UNITED NATIONS DEVELOPMENT PROGRAMME
Country: Bangladesh

PROJECT DOCUMENT

Project Title: Expanding the Protected Area System to incorporate Important Aquatic Ecosystems
UNDAF Outcome(s)/ Indicator(s): Outcome 5.2: By 2016, vulnerable populations benefit from natural resource management (NRM); environmental governance and low- emission green development; *Indicator: Number of new government policies, strategies or plans formulated in support of sustainable use of natural resources*
UNDP Strategic Plan Primary Outcome: Sustainable human development is embedded substantively in development debate and action at all levels
Expected CPAP Outcome(s) /Output/Indicator(s): Output 5.2.1: Communities and local and National authorities are better able to conserve biodiversity and manage natural resources in a pro-poor and Sustainable manner.
Executing Entity/ Implementing Partner: Ministry of Environment and Forests
Implementing Entity/ Responsible Partner: Bangladesh Forest Department
Brief description: The Sundarbans represents the rich tapestry of biodiversity of Bangladesh. It supports one of the last remaining populations of the Ganges and the Irrawaddy dolphins and holds the key for their long-term survival on a global level. However, they are under increasing threat due to unsustainable fishery; increasing maritime traffic; vessel collision; unplanned economic development; poaching; land-use change; climate change etc. In order to ensure the long-term conservation of these cetaceans, it is imperative to consolidate their key habitats, while also taking into account development imperatives, livelihoods and impacts of climate change. However, there are several barriers that prevent this – primarily inadequate capacities at the level of government and communities. This project strives to address these and to augment the conservation prospects of the region through: (i) knowledge generation and dissemination that improves decision making related to the management of aquatic habitats, (ii) new and additional areas to be managed as protected areas and buffer areas identified, notified and capacities developed for improved management effectiveness of conservation, (iii) support to the implementation of Management Plans of new PAs and buffer areas, (iv) monitoring and evaluation framework and replication strategy developed for effective aquatic PA management specifically for the Sundarbans and other aquatic ecosystems in the country, (v) community based resource management plan prepared, capacities developed and financial support extended for operationalizing sustainable fishing practices and conservation of aquatic biodiversity, and (vi) strategies for alternate income generation and livelihood diversification developed and implemented leading to reduced dependence on natural resources.

Programme Period: 2014-2019 **Atlas Award ID:** **Atlas Project ID:** **PIMS:** 4620 **Start date:** 2014 **End Date:** 2019 **Management Arrangements:** NIM	**Total budget:** **US$ 10,126,484** **Total allocated resources (cash)**: US$ 1,626,484 **Partner-managed** o **Government** US$ 3,000,000 o **UNDP-managed** US$ 5,500,000

***Agreed by Implementing Partner (Government of Bangladesh)**:*

NAME SIGNATURE Date/Month/Year

Agreed by (UNDP):

NAME SIGNATURE Date/Month/Year

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ACRONYMS

BARI	Bangladesh Agricultural Research Institute
BDT	Bangladesh Taka
BECA	Bangladesh Environment Conservation Act
BFRI	Bangladesh Forest Research Institute
BLRI	Bangladesh Livestock Research Institute
BMD	Bangladesh Meteorological Department
BNH	Bangladesh National Herbarium
BPATC	Bangladesh Public Administration Training Centre
BPC	Bangladesh Planning Commission
BRRI	Bangladesh Rice Research Institute
BWDB	Bangladesh Water Development Board
CHT	Chittagong Hill Tracts
CO	Country Office
CZP	Coastal Zone Policy
DAE	Department of Agricultural Extension
DFO	Divisional Forest Officer
DOE	Department of Environment
DMB	Disaster Management Bureau
ECA	Ecologically Critical Area
ECC	Environmental Clearance Certificate
ECNEC	Executive Committee of the National Economic Council
ECR	Environment Conservation Rules
EIA	Environmental Impact Assessment
ESRF	Eastern Sundarbans Reserve Forest
FD	Forest Department
GDP	Gross Domestic Product

GEF	Global Environment Facility
GNI	Gross National Income
IUCN	International Union for Nature Conservation
LDC	Least Developed Countries
MDG	Millennium Development Goals
MOA	Ministry of Agriculture
MOEF	Ministry of Environment and Forests
MOFL	Ministry of Fisheries and Livestock
MOWR	Ministry of Water Resources
NAEM	National Academy for Educational Management
NAPD	National Academy for Planning and Development
NARS	National Agricultural Research System
NBSAP	National Biodiversity Strategy and Action Plan
NCS	National Conservation Strategy
NEC	National Economic Council
NEMAP	National Environment Management Action Plan
NEP	National Energy Policy
NGO	Non Government Organization
NNI	Net National Income
NTFP	Non Timber Forest Product
SEMP	Sustainable Environment Management Programme
UNDP	United Nations Development Programme
WARPO	Water Resources Planning Organization
WCS	Wildlife Conservation Society
WSRF	Western Sundarbans Reserve Forest

I. Situation Analysis

A: CONTEXT

National context

1. The People's Republic of Bangladesh, nestled between the Indo-Himalayas and Indo-Chinese sub-regions (between 20^0 and 27^0 N and 88^0 and 93^0 E), is the farthest downstream alluvial zone of three major river systems of the Himalayan Range – the Ganges, the Brahmaputra, and the Meghna. Of the country's total geographic area of 147,570 km^2, about 80% is comprised of one of the world's largest deltas (floodplains and wetlands networked over 300 rivers) bordered by India in the West, North and Northeast; by Myanmar in the Southeast and by the Bay of Bengal in the South.[1]

2. With a population of more than 160 million, Bangladesh supports one of the highest human densities (1,015/km^2) in the world.[2] Although fertility rates have declined in recent years, at the current growth rate (1.34% per annum), the population is projected to reach 220 million by 2040.[3] Around 75% of the population is rural and a significant proportion (around 35 million or 22%)[4] lives along the 710 km long coastal belt.[5] Over 98% of the people are Bengali and predominantly Bangla-speaking, the rest comprise mainly of indigenous tribes from the Chittagong Hill Tracts.[6]

3. Notwithstanding the notable strides made in economic and social development in recent decades[7], Bangladesh is still among the Least Developed Countries (LDCs). In the Human Development Index, it ranked 146 (out of 187 countries) in 2012.[8] During 2012-13, the Per Capita Gross National Income (GNI) was calculated as $923 whereas the Per Capita Net National Income (NNI) stood at $859.[9] An estimated 50 million people still live in poverty, including almost 18% living under extreme poverty.[10 & 11] Despite these challenges, the net primary-school enrollment has reached 94.7% and under-five childhood mortality has declined by 58% from 133 to 56 per 1,000 live birth in 1989-1993 and 2005-2009, and the country is on track to meet its United Nations Millennium Development Goals of 48 under-five deaths per 1,000 live births by 2015. Similarly, infant mortality rate has declined by 48% from 87 to 45 per

[1] GOB, 2010: Rio + Report on Sustainable Development
[2] BBS 2011: Population and Housing Census
[3] BBS 2011: Population and Housing Census
[4] World Bank. 2010: Country Assistance Strategy for the People's Republic of Bangladesh
[5] PDO-ICZMP, 2004: *Where Land Meets the Sea: A Profile of the Coastal Zone of Bangladesh*; and BBS,2001 Census
[6] Some 90% is Muslim, the rest being Hindu, Christian or Buddhist.
[7] Between 1980 and 2012, Bangladesh's life expectancy at birth increased by 14.0 years, mean years of schooling increased by 2.8 years, expected years of schooling increased by 3.7 years and GNI per capita increased by about 175 percent (UNDP, 2013: Human Development Report)
[8] UNDP, 2013: Human Development Report
[9] In 2010, Bangladesh was ranked third out of 95 countries in terms of greatest progress made in human development and for having doubled its Human Development Index (HDI) since 1980 (UNDP, 2010). Noteworthy development achievements include sustained and remarkably resilient economic growth over the last decade (on average 5.8% per annum growth in GDP); reductions in the poverty headcount ratio from nearly 48.9% in 2000 to 31.5% in 2010 and an estimated 26% in 2015 (2.5% lower than the MDG goal) and achieving gender parity in primary and secondary education at the national level (with regional variations). (Source: BBS Household Survey 2010; Bangladesh Poverty Assessment Report (World Bank, 2013))
[10] defined as severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information
[11] BBS Household Survey, 2010.

1,000 births over the same time period.[12] However, more than two-thirds of the rural population is landless or effectively landless (i.e. own less than 0.2 ha land). More than half of the country's population directly depends on natural resources for survival and well-being.[13]

4. Bangladesh remains a predominantly agrarian economy with agriculture occupying nearly 76% of the total land area of the country. Other important economic activities related to land/water use and food production include fisheries, aquaculture, and salt production. Over 60 million people depend on aquatic resources with an estimated one million working as full-time fishers and another 11 million engaged in part-time fishing. The latter are especially significant for the nutritional security of the poor.[14] While agriculture employs the largest proportion of the labour force (around 47.3%[15]), its proportional contribution to GDP has been falling. During 2012-13, the combined share of agriculture and forestry sector stood at 14.3% of GDP (at constant prices) and 13.7% (at current prices). The fisheries sector is estimated to employ around 5% of the workforce and contributed some 3.6% of GDP (at current prices) in 2012-13.[16] Service sector and Industrial sector contribute around 50% and 30% respectively to the country's GDP.[17] Foreign remittances and the export-led garment industry have been the dual engines of the national economy in recent times.

5. Annual consumption of fish in Bangladesh is 11.9 kg per capita (in 2010), accounting for 11.1% of total protein consumption. Altogether, some 76% of the fish consumed are inland species and 18% marine. Urban annual consumption stands at 14.5 kg/capita and rural consumption at 11.0 kg per capita per year, with rural communities eating a larger percentage of inland fish (70%) than urban communities (61%). The most commonly consumed freshwater species include tilapia, catfish and mrigal carp. Hilsa shad is the most commonly consumed marine species and is a valued commodity for export.[18]

6. One of the most disaster-prone nations in the world, Bangladesh experiences frequent, extreme & erratic weather events and storms that cause wide-spread economic, ecological, and social damage. For instance, of the 250,000 deaths reported worldwide due to cyclones between 1980 and 2000, around 60% occurred in Bangladesh.[19] In the past 200 years, the country experienced at least 70 major cyclones, of which 40 have occurred since 1948.[20] Floods are major recurring phenomena that affect around 30-50% of the country each year. Around 93 major disasters were recorded between 1991 and 2000 that caused nearly 200,000 deaths and a direct economic loss of approximately US$ 5.9 billion or around 0.5 – 1% of the country's annual GDP. Women bear a disproportional brunt of such natural disasters.[21]

Climate and geographic context

[12] http://www.cpc.unc.edu/measure/publications/tr-12-87
[13] MoEF/GoB, 2012; UNDP 2011; World Bank 2010.
[14] Parveen and Faisal, 2001 in MoEF 2004 (NBSAP)
[15] BBS Labour Force Survey, 2010
[16] Bangladesh Bureau of Statistics,2013
[17] BTI 2012; UN-REDD 2012
[18] FAO. 2014. The State of World Fisheries and Aquaculture, 2014. http://www.fao.org/3/a-3720e.pdf?utm_source=publication&utm_medium=qrcode&utm_campaign=sofia14
[19] World Bank, 2010.
[20] http://www.dmb.gov.bd/pastdisaster
[21] World Bank, 2010: Economics of Adaptation to Climate Change in Bangladesh

7. Bangladesh has a mostly subtropical climate with four pronounced seasons - a hot humid monsoon (June to September); a progressively cooler, drier season (October to November); a cool dry winter (December to February); and a progressively hotter and drier summer (March to May). The average annual temperature varies between 18 and 29^0C, with a maximum summer temperature of about 41^0C, and winter temperature between 10^0C and 20^0C. Average annual rainfall ranges from about 1,400 mm to 4,400 mm, with 80% occurring during the monsoon.[22]

8. Dynamic physiographic, climatic, and hydrologic conditions shape the alluvial delta of Bangladesh as well as the rich biodiversity it supports. This bounty of nature is exemplified by the country's diverse ecosystems ranging from the mangrove forests of the Sundarbans in the southwest; coastal and marine ecosystems in the far south; deep natural water basins called "haors" and "baors" in the northeast; arid areas in the upper mid-section; hill tracts in the southeast; and flat sandy or marshy deltas of the large rivers of the middle of the country extending south.[23] The country has 29 agro-ecological zones[24] and twenty five bio-ecological zones.[25] (Annexure 1 and 2 respectively). Although some 2.56 million ha or 17.8% of the country's total area is classified as forests[26], only around 11% is actually under tree cover. Another 20% is classified as 'other wooded land', which includes trees within homesteads and other agricultural tree crops.[27] Forest cover had declined by more than 90% over the past 100 years and per capita forest cover in Bangladesh is amongst the lowest in Asia.[28]

Biodiversity Significance

9. Bangladesh is home to over 125 globally threatened species (IUCN Red List) – including 21 Critically Endangered, 34 Endangered and 69 Vulnerable species. It supports Asia's last two remaining species of freshwater dolphins - the Endangered Ganges River Dolphin (*Platanista gangetica*), an obligate freshwater cetacean of the South Asian subcontinent; and the Vulnerable Irrawaddy Dolphin (*Orcaella brevirostris*), a facultative freshwater cetacean found in the estuaries and some large rivers of the Indo-Pacific.[29] The country has established a national system of protected areas to conserve some of its most significant biodiversity. It has, so far, designated 36 protected areas (See Annexure 3) comprising approximately of 2,654 km^2 or about 1.8 % of the country's geographical area. These protected areas (corresponding to Category IV of the IUCN Protected Area classification) cover around 11% of the area under the control of the Forest Department.[30]

10. Bangladesh's diversity of aquatic ecosystems includes Haors (seasonal wetlands that are formed in large depressions appended to rivers when discharge is high), mangrove forests, freshwater swamp forests, oxbow lakes, rivers, shallow coastal seas and a deep (900m+) submarine canyon called the Swatch-of-No-Ground. Natural mangroves cover an estimated 584,000 ha (representing 39.2% of all classified state-owned forest land) and mangrove

[22] UNDP, 2014: GEF-Project Document- Integrating Community-based Adaptation into Afforestation and Reforestation Programmes in Bangladesh
[23] Ministry of Environment and Forests, 2010: Fourth National Report to Convention on Biological Diversity, Bangladesh
[24] GOB, 2010:Rio + Report on Sustainable Development.
[25] IUCN Bangladesh in 2002
[26] ADB, 1995: Forestry Sector Master Plan 1995-2005
[27] FAO, 2010: Forest Resource Assessment, 2010
[28] MoEF/GoB, 2012.
[29] Wildlife Conservation Society, Life Web Project
[30] Various publications of Government of Bangladesh.

plantations around 137,080 ha.[31] The Sundarbans, situated in the southwest of Bangladesh and shared with India, is the world's largest continuous mangrove forests, and it is listed as one of WWF's Global 200 Eco-regions.[32] Around 62% of the Sundarbans are in Bangladesh and the rest in India. The total area of the Sundarbans in Bangladesh is 6, 01,700 ha of which 411,230 ha[33] is covered by forests; the rest is under water (although this is variable according to seasonal discharge) in the form of rivers and creeks.[34]

11. The Sundarbans Reserved Forests (SRF) is one of the two RAMSAR sites in the country. Each year about 2.4 billion tons of sediments are transported through the Sundarbans[35], resulting in dynamic land accretion and erosion processes. This in turn creates a complex mosaic of geomorphic, bathymetric and hydraulic features, which support high levels of terrestrial and aquatic biodiversity. Recognizing the global biological significance of the area, in 1997, UNESCO declared the three Wildlife Sanctuaries in the far southern portion of the Sundarbans *viz*., Sundarbans West (715 km^2), Sundarbans South (370 km^2), and Sundarbans East (310 km^2), covering 139,700 ha, as a 'World Heritage Site'. Together these sanctuaries encompass about 23% of the Reserved Forest.

12. Waterways of the Sundarbans are the only place where both the Ganges River and the Irrawaddy dolphins, occur together. While these species are generally threatened with extinction across their range, both occur in the Sundarbans in populations large enough for early conservation interventions to be effective in ensuring their long-term survival. Based on an intensive monitoring programme carried out over three years by the Wildlife Conservation Society (WCS), six 'five km channel segments that support especially high densities of these two dolphin species were selected as priority habitats or 'dolphin hotspots'.[36] In 2012, the Government of Bangladesh notified these 'dolphin hotspots' as three Wildlife Sanctuaries {viz., Chandpai (including three hotspots), Dhangmari (including two hotspots) and Dudhmukhi (including one hotspot)}. See Annexure 4a, 4b and 4c for Maps. These sanctuaries intend to provide safe havens for freshwater dolphins in 31.4 linear km of channels with a total area of 10.7 km^2. Jurisdictional details of these three new Wildlife Sanctuaries are given in the Section on Administrative context. The focus of the present GEF project is to improve the management effectiveness of these aquatic protected areas though a collaborative approach and expand their operational coverage by identifying other suitable areas needed to ensure the long-term survival of freshwater dolphins.

Ecological and biodiversity context of the Sunderbans

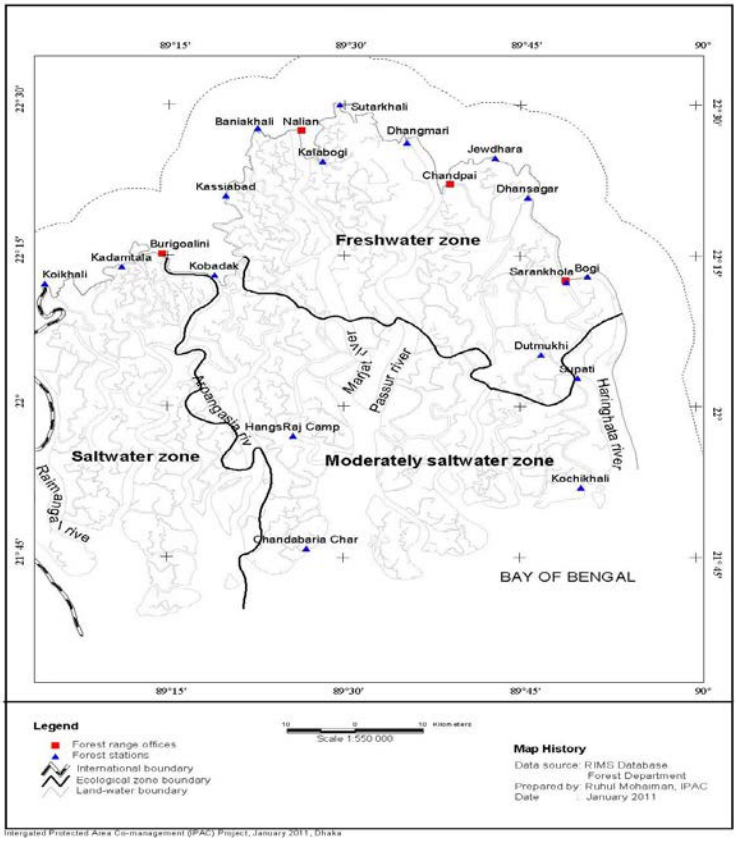
13. The Sundarbans, the world's largest continuous tract of mangroves, is composed of vegetated low-lying islands, with elevation ranging from 0.9-2.1 m above mean sea level, interspersed with a maze of tidal waterways from a few meters to a few kilometers wide.[37&38] Even though, the

[31] World Bank 2013
[32] http://wwf.panda.org/about_our_earth/ecoregions/ecoregion_list/ Accessed on 8 May 2014
[33] http://www.bforest.gov.bd/index.php/forest-category/mangrove-forests
[34] Various publications of GoB
[35] Poffenberger, M. (ed). 2000. Communities and forest management in South Asia. IUCN, DFID and Asia Forest Network, Indonesia. 35-46pp.
[36] Smith, B.D., Diyan, M.A.A., Mansur, R.M., Fahrni-Mansur, E., Ahmed, B. 2009. Identification and channel characteristics of cetacean 'hotspots' in the waterways of the eastern Sundarbans mangrove forest, Bangladesh. *Oryx.*

[37] Katebi, M. N. A. and G. Habib. 1989. Sunderbans and Forestry. Coastal area resource development and management, part II. Coastal Area Resource Development and Management Association, Dhaka, 79-100.
[38] Iftekhar, M. S. and M. R. Islam. 2004b. Managing mangroves in Bangladesh: A strategy analysis. Journal of Coastal Conservation 10, 139-146.

ecological history of the Sundarbans is yet to be understood in detail, it is known to be of relatively recent origin, and the extent of its coverage has changed considerably since its formation. There are three broadly defined ecological zones in the Sundarbans: a) slightly saline zone; b) the moderately saline zone; and c) the strongly saline zone (Figure 1 below). These zones are based on the complex interplay of factors such as spatially and temporally variable fresh-water flow, micro-climate, hydrology, edaphic factors, local rainfall, tidal flows, humidity, geographic aspect, sunshine etc. The zones are affected by daily changes in tidal flux, seasonal changes in hydrology and climate, and long-term degradation due to human impacts including the construction of upstream dams, alterations in the watersheds and sea-level rise.[39]

Figure 1: Ecological Zones in the Sundarbans Reserved Forests



14. Dynamic erosion and accretion processes, which determine the physiographic character of the Sundarbans, are buffered by the relative stability provided by the mangrove forests.[40] These changes are further driven/shaped by a complex interaction of sea-level changes, sedimentation and neo-tectonic subsidence.[41] Together these have profoundly influenced the ecological processes, and the flora and fauna (both relict as well as nascent) in the Sundarbans. Sculptured through the ecological landscape of the Sundarbans are large human populations in fringe

[39] MoEF, 2010: Integrated Resources Management Plan for the Sunderbans.
[40] Brian D. Smith and Elisabeth Fahrni Mansur, 2012. In Climate and Conservation landscape and seascape science, planning, and action Edited by Jodi A. Hilty, Charles C. Chester, and Molly S. Cross Sundarbans Mangrove Forest, Asia
[41] Adam C. D. Barlow, 2008: The Sundarbans Tiger Adaptation, Population Status, And Conflict Management, A Thesis Submitted To The Faculty Of The Graduate School Of The University Of Minnesota

villages who depend on the forests and waterways for vital ecological services, and meeting subsistence and livelihoods needs.[42]

15. Some of the key ecosystem goods and service functions (both tangible and intangible) provisioned by the Sundarbans, which are highly relevant at local, regional and global scales, *inter alia* include: (1) entrapping sediment and land formation; (2) coastal protection against wave action and wind erosion; (3) protection of human lives and habitation from frequent & extreme storms and cyclones; (4) shelter and habitat for diverse life-forms; (5) nursery for fish and other aquatic life; (6) supplying oxygen; (7) nutrient cycling; (8) timber and small timber production; (9) supply of food, NTFPs and building materials; (10) carbon storage, sequestration and cycling; (11) opportunities for education, scientific research, recreation and ecotourism; and (12) act as vital migration corridor for anadromous species such the highly valued *hilsa* shad.[43] The Sundarbans also represents the largest single carbon sink in the country. [44] A brief account of the faunal and floral diversity of the Sundarbans at the project site is given below:

Faunal and floral diversity

16. According to various records, the Sundarbans supports around 49 species of mammals, 59 species of reptiles, eight species of amphibians, 400 species of fishes and 315 species of birds. As many as 20 globally threatened species inhabit the Sundarbans. Historical records suggest the loss in recent times of at least six large mammal species from the Sundarbans *viz.,* Javanese rhinoceros (*Rhinoceros sondaicus*), one horned rhinoceros *(Rhinoceros unicornis*), wild buffalo (*Bulbulus bulbulus*), gaur (*Bos gaurus*), swamp deer (*Cervus duvaucali*) and the hog deer (*Axis porcinus*).[45] Aquatic ecosystems of the Sundarbans also support a significant number of globally important species – including IUCN Red List globally Critically Endangered and Vulnerable species.

17. Some of the Critically Endangered species found in the aquatic environs of the Sundarbans include the knifetooth sawfish (*Anoxypristis cuspidate*), imperial heron (*Ardea insignis*), River terrapin (*Batagur baska*), freshwater sawfish (*Pristis pristis*[46] – may be regionally extinct) and possibly the Ganges River shark (*Glyphis gangeticus*). Endangered species dependent on the aquatic ecosystems include the Asian masked finfoot (*Heliopais personatus*), Cantor's giant soft-shell turtle (*Pelochelys cantorii*), Northern River Terrapin (*Batagur baska*), fishing cat (*Prionailurus viverrinus*) and as noted above the Ganges River dolphin.[47]

18. The Sundarbans also supports a great diversity of terrestrial mammals (49 sp.).[48] It is a well-known habitat of the Royal Bengal tiger (*Panthera tigris*), with one of the world's largest surviving population estimated between 350 and 500 individuals.[49] Other carnivores include the leopard cat (*Prionailurus bengalensis*), fishing cat (*Prionailurus viverrinus*), jungle cat (*Felis*

[42] MoEF, 2010: Integrated Resources Management Plan for the Sunderbans.
[43] Biswas et al. 2007; Islam and Peterson 2008
[44] MoEF, 2010: Integrated Resources Management Plan for the Sunderbans.
[45] MoEF, 2010: Integrated Resources Management Plan for the Sunderbans.
[46] http://www.iucnredlist.org/details/43508905/0
[47] From various sources
[48] Gopal, B. and M. Chauhan. 2006. Biodiversity and its conservation in the Sundarban Mangrove Ecosystem. Aquatic Sciences-Research Across Boundaries 68, 338-354.
[49] Ahmad, I. U., C. J. Greenwood, A. C. D. Barlow, M. A. Islam, A. N. M. Hossain, M. M. H. Khan, J. L.D. Smith. 2009. Bangladesh Tiger Action Plan 2009-2017. Bangladesh Forest Department, Ministry of Environment and Forests, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.

chaus), small-clawed otter (*Aonyx cineria* – both terrestrial and aquatic) and jackals (*Canis aureus*).[50] The main ungulates are spotted deer (*Axis axis*), wild boar (*Sus scrofa*), and barking deer (*Muntiacus muntjak*). Rhesus macaque (*Macaca mulatta*) is the only non-human primate present.

19. Another hallmark of rivers and near-shore waters of the Sundarbans is the presence of a diverse cetacean community. Ganges River dolphins and Irrawaddy dolphins are commonly found in the waterways of the forests whereas Indo-Pacific hump-backed dolphins (*Sousa chinensis*) and finless porpoises (*Neophocaena phocaenoides*) are occasional visitors.[51] The most frequently sighted reptiles are monitor lizard (*Varanus salvator*) and estuarine crocodile (*Crocodylus porosus*). Less often seen are various snakes including the dog-faced water snake (*Cerberus rynchops*), red-tail pit viper (*Cyptelytrops erythrusus*), king cobra (*Ophiophagus hannah*), Indian spectacled cobra (*Naja naja),* and the Indian python (*Python molurus*). Nine species of turtles have also been recorded in the Sundarbans including two marine turtles[52].

20. In addition the Sundarbans supports a rich avifauna with 315 species of birds recorded including 95 species of waterfowl, 38 species of raptors, and nine species of kingfishers.[53] The Brahminy kite (*Haliastur indus*) is widespread, particularly along the riverside while the white-bellied sea eagle (*Haliaeetus leucogaster)* is *c*ommon near the coast. Among the waders and shorebirds, egrets, shanks, herons, plovers, curlews, gulls, and terns are particularly abundant. The Endangered masked finfoot (*Heliopais personata*) is also a resident species of th*e* Sundarbans.

21. Around 400 species of fish, whose distribution is highly dependent on salinity gradients, have been catalogued in the Sundarbans. Crustaceans, such as crab, shrimp, prawns and lobster, comprise a substantial proportion of the overall aquatic biomass.[54] Among a diverse array of terrestrial invertebrates, the giant honey bee (*Apis dorsata*) is of particular economic importance[55] and represents an important livelihood component of the local communities of the Sundarbans. The coast of the Sundarbans is a breeding ground for threatened marine turtles including the Olive Ridley turtle *(Lepidochelys olivacea*) and Green turtle (*Chelonia mydas).* A total of 145 fish and 33 crustacean species were recorded during ecological investigations of freshwater dolphin hotspot and non-hotspot segments in 2010. Among these fishes, 67 were found in both hotspot and non-hotspot segments, 46 were found only in hotspots and 32 were found only in non-hotspot segments. Among the crustacean species, 23 were found in both segment types, whereas seven were found only in hotspots and three were found only in non-hotspot segments.[56]

[50] Adam C. D. Barlow, 2008: The Sundarbans Tiger Adaptation, Population Status, And Conflict Management, A Thesis Submitted To The Faculty Of The Graduate School Of The University Of Minnesota
[51] Ministry of Environment and Forests, 2010: Fourth National Report to Convention on Biological Diversity, Bangladesh
[52] Rashid, S.M.A. & Ian R. Swingland. 1997. Ecology of some freshwater turtles in Bangladesh. *Proceedings of the International Conference on Conservation, Management and Restoration of Tortoises and Turtles.* New York Turtle & Tortoise Society. pp. 225-242.
[53] From various reports.
[54] Islam, M. S. and M. Haque. 2004. The mangrove-based coastal and nearshore fisheries of Bangladesh: ecology, exploitation and management. Reviews in Fish Biology and Fisheries 14, 153-180.
[55] Gopal, B. and M. Chauhan. 2006. Biodiversity and its conservation in the Sundarban Mangrove Ecosystem. Aquatic Sciences-Research Across Boundaries 68, 338-354.
[56] WCS/BCDP 2014. *Research on freshwater dolphin ecology and human activities in three wildlife sanctuaries in the Eastern Sundarbans mangrove forest,* Bangladesh. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.

22. As the largest forests in the country, and with extensive aquatic and marine components, the SRF represents a significant storehouse of floral biodiversity. Forests in the Sundarbans are highly variable in size and combinations, forming a mosaic pattern of vegetation; mangroves occur both in single-species patches and in a mix of a few species in various proportions. [57] A botanical exploration in the area was carried out by Prain in 1903. Since then, there have been considerable changes in the taxa and flora reported.[58] An assessment made during late 1990s reported 245 genera and 334 species of plants.[59] The Sundarbans flora has an abundance of *Heritiera fomes, Excoecaria agallocha, Ceriops decandra, Sonneratia apetala and Nypa fruticans*. While most mangroves in other parts of the world are characterized by members of the Families Rhizophoraceae, Avicenneaceae or Laganculariaceae, those of Bangladesh are dominated by Sterculiaceae and Euphorbiaceae.[60] A survey conducted by IUCN Bangladesh in 2003 listed 108 non-tree plant species including 17 orchids, 21 fern and fern allies, six algae and 16 lichens in the Sundarbans. Of the reported 66 species of "mangroves" in the SRF, 25 have been identified as 'true mangroves' [61] , while the others are considered as 'mangrove associates'.[62]

23. Details on the coverage of vegetation association in the Sundarbans are given in the Table 1. Sundari (*Heritiera fomes*) is the most important tree species, which is distributed over 73% of the Reserved Forest. Other prominent tree species are Gewa (*Excoecaria agallocha*), Bayen (*Avicennia alba, A. officinialis*), Passur (*Xylocarpus mekongensis*), Keora (*Sonneretia apetala*), Goran (*Geriops decandra*) and Hental (*Phoenix peludosa*). Dense patches of thorny Hental (*Phoenix paludosa*) are scattered throughout the Sundarbans, and Golpatta palm (*Nypa fructicans*) and Hargoza (*Acanthus ilicifolius)* are common along the muddy creek banks. Detailed list of flora and fauna found in the project area is given at Annexure 5.

Table 1: Major vegetation association of the Sundarbans

Forest Type	Area (Ha)
Sundari	74.0
Sundari-gewa	105.0
Sundari-passur-kankra	9.6
Gewa	21.5
Gewa-sundari	75.7
Gewa-goran	34.6
Goran / Goran-gewa	64.8
Passur-kankra-baen	4.0
Keora	8.3
Total Forest	**399.5**

Source: IFMP, 1998

Status and distribution of Ganges River and Irrawaddy dolphins in the project area:

24. As already mentioned, the Sundarbans is the only environment that supports the Endangered Ganges River dolphin and Vulnerable Irrawaddy dolphin, the last two remaining species of freshwater dolphins in Asia. In 2002, the population of Ganges and Irrawaddy Dolphins in the

[57] MoEF, 2010: Integrated Resources Management Plan for the Sunderbans.
[58] Khatun and Alam 1987
[59] IFMP. 1998. *Integrated Forest Management Plan*. Forest Department, Dhaka, Bangladesh.
[60] Hussain and Acharya 1994
[61] Out of 60 species of true mangrove globally
[62] Siddiqi, N.A. 2001. Mangrove forestry in Bangladesh. Institute of Forestry and Environmental Sciences (IFES), University of Chittagong, Chittagong. 201 p.

Bangladesh portion of the Sundarbans was estimated to be around 225 and 451 individuals respectively.[63] The density of Ganges River dolphin is particularly high in the low-salinity eastern portion of the mangrove forests with greater concentrations found at channel confluences. The density of Irrawaddy dolphins is high in the high-salinity western portion but the range of both species overlaps in the eastern side. At a waterscape scale, both Ganges River and Irrawaddy dolphins prefer low salinity waters. However, both species also partition themselves such that Ganges River dolphins generally occupy the northeastern portion (which receives freshwater input from the Ganges River), while Irrawaddy dolphins generally occupy the southwestern part with more salinity.[64]

25. According to a series of surveys conducted in 2011-12, the highest density of Ganges River dolphins was found in the Dhangmari wildlife sanctuary during the pre-monsoon and the lowest density was found in the Dudhmukhi wildlife sanctuary during winter/dry seasons. Ganges River dolphin calves were found in the Chandpai wildlife sanctuary during all seasons; in the Dhangmari wildlife sanctuary during the dry, pre-monsoon and monsoon; and in the Dudhmukhi wildlife sanctuary during the pre-monsoon and monsoon seasons. In all three sanctuaries, Irrawaddy dolphins were observed much less frequently compared to Ganges River dolphins. For Irrawaddy dolphins, the highest density was found in Dudhmukhi wildlife sanctuary during the monsoon. No Irrawaddy dolphins were found in Dhangmari during the pre-monsoon season; in Chandpai during the dry, pre-monsoon and monsoon seasons; and in Dudhmukhi during the post-monsoon season. No Irrawaddy dolphin calves were observed in the sanctuaries.[65]

Administrative and governance context:

26. Administratively, Bangladesh is divided into seven Divisions, which are further divided into 64 *Zillas* or Districts. Rural areas have another two-tier administrative system below the District level, *viz.*, *Upazillas* (Sub-districts) and *Union Parishads*. The latter are further sub-divided into electoral wards. City Corporations administer the ten largest cities while other urban areas have *Pourashavas* or Municipalities.[66] All administrative tiers below the Division level have elected *Parishads* or Councils including some reserved seats for women. On average *Upazila* and *Union Parishads* generally cover around 260,000 and 27,000 people, respectively.[67]

27. One and a half centuries ago, the Sundarbans was substantially larger in extent. With the advent of the British Rule, the 'hostile' and 'formidable' Sundarbans was declared as a Reserve Forest (1875-76) under the Act VII of 1865 and was entrusted to the Forest Department for administering it. In recent times, despite the small patches lost to cultivation along the fringes or the appearance of new islands in the south, the extent of the Bangladesh Sundarbans has remained mostly unchanged except for a reduction of about 3,000 hectares between 1985 and 1995 due to shifts in the bordering rivers.[68] Lying between Latitude 21'38 and 22'29 N and

[63] Smith, B. D., G. Braulik, S. Strindberg, B. Ahmed, and R. Mansur. 2006. Abundance of Irrawaddy dolphins (*Orcaella brevirostris*) and Ganges river dolphin (*Platanista gangetica gangetica*) estimated using concurrent counts made by independent teams in waterways of the Sundarbans mangrove forest of Bangladesh. Marine Mammal Science 22, 527-547.

[64] Smith, B.D., Braulik, G., Strindberg, S., Mansur, R. Diyan, M.A.A. and Ahmed, B. 2009. Habitat selection of freshwater cetaceans and the potential effects of declining freshwater flows and sea-level rise in waterways of the Sundarbans mangrove forest, Bangladesh. *Aquatic Conservation: Marine and Freshwater Ecosystems.* 19(2):209-225.

[65] WCS/BCDP 2014. *Research on freshwater dolphin ecology and human activities in three wildlife sanctuaries in the Eastern Sundarbans mangrove forest*, Bangladesh. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.

[66] There are currently nearly 500 *Upazillas*, 4,500 Unions and over 300 *Pourashavas*.

[67] Commonwealth Local Government Forum. 2013.

[68] 4TH National Report to CBD

Longitude 89’02 and 89’53 E, the SRF of Bangladesh falls within the administrative districts of Satkhira in the west, Khulna in the middle and Bagerhat in the east.

28. The Sundarbans Reserve Forest is managed by the Bangladesh Forest Department. From a forest administration point of view, SRF lies in one Circle divided into two Divisions (Sundarbans East and Sundarbans West), four Forest Ranges and 55 compartments. The three dolphin sanctuaries fall under the Sundarbans East Division, which is headed by a Divisional Forest Officer. The Sundarbans East Division has two Range offices - Chandpai and Sarankhola - headed by Range Officers. There are 77 permanent posts in this area under the Forest Department including five sanctuary centers, 16 stations, and 53 patrol posts (29 in the ESRF and 24 in the WSRF).

29. In addition to the three wildlife sanctuaries that were declared as UNESCO World Heritage Sites, the ten-kilometer periphery of the SRF has been declared as Ecologically Critical Area (ECA) under the Bangladesh Environment Conservation Act of 1995. The ECA intend act as a buffer area also. Further, as mentioned above, in 2012, the Government of Bangladesh notified three more protected areas *viz.*, Chandpai, Dhangmari and Dudhmukhi Wildlife Sanctuaries in the river channels in the Sundarbans, bringing the total extent of protected areas to almost 1,400 km^2 or 23% of SRF. Jurisdictional details of these three Wildlife Sanctuaries for freshwater dolphins, the core focus of this project are given at Annexure 6.

30. The current governance arrangements in SRF include a moratorium on timber extraction (since 2002); whereas fishing, recreation and harvesting of Non Timber Forest Products (NTFPs) are regulated through permits. Extraction, including fishing, is prohibited in wildlife sanctuaries and designated river channels (18 streams/*khals*). In the last two decades, land use around the Sundarbans has transformed significantly - from mainly rice-based *f*arms to shrimp aquaculture with associated adverse social and environmental effects, including increased pressure from non-sustainable, often illegal, extraction of natural resources from the Sundarbans. While some form of resource use is allowed in SRF, permanent settlement, cultivation and grazing are prohibited by law.

Socio-economic context

31. The Sundarbans Reserved Forest constitutes 52% of the forest coverage of the country and contributes about 41% of the total forest revenue. Interfaced with cultivated lands and intersected by tidal rivers, canals and streams, the Sundarbans forms a resilient buffer for the lives and assets of the three million people who live in its vicinity, as well as a protective shield for the infrastructure and urban populations in Khulna and Mongla international shipping port.[69]

32. In addition to its immense ecological value, the Sundarbans is also a valuable source of timber[70], fuel wood, medicinal plants, honey, palm leaves, bees-wax, fish, shells and crustaceans apart from supporting recreational and tourism industry. These forests supply around 45% of the country’s demand for timber and fuel wood.[71] During 2008-09, the Government of Bangladesh

[69] MoEF, 2010: Integrated Resources Management Plan for the Sunderbans.
[70] currently there is a logging ban in place (till 2015)
[71] Manju, A.H. 2001. Tk. 382 crore project for conservation of biodiversity in the Sundarbans. In: Chowdhury, Q.I. (ed). State of Sundarbans. Forum of Environmental Journalists of Bangladesh (FEJB), Dhaka. 89-91 pp.

earned BDT 55.17 million revenue from the Sundarbans, mainly from permits for NTFPs including fish.[72] The 12,000 km of river in the SRF produce large quantities of fish (40 commercially important species) and several species of crustaceans. Among them hilsa shad, catfish, white fish, prawn, shrimp and crab are commercially most valuable. It has been estimated that fisheries in the Sundarbans account for approximately 2% (18,150 metric tons) of the total inland open water capture fishery in Bangladesh.[73]&[74] In 2001, there were about 25,000 registered fishing boats to catch fish and crustaceans in the Sundarbans[75], whereas about 18% households in and around the SRF were dependent on harvesting natural resources - 35% shrimp fry collectors, 33% fishermen, 22% wood cutters, 4% boatmen, 3% Nypa palm frond collectors, 2% crab and shell collectors, and 1% honey collectors.[76] People have migrated to the Sundarbans in recent years in pursuit of better livelihoods, while some communities (e.g. Munda - estimated around 4000 people) have been living in this region for at least 250 years.[77] Both recent migrants and indigenous communities have fairly stronger cultural and religious affiliations on the Sundarbans.

Profile of fishers in the project area:

33. Data[78] from surveys conducted by WCS in the project area provide valuable insights on the socio-economic status of local fishers who strongly depend on natural resources. The families consisted of 0-8 children (average 2.1) of which 52% were male. The level of education among the fishers was poor (39% had no formal education; 47% went only to primary school; 13% went to secondary school but did not complete their education; 1% completed secondary school; and only one fisher completed a higher education certificate). Among school-age children (4-16 years), 75% were enrolled in schools with the remaining having left due to poverty (15%), marriage (7%) and lack of interest or merit (3%). Most of the boys reportedly left schools due to poverty (83%) while girls due to marriage (57%).

34. The average monthly income among the fishermen was 3,744 BDT[79] of which 74% came from fisheries and the rest from non-fishery activities.[80] While about 48% had some secondary occupation[81], only 24% of their income was derived from it. Interestingly, only 4% of their secondary occupations involved harvesting resources from the Sundarbans. A few womenfolk (16%) earned additional income through animal husbandry, bawali, manual labor, fishing, handicrafts, poultry, and tea vending, and tailoring. The fishers use a variety of fishing gears that include: Cast net, Crab line, Crab trap, Creek net, Drag net, Drifting gill net, Fixed floating gill net, Long line, Hook & rod, Long-shore net, Otter fishing, Set-bag net, Post-larvae box net,

[72] MoEF, 2010: Integrated Resources Management Plan for the Sunderbans.
[73] Hossain, M.A.R. 2010. Inland Fisheries Resource Enhancement and Conservation in Bangladesh. *In*: Inland Fisheries Resource Enhancement and Conservation in Asia. (eds. Weimin, M., Silva, S. D. and Davy, B.). Rap Publication 2010/22. FAO. USA
[74] Fisheries Resource Survey System (FRSS). 2010. Fisheries Statistical Yearbook of Bangladesh (2008-2009), Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka, Bangladesh.
[75] Bernacsek, G. and Haque, E. 2001. Draft Fishing Gears of the Sundarbans. Internal Notes No. 30. Sundarbans Biodiversity Conservation Project, Khulna, Bangladesh. Pp 50.
[76] Sundarbans Biodiversity Conservation Project (SBCP). 2001. Report on socio-economic baseline study on the impact zone of the Sundarbans. Bangladesh Forest Department, Khulna.
[77] Chiara Perucca and Krishnapodo Munda, 2010. Social watermanagement among Munda people in the Sundarbans.ULAB
[78] Largely from the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project
[79] The monetary conversion of Bangladesh Taka or BDT to the US$ is variable but at the time of the study it was about 1 US$ = 80 BDT.
[80] Their monthly income varied according to season with an average of 4,443 BDT (84% from fisheries) in the monsoon, 3,968 BDT (77% from fisheries) in the pre-monsoon, 3,565 BDT (74% from fisheries) in the winter, and 3,000 BDT (62% from fisheries) in the post-monsoon.
[81] Secondary occupations included day labor (61%), agriculture (21%), wood/palm frond (golpata) cutting or bawali (4%), rickshaw pulling (8%), fish selling (4%), other small businesses such as shop keeping or tailoring (3%), and producing handicrafts (1%).

Post-larvae hand drag net, Post-larvae hand push net, Post-larvae pole net and Post-larvae set-bag net. Of these, gillnets and set-bag nets are the most commonly used gears in the wildlife sanctuaries. Species that are particularly overexploited include the commercially valuable giant tiger prawn or bagda chingri *(Penaeus monodon),* pangas catfish *(Pangasius pangasius)*, *hilsa* shad or *ilish* (*Tenualosa ilisha),* gray eel-catfish or *kainmagur* (*Plotosus canius)* and giant mud crabs (*Scylla serratta).*[82&83]

35. About 77% of the fishermen, used to engage in fishing year-round and 60% of the head fishermen owned boats, mostly non-mechanized. However, only 33% of the fishers owned land (averaging about one tenth of an acre), with 66% of those owning land using it exclusively for their homestead and a few owning additional land for agriculture, aquaculture or poultry. About half (47%) of the fishing operations were conducted by single fisherman, while the others required a crew of 2-4. Of the crew, 82% were paid shares of the catch, whereas the others paid the crew a salary or had family members working without a wage. Permits issued by the Forest Department for fishing trips generally last for a week coinciding with spring tides. Expenses for fishing permit averaged 431 BDT per fishing boat though the official amount was reported to be only 145 BDT. The fishermen generally have to pay to pirates who extort money from them. Most of the fishers live in poor housing conditions - *katcha* buildings (temporary huts made of mud, bamboo, and Nypa palm thatching with a dirt floor) and *pacca* buildings (permanent homes made of bricks or tin sheets). Many live on khas (government land) and on channel embankments.

36. Around 39% of fisherfolk were associated with 30 different NGOs, clubs and societies for loans (95%) and education (5%). Most fishers (58%) sold their catch for a fixed price to either fish depots (54%), fish collectors (31%), money lenders (8%), directly to consumers (4%), or to fish or shrimp farms (3%). Only 9% of their fish catch was reportedly consumed by the fishermen and their families.

37. Overall, the fishers of the project landscape have a highly backward socio-economic status that strongly influences their resource-use practices. The available natural resources are already being intensively used by the local people for eking out day-to-day livelihoods including basic nutritional requirements. The complex interplay of the natural ecology and human systems (the latter including local use as well as the upstream freshwater diversions and climate change) is the primary driving factor behind the rapid degradation of the Sundarbans as witnessed today. More on this is dealt in the Section on Threats and Root Causes.

Climate change context

38. Bangladesh is among the most vulnerable countries to the impacts of climate change.[84] Extreme and erratic weather events, high density of human population, prevailing poverty and poor socio-economic conditions expose the country to heightened risks from climate change. One estimate indicates that the country is currently losing 1.5% of its GDP due to the increased frequency and intensity of natural disasters as a result of climate change.[85] Another estimate says

[82] Huda, M.S. 2003. Preliminary report on the analysis of data collected during the fish stock assessment. Technical Report No.27.Sundarbans Biodiversity Conservation Project, Khulna, Bangladesh.pp158.
[83] Hoq, M.E., Islam, M.N., Kamal, M. and Wahab, M.A. 2003. Fisheries structure and management implications in Sundarbans mangrove reserve forest, Bangladesh. Indian J. Fish.,**50** (2): 243-249.
[84] The Global Climate Risk Index (GCRI) 2010,
[85] Ministry of Environment and Forests,

that on an average more than 8,000 people die each year in Bangladesh due to climate change induced disasters, while the cost of the damage is US $ 1,189 million per year resulting in a loss of 1.8% of the GDP during 1990-2008.[86]

39. While over-exploitation, deforestation, habitat change due to agriculture, pollution, and invasive species are generally considered the most important current drivers of biodiversity loss in Bangladesh, climate change will become a major concern for the survival of important ecosystems and biological diversity as that of the Sundarbans. Several species and ecosystems face imminent extinction/ degradation, if appropriate adaptation measures are not undertaken.[87] Climate change will also adversely impact the ecology of the Sundarbans and the livelihoods of people who depend on the goods and services emanating from it.

40. Furthermore, key ecological functions performed by the mangroves (such as nutrient cycling; trapping of sediment and land formation; buffering action against storms and cyclones; breeding ground for fish and other aquatic life; provisioning wood and NTFPs; carbon sequestration etc.) will be significantly affected by climate change and the rising sea-level. More on the specific impacts of climate change on the project landscape is given in the section on Threats and Root Causes.

Legislative, policy and institutional context

41. To promote conservation and the sustainable use of biodiversity and natural resources, Bangladesh has an extensive body of laws and policies. The country is also a signatory to various international conventions, treaties and multi-lateral agreements/ instruments related to environmental protection/natural resource management. It has also taken several initiatives towards their implementation. Table 2 summarizes the key international conventions and treaties signed/ratified by the country[88].

Table 2: International conventions and treaties related to aquatic ecosystems signed by Bangladesh

[86] Global Climate Risk Index (GCRI) 2010
[87] NBSAP and 4th National Report to CBD
[88]. GOB, 2010. Rio + Report on Sustainable Development.

Convention/ Treaty	Year effective
Convention Relating to the Preservation of Fauna and Flora in their Natural State	1936
International Plant Protection Convention (1951)	1952
International Convention for the Prevention of Pollution of the Sea by Oil (1954)	1974
The Antarctic Treaty (Washington, 1959)	1998
Ramsar Convention on Wetlands of International Importance (Ramsar, 1971)	1982
Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)	1978
Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)	1976
Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979)	1982
Convention on the Conservation of Antarctic Marine Living Resources (Canberra, 1980)	1985
United Nations Convention on the Law of the Sea (Montego Bay, 1982)	1995
Convention on Control of Trans-boundary Movements of Hazardous Wastes & Disposal (1989)	1992
Protocol on Environmental Protection to the Antarctica Treaty (Madrid, 1991)	1998
United Nations Framework Convention on Climate Change (Rio de Janeiro,1992)	1994
Convention on Biological Diversity (Rio de Janeiro, 1992)	1994
Agreement relating to the Implementation of Part XI of the UNCLOS 1982 (1994)	1996
Protocol to the United Nations Convention on Climate Change (Kyoto,1997)	2005

42. There are a number of national policies, legislation and approaches taken by the government which provide provisions for biodiversity conservation and natural resources management in the country that have a bearing on the present GEF project in the Sundarbans. These *inter alia* are the: National Environment Policy, 1992; National Forest Policy, 1994; National Energy Policy, 1996; National Fisheries Development Policy, 1998; National Water Policy, 1999; National Agriculture Policy, 1999; Land Use Policy, 2001; Coastal Zone Policy, 2005; Bangladesh Wildlife (Preservation) (Amendment) Act, 2012; Bangladesh Forest Act, 1978 and subsequent amendments; Bangladesh Environment Conservation Act, 1995 and Environment Conservation Rules 1997; Playfield, Open Space, Park and Natural Water Reservoir Conservation Act, 2000; Flood Action Plan, 1990; Forestry Master Plan, 1996; National Biodiversity Strategy and Action Plan (NBSAP); National Conservation Strategy (NCS); National Environment Management Action Plan (NEMAP); and Sustainable Environment Management Programme (SEMP). Key attributes of these legal and policy framework are given in the Annexure 7.

43. The governance of natural resources in Bangladesh takes place under diverse institutional arrangements. This section provides a brief overview of these institutional arrangements while a more specific analysis in the context of the project is given in the Section on Stakeholder Analysis. The **National Economic Council** (NEC) is the highest policy making and programme/project approving institution in the country, which is headed by the Prime Minister. The Executive Committee of the National Economic Council (ECNEC), headed by the Finance Minister, reviews the plans and programmes sent by various ministries and endorse them.

44. The **Ministry of Environment and Forests** (MoEF) is entrusted with the overall responsibility for the environment sector and the national focal point of all MEAs. The MoEF works with other ministries to ensure that environmental concerns are given due priority in their development programmes/projects. The implementing organs of MoEF are the Department of Environment (DOE) and the Forest Department (FD). While the DOE has wide ranging responsibilities from enforcement of environmental laws and codes in addition to conducting Environmental Impact Assessments (EIAs) of public and private sector projects, the FD is a

specialized body of the MoEF dealing with the management of forest reserves, wildlife and protected areas. The Forest Department works towards ensuring natural sustainability and biodiversity conservation through social forestry, forest management, afforestation, reforestation, protected area management etc. It is one of the oldest departments of the Government.

45. Apart from the above organizations, other **ministries/departments/agencies** including the Ministry of Land, Ministry of Water Resources, Ministry of Industries, Ministry of Power, Ministry of Energy & Mineral Resources, Ministry of Fisheries & Livestock, Bangladesh Planning Commission, Disaster Management Bureau, Bangladesh Water Development Board, Water Resources Planning Organization, Bangladesh Meteorological Department, Ministry of Agriculture, Department of Agricultural Extension, National Agricultural Research System of Bangladesh, Navy, Coast Guard and Port Authority have defined mandates and jurisdiction over matters concerning aquatic resources.

46. Many **research institutions** like the Bangladesh Forest Research Institute (BFRI), Bangladesh National Herbarium (BNH), Bangladesh Agricultural Research Institute (BARI), Bangladesh Rice Research Institute (BRRI), Bangladesh Livestock Research Institute (BLRI), and many university departments are conducting research and implementing programmes on biodiversity and natural resource management. Similarly, various **training institutions** including the Bangladesh Public Administration Training Centre (BPATC), National Academy for Educational Management (NAEM), National Academy for Planning and Development(NAPD), Forest Academy (FA), Bangladesh Space Research and Remote Sensing Organization (SPARRSO), Institute of Water Modelling (IWM) etc. are also involved with overall environmental management and cross-cutting environmental issues.

47. The **District Administration** is headed by the Deputy Commissioner[89], and includes functionaries responsible for different aspects of district governance. Of note to this project are functionaries responsible for district planning, fisheries, agriculture, forests, tourism, wildlife etc. Related to this is the presence of the local government including the elected members of the *Zillas, Upazillas* and *Union Parishads, wh*ich is highly relevant in the context of the project. At the village level, there are also several **Community Institutions** (CIs) that are supported by the government as well as non-governmental organizations. These are also community or user-group based organizations such as Self Help Groups (SHGs), Women's Groups, Fishermen's Associations, tour operator groups, Youth Groups, Co-Management Committees (CMCs), Village Forum (VFs) etc.

48. A large number of **Civil Society Organizations (CSOs) and Non-Governmental Organizations (NGOs)** – both conservation-focused and social service groups are engaged in implementing various programmes on biodiversity conservation, social development and addressing policy issues. These organizations include Centre for Policy Dialogue (CPD), Centre for Nature Resources Studies (CNRS), Centre for Advanced Research in Natural Resources & Management (CARINAM), Nature Conservation Management (NACOM), Bangladesh Centre for Advanced Studies (BCAS), Poribesh Bachao Andolon (POBA), Bangladesh Poribesh Andolon (BAPA), WildTeam, Sushilan, Association for Social Advancement (ASA),

[89] Deputy Commissioners are officers of the Civil Service and are the most powerful government officials of the district. They are entrusted the task of handling law and order, revenue collection, taxation, the control of planning permission and the handling of natural and man-made emergencies.

PROSHIKA, Wildlife Conservation Society (WCS), International Union for Conservation of Nature (IUCN) etc.

B: THREATS, ROOT CAUSES AND IMPACTS

49. In spite of the legal, policy and institutional arrangements in place as described earlier, the Sundarbans' ecosystems in general and the three protected areas (established for protecting the Ganges and the Irrawaddy dolphins) in particular are facing increasing threats. Like many other resource-rich regions of the world, the Sundarbans has been subjected to over-exploitation and a rapidly deteriorating resource-base. Livelihood and economic production activities taking place in and around these protected areas have adversely impacted the ecological richness of the area.[90] Furthermore, serious alterations are occurring to the ecological attributes of the region due to sea-level rise and upstream water abstraction resulting in incursion of marine waters and increased sedimentation.[91] During the project preparation phase, a threat-scape evaluation was undertaken in consultation with stakeholders and experts. This evaluation drew heavily on information in published and unpublished literature. The outcomes of this evaluation (threats, root causes and impacts) are given below.

Threat to biodiversity from unsustainable fishing

50. The Sundarbans is a unique spawning environment for many marine fish and crustacean species. Waterways of the mangrove forests support 27 families and 53 species of pelagic fishes, 49 families and 124 species of demersal fishes, 5 families and 24 species of shrimps, three families and seven species of crabs, two species of gastropods, six species of pelecypods, eight species of locust lobsters, and one family and three species of turtles.[92] During the last decade, fisheries production has reportedly declined by 23% in the Sundarbans,[93] including in the project landscape[94] where fishing is among the most important economic and livelihood activities.

51. Fisheries in the Sundarbans have almost certainly surpassed the threshold of sustainability, and accidental killing by getting entangled in fishing gears is the most immediate direct threat to the survival of the threatened freshwater cetaceans. Over all, the threat to biodiversity from fishing in the project area stems from (1) overfishing of edible fish and crustaceans, and use of destructive fishing gears and practices including poison and small-mesh gill nets; (2) entanglement of dolphins in fishing gear particularly large-mesh gillnets but also in small-mesh gillnets, long lines, and set bag nets; and (3) the enormous by-catch of fish fingerlings and non-target crustacean post-larvae in extremely fine-mesh mosquito nets used to catch marine shrimp or freshwater prawn post-larvae for stocking aquaculture ponds. For a more detailed understanding of these threats, it is necessary to consider the type of gear used, intensity of their use, catch per unit effort etc.

[90] MoEF, 2010: Integrated Resources Management Plan for the Sundarbans.
[91] Smith et al. 2011 –Smith, B.D., Braulik, G., Strindberg, S., Mansur, R. Diyan, M.A.A. and Ahmed, B. 2009. Habitat selection of freshwater cetaceans and the potential effects of declining freshwater flows and sea-level rise in waterways of the Sundarbans mangrove forest, Bangladesh. *Aquatic Conservation: Marine and Freshwater Ecosystems.* 19(2):209- 225.
[92] IUCN, 1994: Mangroves of Sundarbans; Vol.2.
[93] Shah, M.S., Huq, K.A., Rahman, B.S.M., 2010: Study on the conservation and management of fisheries resources of the Sundarbans; Integrated Protected Area Co-management, Bangladesh
[94] Consultation with communities

Overharvesting of fishery stock & continued use of destructive methods:

52. Excessive fishing and prevalent use of small- mesh size nets are highly detrimental to Cetaceans. [95&96&97] Use of small mesh-size nets such as mosquito nets by the fishers cause depletion of small-sized fishes which is the preferred prey size class of the dolphins.[98] With increasing fishing intensity, dolphins tend to be more stressed; their movements restricted; thus resulting in smaller distribution ranges.[99] This compels dolphins to share foraging spaces amidst intense fishing pressure exposing them to direct (entanglement in fishing nets, poaching etc.) and indirect (breeding disruptions, reduced food, low prey density, shallow areas etc.) threats.[100 & 101]

53. As already mentioned, there are various types of fishing gear commonly used in the project area – e.g. cast, drag, drifting gill, long-shore, set-bag, seine, PL box, PL hand drag and PL set-bag nets, crab traps and long lines.[102] At subsistence level, perhaps, most of these would have remained as artisanal/ traditional resource use practices. However, over the years, the use of these gears has increased several folds in the project landscape. During 2011-2012, the highest density of fishing gear was recorded for PL set-bag nets in Dhangmari (30.0 and 44.6 /km^2 in the pre-monsoon and monsoon seasons, respectively) and Chandpai (40.0 and 41.2/km^2 in the pre-monsoon and monsoon seasons, respectively). Among the non-PL fishing gears, the highest density was found for set-bag nets (5.0/km^2) in Chandpai during the winter season, long-shore nets (2.9/km^2) and long lines (0.9/km^2) in Dudhmukhi and drifting gill nets (2.5/km^2) in Dhangmari during the post-monsoon season.

54. Extensive use of set-bag nets is believed to be responsible for the overexploitation of near-shore fisheries.[103] Species that are particularly overexploited include the commercially valuable giant tiger prawn or *bagda chingri (Penaeus monodon),* pangas catfish *(Pangasius pangasius),* *hilsa* shad or *ilish* (*Tenualosa ilisha),* gray eel-catfish or *kainmagur* (*Plotosus canius)* and giant mud crabs (*Scylla serrata).*[104&105] Long-shore nets may also be having a destructive impact on fisheries due to the low selectivity of these nets. Due to the low catches in these nets, fishers have started to line the insides with mosquito nets which make them particularly harmful by trapping fish fingerlings and crustacean post-larvae. The density of fishing gears in the three

[95] Choudhary, S.K., B.D. Smith, S. Dey and S. Prakash. 2006. Conservation and biomonitoring in the Vikramshila Gangetic Dolphin Sanctuary, Bihar, India. Oryx 40: 189 – 197.
[96] Kelkar, N., J. Krishnaswamy, S. Choudhary and D. Sutaria. 2010. Coexistence of fisheries with river dolphin conservation. Conserv. Biol. 24: 1130 – 1140.
[97] Choudhary, S.K., B.D. Smith, S. Dey and S. Prakash. 2006. Conservation and biomonitoring in the Vikramshila Gangetic Dolphin Sanctuary, Bihar, India. Oryx 40: 189 – 197.
[98] Kelkar, N., J. Krishnaswamy, S. Choudhary and D. Sutaria. 2010. Coexistence of fisheries with river dolphin conservation. Conserv. Biol. 24: 1130 - 1140.
[99] Tawqir Bashira , *, Afifullah Khan , Sandeep Kumar Behera and Parikshit Gautam, 2011: Factors determining occupancy of Ganges River dolphin (*Platanista gangetica gangetica*) during differing river discharges in the upper Ganges, India; DOI 10.1515/mammalia-2011-0129 Mammalia 2012; 76(4): 417–426
[100] Bashir, T., A. Khan, J.A. Khan, P. Gautam and S.K. Behera. 2007. Aspects of ecology of Gangetic dolphin (*Platanista gangetica*) in Western Uttar Pradesh, India. In: A survey report funded by WWF-India, Department of Wildlife Sciences, AMU, Aligarh, U.P, India. p. 68.
101 Kelkar, N., J. Krishnaswamy, S. Choudhary and D. Sutaria. 2010. Coexistence of fisheries with river dolphin conservation. Conserv. Biol. 24: 1130 - 1140.
[102] Impact of these gears on sustainable fisheries depend on gear material, mesh size, funnel length, Mouth opening/mouth circumference, twine number, hook etc.
[103] Hoq, M.E. 2007. An analysis of fisheries exploitation and management practices in Sundarbans mangrove ecosystem, Bangladesh. Ocean & Coastal Management **50**:411-427.
[104] Huda, M.S. 2003. Preliminary report on the analysis of data collected during the fish stock assessment. Technical Report No. 27.Sundarbans Biodiversity Conservation Project, Khulna, Bangladesh.pp158.
[105] Hoq, M.E., Islam, M.N., Kamal, M. and Wahab, M.A. 2003. Fisheries structure and management implications in Sundarbans mangrove reserve forest, Bangladesh. Indian J. Fish.,**50** (2): 243-249.

wildlife sanctuaries (based on the surveys conducted in 2011-2012) is given in the Table 3 below:

Table 3: Density of fishing gears in the three wildlife sanctuaries (2011-2012)

(Dh=Dhangmari, Ch=Chandpai, and Du=Dudhmukhi)

Fishing Gear	Winter			Pre-monsoon			Monsoon			Post-monsoon		
	Dh	Ch	Du	Dh	Ch	Du	Dh	Ch	Du	Dh	Ch	Du
Crab line	0.6	0.3	1.8	0	0	0	0	0	0	0	0.2	0
Cast net	1	0.1	0	2.1	0	0	1	0	0	0.4	0.1	0
Drifting gill net	0	0	0	0	0	0	0	0	0	2.5	0.2	0
Drag net	0	0	0	0	0	0	0.3	0	0	0	0	0
Longline	0.1	0	0.3	0.3	0.1	0	0	0	0	0	0.2	0.9
Long shore net	1	0	0	1	0	0	0	0.2	0	0.4	0.3	2.9
PL box net	0	0.2	0	0.7	0	0	15.9	0	0	0	0	0
PL hand drag net	0	0.2	0	2.2	2.2	0	0	12.4	0	0	0	0
PL set-bag net	2.8	12.3	0	30	40	0	44.6	41.2	0	0	0	0
Set-bag net	1.3	5	0	3.2	0.1	0	0	0.1	0	3.8	1.3	0
Seine Net	0	0	0.3	0	0	0	0	0	0	0	0	0

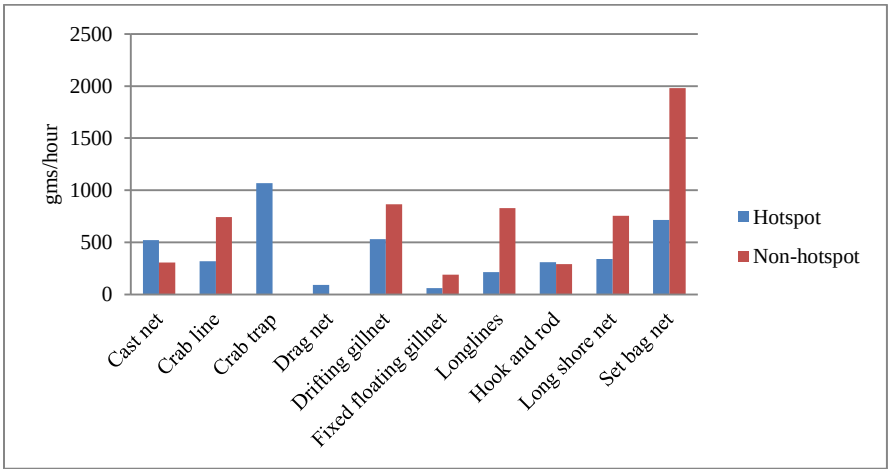
55. The ecological impacts of fishing in the three new wildlife sanctuaries was calculated according to a composite impact score based on the types of gears and their density. The scores revealed that the Chandpai and Dhangmari are highly vulnerable (30 times greater) in terms of depletion of fisheries and the potential for dolphin entanglements, compared to Dudhmukhi. The composite impact score was highest in Dhangmari during the monsoon season. The impact of fishing gear was much higher in hotspot versus non-hotspot segments except during the monsoon season. During the winter and pre-monsoon seasons, there was 94% greater disturbance from fisheries in hotspots compared to non-hotspots.[106]

56. Fish and crustacean catch per hour for various fishing gears in the six dolphin hotspots that comprise the Dhangmari, Chandpai and Dudhmukhi Wildlife Sanctuaries and six randomly chosen non-hotspot segments were also low when assessed in 2010/2011 with catches significantly less for set-bag nets (720 versus 2,693 gm/hour, respectively) and long-shore nets (337 versus 777 gm/hour, respectively) in hotspot segments versus non-hotspot segments; almost certainly due to the much higher fishing pressures in the hotspots that comprise the three wildlife sanctuaries for freshwater dolphins. Similarly the economic value of the catch to the fishermen was also low with a maximum of 200 BDT/hour earned using drifting gillnets in non-hotspot segments and less than 50 BDT/hour earned using most other gears, with particularly low amounts earned especially in hotspot segments. [107] A comparison of the fish and crustacean catch per hour using various fishing gears in the six dolphin hotspots (Sanctuary area) and six non-hotspot segments is given in Table 4 below.

Table 4: Comparison of the fish and crustacean catch per hour using various fishing gears

[106] WCS/BCDP 2014. *Research on freshwater dolphin ecology and human activities in three wildlife sanctuaries in the Eastern Sundarbans mangrove forest*, Bangladesh. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.

[107] Ibid



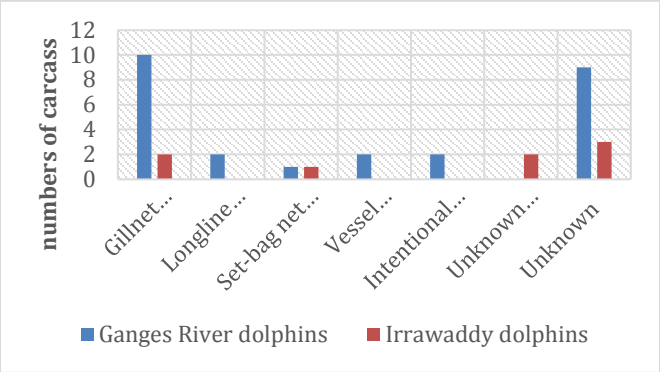
57. Poison fishing (using toxic chemicals and insecticides) is another grave and growing concern due to its serious deleterious impact on aquatic resources. Despite knowing that this practice is highly detrimental to the long-term sustainability of the fishery stock, local fishers often use poison for fishing because their catch using normal means is insufficient to sustain themselves, as well as to compensate for having to pay "informal fees" / 'protection money' to local pirates or other locally influential groups. During community consultations, fishers were strongly in favor of strict enforcement of law to stop poison fishing but said they would continue with this destructive practice until the law is uniformly and fairly enforced[108]. Poison fishing also puts freshwater dolphins and other globally important piscivorous species such as turtles, otters, fishing cats, crocodiles and dolphins, at risk due to prey depletion and possible toxic effects.

Entanglement of dolphins in the fishing gear:

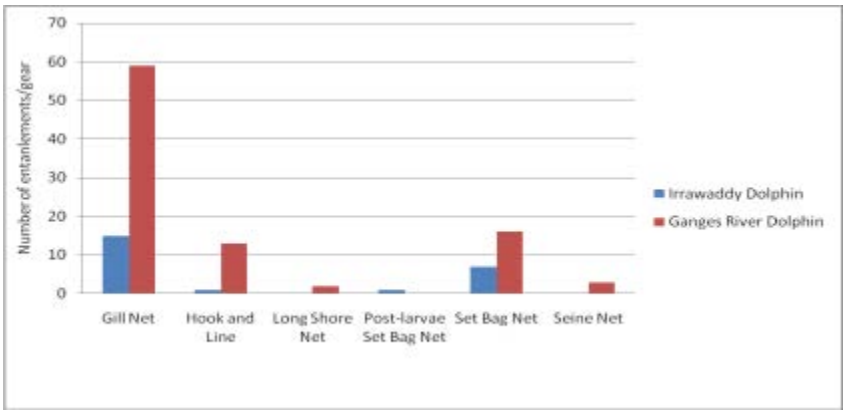
58. Of the gears used to catch edible fish and crustaceans, gillnets are among the most commonly used. These gears cause fatal entanglements of freshwater dolphins at rates that are probably unsustainable. The following statistics illustrate the point. From February 2007 to December 2013, there were 90 cetacean mortalities documented throughout Bangladesh - 63 Ganges River dolphins, 16 Irrawaddy dolphins, five finless porpoises, and two Indo-Pacific humpbacked dolphin, one sperm whale, one false-killer whale and two unidentified cetaceans. Fifty two of these (40 Ganges River dolphins and 12 Irrawaddy dolphins) were from the Sundarbans. Of the 26 carcasses of Ganges River dolphin examined, 13 were killed due to entanglement in fishing gears, two from vessel collision, two from directed killing by villagers, and nine from unknown causes. Among the dolphins entangled in fishing gear, ten were in gill nets, one in a set-bag net and two in long lines. In case of eight Irrawaddy dolphins, the cause of death for five was entanglement in fishing gears, and three due to unknown reasons. Of the Irrawaddy dolphins documented as entangled in fishing gear, two were in gill nets, one in a set-bag net and two were in unknown gears. [109] See the graph below.

[108] WCS/BCDP 2014. *Educational outreach, training and consultations in the three wildlife sanctuaries for freshwater dolphins in the Sundarbans, Bangladesh*. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.

[109] WCS/BCDP 2014. *Research on freshwater dolphin ecology and human activities in three wildlife sanctuaries in the Eastern Sundarbans mangrove forest*, Bangladesh. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.



59. A survey conducted in 2010 among fishers, Forest Department staff and some key informants about dolphin entanglements documented 117 reports of fatalities. Among these entanglements, 79% and 21% were of Ganges River and Irrawaddy dolphins respectively. While gillnets were reportedly responsible for 63% of the entanglements; set-bag nets accounted for 20%; long lines for 12%; with seine-nets, long-shore-nets and post-larvae (PL) set-bag nets accounting for the remaining 5%. See the Graph below.



60. Fishers are generally unaware of entangled dolphins until it is already dead or, if found alive, they may be scared or lack the knowledge to safely release the animal, or allow it to die due to its value for oil and meat.[110] Fishery regulations are inconsistently applied due to inadequate knowledge and capacities among government agencies for monitoring and enforcement.[111]

Reckless handling of incidental by-catch:

61. By-catch of fish fingerlings and non-target crustacean fry in Post-Larvae (PL) collection nets is a major cause for the declining fish and crustacean populations in the Sundarbans.[112&113]

[110] Rashid, S. M. A.; A. W. Akonda; & Bashir Ahmed. 2011. Assessment of South Asian River Dolphin Population at the Padma - Jamuna River Confluence Surrounding the District of Pabna. Report prepared by Centre for Advanced Research in Natural Resources & Management (CARINAM) for Wetland Biodiversity Rehabilitation Project, Department of Fisheries, Government of Bangladesh and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH German International Cooperation, Dhaka. iii+54 pp.
[111] Final Report: 3BAS-USDA Program in Agricultural and Life Sciences
[112] Department of Fisheries (DoF). 2002. Balancing resource conservation with livelihood protection for shrimp fry collectors: an integrated approach to managing coastal resources. Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka, Bangladesh. Pp 14.

Meanwhile, the illegal collection of shrimp and prawn PL[114] continues to be a compelling livelihood option for economically disadvantaged people living in the region[115]&[116] especially those displaced by the conversion of agriculture to marine shrimp and freshwater prawn aquaculture and the loss of land due to increasing storms and erosion. PL nets are extensively used in the dolphin sanctuaries and adjacent waters with an average of more than 40 nets/km^2 recorded during the pre-monsoon and monsoon seasons in 2012. During the same time period, by-catch of fish fingerlings and non-target crustacean post-larvae represented 99.9% of the total catch in PL set-bag nets, 99.6% in PL hand drag nets, and 99.4% in PL box and PL hand push nets. [117]

62. There are considerable variations in the shrimp and prawn PL collection gear. PL set-bag nets are the most commonly encountered ones (84% during 2011-2012). These nets are highly destructive because of the large mouth (circumference = ~14 meter) and funnel length (~14 meter), which results in the by-catch of 10-4,500 fish fingerlings and non-target crustacean PL per target fry. These nets are encountered 15 times more frequently in dolphin hotspots (the new wildlife sanctuaries) than the non-hotspot segments.

63. While some amount of by-catch is inevitable, the current handling of by-catch is far from desirable. The overall live portion of by-catch is relatively high for all gears, although significantly higher for PL hand push nets (94%) and PL hand drag (90%) compared to PL set-bag (81%) and PL box nets (79%).[118] By-catch is handled recklessly and mostly discarded or sold as feed to fish farms. In addition, harvesting salt-water shrimp and freshwater prawn fry for stocking aquaculture ponds also cause rapid depletion of dolphin prey and marked decline in fisheries due to enormous by-catch of fish fingerlings and non-target crustaceans.[119]

Threats to biodiversity from increasing maritime traffic

64. There has been a four-fold increase in commercial shipping vessel traffic in the project area between 2010 and 2011. This increase occurred after the shipping route between Khulna/Mongla and Dhaka was shifted due to sedimentation in the channels along the earlier route. Among the three wildlife sanctuaries, Dhangmari is most disturbed by vessel traffic followed by Chandpai. These vessels can collide with freshwater dolphins resulting in fatal injuries; their large wakes can erode shoreline features and fill the deep pools where freshwater dolphins congregate; and the pollution they discharge can degrade habitat and reduce fish and crustacean recruitment[120].

65. In 96 sampling sessions (each lasted 12-hours) carried out in 2010-2011, there were 1,826 mechanized vessels of 17 types recorded in 5-linear km hotspot segments (where dolphins occur

[113] Ahmed, N., Troell, M., Allison, E. H. and Muir, J. F. 2010. Prawn post-larvae fishing in coastal Bangladesh: Challenges for sustainable livelihoods. Marine Policy **34**: 218–227.
[114] Ibid.
[115] Ireland, C., Malleret, D. and Baker, L. 2004. Alternative sustainable livelihoods for coastal communities. A review of experience and guide to best practice. IUCN Eastern Africa Regional Programme, Nairobi, Kenya.
[116] MoEF, 2010: Integrated Resources Management Plan for the Sundarbans.
[117] WCS/BCDP 2014. *Research on freshwater dolphin ecology and human activities in three wildlife sanctuaries in the Eastern Sundarbans mangrove forest*, Bangladesh. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.
[118] Ibid.
[119] Final Report , ---: 3BAS-USDA Program in Agricultural and Life Sciences
[120] WCS/BCDP 2014. *Research on freshwater dolphin ecology and human activities in three wildlife sanctuaries in the Eastern Sundarbans mangrove forest*, Bangladesh. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.

in particularly high densities and the sites of the three new wildlife sanctuaries) and 95 mechanized vessels from 11 types in randomly chosen 5-linear km non-hotspot segments (where dolphin occur in lower densities) (see Table 5 below). The number of vessels was much higher in hotspots compared to non-hotspots during all seasons except in the monsoon. Vessel traffic was extremely high during the winter in hotspot segments (77 vessels/day). Of the total vessels, the largest number were used for tourism (58%) and smallest for patrolling (6%) by the Navy, Coast Guard and Forest Department. The average speed of cargo vessels and oil tankers in the hotspot segments that compose the new wildlife sanctuaries was 13.3 km/h.

Table 5: Number of vessels according to types recorded in six hotspot (Hot) and six non-hotspot (Non) segments during four seasons.

Name of Vessel	Use of vessels	Dry		Pre monsoon		Monsoon		Post monsoon		Total	
		Hot	Non	Hot	Non	Hot	Non	Hot	Non	Hot	Non
Mechanized covered wooden boat	Tourism	401	4	185	4	65	3	96	7	747	18
Mechanized open wooden boat	Fishing	170	7	97	4	68	15	79	5	414	31
Mechanized fiber glass boat or jali used for tourism	Tourism	145	0	23	0	26	0	39	0	233	0
Mechanized covered metal tourism vessel for inland waters	Tourism	75	10	13	3	6	0	11	4	105	17
Mechanized open metal cargo vessel	Commercial	42	0	41	2	8	0	12	0	103	2
Mechanized covered metal cargo vessel for inland water	Commercial	24	0	11	1	14	0	12	1	61	2
Bangladesh Coast Guard ship	Patrol	27	0	6	1	4	3	2	3	39	7
Mechanized sea going wooden fishing vessel for inland water	Fishing	14	3	5	1	7	5	6	0	32	9
Bangladesh Navy ship	Patrol	8	1	6	0	8	0	12	0	34	1
Mechanized sea going metal cargo vessel under national or international flag	Commercial	13	0	6	0	2	0	2	0	23	0
Speed boat	Patrol	5	0	3	1	2	2	3	4	13	7
Port authority pilot boat	Patrol	2	0	5	0	2	0	5	0	14	0
Mechanized covered metal forest department boat	Patrol	1	0	0	1	0	0	0	0	1	1
Mechanized sea going wooden cargo vessel	Commercial	2	0	0	0	0	0	0	0	2	0
Metal barge pulling by tug boat	Commercial	0	0	0	0	1	0	1	0	2	0
Mechanized covered metal pulling boat	Commercial	0	0	0	0	1	0	1	0	2	0
Mechanized sea going metal fishing vessel	Fishing	0	0	0	0	0	0	1	0	1	0
Total number of		929	25	401	18	214	28	282	24	1826	95

vessels										
Vessels/day	77.4	2.1	33.4	1.5	17.8	2.3	23.4	2.0	38	2
% of total number	48.4	1.3	20.9	0.9	11.1	1.5	14.7	1.2	95	5

66. Increasing maritime traffic poses serious threat to the dolphins and the ecology of the project site such as: a) vessels collide with freshwater dolphins resulting in fatal injuries; b) commercial vessels cause erosion of the river bank due to their high wake; c) pollution from ships degrade habitats and reduce fish and crustacean production and recruitment; and d) erosion caused by vessel wakes results in excessive sedimentation in the deep pools where freshwater dolphins congregate for feeding and rest. A comparison of shoreline maps generated from GPS readings in 2006, 2008, and 2012 indicated significant erosion in two of the three wildlife sanctuaries: in Dhangmari at the confluence of the Dhangmari and Passur rivers (~7.0 hectares) and in Dudhmukhi at the confluence of the Betmar and Barashowla rivers (~1.0 hectares), and Barashowla and Bhola rivers (~1.5 hectares). These add to increases in sedimentation already caused by declining freshwater flows and sea-level rise.[121]

67. Speed boats transit through the wildlife sanctuaries, with Dhangmari accounting for the highest encounter rate for this vessel type (2.4/day) compared to Chandpai (0.6/day) and Dudhmukhi (0.0/day). Dolphin mortality due to vessel collision was cited as one of the causes of death contributing to the recent extinction of the Yangtze River dolphin (*Lipotes vexillifer*).[122] Even though there is a ban on oil tankers and other cargo vessels transiting through the wildlife sanctuaries[123], it has not been enforced as evidenced by the large number of oil tankers and cargo vessels that currently pass through the wildlife sanctuaries.[124]

Threat to biodiversity from upstream industrial developments

68. Large-scale industrial development is beginning to take place in the upstream areas of the project landscape – especially along the east bank of the Passur River, both north and south of Mongla. These include construction of a huge 50,000-tonne food grain silo, a transfer port, a cluster of garment industries etc. in close proximity to Chandpai sanctuary. There are also plans of establishing ship breaking yards, oil tanker docks, cement factories, liquefied petroleum gas plants and other industries. In Mongla, about four km from the Dhangmari sanctuary and 13 km from the Chandpai sanctuary, the Bangladesh Petroleum Corporation has built a series of oil/gas holding tanks with a capacity of 100,000 tones. Two 500-660 MW coal-based thermal power plants are currently being constructed about 14 km upstream from Mongla port. Coal dust released into the environment during transport to these units can coat mangrove leaves and reduce photosynthesis. It can also block the gills of fish, thereby suffocating them, and diminish the prey available for dolphins and other aquatic predators.

69. Unplanned industrialization along the Passur River, close to Dhangmari and Chandpai sanctuaries can also lead to increased vessel traffic, water pollution (persistent contaminants

[121] WCS/BCDP 2014. *Research on freshwater dolphin ecology and human activities in three wildlife sanctuaries in the Eastern Sundarbans mangrove forest*, Bangladesh. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.

[122] WCS/BCDP 2014. *Research on freshwater dolphin ecology and human activities in three wildlife sanctuaries in the Eastern Sundarbans mangrove forest*, Bangladesh. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.

[123] Ibid.

[124] Consultations with experts and community members.

associated with commercial shipping vessels) and air pollution (coal dust and soot). Extensive dredging will be needed to keep the channels in the Passur River open for navigation by the coal barges and other ship traffic needed to support the Khulna/Rampal coal-fired thermal power plant. This could cause substantial changes to the morphology of river channels, potentially altering the priority habitats for freshwater dolphins and other aquatic species, including the critically endangered Batagur turtle and vulnerable small-clawed otter.

70. Another concern surrounding the unplanned industrial development is about the health of natural drainage. Many river channels are already impeded by extensive embankments and polders created for the protection of agriculture from salinity. Declining freshwater flow represents another major threat to the Sundarbans including the project sites. The primary source of freshwater input to the Sundarbans is from the Gorai River, which is in turn a distributory of the Ganges. Freshwater is abstracted from the Ganges basin by an extensive network of more than 50 high dams and barrages (low-gated dams), as well as lost to evaporation from reservoirs, open canals and seepage.[125] The most significant of dams affecting freshwater flow to the Sundarbans is the Farakka Barrage in India which diverts flow from the Ganges to the Hooghly River to reduce sedimentation in Calcutta Port. In short, the rapid industrialization in the upstream will have significant impacts on the ecology of the Sundarbans, including on the three sanctuaries for freshwater dolphins, unless effective redressal measures are put in place.

Threats to biodiversity from poaching

71. There are reports of poaching involving dolphins and consumption of meat. During a boat-based dolphin exhibition (organized by WCS) visiting villages in proximity to the wildlife sanctuaries for Freshwater dolphins in 2012, there were 52 reports of dolphin mortalities of which 40 included information on trade or consumption. Dolphin meat was reported to sell for 50-300 BDT/ kilogram at local markets or directly from the fishers. During 2013, there were 71 reports of dolphin mortalities of which 38 included trade or consumption information with prices varied between 100-700 BDT per kilogram. During 2014, 112 reports about dolphin mortalities were received of which 67 included trade or consumption. Dolphin oil was reportedly sold for 400-500 BDT per liter while the meat sold for 20-200 BDT per kilogram. Two incidences of intentional killings were also reported in 2014 and one incident in both 2013 and 2014. Almost all other mortalities were reported as incidental catches in fishing gear or the cause of death unknown.

72. The locations of dolphin trade and consumption were mostly confined to a relatively small geographical area along the Passur River between Chandpai and Khulna which includes two of the wildlife sanctuaries for freshwater dolphins.[126]Information from local villagers indicates an increasing use of dolphin products. If market develops for these products, it will induce the villagers for more directed hunts.

Threats to biodiversity from climate change

[125] Smith, B.D., Sinha, R.K., Zhou, K., Chaudhry, A.A., Renjun, L., Wang, D., Ahmed, B., Haque, A.K.M. Aminul, Sapkota, K. and Mohan, R.S.L. 2000. Register of water development projects affecting Asian river cetaceans. Pages 22-39 *In* R.R. Reeves, B.D. Smith and T. Kasuya (eds.), *Biology and Conservation of Freshwater Cetaceans in Asia*, IUCN Occasional Papers Series No. 23. Gland, Switzerland.

[126] WCS/BCDP 2014. *Educational outreach, training and consultations in the three wildlife sanctuaries for freshwater dolphins in the Sundarbans, Bangladesh*. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.

73. One of the early manifestations of climate change in the Sundarbans is sea level rise. In 2007, the IPCC predicted that one meter rise in sea level will result in the loss of 2,500 km^2 of mangrove forests in Asia, with Bangladesh losing the most. [127] It has been estimated that a 28 centimeter rise above 2000 sea levels, which is at the low end of the global estimates of projected rise by 2090, would result in significant loss of the mangrove forests in the Bangladesh Sundarbans. [128&129&130] A study by SMRC analyzing 22 years of historical tidal data at three coastal stations [131] revealed that, due to tectonic subsidence, the loss of land in Bangladesh resulting from sea-level rise is many fold higher than the mean rate of global loss.

74. Climate change will have profound impacts on the ecology of the Ganges River and the Irrawaddy dolphins and associated aquatic biodiversity including water birds, turtles, otters, and crocodiles in the project landscape. Priority habitats of freshwater dolphins in the Sundarbans is strongly influenced by a complex interplay of physical dynamics, such as salinity and sedimentation, which are in turn determined by fluctuating freshwater flows; bathymetry; channel width; direction and velocity of water flow; water quality; availability of confluences, mid-channel islands and other geomorphologic complexities; substrate type; sediment load; and diurnal tides, all of which will be altered by climate change. [132] These changes, particularly increasing salinity and sedimentation, will change the species composition of aquatic ecosystems. The sensitivity of freshwater dolphins to environmental attributes including, on a broad scale, salinity and, on a finer scale, geomorphology determined by sedimentation processes, portends an indicator value for the species to inform about the impacts of climate change, as well as potential adaptive measures for conserving biodiversity and sustaining productive fisheries. [133]

75. Climate change induced disruptions/alterations in the hydrology and ecology will have significant adverse impacts on natural resources especially the fishery resources in the project landscape. For instance, hilsa shad (*Tenualosa ilisha*) — the national fish of Bangladesh — accounts for 13 to 14% (valued at around US$71.4 million or 1.3% of the GDP) of the total fish caught in Bangladesh. The hilsa is an anadromous fish, which has a life-cycle that follows a general pattern of breeding upstream in fresh water, with the larvae hatching from free-floating eggs. The immature young grow in river channels and then descend to the sea for a period of feeding and growth before returning to the rivers as mature breeding adults to complete the cycle. [134] The alterations in the aquatic chemistry due to climate change can disrupt their delicately calibrated life-cycle.

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[127] IPCC (2007), Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[128] Loucks, Colby, Shannon Barber-Meyer, Md. Abdullah Abraham Hossain, Adam Barlow, Ruhul Mohaiman Chowdhury 2010. Sea-level rise and tigers: predicted impacts to Bangladesh's mangroves. *Climate Change* 98: 291-98.

[129] Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Basis, Summary for Policy Makers. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. World Meteorological Organization and United Nations Environmental Program. (Available from http://www.ipcc.ch/SPM2feb07.pdf)

[130] Rahmstorf S. 2007. A semi-empirical approach to projecting future sea level rise. Science 315: 368–370.

[131] MoEF, 2005

[132] Smith, B.D., and Mansur, E.F. 2012. Sundarbans. Pages 144-154 in Hilty, J.A., Chester, C. C., and Cross, M. (eds) *Climate and Conservation: Landscape and Seascape Science, Planning and Action*. Island Press.

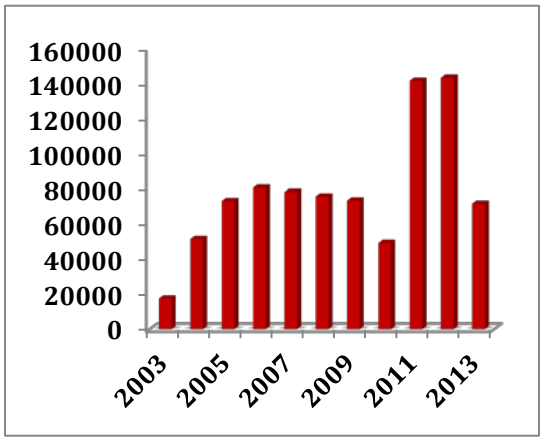
[133] Smith, B.D. and R. R. Reeves. 2012. River cetaceans and habitat change: generalist resilience or specialist vulnerability? *Journal of Marine Biology* 2012:1-11.

[134] UNDP, 2012 – Review Paper: Status of coastal and marine ecosystem management in South Asia

76. Similarly, the human communities, particularly the fishers who already have a precarious existence and are heavily dependent on natural resources, will become even more vulnerable to climate-related impacts including extreme and erratic weather events (cyclones, floods etc.). This may force them to deepen their dependency on diminishing natural resources thus initiating a vicious downward spiral of degradation and even more dependency, which will further imperil their lives and livelihoods. Signs of such vulnerability are already evident in the generally low socio-economic conditions of the local people.

Threat to biodiversity from unplanned tourism

77. The project landscape is slowly emerging as a bustling tourism destination. The river channels constituting the Dhangmari and Chandpai sanctuaries form part of an important circuit navigated by an increasing number of tourists visiting the northeastern forest fringes. The major tourist spots in this area are the Karamjal Wildlife Breeding Center in the Dhangmari wildlife sanctuary and Harbaria, south of the Chandpai wildlife sanctuary. Approximately 250 privately owned tour boats operate small-scale tours out of Mongla. They cater to an increasing number of predominantly national tourists visiting for the day. The following graph depicts the annual tourist inflow to the Karamjal Wildlife Breeding Centre located in the project landscape.[135] By and large, the boat owners and tour operators are conservation conscious and consider dolphins central to their business.[136]



78. Trajectory of tourism development can have differential impacts on the ecology and economy of the region. Responsible, community based nature tourism can offer significant income-earning opportunities for the local people who are otherwise dependent on fisheries for livelihoods. On the contrary, unplanned/irresponsible tourism could put further strain on the fragile ecological fabric of the Sundarbans due to overdevelopment and intensive use of habitats like mangroves, creeks, river channels etc. Irresponsible tourism development and reckless tourist behavior can also disturb dolphins and other wild fauna which are already under stress due to a multitude of factors described above. Unplanned tourism will also have severe social

[135] Forest Department

[136] WCS/BCDP 2014. *Educational outreach, training and consultations in the three wildlife sanctuaries for freshwater dolphins in the Sundarbans, Bangladesh*. Background document prepared by the Wildlife Conservation Society's Bangladesh Cetacean Diversity Project, Khulna, Bangladesh.

implications including the marginalization and dislocation of local people, unequal distribution of benefits, cultural contamination etc.

79. In addition there are additional potential threats to biodiversity in the project landscape – not serious at present but likely to increase if the present trend continues. Use of high quantities of fertilizers and pesticides in agriculture, aquaculture, household wastes (including untreated sewage) from urban areas and industrial discharges cause pollution of water channels. Though not reported on a massive scale, invasive alien species, such as water hyacinth (*Eichhornia crassipes*), can pose a serious threat in future as these species have already established in many other wetlands and river channels.

C. BASELINE ANALYSIS

Baseline projects/ programmes:

Investment from national government

80. The Government of Bangladesh invests around 120 million dollars annually through the Ministry of Environment and Forests for effective environmental management and biodiversity conservation in the country. Of this, Forest Department receives around 43 million dollars annually from the Ministry's national budget allocation. Almost half of the fund that the Department receives is spent on staff salaries, allowances and travel, whilst the rest is invested mostly on forestry programs including reforestation, afforestation, livelihood support to local communities and infrastructure development. Although the Forest Departments retains jurisdiction over aquatic resources, there is also a significant national budget investment from the government in the fisheries sector through the Ministry of Fishery and Animal Resources, which is allocated around 112 million dollars annually, of which some of these funds are spent on supporting fisheries production through aquaculture, which is one of the biggest economic sectors in Bangladesh. Ministry of Agriculture supports programmes such as a) Greater Khulna Division Agriculture Development Project-Phase 2, and b) Enhancing-Food Security through Improved Crop Water Management Practices in the Southern Coastal Areas of Bangladesh that has a bearing on the project landscape.

Investment from multi-lateral/ bilateral donors

81. The Government of Bangladesh also receives aid from -multi-lateral/ bilateral donors for natural resources management including ecosystems and protected area management – which currently averages an estimated USD 10 million per year, much of which is invested to support co-management of natural resources, livelihood development and conservation. Some of these programmes are listed below:

Institution/Department/ NGO/ Donor	Project Name/Location	Period	Project Cost	Outputs/Outcomes
International Fund for Agricultural Development (IFAD)	Coastal Climate Resilient Infrastructure Project	2013-19	US$40.0 million	Improved livelihoods; higher incomes; food security; and enhanced climate resilience.

Government of the Netherlands	BLUE GOLD: Program for Integrated Sustainable Economic Development by improving the Water and Productive Sectors in selected Polders	2014-20	€ 49,851,000	Reduce poverty in the coastal areas by enhancing the livelihoods, efficient water resources management and increased productivity of crops, fishery and livestock
German Federal Ministry for Economic Cooperation and Development (BMZ)-GIZ	Sustainable development and biodiversity conservation in coastal protection forests	2011-15		Capacity building on livelihood strategies, such as honey collection and the sustainable production of mud crabs.
United States Agency for International Development (USAID)	Bengal Tiger Conservation Activity	2014-18	$13,000,000	Protect and improve key tiger habitats.
LifeWeb, Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austria/ Wildlife Conservation Society	Establishing an Effective Protected Area Network for Threatened Freshwater Dolphins in Waterways of the Sundarbans Mangrove Forest, Bangladesh	2006-15	€ 324,629	This project aims to conserve Ganges River and Irrawaddy dolphins by establishing an effectively managed protected area network in waterways of the Sundarbans, Bangladesh.

82. There have been a few projects implemented in the Sundarbans in the past for the sustainable management of natural resources. These include Nishorgo Support Project (NSP), Integrated Protected Area Co-management (IPAC) for the co-management of protected areas, Strengthening Regional Cooperation for Wildlife Protection (SRCWP) Project on natural resources and biodiversity conservation in various ecosystems, Sustainable effort to ensure access to safe drinking water and sanitation in southwest Bangladesh (SIMAVI); Sundarbans Environmental and Livelihood Security (SEALS) Project etc. These programmes form the baseline for the present GEF project.

D. LONG-TERM SOLUTION AND BARRIERS TO ACHIEVING THE SOLUTION

83. The unique aquatic habitats of the Ganges and the Irrawaddy dolphins in the Sundarbans are under increasing threat due to overharvesting of aquatic species (fish and other prey species of dolphins); adoption of highly destructive fishing practices (e.g. gill nets, poison fishing, mosquito nets etc.); reckless handling of incidental by-catch; entanglements of dolphins in the fishing gear; increasing maritime traffic (disrupting the biology of dolphins, wake action causing coastal erosion, sedimentation of pools preferred by dolphins, mortality due to collision with vessels, discharge of pollutants etc.); unplanned development in the upstream such as barrages, industrial establishments, flood diversion systems and roads (freshwater abstraction, diminished freshwater influx); commercial tourism operations (increased cruise through the water channels; exposing unused habitats etc.); habitat destruction and land-use change (conversion to agriculture, aquaculture, settlements etc.); pollution and spread of invasive alien species. Siltation and loss of river channels and small pools cause loss of connectivity between river channels, blocking migration paths of fish and dolphin species. Climate change compounds these problems.

84. Establishment of three new protected areas in 2012 is a significant first step towards the conservation of dolphins in the Sundarbans. However, these protected areas alone cannot ensure the long-term survival of dolphins and their habitats given the complex nature and scale of threats mentioned above. In order to improve the conservation prospects of the dolphin habitats in the Sundarbans, long-term solutions need to be anchored in several key areas such as: establishing a robust database about the preferred hotspots outside the present protected area network; improving the management effectiveness and informed decision making in the three new dolphin sanctuaries; intensive capacity building of Forest Department staff; phasing out destructive fishing practices in the dolphin hotspots; promotion of alternate and viable livelihoods (value added fishery-based products, nature-based tourism, alternate income generating activities etc.) for local communities in order to wean them away from destructive resource use practices; and creating regional and national level institutional mechanisms for cross-sectoral dialogue and action that promotes integrated approaches for aquatic ecosystem management. In short, the long-term solution to be pursued for the sustainable management of the globally significant aquatic biodiversity of Bangladesh would include consolidating the key habitats of aquatic biodiversity particularly that of the Cetaceans, while also taking into account development imperatives, need for sustaining livelihoods and also addressing retrogressive factors including the anticipated impacts of climate change with active support and involvement of government, local communities, NGOs and partners. There are, however, a couple of barriers to realizing this long-term solution.

Barrier 1: Limited government capacities to mitigate threats to globally important aquatic habitats and species

85. Aquatic ecosystems and habitats of endangered species currently have sub-optimal representation in the national PA system. No doubt, designation of the three protected areas (in 2012) forms an important programmatic baseline for cetacean conservation in the region. However, these three new protected areas are not exhaustive in terms of comprehensively consolidating their key habitats. There are still areas in the Sundarbans where important 'dolphin hotspots' need to be identified, confirmed and brought under proper conservation framework. Though definite, innovative attempts have been made by WCS towards this, more systematic and extensive surveys are required for identifying such hotspots. This is crucial for designating future protected areas of representative scale for ensuring the long-term conservation of cetaceans in the region.

86. Robust knowledge base (generation, synthesis and dissemination) is essential for shaping an effective conservation paradigm. While information on dolphins has been growing steadily over the years, there are still knowledge gaps such as the preferred habitats of dolphins, sustainable fisheries catch, impacts of upland development on the biodiversity of the Sundarbans, impacts of maritime traffic on conservations, and trajectory of tourism etc. Further, at the regional level, significant knowledge augmentation is required on issues such as the impacts of economic activities (e.g. fishing, maritime traffic, tourism) and other extraneous threats (upstream water abstraction, diminishing freshwater inflow, climate change etc.) on the biodiversity of the region.

On the other hand, even when knowledge is available, stakeholders do not often have access to appropriate and user-friendly information, tools and other mechanisms for analyzing trade-offs at the time of decision making. Currently, the available knowledge on the project area remains largely in the academic domain and these need to be packaged for the use of managers and user communities. It is also felt that the traditional knowledge available with local communities also needs to be codified, synthesized and disseminated.

87. There are also inadequate institutional capacities to manage aquatic ecosystems and species from a long-term perspective. The Forest Department is mandated for the management of protected areas and has considerable expertise in terrestrial forest management. However, the Department needs significant scale up in its capacity for managing aquatic ecosystems. It has only a few qualified staff with wetlands management training and experiences. Past capacity building efforts on aquatic conservation have been largely ad-hoc and opportunistic as opposed to strategic or long-term. The government has also not been able to effectively mobilize existing national capacities and knowledge (from the academia, NGOs and others) systematically to promote aquatic biodiversity conservation.

88. There is a closely related issue too. Although several threatened aquatic species are protected under the Bangladesh Wildlife Protection Act, 1973, this legal provision alone has not been effective in preventing the decline or degradation of their habitats, thereby undermining their long-term survival. Further, the Wildlife Act follows a 'terrestrial approach' to protected area management, which is built around the premise of excluding resource use. In the context of aquatic biodiversity, where use of resources is an integral element, this approach, however, is found to be highly ineffective. This leads to the conflicts between the attempts of the Forest Department to 'enforce law based on human exclusion' and resource based livelihood aspirations of the local communities.

89. The three newly designated protected areas do not exist in isolation; but are integral part of the ecological, economic and developmental continuum in the larger landscape. Currently, however, there is perceptible disconnect between the objectives of conservation, economic development and livelihood aspirations in the region. As has been described in the Threats section, there are several threats to the globally significant biological diversity of the region. Some of these threats emanate from outside the premises of the protected areas. For instance, developmental programmes in the upstream have significant impacts on the conservation prospects of the project landscape. However, development planning in the upper catchments seldom considers their potential impacts on downstream biodiversity. Similarly, fishery activities rarely take into account the impacts of depletion of fishery resources on cetacean diversity. In short, as of now, sustainable resource use is not a common denominating factor except for the conservation sector. Better sectoral coordination would have helped in maximizing synergies, minimizing adverse impacts, and reconciling competing objectives.

90. At present, the conservation sector (Forest Department) has limited or no institutional opportunities to engage with such developmental planning. Furthermore, these developmental sectors do not also have any inbuilt or externally stimulated mechanisms for internalizing the elements of biodiversity conservation into their developmental processes. In the absence of such opportunities/ mechanisms, the effectiveness of management of protected areas created for

dolphins becomes ineffective/ even a non-starter. Absence of robust data is also a serious constraint in effectively articulating a case for mainstreaming biodiversity conservation in developmental processes in the region.

Barrier 2: Local stakeholders, especially local communities have limited incentives and capacities to support aquatic biodiversity conservation

91. As has been dealt in detail in the Threats section, unsustainable resource use (overharvesting, destructive practices etc.) by local fishers is one of the key drivers of resource depletion in the project landscape. Given the high population pressure and prevailing socio-economic backwardness in the Sundarbans, conservation efforts are unlikely to succeed without strong support and endorsement from local community. At a fundamental level, the key barrier to effectively integrating conservation considerations into the economic and livelihood activities of local fishers is their apparent inability to move out of the vicious spiral of 'diminishing natural stock-prevailing poverty – deepening resource depletion'. During the project preparation phase, it was observed that most fishers are aware of the harmful nature of overharvesting of fishery stock. However, extreme economic backwardness, offer them no margins for economic sacrifices for the sake of conservation.

92. Other barriers on this account include inadequate technical know-how about alternate, less destructive fishing gear and fishing practices. At the same time, even when such knowhow is made available, in the baseline scenario, the fishers lack adequate economic incentives to shift away from the current destructive fishing gears (e.g. mosquito nets) and malign practices (poison fishing) to more benign and sustainable options. The fishers also have weak capacity to access new economic opportunities (both existing and emerging – e.g. Tourism, value added fish products etc.) and develop alternative income generating opportunities over traditional sources of livelihood (fishing) that are rapidly becoming unviable as a result of resource degradation. While there are some interventions (both government and donor driven) to help economically disadvantaged communities, there is need to deepen this engagement through community driven resource management systems. However, such a resource governance system that promote options for sustainable fisheries; avoid destructive fishing practices; provide better market access; and promote alternate income generating activities is non-existent in the region. Dysfunctional nature of the existing community based resource use institutions in the project landscape is another key barrier.

93. Further, even though they are important actors and stakeholders in the region, the interests of the local communities are not well represented in the current planning and decision-making process related to the management of the three new dolphin sanctuaries. This is particularly evident from the lack of awareness among the fisher-folk about the existence of the protected areas itself; or even when aware their apprehension that their economic or livelihood interests will be jeopardized (in the absence of other options) if the provisions of the sanctuary are implemented. This weakness emanates largely from the absence of an institutional mechanism for representing community interests.

94. Likewise, there is extremely limited experience and stakeholder involvement in linking protected area management with the wider landscape to mitigate ecosystem loss and degradation caused by development activities such as the construction of industries or water diversions that have significant negative impacts on aquatic ecosystems. Particularly, limited experiences and examples exist in the country on how to effectively manage riverine ecosystems systems for conservation with the involvement of wide range of stakeholders at a wider ecosystems level. Such support is particularly critical for riverine systems and other aquatic habitats, where upstream or downstream actions can have significant externalities for site level conservation work. For example, upstream water pollution can impact biodiversity downstream, whereas downstream river diversion can also impact movement of fish and other species upstream. Although the government has promoted some efforts at co-management of wetlands at some sites (particularly in the large seasonal wetlands called *Haors*), these have not been widely applied nationally and local communities in the wider landscape have limited access to information and incentives to support aquatic biodiversity conservation – particularly at some critical landscapes, such as those identified by this project, to mitigate threats from households level activities such as from fishing through community sanctions and to prevent outsiders from overharvesting products and from degrading ecosystems.

E. STAKEHOLDER ANALYSIS

95. A generic stakeholder analysis is already given in the Section on Situation Analysis. This section provides a more focused analysis of stakeholders at the site level.

Stakeholders	Relevant roles
Forest Department	The Forest Department will be the lead institution for this project. Its office at Khulna Division will be the primary project implementation unit. The Forest Department will be involved in the overall project implementation, coordination and in ensuring cooperation / collaboration with other stakeholders. At the national level, the FD will ensure that lessons learnt from this project are fed into developing other aquatic protected areas and in integrating better management principles in aquatic ecosystem management as well.
Local communities	Local communities, particularly fishers, are the most important stakeholders of this project. The project will ensure a strong collaborative approach in spearheading the conservation and sustainable resource-use agenda. Component 2 of the project is focusing exclusively on communities. The primary focus of engagement with communities will be through the Co-Management Committees (CMCs)/ Village Forums and other user group based organizations.
Women's associations	Community level women's associations have been promoted in Bangladesh by the government and many NGOs as a means to empower them economically and politically. Such associations will be involved to create opportunities for women and to ensure gender-specific roles in PA management, buffer area management and activities envisaged under Component 2 of the project.
Nature tourism operators	Small scale tourism exists in the Sundarbans that is based on dolphin watching. Some boat captains have been involved in documenting locations where sightings of dolphins occur, in order to build a more comprehensive data on where the species are located at different times of the year. The project will strengthen capacities of local tourism operators, such as by promoting the existing boat captain's sighting network, providing guidance for dolphin-watching within tourism programmes, including input from tourism operators into PA management plans.
Local social service, conservation NGOs	Local NGOs will be involved, as appropriate, to provide information to communities on aquatic conservation, sustainable fisheries management, and strategies to cope with climate change and declining freshwater flows – local NGOs including Prodipan, CARINAM, Rupantar, and Coastal Development Partnership. They may also be involved in community mobilization and awareness raising activities and in conflict mitigation. Since some of these NGOs are involved in promoting sustainable livelihoods, the project will partner with them to strengthen appropriate actions and to ensure that the NGO promoted activities are compatible with conservation actions being promoted by this project,
International	Several international conservation organizations have been active partners in conservation actions in

conservation organizations	Bangladesh. For example, WCS has been providing support through capacity building, research and monitoring, educational outreach, and the development of management plans for aquatic conservation. Other international conservation organizations active in Bangladesh include IUCN, WWF, and CARE International etc. Such organizations will have a strong role under Component 1, where a partnership has been envisioned to strengthen national and regional capacities to manage threatened aquatic species by exchanges of information, knowledge, expertise and experiences. Additionally, specific organizations may be used for implementing certain aspects of the project – such as to support PA management planning, capacity development etc. Some of the organizations will also provide co-finance to this project.

II: Strategy

A. PROJECT RATIONALE, POLICY CONFORMITY AND DESIGN PRINCIPLES

Project Rationale

96. The Government of Bangladesh is requesting GEF support to put in place an enabling management framework for strengthening the biodiversity conservation prospects of the aquatic environment of the Sundarbans - particularly the key habitats of the Ganges and the Irrawaddy Dolphins. As already described in the Situation Analysis section, the biodiversity of the Sundarbans is highly globally significant for its unique attributes. More specifically, the project landscape supports one of the last remaining and viable populations of the Ganges and the Irrawaddy dolphins across the world. As such, if effective conservation actions are supported, the project landscape would hold the key for ensuring the long-term survival of these two species on a global level. The project landscape is also highly vulnerable in the context of climate change and the two cetacean species targeted by the project have high indicator values in understanding and monitoring the impacts of climate change.

97. Further the project area also has considerable national and local significance as it provisions vital ecosystem services, sustains human livelihoods (primarily through fisheries) and supports economic activities (e.g. ecotourism). Notwithstanding such high ecological, economic and livelihood significance, there is clear evidence that the region's natural resources have been increasingly subjected to over-exploitation. In the classical case of "the tragedy of the commons", the poor and marginalized communities (primarily fishers) are compelled to deepen their dependence on diminishing natural stock and the degraded resources further impoverish their resilience. The threatened status of cetaceans is an indicator of this declining prospect of biological diversity in the Sundarbans. As an apex predator in the waterways of the Sundarbans, the conservation of cetaceans represents not only safeguarding them from the impending threats of extinction; but also restoring/ maintaining the ecological health of the aquatic environments of the Sundarbans. However, it is only through reviving the integrity of already degraded ecosystems and more importantly through the prudent use of natural resources that local communities will be able to reinstate their resilience and improve their social and economic welfare that will ultimately reflect in the improved conservation prospects of the cetaceans. However, these require significant changes in the current management approaches being pursued in the region. This GEF project aims to do so.

Design Principles

98. At a fundamental level, the project envisions to put in place a management framework, designed strongly on building capacities for *applied knowledge management on aquatic*

biodiversity, sprucing up enforcement systems, extensive outreach and advocacy on conservation, and strengthening community livelihoods (both resource based and alternate) as a strategy for the conservation of biological diversity in the Sundarbans in general and that of cetaceans in particular. The project design envisages that resource use in the project landscape becomes rational and in sync with conservation objectives. Operationalizing the newly formed protected areas and identifying and establishing a cluster of additional protected areas (in the dolphin hotspots) to protect key populations of cetaceans has been an important consideration. Similarly there is an identified need for the creation of regional and national level institutional mechanisms to bringing together various actors (stakeholders/ decisions makers/ policy makers/ academicians/ donors) for effective cross-sectoral dialogue, programme coordination, joint action and policy engagement on aquatic biodiversity management.

99. A related design principle is to seek leverage support (technical and financial) of various stakeholders particularly from NGOs, academia and donor communities for strengthening biodiversity conservation in the region. Preparation of biodiversity-friendly sectoral guidelines for the economic sectors operating/ coming up in the region, supported by advocacy and high level policy engagement for mainstreaming biodiversity-friendly practices into economic operations are other design considerations built into the project. Furthermore, the project design seeks to engineer a paradigm shift towards sustainable use of fishery resources by local communities, where such use is currently unsustainable; and also promote alternate income generating options for diverting pressure from depleted natural resources.

Project conformity

100. The project will work both within and outside the protected areas and will realize two GEF Biodiversity Focal Area Objectives. First, by seeking to expand coverage (by 51,000 ha) and strengthen the management effectiveness of a cluster of existing PAs (1,070 ha) the project will contribute to *Strategic Objective One: Improve sustainability of Protected Area (PA) systems.* In doing so, it will reduce pressures on PAs and establish replicable model areas across the region and other parts of the world. As the project works towards influencing other developmental sectors in the region, it will also advance *Strategic Objective Two: Mainstream biodiversity, conservation and sustainable use into production landscapes, seascapes and sectors.*

101. This project is consistent with the Convention on Biological Diversity (CBD) and its guidance from the Conference of Parties. The project is designed to support the primary objectives of the CBD - conservation of biological diversity, sustainable use of its components and the equitable sharing of the benefits arising out of the utilization of these components. The project will fulfill the requirements of Article 6: General measures for Conservation and Sustainable use. Article 8: In-situ conservation will be supported through the strengthening of park management and the targeted species and habitat management, research and monitoring programme. Article 10: Sustainable use of components of biological diversity will be furthered through development and demonstration of alternative, sustainable livelihood options that avoid or minimize adverse impacts on biological diversity. The project also supports Article 12: Research on targeted priority issues related to biodiversity of the Sundarbans and provides training in technical and managerial areas and linking exchange of information. Article 13: which stresses education and awareness will also be a key element in the project.

102. This project will also contribute to achieving the CBD's Aichi targets. In particular, it will promote better understanding of aquatic and wetland biodiversity, which will directly contribute to Aichi Target 1 - "By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably." Furthermore, the project will directly support Target 11 - "By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes", Target 5 - "By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced" and Target 6 - "By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits." The project also addresses key elements of the Programme of Work on Protected Areas, including: 1.2 - To integrate protected areas into broader land- and seascapes and sectors so as to maintain ecological structure and function; 1.4 -To substantially improve site-based protected area planning and management; and 1.5 - To prevent and mitigate the negative impacts of key threats to protected areas. Over all, the project is in line with the above mentioned decisions of CBD COP and shall further strengthen the national efforts on the conservation of aquatic biodiversity.

B. PROJECT GOAL, OBJECTIVE, OUTCOMES AND OUTPUTS/ACTIVITIES

103. The long-term goal to which the project will contribute is the sustainable management of the globally significant aquatic biodiversity of Bangladesh. This the project will achieve by consolidating the key habitats of the Sundarbans particularly that of cetaceans, while also taking into account development imperatives and need for sustaining livelihoods. The project will also address retrogressive factors including climate change. The immediate objective of the project is to build capacity to effectively manage the existing protected areas established for dolphin conservation and also expand their operational coverage while still meeting the livelihood aspirations of local communities especially the fishers. The project will further build on the baseline initiatives in the region. The project objective will be realized through the following Outcomes and Outputs.

Outcome 1: Important aquatic ecosystems of the Sundarbans supporting the globally threatened species of cetaceans conserved.

104. This outcome focuses on the transformative changes that need to be made in terms of planning and execution framework to address existing and emerging threats to biodiversity in the project landscape. It will put in place a robust knowledge management and effective implementation system congruent with conservation needs. Knowledge generation and dissemination of will be improved leading to informed and better decision making related to the management of aquatic habitats and sustainable use of resources in the protected areas and biodiversity compatible land uses in the buffer zones. Further, new and additional areas to be

managed as protected areas and buffer areas shall be identified and notified and capacities developed among conservation and fisheries sector staff for strengthening the effectiveness of biodiversity conservation efforts. Support to implementation of select activities of the Management Plans (currently under preparation) of the newly established PAs and buffer area plans will be provided to address existing and emerging threats. This outcome will also support institutionalizing a monitoring and evaluation framework together with a replication strategy for aquatic biodiversity management specifically for the Sundarbans and other key aquatic ecosystems in the country.

Output 1.1: Knowledge generation and dissemination system improves decision making related to the management of aquatic habitats and sustainable use of resources in the protected areas and buffer zones

105. This output will support building up knowledge on the aquatic environment of the Sundarbans. There are some pioneering baseline studies already carried out in the region (primarily by WCS) that *inter alia* include: the status, distribution and threats to cetaceans; the catch-composition and efforts of local fisheries; patterns of human use and anthropogenic activities including vessel traffic; density and fine-scale distribution of different fishing practices; socio-economic characteristics and local attitudes of fringe area communities; preliminary investigations of fishery market chains etc. Despite these, there still remain several knowledge gaps. The primary focus of this output will be to support carrying out selected diagnostic studies, the results of which will enable programme planners and practitioners to make choices about the use of natural resources and further strengthen the prospects of biodiversity conservation in the Sundarbans. Broadly, the key thematic areas of such studies would include: (1) the status and distribution of cetaceans in the whole of the Sundarbans including identifying additional dolphin hotspots and high priority areas particulalry that of Irrawaddy dolphins in the western Sundarbans; (2) assessing the potential for establishing buffer zones to the existing wildlife sanctuaries with an emphasis on promoting sustainable use consistent with protecting dolphin populations; (3) strengthening the ongoing freshwater dolphin sightings network conducted by the captains of nature tourism vessels. This is to be achieved through: a) involving additional vessel captains, b) incorporating the routine collection of data on salinity and depth; c) and using data from the sighting network to develop a monitoring framework for detecting long-term trends in the abundance, seasonal occupancy and habitat use of freshwater dolphins; (4) integrating the careful documentation of search effort, dolphin sightings, and fishing gears/practices into a patrolling protocol using the 'Spatial Monitoring and Report Tool' (SMART).[137]; (5) investigating illegal poison fisheries through interview surveys and intelligence gathering about where, when, and how it is practiced, the chemicals used, effects of eating poisoned fish on the dolphins and humans, and on ways to prevent this practice; (6) using salinity and depth data recorded from a strengthened dolphin sighting network among nature tourism vessels, as well as satellite imagery, for modeling long-term changes in salinity, depth, and geomorphology caused by upstream dams and climate change; (7) obtaining and comparing depth profiles of three wildlife sanctuaries to investigate potential habitat changes due to increasing sedimentation from vessel traffic, declining freshwater flows, and sea-level rise; (8)

[137] SMART can measure, evaluate and improve the effectiveness of wildlife law enforcement patrols and site-based conservation activities. It can also provide a long-term data base vital for detecting trends in wildlife populations and human activities. The FD is already adopting SMART as a monitoring tool for terrestrial patrols

comparing indices of fish and crustacean catch and diversity over time to evaluate the biological responses in the wildlife sanctuaries and surrounding waters to dolphin/fisheries protection efforts; (9) studying the potential for sorting live fish fingerlings and non-target crustaceans from the catch of saltwater shrimp and freshwater prawn PL collection nets, including field trials with local fishers; (10) assessing the feasibility of using fixed acoustic detection devises to monitor freshwater dolphin abundance and occupancy; (11) assessing the potential of sustainable fishery livelihoods and technological options/ innovations in fishing gear for conservation-friendly fisheries; (12) economics and market mechanisms (value addition and end-user markets) for enterprises based on natural resources; (13) carrying capacity assessment for planning responsible tourism (including costs and distribution of benefits etc.); (14) assessing the vulnerability of the Sundarbans' habitats to climate change (short, medium and long-term)– at species and ecosystem levels, and also on local livelihoods; (15) the long-term impacts and challenges of excessive use of chemical fertilizers and pesticides in aquaculture; (16) ecosystem alterations due to upland developments and water abstraction; (17) feasibility of adopting GIS mapping tools to inform physical development and placement of infrastructure across the landscape; and (18) protocols for the periodic monitoring of natural resources including participatory resource monitoring systems.

106. While above research activities were identified as vital, considering the limited funds available with the project, it wouldn't be realistic to support all these research themes. The project can support undertaking priority research topics (e.g. the status and distribution of cetaceans in the whole of the Sundarbans including identifying additional dolphin hotspots and high priority areas particulalry that of Irrawaddy dolphins in the western Sundarbans), while other research programmes will be conducted in partnership with universities and other institutions as part of own programmes, collaborative efforts or student dissertation works. Keeping this in mind, in the initial phases of the project, a thorough research prioritization exercise will be undertaken on key research gaps, with inputs from research institutions/ academia/ NGO partners etc. This will help the project to collect, collate and synthesize the existing knowledge (both formal and customary) to support narrow down on critical knowledge gaps. This information will help prioritize research to be supported under the project while also helping identify co-financing partners for conducting additional research.

107. This Output will also support effective outreach and knowledge dissemination for translating the research knowledge into user-friendly information for field practitioners, policy makers and local communities. In order to integrate conservation considerations in the activities of economic sectors, *biodiversity-friendly sectoral guidelines* will be prepared for key sectors such as Fisheries, Tourism, Maritime traffic, Industrial Development and aquaculture. These guidelines shall critically assess the existing land-use and development practices in and around the project area and will provide a plan for how existing practices/ operations of different sectors can be made more compatible with the conservation needs.

108. A review of the existing national and international "best management practices" on minimizing adverse impacts on biodiversity for each sector shall be undertaken. Accordingly, appropriate ecologically viable, economically feasible and socially acceptable measures will be identified and adapted. Extensive consultation with various stakeholders is envisaged in the

formulation of biodiversity-friendly sectoral guidelines as this is crucial to ensure necessary ownership of various agencies/ sectors for whom the guidelines are targeted.

109. *Shushuk mela*, an innovative outreach programme (initiated under the BCD project by the WCS), is an annual, month-long, vessel-based, interactive, educational outreach exhibition, visiting villages close to the key dolphin habitats. The exhibition includes informative panels and other interactive elements guided by skilled interpreters recruited mostly from a network of university student interns. There has been significant improvement in perception and awareness about cetacean conservation generated through this innovative approach. This output will earmark resources for continuing and scaling up this activity.

110. Under this output, support will also be provide to facilitate online knowledge management efforts such as electronic discussion forums, web-based portals, expert referrals, document repository, data warehousing etc. Findings of research programmes will be converted into various formats (such as print, audio and video documentation) and will be developed for different audiences.

111. The primary approach for knowledge generation and dissemination under this output will be to make use of the expertise available with local/ regional research institutions, NGOs (national and international) and universities. Further, the project will support scholars/ students from colleges and universities for research studies that are of mutual interest. Apart from producing research outputs, the intent is also to build and retain capacities for knowledge generation and dissemination in the region itself. The knowledge generated/ synthesized under this output will also feed into necessary points of engagement in developing replication strategies/ policy processes at the regional and national level under output 1.4.

Output 1.2: New and additional areas to be managed as Protected Areas and buffer areas identified, notified and capacities developed among conservation and economic sector staff for strengthening the management effectiveness of biodiversity conservation efforts.

112. This output will be delivered through three sub-outputs: 1) new and additional areas of important dolphin habitats to be brought under protected area network; 2) delineation of buffer zones around the existing and new protected areas so that the management interventions taking place in these areas are not inimical to protected area management objectives; and c) intensive capacity building programmes for conservation and fishery sector staff on aquatic conservation issues.

113. *Establishing new protected areas:* Setting up protected areas continues to be a crucial strategy for conserving the aquatic biodiversity in Bangladesh including that of the cetaceans. It would be pertinent to note that between the formulation of the Project Identification Form (PIF) and this project document, the Government of Bangladesh has notified three dolphin sanctuaries (encompassing 1,070 ha) in the Sundarbans. Undoubtedly, this is a major stride towards conserving the globally threatened cetacean communities particularly the Ganges dolphins and the Irrawaddy dolphins. However, to comprehensively consolidate the long-term conservation prospects of these species, all important 'dolphin hotspots' (across the whole of the Sundarbans and even in the aquatic environments outside the Sundarbans) need to be brought under protection.

114. With this in view, drawing on the outcomes of the diagnostic studies proposed under the Output 1.1, this output shall help confirm and notify additional dolphin hotspots in the Sundarbans and other major aquatic environments as new protected areas (at least 51,000 ha). These PAs will be governed under the Wildlife (protection and safety) Act, 2012 of Bangladesh. Legally, wildlife sanctuaries are areas closed for hunting, shooting or trapping of wild animals and are declared under Article 23 of the Bangladesh Wildlife (Preservation) Order, 1973 for the protection of wildlife and all natural resources such as vegetation soil and water therein (paragraph) (p) of Article 2). Such sanctuaries shall equate to IUCN Protected Areas Management Category IV (Habitat/Species Management Area).

115. *Delineation of buffer zones:* This output also will support declaration of buffer areas (at least 50,000 ha) in and around the protected areas (both existing and proposed) that will provide further buffer against direct threats to the biodiversity of the protected areas. Mostly, these buffer areas will be nested within the SRF which is a part of Bangladesh's permanent national forest estate. The core of these buffer areas will equate to IUCN Category VI Protected Area with provisions for the sustainable use of natural resources. Although these forests in Bangladesh are not legally considered as protected areas, such forests are expected to continue to be under strong government protection. This output will finance the design of buffer areas and preparation of buffer area management plans, in order to ensure that they adequately take into account landscape-wide conservation considerations of connectivity, resource use, resource allocation and make appropriate provision for their sustainability. The buffer area management plans will be designed to facilitate joint conservation work across the PAs on various aspects of biodiversity conservation.

116. *Capacity development among conservation and economic sector staff*: This output will support building capacities of conservation and other economic sector staff in sustainable natural resources management. To start with, there is a felt need to develop appropriate management capacities of the Khulna Forest Division (the focal point of the project) in aquatic biodiversity conservation planning and implementation. This will be accomplished through innovative and interactive training programs that will include professional training opportunities and sustained mentoring support. Priority areas for trainings include the use of MIST software (a user-friendly spatial management information system designed to service PA management), and participatory techniques to work with local communities and other stakeholders, enforcement (e.g. surveillance techniques and successful prosecution), monitoring protocols (e.g. trends in freshwater dolphins and other aquatic fauna and on documenting threats in the protected areas), and community outreach (e.g. pparticipatory governance systems for effective resource management in collaboration with local communities). Additional topics for trainings shall include: (a) PA and buffer area management planning; (b) habitat improvement techniques with focus on aquatic biodiversity; (c) legal framework on environmental protection ; (d) business planning (financial planning, budgeting); (e) project management (including operational planning); (f) conservation of mangroves, water channels, aquatic ecosystems; etc.

117. Capacity development among economic sectors (fisheries, tourism, maritime, industries and aquaculture) will be anchored through the familiarization of the biodiversity-friendly sectoral guidelines developed for each of these sectors. In furtherance of this, under this output, detailed

training curriculum will be developed. The presence of research institutions, universities, other educational and training institutes and NGOs (both national and international) will be utilized towards this. Inadvertently, it is also presumed that this will lead to the development of necessary local capacities within local agencies and institutions on aquatic biodiversity conservation. Apart from imparting training on biodiversity-friendly sectoral guidelines, the training content for economic sectors will cover the following areas (though specifics may vary from sector to sector): appreciation of global biodiversity significance of the Sundarbans and cetaceans; impacts of current fishing practices on biodiversity and the long-term sustainability of the fisheries sector; ecosystem approach to fisheries management; monitoring, regulation and surveillance of fishing activity; methods for conflict resolution in natural resource use; market mechanisms and value addition in fisheries; strategic planning for sustainable environmental management for industrial development; enforcing the existing environmental regulatory framework; EIA process and mainstreaming biodiversity in production operations; options for investing in biodiversity conservation (e.g. strengthening protected areas, support for scientific research, support for environmental education and awareness building, sharing information on biodiversity, support for capacity building, support for integrated conservation and development, technological innovations) etc.

Output 1.3: Support provided to the implementation of Management Plans of new PAs and buffer areas to address existing and emerging threats to aquatic biodiversity particularly the cetaceans

118. Even though gazetted in 2012, the three dolphin sanctuaries are yet to be made fully functional and as a result, the objectives of establishing these protected areas remain largely unfulfilled as of now. Thus the key aim of this output is to strengthen the management effectiveness of these new protected areas. Currently, Bangladesh Forest Department, with support from WCS, is formulating Management Plans for these sanctuaries. Technical and financial assistance will be provided under this output for implementing select activities identified through the Management Planning process. These may include improved enforcement systems, eco-restoration efforts; sustainable fisheries, capacity development of staff and local community members, participatory resource management, provision of better equipment, strengthening wildlife research, education and nature awareness; strengthening of infrastructure; wildlife veterinary care; staff welfare activities; community oriented activities; fostering eco-tourism, etc.

119. Details of activities to be supported under this shall be prepared after the finalization and approval of the Management Plans. However, it is to note that the project support for implementing the Management Plans will be limited to select catalytic activities whereas regular funds from the government and co-financing leveraged from the other agencies will be deployed for implementing other activities. In a similar way, this output will also support the implementation of identified activities in the buffer area management plans once these have been formulated. Further, this output will also provide support for continuing with the already established dolphin mortality monitoring network and increase its coverage through additional training and capacity building with the Forest Department, Fisheries Department, Coast Guard, local communities and tourism operators.

Output 1.4 Monitoring and evaluation framework and replication strategy developed for effective aquatic PA management specifically for the Sundarbans and other aquatic ecosystems across country

120. This output envisions the evolution of regional and national level institutional mechanisms for ensuring cross-sectoral dialogue and joint action with regard to sustainable resource use and conservation of biodiversity in the Sundarbans and other aquatic environment in the country. There are two main considerations here. First, some of the major threats to the biodiversity of the Sundarbans emanate from outside the Sundarbans (e.g. upland water abstraction, unplanned industrial development etc.). This necessitates upstream policy engagement and cross-sectoral dialogue on issues related to aquatic resource management. With this in view, it is proposed to establish a National Technical Group on Aquatic Conservation which will bring together government, NGOs (national and International) and academia to advise the Forest Department on aquatic conservation and to develop a long-term National Aquatic Conservation Plan linking wetland management with Critical Area management. This group will periodically assess and review the overall status of aquatic biodiversity conservation in the country and suggest appropriate actions and advisories (including policy processes) to the national government.

121. Second, under "the Wildlife (Preservation and Protection) Act, 2012, the Forest Department is the lead government agency for protected area management in Bangladesh. That means, management of the PAs and buffer areas in the project landscape *w*ill be led by the Wildlife and Nature Conservation Circle of the Forest Department, and the Reserve Forest management will continue to be under the Forest Management Circle. The project will support joint work between these two units within the Forest Department (in Khulna Circle) to effectively work together to implement and promote aquatic biodiversity conservation in the Sundarbans.

122. As already mentioned, majority of the issues threatening the conservation prospects of the project landscape are multi-sectoral in nature. However, at present, there are no formal arrangements/ institutional mechanisms at the regional level, wherein various sectors/ actors operating in the region can come together and discuss and initiate joint action to resolve such issues. This is a major stumbling block. The project will, therefore, support establishing a Regional Cross-Sectoral Stakeholder Committee under the chairmanship of the Conservator of Forests in charge of the Khulna Circle. Key department officials at the district/ local level will be represented in this Committee (including forests, fisheries, tourism, ports and maritime traffic, agriculture/ horticulture, industries). The Committee shall also have representation from private sector, NGOs (national and international), local communities and other key stakeholders in the region. It shall meet at least twice a year to consider ways to: (i) improve coordination and information sharing among the sectors related the implementation of the biodiversity-friendly sectoral guidelines developed under Output 1.1; (ii) ensure that technical expertise from each department/ sector is made available to the process of implementation of biodiversity-friendly sectoral guidelines; (iii) identify potential jurisdictional overlaps and conflicts in safeguarding the concerns of conservation and recommend strategies for addressing these; and (iv) coordinate sector support provided at the community/ local level to maximize synergies. Finally, this outcome shall also develop a replication strategy for piloting similar conservation approaches in other aquatic areas of the country including upstream policy engagements.

Outcome 2: Community-based ecosystems management systems in place to support aquatic biodiversity conservation

123. This outcome will support strengthening community capacities for managing aquatic ecosystems. This will be achieved through: a) developing a Community Based Resource Management Plan (CBRMP) that will explicitly provide for community level resource management prescriptions (particularly that of fisheries); and b) providing limited implementation support (as demonstration units) for the CBRMP and other resource-based and alternate income generating activities. Further, community institutions will be developed/ revitalized (such as CMCs) for the effective implementation of the CBRMP. The project will promote a strong participatory and consultative approach to ensure that partnerships are strengthened amongst local communities, government agencies, NGO's and other projects working on sustainable development initiatives in the project landscape. As is the case of other capacity development efforts, assistance of local/ regional research/ training institutions, NGOs (national and international) and Universities will be mobilized for the preparation of CBRMP, conducting capacity building programmes on its implementation and in identifying and implementing resource-based and alternate livelihood strategies..

Output 2.1 Community based resource management plan prepared, capacities developed and financial support extended for operationalizing sustainable resource use practices and conservation of aquatic biodiversity

124. The primary focus of this output is to develop a Community Based Natural Resource Management Plan (CBRMP) that aims at reducing the current unsustainable and destructive resource use (mostly fishery operations) in the project landscape to sustainable levels. The plan will be based on community or user-group approach and would address different issues related to resource use such as time/area closures (e.g. in wildlife sanctuaries and the 18 no-fishing zones in the SRF and canals less than 25 feet/7.6 meters wide within 1.9 miles/3 km of permanent FD offices and stations, seasonal ban on fishing in backwater marshes and creeks (*beels/chatals*); and gear restrictions (ban on set-bag nets or *bhendi/bebdi/bhasan jaals*, mosquito PL collection nets or *pona jaals*, mono-filament gillnets or *current jaals*, and possibly also long-shore nets or *char pata*, seasonal ban on the use of drifting gillnets or *fash jaal* used for catching *hilsa* shad from September to October, ban on all nets with a mesh size below 1 inch/25 mm, enforcement of the ban on the use of insecticides and other poisons for fishing).

125. The CBRMP will also look at issues of access (restricting annual boat license certificates and fishing permits, monitoring in the field to ensure that all fishers possess a valid permission, restricting the maximum permitted fishing duration per permit); catch restrictions (establishing an alternating annual ban on fishing for pangas catfish and Asian seabass (*Lates calcarifer*); seasonal ban on fishing for *hilsa* shad and giant mud crabs; ban on catching of *hilsa* shad below 9 inch/23 cm and pangas catfish below 12 inch/30 cm in length; ban on catching carp fishes, including rohu or *rui* (*Labeorohita*), orange fin labeo or *kalibous* (*L. calbasu*), Catla (*Catla catla),* and Mrigal carp (*Cirrhinus cirrhosus)* below 9 inch/23 cm in length from July to December, ban on catching Silond catfish or *silon* (*Silonia silondia*), long-whiskered catfish or *ayer* (*Sperata aor*), and all croaker fish below 12 inch/30 cm in length from February to June); reduction in by-catch; handling of dolphin entanglements etc.

126. The preparation and implementation of the CBRMP will be founded on extensive interactions among the communities. The user group approach has the advantage of bringing together similar resource users from different villages. This plan would also indicate strategies for building capacities among local people on the effective utilization of resources through value addition, developing better access to markets, opportunities for income generation during the lean period etc. Strategies will be discussed and vetted among the user groups so as to ensure their acceptance and efficient implementation. In addition, workshops and awareness programmes will be conducted that bring in external expertise and best practices.

127. Based on the prescriptions of the CBRMP, this output will provide technical and financial support to fishers to shift over from the current harmful activities (e.g. mosquito nets, poison fishing etc.) to low-impact practices (e.g. improved mesh-sized nets). Communities will also be supported in better regulating fishing efforts (boats, fishers, gear, species targeted, fishing areas, and catch) and in the use of improved fishing nets and gear. Further, fishers will be trained in conservation management practices so that they become active partners in conservation actions. At present the Co-Management Committees (CMCs)[138] are not active in the project landscape and the project will re-vitalize the CMCs for implementing the CBRMP. Monitoring groups will be formed among the local communities and participants will be trained in collecting data on change realized as a result of project interventions. Communities will also be trained on habitat restoration techniques, participatory resource appraisal, clean-up of wastes such as discarded fishing nets, other types of maintenance activities within the dolphin sanctuaries, monitoring of dolphin entanglements and other potential illegal activities etc.

Output 2.2 Strategies for alternate income generation and livelihood diversification developed and implemented leading to reduced dependence on natural resources.

128. This output will support identification and implementation of select alternate income generating and livelihoods diversification activities so that local communities meet part of their economic needs from supplementary sources and thereby reduce their excessive dependence on natural resources particularly the fishery stock. Preparation and implementation of alternate income generation and livelihood diversification strategies in the project area shall be carried out in association with the Social Service NGOs operating the area. Through extensive stakeholder and expert consultations, small business plans will be prepared either at the level of resource-user group or at the level of the community/ village/ CMCs.

129. Some of the indicative activities that can be supported under this output include fishery based livelihoods such as fish net/trap making/repair; cage culture for commercially valuable fish and crabs; pond culture for fish and crab; fish feed production; integrated shrimp-rice cultivation; drying/smoking fish; integrated homestead farming; betel leaf cultivation; etc. Agriculture/Horticulture/Animal Husbandry based livelihoods include nypa palm cultivation; tree and horticultural nursery; homestead plantations of medicinal species; mushroom cultivation; frog/snail/rabbit farming; poultry/duck rearing; suck-cum-fish culture in family ponds; pigeon farming; cow rearing (beef fattening, milk cow rearing) etc. Other livelihood options that can be developed based on processing natural resources are cultivating and

[138] Participatory resource use committees set up at the village level.

processing nypa palm, producing molasses, mats, thatching, and fans; mat/basket weaving with grasses/reeds; broom making from palm leaves and coconut leaf stems; producing honey and wax products; producing coconut by-products (e.g., mattresses, ropes, jewelry, buttons, oil, show pieces); water hyacinth collecting, processing and marketing (e.g., fire sticks [alternative to fire wood or tushkaht], building materials (e.g., pressboard), fiber/paper, animal feed, and fertilizer); organic toiletries and beauty products (e.g., reusable sanitary pads, coconut hair oil, mud packs, herbal facial packs); bio-fuel production from 'waste' materials for local motorized transport (e.g. from water hyacinths, rice husks, invasive plants or weeds); food processing, preservation, and marketing. Livelihood opportunities also lie in the tourism sector such as producing organic food for tourist vessels (e.g., grains, vegetables, meats/poultry, sweets); village home stays; cultural presentation groups (songs, dance, theater); guide/information services; day trips with fisher folk; dolphin watching tours; bird watching tours; sport fishing trips; selling souvenirs and curios; selling provisions for visitors; operation of public toilet facilities; operation of watchtowers near dolphin hotspots; operation of guest house/restaurant/tea house etc. Small enterprises or cottage industries such as tailoring/dress making; knitting; embroidery; block printing; produce and market products from waste/recycled materials; cement-block making (embankments, buildings); bicycle/motorbike/boat engine maintenance/repair; book binding; local transport operations can also be explored under this output.

130. Necessary data collection and feasibility analysis will be undertaken, as required, for selecting the appropriate alternate income generation activities (resource based and non-resource based). Local communities and other stakeholders will be assisted to develop agreements/ codes of conduct, indicators and measures to monitor environmental status for this area along with concerned government agencies.

C. RISKS AND ASSUMPTIONS

131. The following table lists the project's risk and risk mitigation strategy. These will be revisited at the inception workshop, annually during the planning meetings and at the time of two planned evaluations (mid-term and terminal).

Risk	Level	Mitigation
Lack of community and stakeholder support (particularly fishers) due to apprehension that operationalizing the PAs will adversely affect their livelihoods.	Low to Medium	The project will have a strong focus on community co-management that will ensure participation of local people and stakeholders at all stages. The benefits to them in establishing protected areas will be explained (e.g. more incentives from tourism, improved fishery stock etc.) and mitigation measures will be designed for any loss of livelihood opportunities brought about by the creation and functioning of protected areas.
Climate change impacts make the PAs unsuitable for conserving aquatic diversity.	Medium	The PA management plan in Component 1 will include a mechanism to periodically review to determine if the location, size and configuration of the PAs. In a dynamic manner, this Plan would suggest that the PA boundaries will be reviewed and if needed altered to protect representative aquatic diversity every ten years to ensure that the PAs are relevant for the objectives of aquatic conservation.
Inter-community conflicts may arise due to different interests of communities on use of aquatic biodiversity	Medium	Inter and intra-community conflicts may arise due to differential dependence and interests of stakeholders on the use/ conservation of aquatic biodiversity. The project will ensure that effective stakeholder analysis is undertaken and rights and interests of different stakeholder groups are effectively considered – and if any negative livelihood impacts are likely due to project actions, then adequate substitution or

		compensations are factored in by the government. Appropriate community level mediation mechanisms will also be promoted, with help and involvement of local government officials and NGOs working in the area.
Stakeholder institutions may not show adequate interest in the regional stakeholder committee and unwilling to share information that is required for the effective management of the area.	Medium	The proposed cross-sectoral regional level stakeholder committee will promote active dialogue with stakeholders to ensure full ownership and participation in the agreed final structure. Similarly, Component 2 of the project also envisages the preparation of Biodiversity friendly good practice guidelines for key sectors and extensive capacity building programmes for the staff of these sectors for implementing these guidelines. This is expected to generate considerable interest and buy-in from other sectors in project activities and conservation issues.
The livelihood activities supported under the project may not add significantly to income opportunities of local people so that the dependency on natural resources is reduced.	Medium	Livelihood options shall be finalized after extensive consultations during the course of project implementation as some of these activities that may seem attractive have to be critically examined for their feasibility among the villages and the market for the product. While identifying livelihood strategies, special care shall also be given to select those activities with substantial livelihood augmentation and income generation potential.

D. INCREMENTAL REASONING AND EXPECTED GLOBAL, NATIONAL AND LOCAL BENEFITS

132. GEF support will mobilize action to consolidate some of the key habitats of the cetacean communities threatened with extinction across the globe. In the absence of this GEF project, the status of the cetaceans in the Sundarbans will remain weak and bleak in the wake of the prevailing and escalating threats. Baseline projects/ investments alone are unlikely to trigger the much needed alterations in the management approach to secure the long-term survival of the cetaceans. Broadly, the GEF investment aims at triggering a change in resource governance in the target project area and generate the following global, national and local benefits: a) establishing a robust database about the preferred dolphin hotspots outside the present protected area network; b) expanding the coverage of protected areas/ buffer areas for dolphin conservation (by around 100,000 ha); c) improving the management effectiveness and informed decision making in the new dolphin sanctuaries; d) intensive capacity building of Forest Department and other economic sector staff; e) preparation of biodiversity-friendly sectoral guidelines for key development sectors; f) preparation of Community Based Resource Management Plan (CBRMP); g) phasing out destructive fishing practices in the dolphin hotspots; h) promotion of alternate and viable livelihoods (value added fishery-based products, nature-based tourism, alternate income generating activities etc.) for local communities in order to wean them away from destructive resource use practices; and i) creating national and regional level institutional mechanisms (National Technical Group on Aquatic Conservation and Regional Cross-Sectoral Stakeholder Committee) for cross-sectoral dialogue and action that promotes integrated approaches for aquatic ecosystem management.

133. The above-mentioned GEF alternative is expected to lead to the sustainable management of the globally significant aquatic biodiversity of Bangladesh that would include consolidating the key habitats in the Sundarbans particularly that of the Cetaceans, while also taking into account development imperatives, need for sustaining livelihoods and also addressing retrogressive factors including the anticipated impacts of climate change with active support and involvement of government, local communities, NGOs and partners. The baseline projects in the project area comprise mostly of programmes of government, bilateral/ multi-lateral donors institutions relevant to biodiversity, poverty reduction and natural resource use. GEF funding will

incrementally leverage new skills, practices and technologies through building capacities across identified stakeholders. GEF financing will provide additional assistance for cross-cutting capacity development and knowledge management that will fill a critical gap in the existing baseline project to enable the replication and scaling up of integrated approaches for biodiversity conservation. The IC matrix details the baseline expenditures, and the incremental cost of realizing each outcome, as well as how the incremental costs are to be shared by the GEF and different government departments. (Incremental Cost Matrix is in Annexure 8).

134. More specifically, the most important direct global benefit the project will deliver include conservation of globally important habitats (including new protected areas, buffer areas) totaling around 100,000 ha in the Sundarbans of Bangladesh, that houses globally threatened populations of the last two remaining freshwater dolphin species. Through this project Bangladesh will ensure that it is a global safety net for preventing the extinction of the two threatened, iconic aquatic species as well as other globally threatened species. The areas identified to create protected areas have significant global populations of these species. In addition to protection of breeding populations of the two globally threatened cetacean species, the project will also benefit other aquatic species including the Critically Endangered river terrapin (*Batagur baska*), Endangered masked finfoot (*Heliopais personatus*), Vulnerable small-clawed otter (*Aonyx cinerea*), and the estuarine crocodile (*Crocodylus porosus*). The Sundarban mangroves are also important bird areas (IBA), which host populations of *Pelecanus philippensis, Leptoptilos javanicus, Leptoptilos dubius, Haliaeetus leucoryphus, Heliopais personata, Eurynorhynchus pygmeus,* and *Rynchops albicollis* [139]and conservation of aquatic habitats, will also contribute directly to the conservation of several of such bird species

E. COST-EFFECTIVENESS

135. The project preparation team has adopted a qualitative approach to identify the most cost-effective strategy for achieving the project objectives in line with the GEF Council's guidance on assessing project cost-effectiveness (Cost Effectiveness Analysis in GEF Projects, GEF/C.25/11, April 29, 2005). Various scenarios for the better long-term management of the project landscape have been considered, and these are described below.

136. One option would be to continue pursuing conservation objectives through the newly established dolphin sanctuaries. However, these protected areas currently do not encompass the whole of the key habitats of the cetaceans in the Sundarbans and in Bangladesh. Similarly, the management effectiveness of the newly constituted protected areas also requires significant scaling up that is quite unlikely in the business-as-usual scenario considering the inadequate capacities among the conservation sector on aquatic biodiversity management. Further, the biological diversity of the Sundarbans and more particularly that of the project area are under various threats-both intraneous (e.g. fishing) and extraneous (e.g. water abstraction, unplanned development etc.). Attempts to resolve these multiple threats through a single-sector approach, wherein the conservation sector focuses solely on the dolphin sanctuaries are considered less likely to succeed and critical biodiversity values in the region will continue to be under intense pressure. A second option could be to significantly expand the territorial extent of the protected areas, which would provide greater safeguards (at least theoretically), for biodiversity values.

[139] http://www.birdlife.org/datazone/userfiles/file/IBAs/AsiaCntryPDFs/Bangladesh.pdf

While this approach has some merit and definitely a strategy to pursue, this alone is, however, going to yield the desired conservation outcomes in the wake of the continuing and escalating nature of anthropogenic pressure on biological diversity. A critical consideration in this regard is the livelihood aspirations of the local fishers and the trajectory of development occurring in the region.

137. Therefore, the project focuses on a third option, which is a combination of the above and cross-sectoral in nature. This approach includes further consolidating the key habitats of cetaceans by identifying additional dolphin hotspots and bringing them under the protected area network and buffer areas; improving the management effectiveness of the existing and new protected areas; adopting biodiversity-friendly good practice guidelines for the key economic sectors operating in the region; constitution of national and regional level cross-sectoral committees to address inter-sectoral issues related to aquatic biodiversity management; strong outreach and advocacy; generation of knowledge and dissemination etc. Another important pillar of this strategy is in mobilizing local communities as effective vanguards of conservation through the preparation of a Community Based Resource Management Plan, imparting capacities (technical knowhow, skills) on sustainable fisheries and providing economic incentives through alternate and livelihood diversification (as demonstration units) so that their unsustainable dependence on natural resources are reduced significantly. This third option is considered to be the most cost-effective use of GEF resources. Furthermore, this approach is considered more likely to succeed in bringing multiple interests to the table for joint planning and action to safeguard the biodiversity values of the region.

F. COUNTRY OWNERSHIP: COUNTRY ELIGIBILITY AND COUNTRY DRIVEN-NESS

138. The project is consistent with the GEF5's *BD Strategic Objective 1: Improve sustainability of PA systems*. In line with this SO, and especially through its Outcome 1, the project will fill a major gap in national PA system by expanding the PA estate by establishing new PAs and buffer areas to conserve globally important aquatic biodiversity. These will conserve a host of globally important species, particularly critical populations of globally threatened Irrawaddy and Ganges river dolphins. Bangladesh is the only country in the world where both these species are found in large numbers, which provide a safety net for these species' survival against possible extinction threats. The project will assist the Forest Department to effectively manage these new PAs, which will be nested within a wider conservation management of the Sundarbans Reserve Forest. The project will ensure that there is strong support and involvement of local communities, and other stakeholders' in these protected areas and buffer area management, so that their long term integrity and sustainability are ensured.

139. This project is fully aligned with Bangladesh's Sixth Five Year Plan (2011-2015). The Plan, which serves as the primary development agenda for the country, has prioritized several environmental management actions including wetland management. It notes that "the government is very keen to see the change in (the) management paradigm and to consolidate the co-management system not only in the Tanguar Haor but also for overall wetland management in Bangladesh". It has further stressed that "watershed management, wetland conservation etc. will be initiated in new (protected) areas and also will be intensified in the (existing protected) areas for better conservation of nature in the country during the plan period." The project is also well aligned with the objectives of the National Biodiversity Strategy and Action Plan for Bangladesh

(August 2004), which aims to (1) conserve and restore the biodiversity of the country; and (2) maintain and improve ecosystem integrity. The project further responds to the Bangladesh Biodiversity National Assessment and Programme of Action 2020 (BPA 2020) –especially Project 7 – "Community based conservation and management for aquatic species like Ganges River and Irrawaddy dolphin." The project document has also considered the National Capacity Self-Assessment carried out in Bangladesh in 2007.

140. Bangladesh is fully committed to meet its obligations under the MEAs and the proposed project is intended to facilitate an important step towards developing the capacities for an effective national environmental management framework. Bangladesh ratified the Convention on Biological Diversity on 3 May 1994; the Convention to Combat Desertification on 26 January 1996; and the Framework Convention on Climate Change on 16 February 1994. In addition to the three Rio Conventions, Bangladesh has also acceded to or ratified several other international treaties and protocols that call for the protection and sustainable use of natural resources. These MEAs include: Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES); Ramsar Convention on Wetlands of International Importance; Convention on Migratory Species (CMS) etc.

G. SUSTAINABILITY AND REPLICABILITY

Sustainability

141. *Ecological sustainability:* The project will support long-term conservation of the globally significant biodiversity in the Sundarbans. The project will augment the conservation prospects of the biodiversity of the project area through the following key measures: (i) knowledge generation and dissemination that improves decision making related to the management of aquatic habitats and sustainable use of resources in the protected areas and buffer areas, (ii) new and additional areas to be managed as protected areas and buffer areas identified, notified and capacities developed among conservation and economic sector staff for improved management effectiveness of conservation, (iii) support to the implementation of Management Plans of new PAs and buffer areas, (iv) monitoring and evaluation framework and replication strategy developed for effective aquatic PA management specifically for the Sundarbans and other aquatic ecosystems in the country, (v) community based resource management plan prepared, capacities developed and financial support extended for operationalizing sustainable fishing practices and conservation of aquatic biodiversity, and (vi) strategies for alternate income generation and livelihood diversification developed and implemented leading to reduced dependence on natural resources.

142. *Financial sustainability:* In order to ensure that conservation approaches steered by this project are sustained post-project, it is proposed to establish a National Technical Group on Aquatic Conservation which will bring together government, NGOs (national and International) and academia to advise the Forest Department on aquatic conservation and to develop a long-term National Aquatic Conservation Plan (NACP) linking wetland management with Critical Area management. This group will periodically assess and review the overall status of aquatic biodiversity conservation in the country and suggest appropriate actions and advisories (including policy processes) to the national government. The NACP will also have a financial strategy for supporting similar aquatic biodiversity conservation efforts across the country. This

strategy will look at a mix of approaches such as re-alignment of existing government budgetary resources, re-allocation of user fees generated within the conservation and production sectors to conservation of the resource base on which these sectors depend, and/ or mobilizing new resources. In terms of the livelihoods/ subsistence sector, the project will implement a livelihoods diversification strategy based on economic feasibility assessments to ensure that alternative livelihoods are sustained over the long-term.

143. *Institutional sustainability:* To ensure that prevailing structures and processes have the capacity to continue to perform their functions over the long-term, the project has earmarked significant resources to capacity development. To ensure that training support continues post-project, efforts will be made to locate the training curriculum and resource persons with local institutions/ NGOs/ Universities based on their comparative advantages. One of the key considerations while preparing the project has been on building capacities at the local level to the extent possible so that these are retained in the project area even after the project period. Further, the National Technical Group on Aquatic Conservation and Regional Cross-Sectoral Stakeholder Committee shall bring in the much needed institutional stability to the objectives set in the project.

144. *Social sustainability:* To ensure that equity is maximized and exclusion minimized, project activities targeting the livelihoods/ subsistence sector will be founded on extensive stakeholder participation. Existing networks of community institutions (CMCs) will be the primary conduit of the project. Further, the project adopts a user group strategy in terms of community mobilization. The project will also ensure maximum representation and targeting of women beneficiaries. The project will target the institutions operating at the community level to enable them to actively participate in developing and implementing activities to ensure continuity and once the project is completed.

Replicability

145. There are various aspects of project design that facilitate replication. The project will strengthen the enabling environment for biodiversity conservation in the Sundarbans. The project will undertake research studies to address key knowledge gaps on the biodiversity values of the region (Outputs 1.1), which will be made available to wider audience. Similarly, the lessons learned from project implementation will also be made easily accessible through the knowledge management system. Moreover, the project's training efforts will be associated and internalized within training institutions/ NGOs/ Universities so that these can become an accessible resource to other aquatic areas where there is interest in replicating the project approach. Training programs will be accompanied by handbooks/ manuals/ compendiums. Further, during the latter phase of the project, efforts will be made to replicate the project approach in other aquatic habitats in the country through the National Technical Group on Aquatic Conservation constituted under the project.

III: Strategic Results Framework

Project Strategy	Indicator	Baseline	Targets[140]	Means of verification	Risks and Assumptions
The long-term goal to which the project will contribute is the sustainable management of the globally significant aquatic biodiversity of Bangladesh by consolidating the key habitats of the Sundarbans particularly that of Cetaceans, while also taking into account development imperatives, need for sustaining livelihoods and also addressing retrogressive factors including the anticipated impacts of climate change with active support and involvement of government, local communities, NGOs and partners.					
Immediate Objective: To build capacity to manage the existing protected areas established for dolphin conservation and also expand their operational coverage (new protected areas and buffer areas) while still meeting the livelihood aspirations of local communities especially the fishers.	Extent of aquatic environment of the Sundarbans brought under effective conservation planning and management framework	0 ha	102,000 ha	Mid-term and Final Technical Evaluation	The population dynamics of flora and fauna may depend on various extraneous factors over which project may have little control.
	Population status of the following critical species remain stable or increases: Ganges freshwater dolphin Irrawaddy dolphin	 225 451	Remain stable or increase by project end	Monitoring reports, Population estimation reports, Publications of Forest Department Research and Monitoring Reports	
Outcome 1: Important aquatic ecosystems of the Sundarbans supporting the globally threatened species of cetaceans conserved	Improved management effectiveness PAs as measured and recorded by Management Effectiveness Tracking Tool (METT)	46 out of 300	Increase in METT scores (at least around 70 out of 300) by 30 percent by year 5	METT scorecard prepared annually. Independent mid-term and final evaluations	Government agencies may not show adequate interest required for bringing in the necessary transformative change in the conservation prospects of the project landscape.
	Biodiversity-friendly Sectoral Guidelines prepared and implemented leading to effective integration of biodiversity considerations into economic sector practices	0	At least five Sectoral Guidelines (Fisheries, Tourism, Maritime traffic, industrial development and Aquaculture prepared and adopted.	Approved documents Mid-term and Final Evaluations	

[140] The time frame for realizing project targets is project end (2019), unless otherwise specified.

Project Strategy	Indicator	Baseline	Targets[140]	Means of verification	Risks and Assumptions
	Effective and functioning cross-sectoral, multi-stakeholder institutions (including conservation, livelihood and production) established at regional and national level.	0	2	Government Orders or Notifications, meeting records Mid-term and Final Evaluations	Stakeholder institutions may not show adequate interest in the regional stakeholder committee and unwilling to share information that is required for the effective management of the area. Sectoral institutions are unwilling to commit the expected number of personnel for training
	Number of representatives from the key government sectors trained in effective management of aquatic biodiversity	0	Conservation Sector -100 Economic Sector - 100	Training records; training evaluations	
	Reported mortality of dolphins by entanglement in nets and vessel hit.	90 reports in 2013	50% reduction by year project end	Documents of Forest Departments Research Reports Mid-term and Final Evaluations	

<table>
<tr><th>Project Strategy</th><th>Indicator</th><th>Baseline</th><th>Targets[140]</th><th>Means of verification</th><th>Risks and Assumptions</th></tr>
<tr><td></td><td>Improvement in Systemic Level Indicators of Capacity Development Scorecard (Annex 19)</td><td colspan="2"><table>
<tr><td>SYSTEMIC LEVEL</td><td>B/L</td><td>Tgt.</td></tr>
<tr><td>1. Capacity to conceptualize and formulate policies, legislations, strategies, programme</td><td>20%</td><td>30%</td></tr>
<tr><td>2. Capacity to implement policies, legislation, strategies and programmes</td><td>25%</td><td>30%</td></tr>
<tr><td>3. Capacity to engage and build consensus among all stakeholders</td><td>15%</td><td>25%</td></tr>
<tr><td>4. Capacity to mobilize information and knowledge</td><td>20%</td><td>30%</td></tr>
<tr><td>5. Capacity to monitor, evaluate and report and learn at the sector and project levels.</td><td>100%</td><td>20%</td></tr>
</table></td><td>Mid-term and Final Evaluation</td><td>and capacity building and Trained staff may not continue in current roles</td></tr>
<tr><td rowspan="2">Outcome 2: Community-based ecosystems management systems in place to support aquatic biodiversity conservation.</td><td>Number of fishers in the project area using sustainable fishing gear as evidenced by mesh size</td><td>0</td><td>30% of fishers follow the mesh size norms set up by the project by project end</td><td>Documents of Forest Departments

Research Reports

Mid-term and Final Evaluations</td><td rowspan="2">The livelihood activities supported under the project may not add significantly to income opportunities of local people so that the dependency on natural resources is reduced.</td></tr>
<tr><td>Amount of resources flowing to local communities annually from community based ecotourism</td><td>0</td><td>USD 0.1 million by year 5 (target value to be re-confirmed during the 1st year</td><td>Records of Forest Departments, CMCs administrative</td></tr>
</table>

Project Strategy	Indicator	Baseline	Targets[140]	Means of verification	Risks and Assumptions
	activities		of the project)	records, etc Mid-term and Final Evaluations	Inter-community conflicts may arise due to different interests of communities on use of aquatic biodiversity. Lack of community and stakeholder support (particularly fishers) due to apprehension that operationalizing the PAs will adversely affect their livelihoods.
	Number of people shifting to alternative income generating options that reduce pressure on biodiversity	0	At least 500 fishers by year 3 and 700 by project end	Records of CMCs, administrative records, etc Mid-term and Final Evaluations	
	Number of people sensitized on aquatic biodiversity conservation particularly that of cetaceans	0	3000 by year 3 and 5000 by project end	Records of CMCs, administrative records, etc Mid-term and Final Evaluations	
Project Outputs					
Output 1.1	Knowledge generation and dissemination system improves decision making related to the management of aquatic habitats and sustainable use of resources in the protected areas and buffer zones				
Output 1.2	New and additional areas to be managed as Protected Areas and buffer areas identified, notified and capacities developed among conservation and economic sector staff for strengthening the management effectiveness of biodiversity conservation efforts.				
Output 1.3	Support to the implementation of Management Plans of new PAs and buffer areas to address existing and emerging threats to aquatic biodiversity particularly the cetaceans				
Output 1.4	Monitoring and evaluation framework and replication strategy developed for effective aquatic PA management specifically for the Sundarbans and other aquatic ecosystems across country				
Output 2.1	Community based fishery management plan prepared, capacities developed and financial support extended for operationalizing sustainable fishing practices and conservation of aquatic biodiversity				
Output 2.2	Strategies for alternate income generation and livelihood diversification developed and implemented leading to reduced dependence on natural resources.				

IV: Total budget and Work plan

Award ID:						Project ID:						
Award Title:	Expanding the Protected Area System to Incorporate Important Aquatic Ecosystems											
Business Unit:	BDG10											
Project Title:	Expanding the Protected Area System to Incorporate Important Aquatic Ecosystems											
PIMS no.:	4620											
Implementing Partner (Executing Agency)/ Responsible partner	MoEF/ FD											
GEF Outcome/Atlas Activity	**Responsible Party/ Implementing Agent**	**Fund ID**	**Donor Name**	**Atlas Budgetary Account Code**	**Atlas Budget Description**	**Total**	**Amount Year 1 (USD)**	**Amount Year 2 (USD)**	**Amount Year 3 (USD)**	**Amount Year 4 (USD)**	**Amount Year 5 (USD)**	**Budget Note**
Outcome 1: Important aquatic ecosystems of the Sundarbans supporting the globally threatened species of cetaceans conserved.	MoEF/ FD	62000	GEF	71300	Local consultants	145,700	14,570	30,597	32,054	33,511	34,968	1
				71200	International Consultants	35,000	3,500	7,350	7,700	8,050	8,400	2
				72100	Contractual Services-Companies	527,000	52,700	110,670	115,940	121,210	126,480	3
				71600	Travel	66,500	6,650	13,965	14,630	15,295	15,960	4
				74500	Miscellaneous	50,500	5,050	10,605	11,110	11,615	12,120	5
				72200	Equipment & Furniture	15,000	1,500	3,150	3,300	3,450	3,600	6
				74200	Audio-visual and printing production costs	61,000	6,100	12,810	13,420	14,030	14,640	7
Total Outcome 1						**900,700**	**90,070**	**189,147**	**198,154**	**207,161**	**216,168**	
Outcome 2: Community-based ecosystems management to support aquatic biodiversity conservation.	MoEF/ FD	62000	GEF	71300	Local consultants	15,000	1,500	3,150	3,300	3,450	3,600	8
				72100	Contractual Services-Companies	615,000	61,500	129,150	135,300	141,450	147,600	9
				71600	Travel	5,000	500	1,050	1,100	1,150	1,200	10
				74500	Miscellaneous	5,000	500	1,050	1,100	1,150	1,200	11
				74200	Audio-visual and printing production costs	5,000	500	1,050	1,100	1,150	1,200	12
TOTAL OUTCOME 2						**645,000**	**64,500**	**135,450**	**141,900**	**148,350**	**154,800**	
Project Management Cost	MoEF/ FD	62000	GEF	71400	Contractual Services Individual	30,000	3,000	6,300	6,600	6,900	7,200	13
				71400	Contractual Services Individual	42,400	4,240	8,904	9,328	9,752	10,176	14
				72400	Communication & Audio Visual Equipment	4,500	500	1,050	1,100	1,150	700	15

				74500	UNDP DPC	784	784	0	0	0	0	16
				71600	Travel	3,100	310	651	682	713	744	17
TOTAL PROJECT MANAGEMENT						**80,784**	**8,834**	**16,905**	**17,710**	**18,515**	**18,820**	
TOTAL GEF ALLOCATION						**1,626,484**	**163,404**	**341,502**	**357,764**	**374,026**	**389,788**	

Budget Note	**Explanation**
1*	These include the cost of hiring technical consultants (national) for identifying and prioritizing research programmes (4 weeks @ USD 500 per week), engaging specialists for identifying dolphin hotspots (125 weeks @ USD 500 per week), conducting prioritized research programmes (50 weeks @ USD 500 per week), preparation of biodiversity friendly sectoral guidelines (50 weeks @ USD 500 per week), preparation of Management Plans for new Protected Areas/ Buffer areas (50 weeks@ USD 500 per week), for mid-term evaluation (4 weeks @ USD 500 per week) and final evaluation (6 weeks @USD 500 per week).
2	This includes the cost of hiring international expert for mid-term (4 weeks @ USD 3500 per week) and final evaluation (6 weeks @ USD 3500 per week).
3	These include support to conduct Shushuk Mela and other similar outreach programmes (50 programme @ USD 1000 per programme), support to capacity building of conservation and production sector staff (50 programme @ USD 1000 per programme), and implementation support to select activities of the Management Plan (USD 420,000).
4	These include travel for identifying and prioritizing research programmes (2 trips @ USD 500 per trip), for identifying dolphin hotspots (50 trips @USD 500 per trip), for conducting other prioritized research programmes (25 trips @ USD 500 per trip), for preparation of biodiversity friendly sectoral guidelines (10 trips @ USD 500 per trip), preparation of Management Plans for new Protected Areas/ Buffer areas (20 trips @ USD 500 per trip), mid-term evaluation (2 trips @USD 3000 per trip) and final evaluation (2 trips @ USD 3500 per trip). This would also cover the cost of travel of a few conservation sector staff for getting trained on aquatic PA management issues overseas.
5	These include meetings and consultations for research prioritization (1 meeting @ USD 500 per meeting), for confirming dolphin hotspots (10 meetings @ USD 500 per meetings), for conducting prioritized research programmes (20 meetings @ USD 500 per meeting), for preparation of biodiversity friendly sectoral guidelines (10 meetings @ USD 500 per meetings), Management Plans for new Protected Areas/ Buffer areas (20 meetings @ USD 500 per meeting), and meetings of National Technical Group on Aquatic Conservation and Regional Stakeholder Committees (20 meetings @ USD 1000 per meeting). This would also cover the cost of Inception workshop and other thematic workshops planned under the project (USD 10,000).
6	These include various materials and goods for implementing the project such as computers, accessories, GIS equipment, monitoring equipment etc.
7	These include publications on research prioritization (USD 1000), preparation of various knowledge materials (USD 50,000), biodiversity friendly sectoral guidelines (USD 5000) and publications on Management Plans for new Protected Areas/ Buffer areas (USD 5000).
8	This is for engaging a national expert for preparation of the Community Based Resource Management Plan (30 weeks @ USD 500 per week).
9	These include Capacity development on the implementation of the Community Based Resource Management Plan (20 programmes @ USD 1000 per programme), support to implementation of the alternative livelihoods and livelihoods diversification strategy (USD 275,000), Capacity development on the implementation of alternative livelihoods and livelihoods diversification strategy (20 programmes @ USD 1000 per programme), and support to implementation of the alternative livelihoods and livelihoods diversification strategy (USD 300,000)
10	This includes preparation of the Community Based Resource Management Plan (10 trips @ USD 500 per trip).
11	This includes the preparation of the Community Based Resource Management Plan (10 meetings @ USD 500 per meetings)
12	This includes various outreach materials based on the Community Based Resource Management Plan (USD 5000)
13	This is the part salary of the Project Manager –cum – Technical Officer (10 months @ USD 3000 per month). The job profile of the Project Manager is also technical in nature, and part of his time is also budgeted against both the Outcomes depending on the services rendered.

14	This is the salary of Financial cum Administrative assistant (53 months @ USD 800 per month)
15	This is for setting up the PMU and for other project related expenses
16	DPC for project/ consultant recruitment to be determined during inception workshop
17	This is for project related local travel (31 trips @ USD 100 each) for project staff

Note: * The exchange rate during the life of the project may vary considerably. The budget may require adjustments accordingly in due course.

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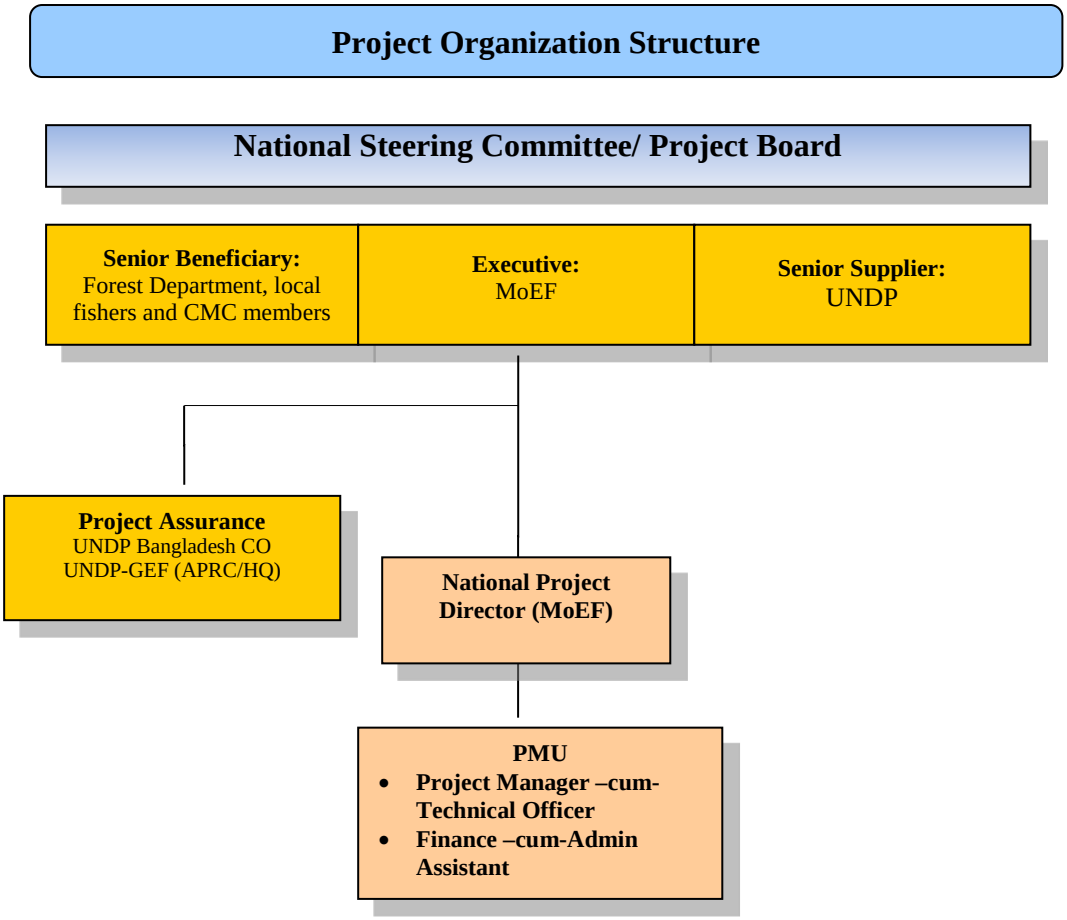
OUTCOME	OUTPUT NUMBER	OUTPUT	BUDGET (GEF resources, USD)
Outcome 1: Important aquatic ecosystems of the Sundarbans supporting the globally threatened species of cetaceans conserved	Output 1.1	Knowledge generation and dissemination system improves decision making related to the management of aquatic habitats and sustainable use of resources in the protected areas and buffer zones	284,500
	Output 1.2	New and additional areas to be managed as Protected Areas and buffer areas identified, notified and capacities developed among conservation and economic sector staff for strengthening the management effectiveness of biodiversity conservation efforts.	100,000
	Output 1.3	Support to the implementation of Management Plans of new PAs and buffer areas to address existing and emerging threats to aquatic biodiversity particularly the cetaceans	420,000
	Output 1.4	Monitoring and evaluation framework and replication strategy developed for effective aquatic PA management specifically for the Sundarbans and other aquatic ecosystems across country	96,200
Sub-total Outcome 1			**900,700**
Outcome 2: Community-based ecosystems management to support aquatic biodiversity conservation.	Output 2.1	Community based fishery management plan prepared, capacities developed and financial support extended for operationalizing sustainable fishing practices and conservation of aquatic biodiversity	325,000
	Output 2.2	Strategies for alternate income generation and livelihood diversification developed and implemented leading to reduced dependence on natural resources.	320,000
Sub-total Outcome 2			**645,284**
Sub Total PMC			**80,500**
GRAND TOTAL			**1,626,484**

V. MANAGEMENT ARRANGEMENTS

Project executive and implementing partner (GoB):

146. The project will be executed according to UNDP's National Implementation Modality (NIM), as per the NIM project management implementation guidelines agreed by UNDP and the Government of Bangladesh.

Project Organogram, Management Structure and Responsibilities



147. **Implementing Partner (IP):** At the national level, the Ministry of Environment and Forest (MoEF), will act as the Implementing Partner (Project Executive) of the project. Based on the standard NIM procedures, the MoEF will be responsible for the overall project and reporting to UNDP Bangladesh Country Office. The MoEF will establish a Project Management Unit (PMU) in Dhaka with a full time Project Manager –cum- Technical Officer and a Finance-cum-Admin Assistant. The Project Executive (MoEF) will appoint the Chief Conservator of the Forests as the National Project Director (NPD), given the strategic importance of the project. The NPD will be supported by the PMU.

148. **Responsible Party (RP).**The MoEF will designate the Department of Forest (DF), within the MoEF, as a responsible party to implement the project. The DF is best placed to carry out activities related to the project as they are the main focal agency for natural resources management in the region. As per the standard UNDP modality, the FD, as an RP,

will be responsible for the delivery of the results towards achieving the project objectives and accountable to the National Project Director.

149. **Project Board (PB)/ National Project Steering Committee (NPSC):** The PB/ NPSC is responsible for making management decisions for the project in particular when strategic guidance and decisions are required. The PB plays a critical role in project monitoring and evaluations by assuring quality of the project's processes and products, and using evaluations for performance improvement, accountability and learning. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. In addition, it approves the appointment and responsibilities of the National Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual Work Plan, the Project Board/ NPSC can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

150. In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP Project Manager (i.e. UNDP Bangladesh CO). Potential members of the Project Board are reviewed and recommended for approval during the Local Project Appraisal Committee (LPAC) meeting. The Project Board contains three distinct roles, including:

151. **An Executive**: Individual representing the project ownership to chair the group. This will be the National Project Director.

152. **Senior Supplier**: Individual or group representing the interests of the parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project. This will be a Representative from UNDP that is held accountable for fiduciary oversight of resources in this initiative.

153. **Senior Beneficiary**: Individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries. This will be representatives from Forest Department, selected members of Co-Management Committees, local communities and NGOs.

154. **Specific responsibilities of the PB/ NPSC**

<u>Defining a project</u>

- Review and approve the Initiation Plan (if such plan was required and submitted to the Local PAC).

<u>Initiating a project</u>

- Agree on Project Manager –cum-Techincial Officer's responsibilities, as well as the responsibilities of the other members of the Project Management Unit;
- Delegate any Project Assurance function as appropriate;
- Review the Progress Report for the Initiation Stage (if an Initiation Plan was required);

- Review and approve detailed Project Plan and Annual Work Plans, including Atlas reports covering activity definition, quality criteria, issue log, updated risk log and the monitoring and communication plan.

Running a project

- Provide overall guidance and direction to the project, ensuring it remains within any specified constraints;
- Address project issues as raised by the Project Manager-cum-Techncial Officer;
- Provide guidance and agree on possible countermeasures/management actions to address specific risks;
- Agree on Project Manager-cum-Technical Officer's tolerances in the Annual Work Plan and quarterly plans when required;
- Conduct regular meetings to review the Project Quarterly Progress Report and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to plans.
- Review Combined Delivery Reports (CDR) prior to certification by the Implementing Partner;
- Appraise the Project Annual Review Report, make recommendations for the next Annual Work Plan, and inform the Outcome Board about the results of the review.
- Review and approve end project report, make recommendations for follow-on actions;
- Provide ad-hoc direction and advice for exception situations when project manager-cum-Technical Officer's tolerances are exceeded;
- Assess and decide on project changes through revisions;

Closing a project

- Assure that all Project deliverables have been produced satisfactorily;
- Review and approve the Final Project Review Report, including Lessons-learned;
- Make recommendations for follow-on actions to be submitted to the Outcome Board;
- Commission project evaluation (only when required by partnership agreement)
- Notify operational completion of the project to the Outcome Board

155. **Specific Responsibilities of Executive** (as part of the above responsibilities for the Project Board)

- Ensure that there is a coherent project organisation structure and logical set of plans
- Set tolerances in the Annual Work Plan and other plans as required for the Project Manager-cum-Techncial Officer
- Monitor and control the progress of the project at a strategic level
- Ensure that risks are being tracked and mitigated as effectively as possible
- Brief Outcome Board and relevant stakeholders about project progress
- Organise and chair Project Board meetings
- The Executive is responsible for overall assurance of the project as described below. If the project warrants it, the Executive may delegate some responsibility for the project assurance functions.

156. **Specific Responsibilities of Senior Supplier** (as part of the above responsibilities for the Project Board)

- Make sure that progress towards the outputs remains consistent from the supplier perspective
- Promote and maintain focus on the expected project output(s) from the point of view of supplier management

- Ensure that the supplier resources required for the project are made available
- Contribute supplier opinions on Project Board decisions on whether to implement recommendations on proposed changes
- Arbitrate on, and ensure resolution of, any supplier priority or resource conflicts

The supplier assurance role responsibilities are to:

- Advise on the selection of strategy, design and methods to carry out project activities
- Ensure that any standards defined for the project are met and used to good effect
- Monitor potential changes and their impact on the quality of deliverables from a supplier perspective
- Monitor any risks in the implementation aspects of the project

157. **Specific Responsibilities of Senior Beneficiary** (as part of the above responsibilities for the Project Board)

- Ensure the expected output(s) and related activities of the project are well defined
- Make sure that progress towards the outputs required by the beneficiaries remains consistent from the beneficiary perspective
- Promote and maintain focus on the expected project output(s)
- Prioritise and contribute beneficiaries' opinions on Project Board decisions on whether to implement recommendations on proposed changes
- Resolve priority conflicts

The assurance responsibilities of the Senior Beneficiary are to check that:

- Specification of the Beneficiary's needs is accurate, complete and unambiguous
- Implementation of activities at all stages is monitored to ensure that they will meet the beneficiary's needs and are progressing towards that target
- Impact of potential changes is evaluated from the beneficiary point of view
- Risks to the beneficiaries are frequently monitored

158. **Project Management Unit (PMU):** The PMU will be based in Dhaka within the MoEF. It will consist of a Project Manager-cum-Techncial Officer, and a Finance-cum-Admin assistant. The PMU will amongst other tasks, i) develop Standard Operating Procedures for project implementation, ii) develop Quarterly and Annual Work Plans and Budgets, iii) provide Techncial, financial and administrative management support, iv) prepare Quarterly and Annual Financial and Technical Progress Reports to be submitted to the MoEF, v) ensure compliance with applicable UNDP/GEF/LDCF/Government rules and regulations, and vi) provide Quality Technical support to various project components and activities.

159. **Project Manager –cum-Technical Officer** has the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Board. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. S/He shall also provide quality technical inputs for the successful implementation of the project. Terms of References of key project staff and experts are provided in Annex 9.

Audit arrangements

160. Audits will be conducted in accordance with the UNDP NIM Audit policies and procedures, and based on UN Harmonized Approach to Cash Transfer (HACT) policy

framework. Annual audit of the financial statements relating to the status of UNDP (including GEF) funds will be undertaken according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by a special and certified audit firm. UNDP will be responsible for making audit arrangements for the project in communication with the Project Implementing Partner. UNDP and the project Implementing Partner will provide audit management responses and the Project Manager-cum-Technical Officer and Project Management Unit (PMU) will address audit recommendations.

UNDP Country Office Support Services

161. As per standard agreement between UNDP and the Government of Bangladesh, and upon request from the Implementing Partner (IP), UNDP Bangladesh CO may provide the following support services to the IP, and recover the actual direct and indirect costs incurred by the MCO in delivering such services:

- Payments, disbursements and other financial transactions
- Recruitment of staff, project personnel, and consultants
- Procurement of services and equipment, including disposals
- Organization of training activities, conferences, and workshops, including fellowships
- Travel authorization, Government clearances ticketing, and travel arrangements
- Shipment, custom clearance, and vehicle registration.

161. The estimate for UNDP Country Office Support Services will be validated and recorded in a Letter of Agreement annexed to the project document.

Intellectual property rights

162. These will be retained by the employing organization of the personnel who develops intellectual products, either Government or UN/UNDP in accordance with respectively national and UN/UNDP policies and procedures.

Monitoring Framework and Evaluation

163. The project will be monitored through the following M&E activities. The M&E budget is provided in the table below. The M&E framework set out in the Project Results Framework in Part III of this project document is aligned with the AMAT and UNDP M&E frameworks.

Project start and implementation

164. A Project Inception Workshop will be held within the first 3 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

165. The **Inception Workshop** should address a number of key issues including:

- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- Based on the project results framework and the LDCF related AMAT set out in the Project Results Framework in Section III of this project document, and finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule PB meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first PB meeting should be held within the first 12 months following the inception workshop.

166. An **Inception Workshop report** is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

167. The project will submit the following quarterly and annual reports:

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Managment Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).

- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned etc.. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

- The APR/PIR includes, but is not limited to, reporting on the following:
- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR

Periodic Monitoring through site visits:

168. UNDP CO and the UNDP GEF region based staff will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle

169. The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation expected to be in May 2015. The Mid-Term Review will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term review will be decided after consultation between the parties to the project document.

170. The Terms of Reference for this Mid-term review will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC).

End of Project

171. An independent Terminal Evaluation will take place three months prior to the final PB meeting and will be undertaken in accordance with UNDP-GEF guidance. The terminal evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term review, if any such correction took place). The terminal evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The

Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response, which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC).

Learning and knowledge sharing:

172. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. There will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements

173. Full compliance is required with UNDP's Branding Guidelines. These can be accessed at http://intra.undp.org/coa/ branding.shtml, and specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at http://intra.undp.org/coa/ branding.shtml.

174. Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"). The GEF Guidelines can be accessed at: http://www.thegef.org/gef/ sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf. Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items. Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

M&E work plan and budget

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
Inception Workshop and Report	▪ Project Manager-cum-Techncial Officer ▪ PMU ▪ UNDP CO, UNDP GEF	Indicative cost: $5,000	Within first two months of project start up
Measurement of Means of Verification of project results.	▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team staff time*	Time frame
	▪ PMU		
Measurement of Means of Verification for Project Progress on *output and implementation*	▪ Oversight by Project Manager - cum-Technical Officer ▪ PMU ▪ Implementation teams	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	▪ Project Manager- cum-Technical Officer ▪ PMU ▪ UNDP CO ▪ UNDP RTA ▪ UNDP EEG	None	Annually
Periodic status/ progress reports	▪ Project Manager- cum-Technical Officer ▪ and team	None	Quarterly
Mid-term Evaluation	▪ Project Manager- cum-Technical Officer ▪ PMU ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost: $22,000	At the mid-point of project implementation.
Terminal Evaluation	▪ Project Manager- cum-Technical Officer ▪ PMU ▪ UNDP CO ▪ UNDP RCU ▪ External Consultants (i.e. evaluation team)	Indicative cost : $32,200	At least three months before the end of project implementation
Synthesis of major achievements & Lessons learned report	▪ Project Team ▪ UNDP CO ▪ FD ▪ CMCs ▪ UNDP-GEF RCU	$5,000	
Audit	▪ UNDP CO ▪ Project Manager-cum-Technical Officer ▪ PMU	Indicative cost per year: $3,000 ($12,000 total)	Yearly
Visits to field sites	▪ UNDP CO ▪ UNDP RCU (as appropriate) ▪ Government representatives	For GEF supported projects, paid from IA fees and operational budget	Yearly for UNDP CO; as required by UNDP RCU
TOTAL indicative COST Excluding project team staff time and UNDP staff and travel expenses		US$ 76,200 (+/- 5% of total budget)	

Legal Context

175. The project document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA [or other appropriate governing agreement] and all CPAP provisions apply to this document.

176. Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

177. The implementing partner shall:

- put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

178. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

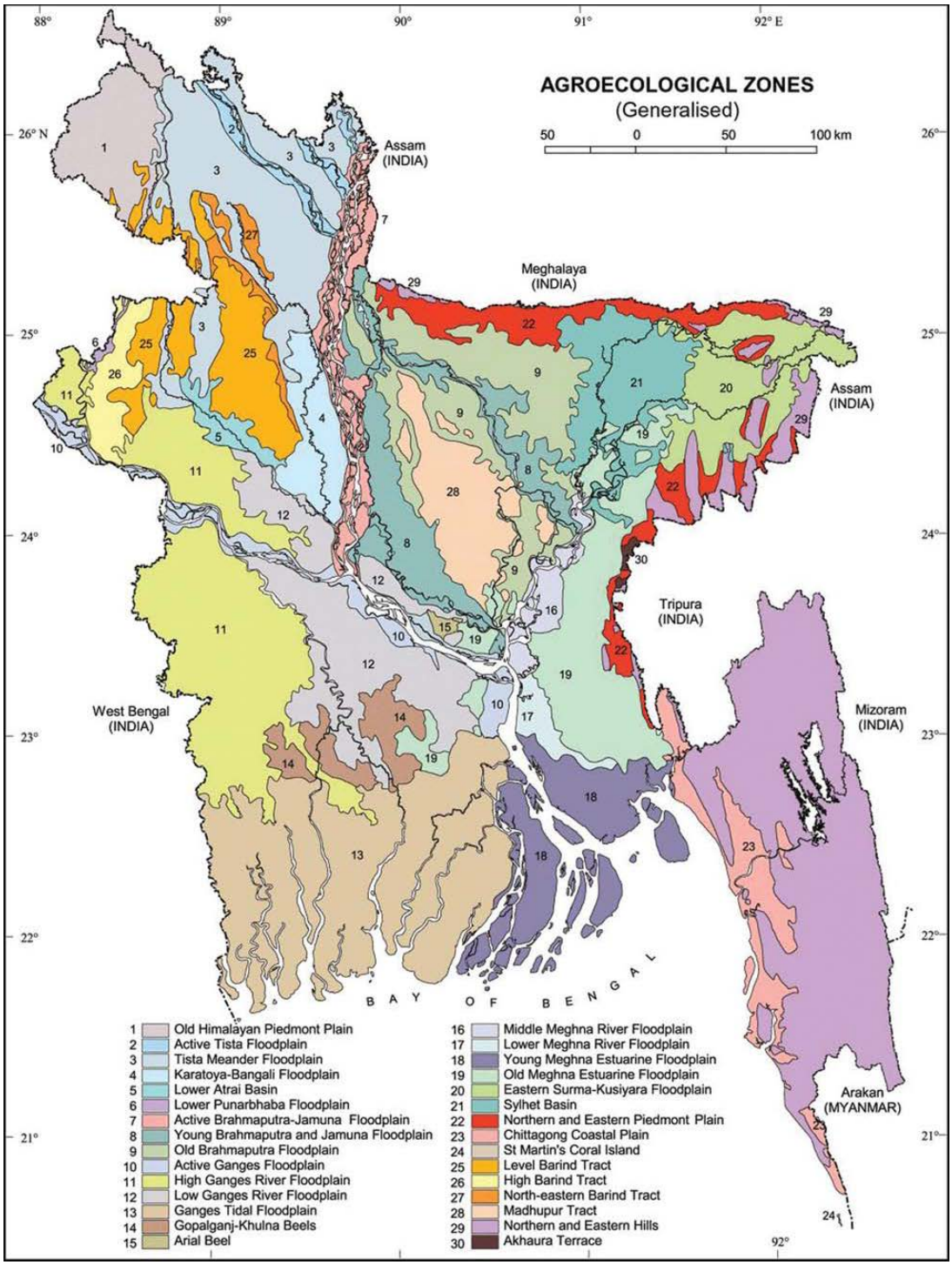
179. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP/GEF hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

180. The UNDP Resident Representative in Bangladesh is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP Regional Coordination Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

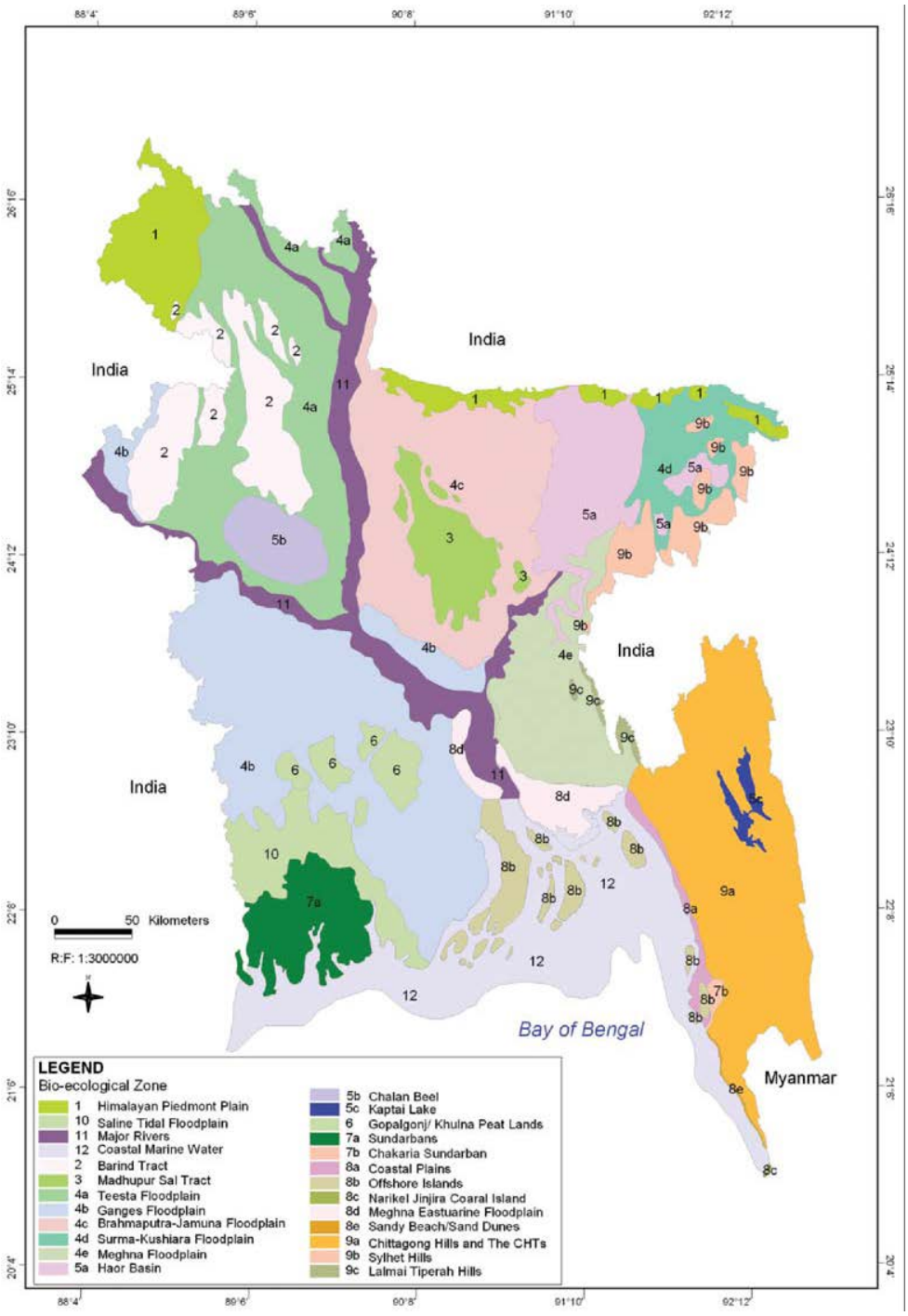
- Revision of, or addition to, any of the annexes to the Project Document;
- Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- Inclusion of additional annexes and attachments only as set out here in this Project Document

ANNEXES

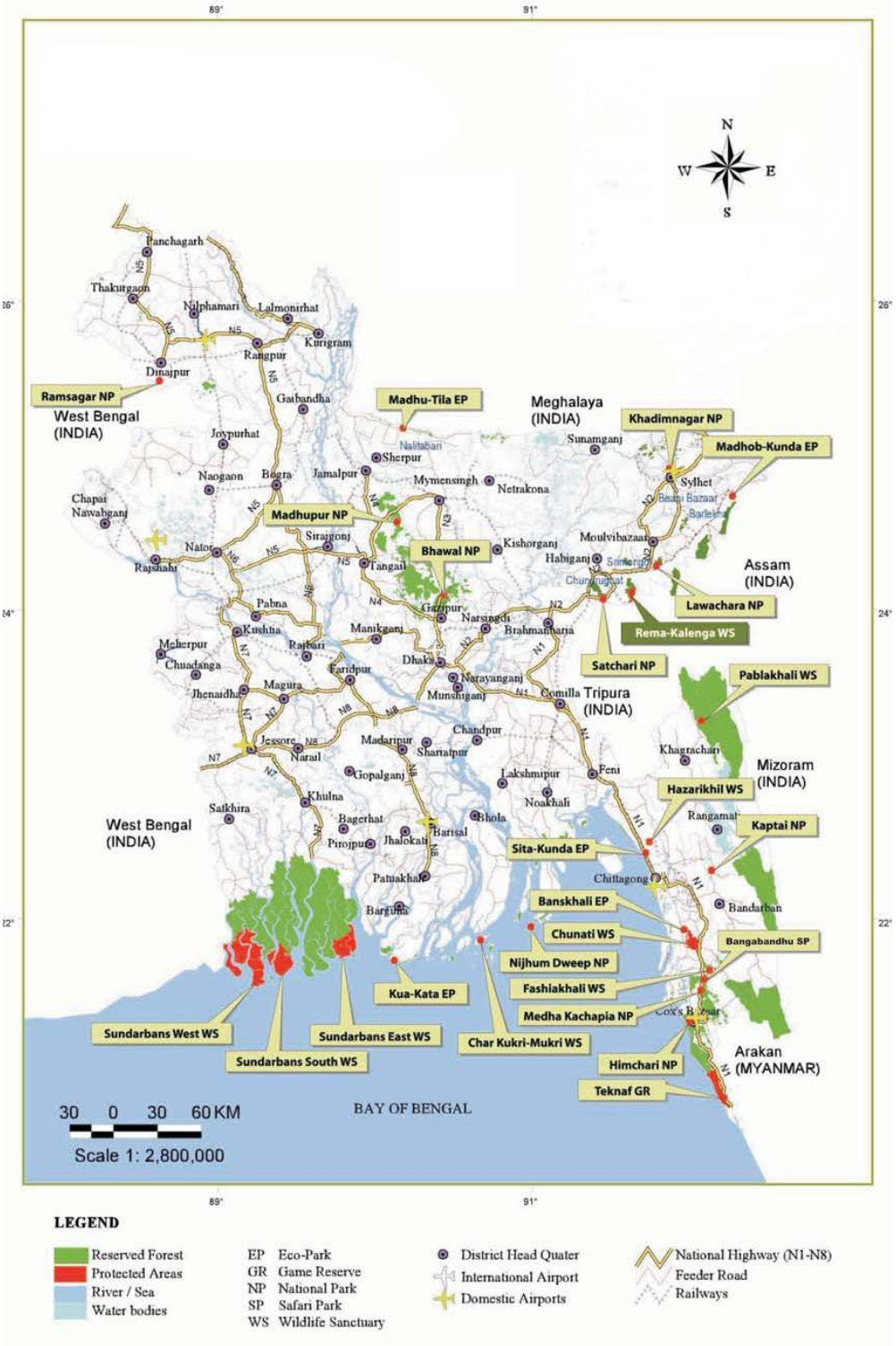
ANNEX 1 - AGRO-ECOLOGICAL ZONES OF BANGLADESH



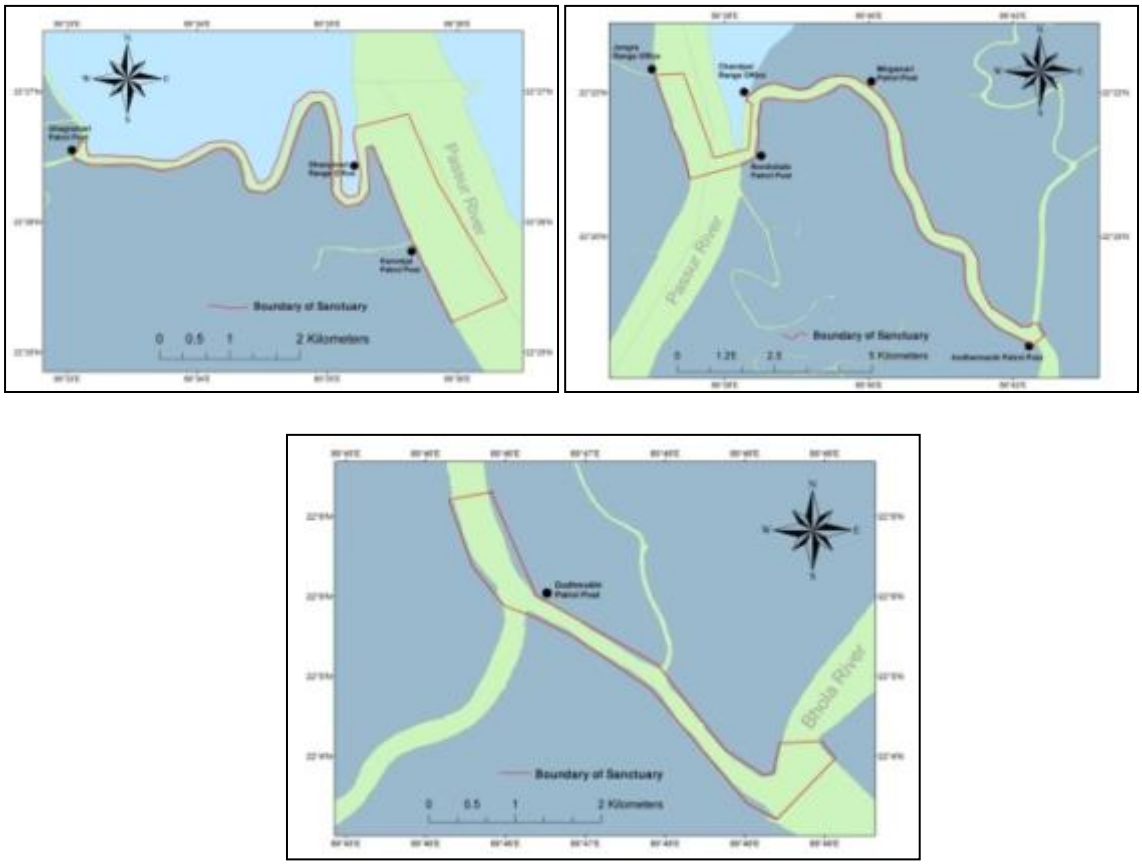
ANNEX 2 - BIO-ECOLOGICAL ZONES OF BANGLADESH



ANNEX 3 - PROTECTED AREAS OF BANGLADESH



ANNEX 4A, 4B, AND 4C - MAP OF DHANGMARI (3.4 SQ KM; TOP LEFT), CHANDPAI (5.6 SQ KM; TOP RIGHT), AND DUDMUKHI (1.7 SQ KM; BOTTOM) WILDLIFE SANCTUARIES FOR FRESHWATER DOLPHINS IN THE EASTERN SUNDARBANS RESERVED FOREST.



ANNEX 5 - FLORA OF THE SUNDARBANS

Scientific Name	Family	Vernacular Name	Type of Plant
Acanthus ilcifolius	Acanthacea	Hargoza	Scrambling, woody, thorny herb
Acrostichum aureum	Pteridiaceae	Hodo, tiger fern	Gregarious fern
Aegialitis rotundifolia	Plumbaginaceae	Dhalchaka	Small tree
Aegiceras corniculatum	Myrsinaceae	Khalisha, Khalshi	Shrub or small tree
Amoora cucullata	Meliaceae	Amur	Small tree
Avicennia alba/marina	Avincenniaceae	Morcha baen/sada baen	Small tree
Avicennia officinalis	Avincenniaceae	Baen	Tree
Barringtonia racemosa	Barringtoniaceae	Kumb, kumba, kumbi	Small tree
Blumea sp.	Compositae	Baria gash, bon gash	Aromatic herb
Brownlowia tersa	Tiliaceae	Sundri lota, lota shundri	Scandent shrub
Bruguiera gymnorrhiza	Rhizoporaceae	Kankra	Tree
Caesalpinia crista	Leguminosae	Kutum katta	Scandant, armed shrub
Cerbera manghas	Apocynaceae	Dagor	Small tree
Ceriops decandra	Rhizoporaceae	Goran	Shrub or small tree, usually coppices
Clerodendrum inerme	Verbenaceae	Sitka, sitki	Scandent, armed shrub
Cynometra ramiflora	Leguminosae	Shingra	Shrub
Cyperus javanicus	Cyperaceae	Kucha, kusha	Grass -like herb (sedge)
Dalbergia Candenatensis	Leguminosae	Chanda lota	Scrambling climber
Dalbergia spinosa	Leguminosae	Chanda katta	Scandent, armed shrub
Dendrophthoe Falcata	Loranthaceae	Porgassa	Woody parasite in tree crowns
Derris trifoliata	Leguminosae	Gila lota, kali lota	Climber
Diospryros peregrina	Ebenaceae	Gaen	Tree
Drypetes sp.	Euphorbiaceae	Achet	Scandent shrub
Eriochloa procera	Gramineae	Nol gash	Grass
Eugenia fruticosa	Myrtaceae	Bon jam, jam gach	Small tree
Excoecaria agallocha	Euphorbiaceae	Gewa	Tree
Excoecaria indica	Euphorbiaceae	Batla, batul	Small tree
Ficus sp.	Moraceae	Jir	Tree with aerial roots
Flagellaria indica	Flagellariaceae	Abetaa	Climber
Flueggia virosa	Euphorbiaceae	Sitka, sitki	Scandent shrub
Heritiera fomes	Sterculiaceae	Sundri	Tree
Hibiscus Tiliaceous	Malvaceae	Bhola	Shrub
Hoya sp.	Asclepiadaceae	Agusha	Climber
Imperata cylindrica	Gramineae		Grass
Intsia bijuga	Leguminosae	Bhaela, bharal	Small tree
ipomoea pes-caprae	Convulvulaceae		Succulent, prostrate herb
Ixora sp.	Rubiaceae	Bon bokul	Small tree
Kandelia candel	Rhizoporaceae	Gura, gurae, gural	Small tree
Leea aequata	Leeaceae		Shrub
Lepisanthes rubiginosa	Sapindaceae	Bon lichu	Tree
L.ap?.Nov.aff.rubiginosa	Sapindaceae		Shrub
Lumnitzera racemosa	Combretaceae	Kirpa, kripa	Small tree
Macrosolen	Loranthaceae	Poragassa	Woody parasite in tree crowns

cochinchinensis			
Mallotus repandus	Euphorbiaceae	Bon notoy	Scandent shrub
Macuna gigantea	Leguminosae	Doyal	Climber
Myriostachya wightiana	Gramineae	Dhanshi	Grass, common new accretions
Nypa fruticans	Palmae	Golpata	Palm with underground stem
Pandanus foetidus	Pandanaceae	Kewa katta	Prickly succulent screw pine
Petunga roxburghii	Rubiaceae	Narikili	Small tree
Phoenix paludosa	Palmae	Hantal	Thorny palm
Phragmites kakra	Gramineae	Nol kagra	Grass
Pongamia pinnata	Leguminosae	Karanj, karanja	Small tree
Premna corymbosa	Verbenaceae	Serpoli, setpoli	Shrub or small tree
Rhizophora mucronata	Rhizoporaceae	Garjan, jhanna	Tree with still roots
Salacia chinensis	Celastraceae	Choyt barai	Small tree
Sarcolobus globosus	Asclepiadaceae	Bowali lota	Climber
Sonneratia caseolaris	Sonneratiaceae	Choyla, ora, soyla	Small tree
Sonneratia apetala	Sonneratiaceae	Keora	Tree
Stenochlaena palustris	Blechnaceae	Deki tola	Climbing fern
Tamarix indica	Tamaricaceae	Jhao, nonajhao	Small tree
Tetrastigma bracteolatum	Vitidiaceae	Golgoti lota	Climber
Thunbergia sp.	Thunbergiaceae	Jermani lota	Climber
Viscum monoicum	Loranthaceae	Shamu lota	Woody parasite in tree crowns
Xylocarpus granatum	Meliaceae	Dhundul	Small tree
Xylocarpus mekongensis	Meliaceae	Passur	Tree

ANNEX 6 - JURISDICTIONAL DETAILS OF THE THREE NEW DOLPHIN SANCTUARIES

Name of the Wildlife Sanctuary	District	Upazilla	Forest Range	Station	Compa rt-ments	River/ Khal Area (Ha)	Comments/ Sanctuary Boundary
Chandpai	Bagerhat	Mongla	Chandpa i	Chandpai	27 & 28	560.00 (12 km)	Reserve Forest: in the north Joymonirgul/ Chandpai Checkpost Mrigamari Khal bounded by Pussur River; south to Andermanik Khal opp. Mirgamari PP through Jhongra PP to Nandabala PP; east from Pussur River (east bank) - Joymonirgul/Mirgamari Khal and west to Pussur River bank (Comp.30).
Dhangmari	Khulna	Dacope	Chandpa i	Dhangmari	31	340.00 (15 km)	Reserve Forest: northern boundary of SRF in the north
Dudmukhi	Bagerhat	Sarankhola	Sarankh ola	Dudmukhi Patrol Post & Suputi	2 & 3	170.00 (5 km)	Reserve Forest: In the north from east bank of Betmor river to Bhola River west bank (Comp.2) to east bank of Betmor river in Comp.1 - south from Dudmukhi Patrol Post opposite confluence of Betmor river & Boro Sheola Khal to confluence of Bhola river and Boro Sheola Khal; east from confluence of Bhola River and Boro Sheola Khal and west Betmor River bank (east of Comp.12A)
Total						1070.00 (32 km)	

ANNEX 7 - TERMS OF REFERENCE FOR KEY PROJECT MANAGEMENT STAFF

I. Project Manager –cum- Technical Officer (PM)

Duration: Full-time during the course of the project
Location: Dhaka/Khulna
Duties and responsibilities:

PM will report to the NPD and UNDP CO and shall assist in supervising and coordinating the project to ensure its results are in accordance with the Project Document and the rules and procedures established;
PM shall assume the overall responsibility for the day-today project management - both organizational and substantive matters – budgeting, planning and general monitoring of the project and ensure adequate information flow, discussions and feedback among the various stakeholders; ensure adherence to the project's work plan, prepare revisions of the work plan, if required;
PM shall all ensure proper handling of logistics related to project workshops and events; prepare GEF quarterly progress reports, as well as any other reports requested by the Executing Agency and UNDP; prepare, and agree with UNDP on, terms of reference for national and international consultants and subcontractors;
PM shall guide the work of consultants and subcontractors and oversee compliance with the agreed work plan; maintain regular contact with UNDP Country Office, Implementing Partner and the NPD on project implementation issues of their respective competence;
PM shall monitor the expenditure, commitments and balance of funds under the project budget lines, and draft project budget revisions; assume overall responsibility for meeting financial delivery targets set out in the agreed AWP, reporting on project funds and related record keeping;
PM shall liaise with project partners to ensure their co-financing contributions are provided within the agreed terms;
PM shall assume overall responsibility for reporting on project progress vis-à-vis indicators in the logframe;
PM shall also undertake any other actions related to the project as requested by UNDP or the NPD;
PM will provide technical support to project implementation particularly in the effective and quality delivery of project activities;
PM shall assist the other contracted specialists in the project;
PM shall undertake the capacity building training programme of the conservation, livelihoods and economic sectors as envisaged in the project;
PM shall undertake ecological monitoring as envisaged in the project document;
PM shall provide technical support to projectcConsultants in coordinating and conducting different project activities (trainings, workshops, stakeholder consultations, arrangements of study tour, etc.);
PM shall coordinate with the Government, Consultants, other relevant agencies and stakeholders on the implementation of the project on technical matters;
PM shall keep regular contact with project experts and Consultants to inform them about the project technical details and changes and shall also review the reports and other documents for technical content;
PM will provide technical support to the development, implementation and/or evaluation of the project activities.

Qualifications and skills:

Post Graduate degree in the field of environment & management, sustainable development or related field;
Outstanding communication, project management and organizational skills;
At least 5 years of work experience in relevant field;
Familiarity with the working environment and professional standards of international organizations;

Working experience with Government institutions;
Experience in working with NGOs and civil society, and with participatory approaches;
Proficiency in English and computer literacy.

II. Financial-cum- Administrative Assistant (FAA)

Duration: Full-time during the life of the project
Location: Dhaka/ Khulna
Duties and responsibilities:

FAA shall assist the NPD/PM in the overall administrative and financial matters of the project.
FAA shall be responsible for all administrative (contractual, organizational and logistical) and accounting (disbursements, record-keeping, cash management) matters under the project;
S/he will be responsible for preparing periodic financial statements and compiling the annual project activities and achievement of planned project outputs;
FAA shall provide general administrative and financial support to the project so as to ensure the smooth running of the project management unit; provide logistical support to the project staff and consultants in conducting different project activities;
FAA shall monitor the budget expenditures by preparing payment documents, and compiling financial reports; maintain the project's disbursement ledger and journal; keep files with project documents, expert reports; control the usage of non expendable equipment (record keeping, drawing up regular inventories);
FAA shall draft and finalize correspondence of administrative nature; arrange duty travel; fax, post and e-mail transmissions, and co-ordinate appointments;
FAA shall also perform any other administrative/financial duties as requested by the NPD/PM and organize and coordinate the procurement of services and goods under the project.

Qualifications and skills:

University degree preferably in account keeping;
Fluency in written and spoken English and local language;
Outstanding time-management, organizational and inter-personal skills;
At least 5-year experience in office administration, preferably with externally aided projects;
Excellent computer literacy.

Roles and responsibilities of consultants providing technical expertise under the project

Output	Name of the position	National/ international	Period	Task
Output 1.1: Knowledge generation and dissemination system improves decision making related to the management of aquatic habitats and sustainable use	Research Gap Analysis specialist	National	4 weeks	Research gap Analysis Specialist shall conduct an assessment of existing research gaps in the Sundarbans and propose priority research studies to be carried out.
Output 1.1 : Knowledge generation and dissemination system improves decision making related to the management of aquatic habitats	Specialists for identifying dolphin hotspots	National	125 weeks	Undertake extensive inventory and prospecting of Dolphin Hotspots in the Sundarbans and other aquatic ecosystems in the country.

Output	Name of the position	National/ international	Period	Task
and sustainable use of resources in the protected areas and buffer zones				
Output 1.1 : Knowledge generation and dissemination system improves decision making related to the management of aquatic habitats and sustainable use of resources in the protected areas and buffer zones	Specialists for conducting prioritized research programmes	National	50 weeks	To conduct prioritized research programmes under the project.
Output 1.1: Knowledge generation and dissemination system improves decision making related to the management of aquatic habitats and sustainable use of resources in the protected areas and buffer zones	Biodiversity friendly-sectoral guidelines Specialists	National	50 weeks	Specialists to prepare biodiversity-friendly sectoral guidelines for at least Fisheries, Tourism, Maritime traffic, industrial development and Aquaculture sectors.
Output 1.2: New and additional areas to be managed as Protected Areas and buffer areas identified, notified and capacities developed among conservation and economic sector staff for strengthening the management effectiveness of biodiversity conservation efforts.	Protected Area Management Plan Specialists	National	50 weeks	To prepare the Management Plans for new Protected Areas/ Buffer areas
Output 1.4: Monitoring and evaluation framework and replication strategy developed for effective aquatic PA management specifically for the Sundarbans and	International specialist for independent mid-term evaluation.	International	4 weeks	International specialist shall lead independent mid-term evaluation of project.

Output	Name of the position	National/ international	Period	Task
other aquatic ecosystems across country				
Output 1.4: Monitoring and evaluation framework and replication strategy developed for effective aquatic PA management specifically for the Sundarbans and other aquatic ecosystems across country	National specialist for independent mid-term evaluation of project.	National	4 weeks	National specialist assists international specialist for independent mid-term evaluation.
Output 1.4: Monitoring and evaluation framework and replication strategy developed for effective aquatic PA management specifically for the Sundarbans and other aquatic ecosystems across country.	International specialist for independent final evaluation.	International	6 weeks	International specialist shall lead independent final evaluation of project.
Output 1.4: Monitoring and evaluation framework and replication strategy developed for effective aquatic PA management specifically for the Sundarbans and other aquatic ecosystems across country	National specialist for independent final evaluation.	National	6 weeks	National specialist assists international specialist for independent final evaluation.
Output 2.1: Community based fishery management plan prepared, capacities developed and financial support extended for operationalizing sustainable fishing practices and conservation of aquatic biodiversity	Preparation of the Community Based Resource Management Plan	National	30 weeks	To prepare the Community Based Resource Management Plan
Project Management	Project Manager-cum-Technical Officer	National	10 months	Project Manager shall perform the overall coordination of the project.
Project	Financial-cum-	National	53 months	Shall assist Project Manager and NPD in

Output	Name of the position	National/ international	Period	Task
Management	Administrative Assistant			financial and administrative aspects of project.

ANNEX 8 – CO FINANCE LETTERS

- See in separated file.

ANNEX 9 – ENVIRONMENTAL AND SOCIAL SCREENING SUMMARY

PROJECT: Expanding the Protected Area System to Incorporate Important Aquatic Ecosystems

A. Environmental and Social Screening Outcome

☐Category 1. No further action is needed

☒Category 2. Further review and management is needed. There are environmental and social benefits, and possible impacts, and/or risks associated with the project, but these are predominantly indirect and very long-term and so extremely difficult or impossible to directly identify and assess.

☐Category 3. Further review and management is needed, and it is possible to identify these with a reasonable degree of certainty. If Category 3, select one or more of the following sub-categories:

☐Category 3a: Impacts and risks are limited in scale and can be identified with a reasonable degree of certainty and can often be handled through application of standard best practice, but require some minimal or targeted further review and assessment to identify and evaluate whether there is a need for a full environmental and social assessment (in which case the project would move to Category 3b). See Section 3 of the Review and Management Guidance.

☐Category 3b: Impacts and risks may well be significant, and so full environmental and social assessment is required. In these cases, a scoping exercise will need to be conducted to identify the level and approach of assessment that is most appropriate. See Section 3 of Review and Management Guidance.

B. Environmental and Social Issues

The GEF investment through this project aims at triggering a transformative change in resource governance in the target project area and generate the following global, national and local benefits: a) establishing a robust database about the preferred dolphin hotspots outside the present protected area network; b) expanding the coverage of protected areas/ buffer areas for dolphin conservation (by around 100,000 ha); c) improving the management effectiveness and informed decision making in the new dolphin sanctuaries; d) intensive capacity building of Forest Department and other economic sector staff; e) preparation of biodiversity-friendly sectoral guidelines for key development sectors; f) preparation of Community Based Resource Management Plan (CBRMP) for regulating resource in protected areas and buffer areas; g) phasing out destructive fishing practices in the dolphin hotspots; h) promotion of alternate and viable livelihoods (value added fishery-based products, nature-based tourism, alternate income generating activities etc.) for local communities in order to wean them away from destructive resource use practices; and i) creating national and regional level institutional mechanisms (National Technical Group on Aquatic Conservation and Regional Cross-Sectoral Stakeholder Committee) for cross-sectoral dialogue and action that promotes integrated approaches for aquatic ecosystem management. The implementation of these activities/interventions will have measurable environmental and social impacts during the project period and subsequently. These

will be primarily positive impacts; but there could also be short-term/ temporary "negative" impacts on some fishers who might have

reduce their dependence on fishery stock or to take up other professions so as to ensure sustainability of resources envisaged in the project.

C. Next Steps

The project design is fully conscious of these 'temporary shock' to a few fishers. In order to avoid such temporary negative impacts on beneficiaries of the project, project design incorporates several safeguards. Firstly, it doesn't advocate forced exclusion of human activities in dolphin hotspots. Rather, it promotes a humane enforcement system coupled with providing resource based and alternate income generation activities (for fisher-folk) that the project will be able to implement to mitigate any impacts arising. Other long-term social and environmental impacts arising from the project implementation are expected to be positive and beneficial. For instance, improved ecological health of the project landscape inadvertently means improved economic opportunities for the fishers in the long-term. The project design has incorporated full consideration of social and environmental issues so that there are limited negative impacts and maximization of positive impacts. The potential social and environmental impacts will be determined as accurately as possible through extensive socio-economic and ecological survey during the course of project implementation and will be made available for review during mid-term and final evaluation.

D. Sign Off

Project Manager **Date**

PAC **Date**

Programme Manager  **Date** 30 July 2014

ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

QUESTION 1:

Has a combined environmental and social assessment/review that covers the proposed project already been completed by implementing partners or donor(s)?

✓**NO** → Continue to Question 2

QUESTION 2:

Do <u>all</u> outputs and activities described in the Project Document fall within the following categories?

- Procurement
- Report preparation
- Training
- Event/workshop/meeting/conference
- Communication and dissemination of results

✓**NO** → Continue to Question 3

QUESTION 3:

Does the proposed project include activities and outputs that support *upstream* planning processes that potentially pose environmental and social impacts or are vulnerable to environmental and social change (refer to Table 3.1 for examples)?(Note that *upstream* planning processes can occur at global, regional, national, local and sectoral levels)

✓**YES**

TABLE 3. 1 EXAMPLES OF UPSTREAM PLANNING PROCESSES WITH POTENTIAL DOWNSTREAM ENVIRONMENTAL AND SOCIAL IMPACTS	
1 Support for the elaboration or revision of **global- level** strategies, policies, plans, and programmes.	N/A
2 Support for the elaboration or revision of **regional-level** strategies, policies and plans, and programmes.	N/A
3Support for the elaboration or revisionof**national-level**strategies, policies, plans and programmes.	N/A
4 Support for the elaboration or revision of **sub-national/local-level** strategies, polices, plans and programmes.	The project has **potential** social impacts.

QUESTION 4:

Does the proposed project include the implementation of *downstream* activities that potentially pose environmental and social impacts or are vulnerable to environmental and social change?

✓ **NO**

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT		
1.	**Biodiversity and Natural Resources**	
1.1	Would the proposed project result in the conversion or degradation of modified habitat, natural habitat or critical habitat?	No
1.2	Are any development activities proposed within a legally protected area (e.g. natural reserve, national park) for the protection or conservation of biodiversity?	No
1.3	Would the proposed project pose a risk of introducing invasive alien species?	No
1.4	Does the project involve natural forest harvesting or plantation development without an independent forest certification system for sustainable forest	No

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT		
	management?	
1.5	Does the project involve the production and harvesting of fish populations or other aquatic species without an accepted system of independent certification to ensure sustainability?	No
1.6	Does the project involve significant extraction, diversion or containment of surface or ground water?	No
1.7	Does the project pose a risk of degrading soils?	No
2.	**Pollution**	
2.1	Would the proposed project result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and transboundary impacts?	No
2.2	Would the proposed project result in the generation of waste that cannot be recovered, reused, or disposed of in an environmentally and socially sound manner?	No
2.3	Will the propose project involve the manufacture, trade, release, and/or use of chemicals and hazardous materials subject to international action bans or phase-outs?	No
2.4	Is there a potential for the release, in the environment, of hazardous materials resulting from their production, transportation, handling, storage and use for project activities?	No
2.5	Will the proposed project involve the application of pesticides that have a known negative effect on the environment or human health?	No
3.	**Climate Change**	
3.1	Will the proposed project result in significant[141] greenhouse gas emissions	No
3.2	Is the proposed project likely to directly or indirectly increase environmental and social vulnerability to climate change now or in the future (also known as maladaptive practices)? You can refer to the additional guidance in Annex C to help you answer this question.	No
4.	**Social Equity and Equality**	
4.1	Would the proposed project have environmental and social impacts that could affect indigenous people or other vulnerable groups?	No
4.2	Is the project likely to significantly impact gender equality and women's	No

[141] Significant corresponds to CO_2 emissions greater than 100,000 tons per year (from both direct and indirect sources). Annex E provides additional guidance on calculating potential amounts of CO_2 emissions.

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT	
empowerment[142]?	
4.3 Is the proposed project likely to directly or indirectly increase social inequalities now or in the future?	No
4.4 Will the proposed project have variable impacts on women and men, different ethnic groups, social classes?	No
4.5 Have there been challenges in engaging women and other certain key groups of stakeholders in the project design process?	No
4.6 Will the project have specific human rights implications for vulnerable groups?	No
5. Demographics	
5.1 Is the project likely to result in a substantial influx of people into the affected community(ies)?	No
5.2 Would the proposed project result in substantial voluntary or involuntary resettlement of populations?	No
5.3 Would the proposed project lead to significant population density increase which could affect the environmental and social sustainability of the project?	No
6. Culture	
6.1 Is the project likely to significantly affect the cultural traditions of affected communities, including gender-based roles?	No
6.2 Will the proposed project result in physical interventions (during construction or implementation) that would affect areas that have known physical or cultural significance to indigenous groups and other communities with settled recognized cultural claims?	No
6.3 Would the proposed project produce a physical "splintering" of a community?	No
7. Health and Safety	
7.1 Would the proposed project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	No
7.2 Will the project result in increased health risks as a result of a change in living and working conditions?In particular, will it have the potential to lead to an increase in HIV/AIDS infection?	No

[142] Women are often more vulnerable than men to environmental degradation and resource scarcity. They typically have weaker and insecure rights to the resources they manage (especially land), and spend longer hours on collection of water, firewood, etc. (OECD, 2006). Women are also more often excluded from other social, economic, and political development processes.

TABLE 4.1: ADDITIONAL SCREENING QUESTIONS TO DETERMINE THE NEED AND POSSIBLE EXTENT OF FURTHER ENVIRONMENTAL AND SOCIAL REVIEW AND MANAGEMENT	
7.3 Will the proposed project require additional health services including testing?	No
8. Socio-Economics	
8.1 Is the proposed project likely to have impacts that could affect women's and men's ability to use, develop and protect natural resources and other natural capital assets?	No
8.2 Is the proposed project likely to significantly affect land tenure arrangements and/or traditional cultural ownership patterns?	No
8.3 Is the proposed project likely to negatively affect the income levels or employment opportunities of vulnerable groups?	No
9. Cumulative and/or Secondary Impacts	
9.1 Is the proposed project location subject to currently approved land use plans (e.g. roads, settlements) which could affect the environmental and social sustainability of the project?	No
9.2 Would the proposed project result in secondary or consequential development which could lead to environmental and social effects, or would it have potential to generatecumulative impacts with other known existing or planned activities in the area?	No

Annex 10 - Capacity Development Score Card

This scorecard has been adapted specifically as a tool to measure success in terms of developing capacity to integrate biodiversity conservation considerations in the context of economic sectors. While, the tool is conceptually based on the UNDP Capacity Development Scorecard, it is different in its substantive focus and the indicators. Table 1 tries to be as objective as possible in its selection of indicators. Each indicator is scored from 0 (worst) to 3 (best), with an explanation of what each score represents for the particular indicator. The tool then estimates the baseline situation/ score for each indicator (cell marked in yellow). Tables 2 through 4 provide a quantitative summary of the total possible scores, baseline scores, and baseline score as a percentage of the total possible score. Baselines have been moderated/ adapted and target scores have been fixed based on discussions with stakeholders and after assessing current capacities and the possible interventions of the project.
In assigning scores, the term "economic sector activities" is assumed to include the following: fishing, aquaculture, tourism, maritime traffic, manufacturing units, and subsistence livelihoods. "Economic sector institutions" covers all institutions that play some role in planning and management of the economic sector activities (sectors as defined above) in the project landscape. During the project preparation phase, the Capacity Scorecard has been applied at a generic level to all economic sectors/ actors operating in the region. However, during the 1st 6 months of project implementation, it will be applied separately to different sectors.

Table 1: Scorecard

Strategic Area of Support	Capacity Level	Indicator	Scores							
			Worst (Score 0)		Marginal (Score 1)		Satisfactory (Score 2)		Best (Score 3)	
1. Capacity to conceptualize and formulate policies, legislations, strategies and programmes	Systemic	There is a strong and clear legal mandate for integrating biodiversity into economic sector activities	There is no legal framework for biodiversity integrating into production sector activities		There is a partial legal framework for biodiversity integration into economic sector activities, but it has many inadequacies	1	There is a reasonable legal framework for biodiversity integration but it has a few weaknesses and gaps		There is a strong and clear legal mandate for biodiversity integration into economic sector activities	
1. Capacity to conceptualize and formulate policies, legislations, strategies and programmes	Institutional	There is a multi-sectoral institutional mechanism responsible for mainstreaming biodiversity concerns into economic sector	There is no multi-sectoral institutional mechanism responsible for mainstreaming biodiversity concerns into production sector activities.	0	There is a multi-sectoral institutional mechanism responsible for mainstreaming biodiversity concerns into production sector activities but there is no clear strategy to this end		There is a multi-sectoral institutional mechanism responsible for mainstreaming biodiversity concerns into production sector activities, and there is an initial strategy to this end		There is a multi-sectoral institutional mechanism responsible for mainstreaming biodiversity concerns into production sector activities, and there is a regularly updated strategy developed through wide stakeholder	

Strategic Area of Support	Capacity Level	Indicator	Scores							
			Worst (Score 0)		Marginal (Score 1)		Satisfactory (Score 2)		Best (Score 3)	
									participation	
2. Capacity to implement policies, legislation, strategies and programmes	Systemic	There are adequate skills for integrating biodiversity into economic sector activities	There is a general lack of skills		Some skills exist but in largely insufficient quantities to guarantee effective biodiversity integration	1	Necessary skills for effective biodiversity integration into economic sector activities do exist but are stretched and not easily available		Adequate quantities of the full range of skills necessary for effective biodiversity integration into production sector activities are easily available	
2. Capacity to implement policies, legislation, strategies and programmes	Systemic	There is an oversight mechanism with clear responsibility to monitor and enforce biodiversity integration into economic sector activities	There is no oversight at all	1	There is some general oversight on environmental compliance but it lacks capacity to specifically monitor and enforce compliance with biodiversity considerations	1	There is a reasonable oversight mechanism in place providing for regular review of biodiversity considerations but it lacks transparency (e.g. is not independent, or is internalized)		There is a fully transparent oversight mechanism in place providing for regular review of biodiversity considerations	
2. Capacity to implement policies, legislation, strategies and programmes	Institutional	Economic sector institutions have regularly updated, biodiversity-friendly good practice guidelines prepared with effective participation of land users	Economic sector institutions do not have biodiversity-friendly good practice guidelines	0	Production sector institutions have biodiversity-friendly good practice guidelines, but these are not developed through consultations with land users		Production sector institutions have biodiversity-friendly good practice guidelines, developed through consultations with land users, but there is no process for regular review and updating of the plans	2	Production sector institutions have biodiversity-friendly good practice guidelines, developed through consultations with land users, and there is a process for regular review and updating of the plans	
2. Capacity to implement policies, legislation, strategies and programmes	Institutional	Biodiversity-friendly good practice guidelines are implemented in a timely manner effectively achieving their objectives	There is very little implementation of biodiversity-friendly good practice guidelines	0	Biodiversity-friendly good practice guidelines are poorly implemented and their objectives are rarely met		Biodiversity-friendly good practice guidelines are usually implemented in a timely manner, though delays typically occur and some objectives are not met		Biodiversity-friendly good practice guidelines are implemented in a timely manner effectively achieving their objectives	
2. Capacity to	Institutional	Economic sector	Economic sector		Economic sector	1	Economic sector		Economic sector	

Strategic Area of Support	Capacity Level	Indicator	Scores							
			Worst (Score 0)		Marginal (Score 1)		Satisfactory (Score 2)		Best (Score 3)	
implement policies, legislation, strategies and programmes		institutions in the project landscape are able to mobilize sufficient funding, and human and material resources to effectively implement the biodiversity mainstreaming mandate	institutions typically are severely under-funded and have no capacity to mobilize sufficient resources		institutions have some funding and are able to mobilize some human and material resources but not enough to effectively implement their biodiversity mainstreaming mandate		institutions have reasonable capacity to mobilize funding or other resources but not always in sufficient quantities for effective implementation of their biodiversity mainstreaming mandate		institutions are able to adequately mobilize sufficient quantity of funding, human and material resources to effectively implement their biodiversity mainstreaming mandate	
2. Capacity to implement policies, legislation, strategies and programmes	Individual	Human resources in economic sector institutions in the project landscape are well qualified and motivated to mainstream biodiversity concerns into sectoral plans	Human resources (HR) are poorly qualified and unmotivated		HR qualification is spotty, with some well qualified, but many only poorly and in general unmotivated		HR in general reasonably qualified, but many lack in motivation, or those that are motivated are not sufficiently qualified.	2	Human resources are well qualified and motivated	
2. Capacity to implement policies, legislation, strategies and programmes	Individual	There are appropriate systems of training, mentoring, and learning in place to maintain a continuous flow of new staff with the capacity to mainstream biodiversity	No mechanisms exist		Some mechanisms exist but unable to develop enough and unable to provide the full range of skills needed	1	Mechanisms generally exist to develop skilled professionals, but either not enough of them or unable to cover the full range of skills required		There are mechanisms for developing adequate numbers of the full range of highly skilled professionals able to mainstream biodiversity in territorial plans	
3. Capacity to engage and build consensus among all stakeholders	Systemic	Conservation of biodiversity and its mainstreaming has the political commitment they require	There is no political will at all, or worse, the prevailing political will runs counter to the interests of biodiversity mainstreaming into		Some political will exists, but is not strong enough to make a difference		Reasonable political will exists, but is not always strong enough to fully support biodiversity mainstreaming	2	There are very high levels of political will to support biodiversity mainstreaming	

Strategic Area of Support	Capacity Level	Indicator	Scores							
			Worst (Score 0)		Marginal (Score 1)		Satisfactory (Score 2)		Best (Score 3)	
			sectoral plans							
3. Capacity to engage and build consensus among all stakeholders	Systemic	Biodiversity-conservation considerations have the public support they require	The public has little interest in and there is no significant lobby for it	0	There is limited support for the biodiversity-conservation considerations		There is general public support for Biodiversity-conservation considerations		There is tremendous public support in the country for Biodiversity-conservation consideration	
3. Capacity to engage and build consensus among all stakeholders	Institutional	Economic sector institutions establish the partnerships needed to achieve biodiversity mainstreaming objectives	Economic sector institutions operate in isolation	0	Some partnerships are in place but there are significant gaps, and existing partnerships achieve little		Many partnerships in place with a wide range of agencies, NGOs etc, but there are some gaps, partnerships are not always effective and do not always enable efficient achievement of biodiversity mainstreaming objectives		Economic sector institutions establish effective partnerships with other agencies and institutions, including provincial and local governments, NGO's and the private sector to enable achievement of biodiversity mainstreaming objectives in an efficient and effective manner	
4. Capacity to mobilize information and knowledge	Systemic	Economic sector institutions have the biodiversity information they need to develop and monitor biodiversity in the project landscape	Information is virtually lacking		Some information exists, but is of poor quality, is of limited usefulness, and is not always available at the right time	1	Much information is easily available and mostly of good quality, but there remain some gaps in quality, coverage and availability		Economic sector institutions have the biodiversity information they need to develop and monitor sectoral plans	
4. Capacity to mobilize information and knowledge	Individual	Individuals working on sectoral planning work effectively together as a team	Individuals work in isolation and don't interact		Individuals/sectors interact in limited way and sometimes in teams but this is rarely effective and functional	1	Individuals interact regularly and form teams, but this is not always fully effective or functional		Individuals interact effectively and form cross-disciplinary functional teams	
5. Capacity to monitor, evaluate, report	Systemic	Sectoral Stakeholder Committee	There is no dialogue at all		There is some dialogue going on, but not in the wider	1	There is a reasonably open public dialogue going on but issues		There is an open and transparent public dialogue about the	

Strategic Area of Support	Capacity Level	Indicator	Scores							
			Worst (Score 0)		Marginal (Score 1)		Satisfactory (Score 2)		Best (Score 3)	
and learn		monitors the state of biodiversity mainstreaming in the project landscape			public and restricted to specialized circles		that particularly magnify the conflict between economic activities and biodiversity considerations are not discussed		state of biodiversity mainstreaming	
5. Capacity to monitor, evaluate, report and learn	Institutional	Economic sector institutions have effective internal mechanisms for monitoring, evaluation, reporting and learning on biodiversity integration	There are no mechanisms for monitoring, evaluation, reporting or learning		There are some mechanisms for monitoring, evaluation, reporting and learning but they are limited and weak	1	Reasonable mechanisms for monitoring, evaluation, reporting and learning are in place but are not as strong or comprehensive as they could be		Institutions have effective internal mechanisms for monitoring, evaluation, reporting and learning	

Table 2: Quantitative summary of Total Possible Scores

Strategic Areas of Support	Total Possible Scores		
	Systemic	Institutional	Individual
1. Capacity to conceptualize and formulate policies, legislations, strategies and programme	3	3	-
2. Capacity to implement policies, legislation, strategies and programmes	6	9	6
3. Capacity to engage and build consensus among all stakeholders	6	3	-
4. Capacity to mobilize information and knowledge	3	-	3
5. Capacity to monitor, evaluate and report and learn at the sector and project levels	3	3	-
Total	**21**	**18**	**9**
Note: "-" means no indicator was selected for that level.			

Table 3: Quantitative summary of Baseline Scores

Strategic Areas of Support	Baseline Scores		
	Systemic	Institutional	Individual
1. Capacity to conceptualize and formulate policies, legislations, strategies and programme	1	0	-
2. Capacity to implement policies, legislation, strategies and programmes	2	2	3
3. Capacity to engage and build consensus among all stakeholders	2	-	-
4. Capacity to mobilize information and knowledge:	1	-	1
5. Capacity to monitor, evaluate and report and learn at the sector and project levels	1	1	-
Total	**7**	**3**	**4**
Note: "-" means no indicator was selected for that level.			

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Annex 11- GEF BD TT

- In separated file -