details). When compared to both the average of the three RFI inland sites and the average of all other inland wetlands in Bangladesh (Table A2 in Annex 1), Tanguar Haor shows some consistent results in terms of benefits and beneficiaries:

1. for the average green storage capacity per sq. km of wetland, Tanguar Haor is below average (298 vs. 325 Giga Litres or GL of water per  $\text{km}^2$  for RFI inland sites and 355  $\text{GL}/\text{km}^2$  for all other inland wetlands);
2. for the average population uniquely benefitting from influential green storage upstream per sq. km of wetland, Tanguar Haor is also well below average (29 vs. 82 people/ $\text{km}^2$  of RFI inland sites and 348 people/ $\text{km}^2$ ); and
3. for the average built-up area uniquely benefitting from influential green storage upstream per sq. km of wetland, Tanguar Haor is again below average when compared to RFI inland sites (0.59  $\text{ha}/\text{km}^2$  vs. 0.96  $\text{ha}/\text{km}^2$ ) or to all other inland wetlands (0.59 vs. 1.93  $\text{ha}/\text{km}^2$ ).

## 5. Drivers of change and their potential impacts on Tanguar Haor and Panabeel

### 5.1. Current drivers of change and their level of impact

Stakeholders at the RFI workshop<sup>2</sup> identified 39 drivers of change impacting Tanguar Haor and Panabeel, and their corresponding levels of impact on the wetland site (Table 3). High-impact drivers include agricultural and forestry effluents, which contribute significantly to water pollution and habitat degradation. Dams and other hydrological modifications disrupt the natural water flow, impacting the wetland's ecological balance. Biological resource use, such as fishing, hunting, and collecting terrestrial animals, poses substantial threats to biodiversity. Increased fragmentation within the wetland, invasive plant species, livestock farming and grazing, recreational activities, and tourism infrastructure further exacerbate habitat loss and degradation. Additionally, sewage and wastewater from facilities contribute to water contamination.

Medium-impact drivers include erosion and siltation/deposition, which affect habitat quality and water conditions. Garbage and solid waste, habitat clearing, and isolation from other natural habitats add to the medium-level impact on the site's health. Other notable medium-impact factors include the loss of hydrological connectivity, loss of keystone species, edge effects that degrade wetland values, pathogens, roads and railroads, and vandalism or destructive activities.

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<sup>2</sup> 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 Tanguar Haor and Panabeel based on consultations with stakeholders.

Driver of change	Impact
Agricultural and forestry effluents	High
Dams within or upstream of the wetland site, which alter the hydrological regime	
Dams, hydrological modification and water management/use	
Fishing, killing and harvesting of aquatic resources	
Hunting, killing and collecting of terrestrial animals	
Increased fragmentation within the wetland site	
Invasive plant species	
Livestock farming and grazing	
Recreational activities and tourism	
Sewage and wastewater from wetland site facilities	
Tourism and recreation infrastructure	
Erosion and siltation/deposition	Medium
Garbage and solid waste	
Habitat clearing	
Isolation from other natural habitats	
Loss of hydrological connectivity	
Loss of keystone species	
Other 'edge effects' that degrade the wetland site values	
Pathogens	
Roads and railroads	
Vandalism, destructive activities or threats to staff and visitors	
Air-borne pollutants	
Annual and perennial non-timber crop production	
Collecting terrestrial plants or plant products (non-timber)	
Commercial and industrial areas	
Drought conditions	
Droughts	
Energy generation, including from hydropower dams, wind farms and solar panels	
Excess energy	
Excess ponding of water onsite	
Fire and fire suppression	
Habitat shifting and alteration	
Housing and settlement	
Introduced genetic material	
Logging and timber harvesting	
Loss of cultural links, traditional knowledge and/or management practices	
Natural deterioration of important cultural wetland site values	
Temperature extremes	
Water extraction/diversion within the wetland site or catchment	

## 5.2. Potential alternative state of Tanguar Haor and Panabeel under current drivers of change

Stakeholders at the RFI workshop<sup>3</sup> 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 site (current habitat cover vs future alternative cover; Figure 4). The alternative state of the site assumes there will be no changes in the current drivers of change impacting the site, and the current management regime.

<sup>3</sup> 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>

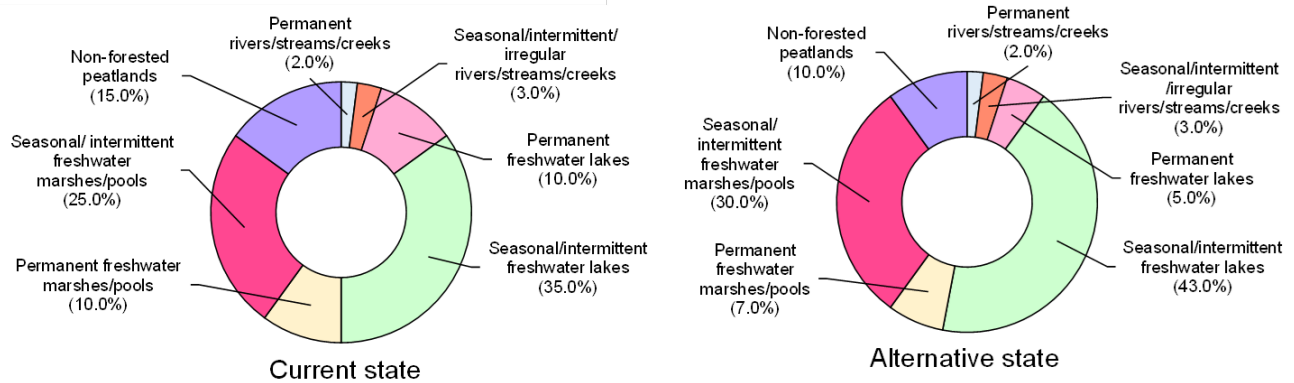


Figure 4 The proportional change in the extent of different habitat types between the current and alternative states of Tanguar Haor and Panabeel.

### 5.3. Expected changes in the ecosystem services of Tanguar Haor and Panabeel

Stakeholders at the RFI workshop<sup>4</sup> documented the future trends in the provision of ecosystem services in Tanguar Haor and Panabeel, 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 provisioning service for cultivated food has shown an increase in the past, with a continued increase anticipated in the future. In contrast, provisioning service for wild food has experienced a decline in the past and is projected to keep decreasing. Local climate regulation has seen an increase in the past but is expected to decrease in the future. Flood hazard regulation has remained stable in the past but is projected to decline. Cultural ecosystem service, specifically nature-based recreation and ecotourism have seen an increase in the past and is expected to continue rising.

In the alternative state, the loss of 33% of peatland with the gain of 6% of wetlands (which include permanent freshwater marshes/pools and seasonal/intermittent freshwater marshes/pools) will result in a gain of stored carbon, estimated to be between 5,730 and 8,270 tonnes, and a decrease in carbon sequestration rate (carbon accumulation) by approximately 791 tonnes per year

A loss of 477.2 hectares of green water habitats including permanent freshwater marshes, seasonal freshwater marshes, and non-forested peatlands as presented in Table A5, however equivalent to 3% of the total land use for the site, is expected to result in a disproportionate, effective loss of 6% or 18 Giga Litres of green storage capacity per km<sup>2</sup>. This significant impact, calculated against the area of key wetland habitats, may amount to nearly 15 people and 0.07 hectares of built-up areas losing flood mitigation benefits per km<sup>2</sup> of wetland.

<sup>4</sup> 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 Tanguar Haor and Panabeel

The stakeholder consultation and analyses with stakeholders representing government and civil society identified at least three groups of stakeholders with clear roles in the long-term sustainable management of wetlands in Tanguar Haor. Major gaps exist for government stakeholders in relation to strengthening the management and restoration of wetland landscapes, biodiversity and agricultural landscapes, and livestock. In Tanguar Haor, local communities and the development of local-led livelihood opportunities have been identified as the single most important stakeholder. There are major opportunities to strengthen livelihoods of local communities through fisheries and ecotourism, and potentially in partnership with the private sector, which can include small-scale enterprises and entrepreneurs, and a few larger companies.

*Table 4 Stakeholder groups and their corresponding capacity gaps and needs in Tanguar Haor.*

Stakeholder group	Current role in wetland management	Possible future role in wetland management	Current capacity for sustainable wetland management	Form of capacity development (e.g. training, organisational strengthening)
Ministry of Land	Managing lease of <i>jalmahal</i>	Upgrading lease value	Adequate	-
Department of Fisheries	Oversee the establishment of fish sanctuaries	Enhancement of Fish production & aquatic resource	Limited, with constrains in human resources and logistics	Training to strengthen awareness and policy frameworks  Strengthen logistics and field coordination  Human resources
Department of Agriculture Extension	Crop production	Development of crop production	Adequate	-
Department of Livestock	Oversee cattle grazing and poultry	Enhance livestock production	Adequate	-
Forest Department	Wildlife and habitat protection. Wetland restoration.	Oversee wildlife and habitat protection.  Promoting and strengthening nature-based tourism	Limited, with constraints in human resources and logistics	Training to strengthen awareness and policy frameworks  Strengthen logistics and field coordination  Human resources

Stakeholder group	Current role in wetland management	Possible future role in wetland management	Current capacity for sustainable wetland management	Form of capacity development (e.g. training, organisational strengthening)
Water Development Board	Manage water infrastructure, including excavation of channels and pools	Protection of water bodies from Siltation	Limited, with constraints in human resources and logistics	Strengthen logistics and field coordination  Strengthen financing for projects.
Department of Environment	Environmental monitoring.  Oversee enforcement of environmental regulations.	Environmental management	Limited, with constraints in human resources and logistics.	Training to strengthen awareness and policy frameworks  Strengthen logistics and field coordination.
Conservation organisations, including local NGOs	Wetland restoration and protection. Biodiversity monitoring.  Mobilising local communities.	Wetland restoration and protection  Mobilising local communities; strengthening awareness	Adequate	NA

## 7. Opportunities for RFI interventions

### 7.1 Recommended Interventions

The Haor Basin of northern Bangladesh on the Brahmaputra floodplains hold several freshwater wetland landscapes of high conservation priority such as Tanguar Haor (Sultana et al. 2022). The per annum value of Tanguar Haor's fisheries are estimated at 151,128,000 BDT (Sultana et al. 2022). Local (fishing and farming) communities here have limited access to credit and remain impoverished and therefore are highly vulnerable to climate change (Rahaman et al. 2016). Local levels of poverty remain high. There is considerable scope for stronger (and better coordinated) management and interventions to strengthen the livelihoods of local people involved in fisheries and nature-based tourism through access to the wetlands, and the scope of this, to a large extent, is addressed in the Tanguar Haor Management Plan (THMP) (Alam et al. 2015).

Strengthening access and benefit-sharing for livelihood opportunities, especially for fishing communities, can also be expected to ensure a more sustainable use of declining fisheries (Sun et al. 2017), and in alignment with the priorities outlined in the THMP (see Chowdhury 2010; Alam et al. 2015; Rahaman et al. 2016). This can be done through strengthening existing co-management structures by increasing local community participation, strengthening microfinance for local communities to access credit, improving guidance and regulation for sustainable fisheries (including enforcement of quota for take, good practices for sustainable fisheries, and fishing seasons), and the creation of new fish sanctuaries (at least five has been established; see also Rahaman et al. 2016). Meanwhile, there is scope for soft interventions to strengthen local awareness of wildlife such as migratory waterbird species and Fishing Cat, in complement with biodiversity monitoring. At the RFI stakeholder workshop in December 2024, ecotourism was identified as potentially offering alternative sources of economic benefits for local communities and can be strengthened by improving access to wetlands and associated infrastructure for short-term tourists. At present, very limited infrastructure exists on site but there is potential for constructing new shelters, observation hides and structures for the benefit of visiting (domestic) tourists, alongside access roads during the dry season, shelters, waste management facilities (storage and transfer for better disposal of solid waste) and solar-run facilities. There is also considerable scope to build capacity for nature-based tourism through training programmes for local communities, facilitated by the local authorities and the Forest Department.

Improving water management through science-based management plans, new infrastructure and flood management and warning systems are also important, and has been identified as a priority by stakeholders, especially farmers affected by flooding. A better understanding of the water use regimes in landscapes around the Tanguar Haor wetlands is urgently needed as there has been a reduction of water area under the currently unsustainable use regimes. This may require construction of new water management channels and associated structures.

Finally, there are opportunities for the development of biodiversity conservation and monitoring mechanisms, in alignment with the THMP. Wildlife populations (e.g. migratory waterfowl, fishing cat) appear to be showing signs of recovery and to enhance wildlife protection measures there are

opportunities for (1) improving habitat management (currently limited) of vegetation for migratory species such as waterbirds, including the control of floating vegetation (e.g. water hyacinth) and the restoration of degraded areas of aquatic vegetation and protection of existing areas of reedbeds, (2) woodland restoration to targeted planting, and the (3) creation of community-led conservation areas for migratory waterbirds (Alam et al. 2023), including leasing areas of wetlands such as reedbeds for biodiversity management.

*Table 5 Summary of the key interventions needed to improve the management of the Tanguar Haor wetlands.*

<b>Intervention</b>	<b>Outcome</b>	<b>Indicators</b>	<b>Cost (USD)</b>	<b>Timeframe</b>	<b>Potential Stakeholders</b>
<i>Component 1: Coastal wetland habitat protection and management</i>					
Strengthen access of local communities to wetlands (leasing framework, tenure) and credit under existing co-management structures for local communities.	Livelihood benefits for local communities strengthened, and poverty addressed.	<p>Number of community-led conservation areas facilitated</p> <p>Number of people benefitting from livelihood activities, with up to 30% beneficiaries from women, youth, elderly, indigenous people, and other vulnerable groups</p> <p>Number of people trained on livelihood activities and microcredit</p>	500,000	2 years (micro-finance mechanism should be established alongside capacity building activities)	<p>Ministry of Land</p> <p>Department of Fisheries</p> <p>Department of Agriculture Extension</p> <p>Department of Livestock</p> <p>Forest Department</p> <p>Department of Environment</p> <p>Conservation NGOs</p>

Intervention	Outcome	Indicators	Cost (USD)	Timeframe	Potential Stakeholders
Establishing new fish sanctuaries to complement existing sanctuaries.	Improved (alternative) livelihoods for local communities (especially local people collecting NTFPs such as reeds, fishing) and rice agriculture.	Number of fishery management policies facilitated Number of established fish sanctuaries	500,000.00	5 years. Expected to involve targeted dredging and deepening of identified water bodies, and creation of channels.	Ministry of Land Department of Fisheries Department of Agriculture Extension
Habitat restoration and biodiversity monitoring.	Wetland ecosystem more resilient. Wildlife population (e.g. wetland birds, fishing cat) sustained, or showing signs of recovery. Restored areas of woodland.	Number of monitoring activities conducted employing standardized methodology Number of supported habitat management and wetland conservation activities in community-led conservation areas	100,000.00	5 years	Department of Livestock
Habitat management and conservation of wetlands (including reedbeds) and the development community-led conservation areas.			1,000,000.00	3 years (includes the costs of acquiring short-term leases of the wetlands)	Forest Department Department of Environment Conservation NGOs Local government and administration
Socioeconomic surveys and consultation with local communities			50,000.00	1 year	
<b>Total investment for five years</b>			<b>7,050,000.00</b>		

## 7.2 Potential Financing

The estimated project cost is USD 7,050,000 over five years. This project budget covers community consultations, wetland management and restoration activities, biodiversity monitoring with a focus on waterbirds and the flagship Pallas' Fish Eagle, creation of two fish sanctuaries, capacity-building activities on sustainable fisheries, and creation of microfinancing mechanisms for about 100-300 local households.

Construction of access infrastructure such as roads and trails, for tourism and water management infrastructure is expected to contribute to wetland degradation and increased siltation, potentially impacting fisheries. Stronger 'take' policies on fisheries may impact the livelihoods of local people in the short term.

### 7.3 Proposed Institutional Arrangements

Local communities can be more involved in the conservation and management of Tanguar Haor through existing co-management structures, as already implemented in other wetland systems in Bangladesh. Fishing take policies need to be better enforced and regulated by local district authorities and the Department of Fisheries to control unsustainable fishing activities, alongside regulations on illegal fishing and encroachment.

### 7.4 Project Beneficiaries

Fishing is currently carried out by fisherfolk recruited from well outside the district, and a temporary fishing camp is annually established to house more than 2,000 fishermen and their families.

Vulnerable local communities, including households largely dependent on fishing or rice agriculture as a main source of livelihoods, are not well represented in the existing co-management structures. Interventions to strengthen the representation of women and disadvantaged groups in livelihood development opportunities, including nature-based tourism will help improve co-management structures. The role of indigenous people is probably relatively minor as there are no major indigenous community here.

### 7.5 Anticipated Implementation Risks

*Climate:* The projected future state of Tanguar Haor indicates a loss of 477,2 has of permanent freshwater marshes/pools, seasonal/intermittent freshwater marshes/pools, and non-forested peatlands equivalent to nearly 48 people and 0.21 hectares of built-up areas losing flood mitigation benefits from Tanguar Haor per km<sup>2</sup> of wetland. Determining mitigation strategies for project interventions will help ensure the reduction of climate-related impacts on activities.

*Social Safeguards:* The implementation of new fish harvesting regulations and fish sanctuaries, as part of wider fisheries co-management plans of Tanguar Haor may have significant implications on the livelihoods of local communities. Scoping studies will be necessary to assess the impact of fishing quotas on domestic incomes, the challenges of implementing quotas in a complex environment, and the development of alternative income sources for affected communities.

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## Annex 1. Supplementary information on flood mitigation 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 flood mitigation were spatially inferred in QGIS from a selection of metrics expressing different biophysical values modelled online by the Water World component of this tool. Equivalent data to assess monetary values similarly to coastal protection were not available for the RFI region.

The key metrics selected for biophysical values (Table A1) were the average green storage capacity, which is the volume of water stored by each square kilometre of wetland itself as well as its soil and vegetation, and the direct influence of this storage capacity on beneficiaries found downstream of the wetland, both as the average number of people and the average built-up area that are uniquely benefitting from the resulting flood mitigation (and not from other green storage found upstream).

**Table A1.** Contribution of the wetland habitats to flood mitigation in Tanguar Haor and Panabeel based on site-level (biophysical) values inferred from Mulligan (2022) and expressed as ranges to represent the resulting uncertainty.

Influence of the wetland on flood mitigation (metrics)	Benefit/Beneficiaries
Average green storage capacity per sq. km of wetland in million cubic metres (GigaLitres/km <sup>2</sup> )	280 – 319
Average population uniquely benefitting from influential green storage upstream per sq. km of wetland (n/km <sup>2</sup> )	240 – 273
Average built-up area uniquely benefitting from influential green storage upstream per sq. km of wetland (ha/km <sup>2</sup> )	1.06 – 1.20

**Table A2.** Biophysical benefits from and beneficiaries of RFI inland wetland sites (expressed as ranges to represent the resulting uncertainty) and at the national level.

Site name	Green storage capacity (GigaLitres/km <sup>2</sup> )	Downstream population (n /km <sup>2</sup> )	Downstream built-up area (ha /km <sup>2</sup> )
Hail Haor (including Baikka Beel)	407 (±18)	382 (±17)	1.07 (±0.05)
Hakaluki Haor	269 (±24)	244 (±21)	0.40 (±0.06)
Tanguar Haor	299 (±19)	256 (±16)	1.13 (±0.07)
Bangladesh RFI average	325	294	0.96
Bangladesh national average	355	348	1.93

**Table A5.** Key habitat types in Tanguar Haor and Panabeel 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 rivers/streams/creeks	318.1	2.0	318.1	2.0
Seasonal/intermittent/irregular rivers/streams/creeks	477.2	3.0	477.2	3.0
Permanent freshwater lakes	1,590.7	10.0	795.3	5.0
Seasonal/intermittent freshwater lakes	5,567.3	35.0	6,839.9	43.0
Permanent freshwater marshes/pools	1,590.7	10.0	1,113.5	7.0
Seasonal/ intermittent freshwater marshes/pools	3,976.7	25.0	4,772.0	30.0
Non-forested peatlands	2,386.0	15.0	1,590.7	10.0
<b>Total</b>	<b>15,906.7</b>	<b>100.0</b>	<b>15,906.7</b>	<b>100.0</b>